KENNETH J. HOPKINS
MAYOR

1754-1910

Justin Mateus, P.E.
Acting Director of Public Work

DEPARTMENT OF PUBLIC WORKS
CITY HALL, ROOM 109
869 PARK AVENUE
CRANSTON, RHODE ISLAND 02910

March 7, 2024

RIDEM, Office of Water Resources
RIPDES Program
Permitting Section
235 Promenade Street
Providence, RI 02908
Attn: Jennifer Stout

Re: 2023 Annual Report
RIPDES Permit NO. RIR040012, Cranston, RI

Dear Ms. Stout,

Enclosed please find the City of Cranston's Phase II Storm Water Annual Report for Year 20. This report documents implementation of the City's Storm Water Management Program Plan (SWMPP), TMDL Implementation Plan, and State requirements pertaining to the discharge of stormwater.

The City looks forward to working with RIDEM toward meeting our 2024 Permit requirements and improving Rhode Island's waters through pollution prevention and reduction.

If you have any questions or comments regarding this submittal, please contact me at 401-780-3173.

Sincerely,

Edward J Tally

Edward J. Tally
Environmental Program Manager
Department of Public Works

Cc: Kenneth J. Hopkins, Mayor
Justin Mateus, Acting Director of Public Works
Anthony Moretti, Director of Administration
Derek Bonin, Environmental Scientist/Engineer

RHODE ISLAND DEPARTMENT OF
ENVIRONMENTAL MANAGEMENT
Office of Water Resources

DEM USE ONLY

Date Received ____________

RIPDES SMALL MS4 ANNUAL REPORT

GENERAL INFORMATION PAGE

RIPDES PERMIT #RIR040012

REPORTING PERIOD: ☒ **YEAR 20**
Jan 2023-Dec 2023

OPERATOR OF MS4

Name: City of Cranston			
Mailing Address: 869 Park Avenue			
City: Cranston	State: RI	Zip: 02910	Phone: (401) 780-3173
Contact Person: Edward Tally	Title: Environmental Program Manager		
	Email: etally@cranstonri.gov		
Legal status (circle one): PRI - Private [✓ PUB - Public] BPP - Public/Private STA - State FED – Federal Other (please specify):			

OWNER OF MS4 (if different from OPERATOR)

Name:			
Mailing Address:			
City:	State:	Zip:	Phone: ( )
Contact Person:	Title:		
	Email:		

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under the direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, I certify that the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print Name Kenneth J. Hopkins

Print Title Mayor

Signature ____________________ Date 3/5/24

MINIMUM CONTROL MEASURE #1:
PUBLIC EDUCATION AND OUTREACH (Part IV.B.1 General Permit)

SECTION I. OVERALL EVALUATION:

GENERAL SUMMARY, STATUS, APPROPRIATENESS AND EFFECTIVENESS OF MEASURABLE GOALS:

Include information relevant to the implementation of each measurable goal, such as activities, topics addressed, audiences and pollutants targeted. Discuss activities to be carried out during the next reporting cycle. If addressing TMDL requirements, please indicate rationale for choosing the education activity to address the pollutant of concern.

(Note: Identify parties responsible for achieving the measurable goals and reference any reliance on another entity for achieving measurable goals. Mark with an asterisk (*) if this person/entity is different from last year.)

Responsible Party Contact Name & Title: Edward Tally, Environmental Program Manager

Phone: (401) 780-3173 **Email:** etally@cranstonri.gov

IV.B.1.b.1	Use the space below to provide a General Summary of activities implemented to educate your community on how to reduce stormwater pollution. For TMDL affected areas, with stormwater associated pollutants of concern, indicate rationale for choosing the education activity. List materials used for public education and topics addressed. Summarize implementation status and discuss if the activity is appropriate and effective.

In 2018, the City started distributing approximately 30,400 stormwater flyers via mail to all MS4 contributors, including residential, commercial, and industrial accounts. The flyer encourages reducing the usage of pesticides and fertilizers, diverting downspout runoff, avoiding illicit discharges to catch basins, as well as other stormwater best management practices (BMPs). To help explain the importance of these BMPs, the flyer highlights the Spectacle Pond TMDL and the water quality issues associated with it. The contact information for the Department of Public Works (DPW) is also provided on the flyer. The flyer can be found in Appendix A.

In 2019, the City launched a new website. The new website has a more modern look and is much more navigable. In addition to the aesthetic and navigability, the website added a stormwater dedicated page, which provides information on the RIPDES program and what residents can do to get involved. The stormwater flyer and the previous RIPDES annual MS4 report are also posted on the page. All City libraries and schools have access to the City website. Below is the link to the stormwater page:

https://www.cranstonri.gov/departments/building-and-public-works/public-works/stormwater/default.aspx

In 2021, DPW partnered with the Stormwater Innovation Center and Eden Park Elementary School for students to design and install sidewalk storm drain murals. A total of three murals were painted, including one on school property and two in front of residential properties with the approval of the property owners. The murals are designed to grab the interest of passing pedestrians and educate them about where catch basin discharges end up, in the ocean. A video was produced to highlight the student's efforts, which can be found at the link below:

https://tnc.box.com/s/4szkxhyiumxs37mjyscgfk8q0bix59m8

The City of Cranston's stormwater management efforts were highlighted in the Spring 2021 Audubon Society of Rhode Island Report. The article spoke about the Environmental Program Manager, Edward Tally, and his end-of-road project idea, where a BMP is installed right before the outlet to Spectacle Pond. The recently constructed bioretention swale on Narragansett Boulevard was also mentioned in the article. The article can be found in Appendix B or at the link below:

https://asri.org/file_download/inline/d0fb3f23-7544-4708-8f9f-98cdd4ee1155

In 2022, the City completed construction of a SEP project approved by RIDEM Spectacle Pond Phosphorous Reduction project, which includes an underground infiltration basin and a vegetated infiltration basin. The project was completed at the Speck Field recreation facility, located at the ends of Cottage and Carlton Streets. This project is used as an example to showcase the benefits of phosphorus reduction for future projects and proposals.

In 2022, the City completed construction of an additional stormwater underground infiltration basin at the end of Barrett Street. This project assists in the reduction of phosphorous in the Spectacle Pond watershed area. The project was partially funded through a EPA Southeast New England Program (SNEP) grant. In the reporting year the City submitted an executive summary of the completed project to Restore Americas Estuaries. See Appendix C for a copy of the executive summary.

In the reporting year, the City proceeded with the design and engineering for an additional stormwater infiltration project at Pomham Street. This project is also partially funded through a SNEP grant. This project went out to bid in November of 2023 and construction is anticipated to be completed in Spring of 2024 along with outreach activities. See Appendix D for the approved plans for the project.

The City continues to employ a full-time Clean City Coordinator, who is responsible for implementing and managing a successful waste management and recycling program. A key part of this position is educating the public on trash and recycling services, including what is and isn't recyclable material. The Clean City Coordinator also participates in the Rhode Island Resource Recovery Corporation (RIRRC) educational program activities.

IV.B.1.b.2	Use the space below to provide a general summary of how the public education program was used to educate the community on how to become involved in the municipal or statewide stormwater program. Describe partnerships with governmental and non-governmental agencies used to involve your community.

In October, 2022, the City conducted a Public Meeting at the Speck Field parking lot to discuss the recently completed Speck field underground infiltration/vegetated surface infiltration project as well as the Barrett Street project. The meeting was advertised on the City website and was also mailed out to 168 of the closest abutters to the projects. See Appendix E for the advertisement.

The City is partnered with Save the Bay and the Stormwater Innovation Center with our Pomham Street stormwater infiltration project. The City website and stormwater flyer encourages residents and businesses to contact DPW with any questions or concerns.

Check all topics that were included in the Public Education and Outreach program during this reporting period. For each of the topics selected, provide:

<u>Target Audience(s)</u>: Public Employees, Residents, General Public, Businesses, Industries, Restaurants, Contractors, Developers, Agriculture, Other (describe);

<u>Target Pollutant(s)</u>: (e.g. pet waste, fertilizers, Total Suspended Solids, etc.);

<u>Strategies/Media</u>: Direct Mailings, List Servs, Kiosks or Other Displays, Newspaper Ads or Articles, Public Events or Presentations, School Programs, Printed Materials, Direct Trainings, Videos, Webpage, Other (describe)

Topic	**Target Audience(s)**	**Target Pollutant(s)**	**Strategies/Media**
☒ Construction Sites	General Public	Phosphorus	Pedestrian engagement
☒ Pesticide and Fertilizer Application		Herbicides	City Council public notice and ordinance change
☒ General Stormwater Management Info	General Public	TSS, Pet Waste, Oil & grease, fertilizers	City Website
☒ Pet Waste Management			
☒ Household Hazardous Waste Disposal	General Public	Hazardous Waste	City Website
☒ Recycling	General Public	Floatables	City Website
☒ Illicit Discharge Detection and Elimination	General Public	Oil, surfactants, fertilizers, paint	City Website
☐ Riparian Corridor Protection/Restoration			
☐ Infrastructure Maintenance			
☒ Trash Management	General public, Businesses	Floatables	City Website
☐ Smart Growth			
☐ Vehicle Washing			
☐ Storm Drain Marking			
☐ Water Conservation			
☒ Green Infrastructure/Better Site Design/LID	General Public, Developers	Phosphorus	Public Meeting
☐ Wetland Protection			
☐ Other:			
☐ None			

Additional Measurable Goals and Activities

Please list all stormwater training attended by your staff during the 2023 calendar year and list the name(s) and position of all staff who attended the training.

Trainings:

See Appendix F

MINIMUM CONTROL MEASURE #2:
PUBLIC INVOLVEMENT/PARTICIPATION (Part IV.B.2 General Permit)

SECTION I. OVERALL EVALUATION:

GENERAL SUMMARY, STATUS, APPROPRIATENESS AND EFFECTIVENESS OF MEASURABLE GOALS:

Include information relevant to the implementation of each measurable goal, such as types of activities and audiences/groups engaged. Discuss activities to be carried out during the next reporting cycle. If addressing TMDL requirements, please indicate rationale for the activities chosen to address the pollutant of concern.

(Note: Identify parties responsible for achieving the measurable goals and reference any reliance on another entity for achieving measurable goals. Mark with an asterisk (*) if this person/entity is different from last year.)

Responsible Party Contact Name & Title: Edward Tally, Environmental Program Manager

Phone: (401) 780-3173 **Email:** etally@cranstonri.org

IV.B.2.b.2.ii	Use the space below to describe audiences targeted for the public involvement minimum measure, include a description of the groups engaged, and activities implemented and if a particular pollutant(s) was targeted. If addressing TMDL requirements indicate how the audience(s) and/or activity address the pollutant(s) of concern. Name of person(s) and/or parties responsible for implementation of activities identified. Assess the effectiveness of BMP and measurable goal.

The Department of Public Works hires a private contractor, Waste Management, to collect trash and recycling from Residents and Businesses in the City. In 2015 and 2016, the City issued new, 64-gallon bins for both trash and recycling, which came with an educational flyer about proper recycling. These larger bins have helped keep floatables out of the MS4. The City has also introduced overflow bags, which are sold at local retailers, which help keep trash items out of the recycling bins. DPW receives thousands of calls a year about trash and recycling. The Clean City Coordinator takes advantage of this time to educate the public about proper disposal practices.

In addition to weekly trash and recycling services, the City coordinates annual Earth Day cleanups program, In the reporting year, the City removed 3.75 tons of trash and litter associated with the Earth Day cleanups.

In 2015 and 2016, the City made a significant investment to update the GIS database. The update included refining existing sewer and stormwater infrastructure data, merging historic stormwater maintenance records, and creating mobile applications for real time editing from the field. The GIS data and available and downloadable from the City's DPW webpage. The Environmental Program Manager, and GIS Manager, have an email signature containing the hyperlink to the GIS map. This has been extremely helpful for the public and contractors to access this information.

As mentioned in the previous section, the City mailed stormwater flyers to the public in 2018. In addition to the mailing, the flyers are available in the DPW office and are often given to residents who come in with stormwater related inquiries. Also, the previously mentioned 2019 website update included educational components, such as a link to URI's RI NEMO webpage. Cranston's libraries and schools provide access to the updated website.

In 2016, the City partnered with the Edgewood Waterfront Preservation Association, Save the Bay, and Fuss and O'Neill to research and design the installation of a stormwater BMP within the Edgewood neighborhood. The project included a watershed analysis and the conceptual design for two BMP locations. In 2017, two public meetings were held to finalize the design, which ended up being a bioretention swale on Narragansett Boulevard. The BMP was installed in 2018 and has been maintained by the City, with some help from the Edgewood Waterfront Preservation Association and Save the Bay.

The City entered into a consent agreement with RIDEM in 2020 to resolve a 12/24/2018 NOV associated with the Cranston WWTF by way of a SEP. The City completed the Spectacle Pond Phosphorus Reduction project, which includes and design and installation of an underground infiltration system and a vegetated infiltration basin. Construction started in 2021 and was completed in the Summer of 2022. This project was also be used as a presentation to encourage addition similar projects.

In 2020, Chapter 12.25 of the Code of the City of Cranston was amended to prohibit the use of synthetic herbicides, including on the bike path.

In 2019 and 2021, the City was approved for two (2) SNEP Grants within the Spectacle Pond watershed. These grants resulted in stormwater infiltration practices to be installed at the end of Barret Street and Pomham Street Both projects are very similar, with them both being an "end-of-road" project with underground infiltration basins. The Barrett St project was completed in 2022. The Pomham Street project completed final design and was put out to bid late 2023. Outreach activities and construction is planned for the Spring of 2024.

Also in 2021, the City worked in conjunction with the Stormwater Innovation Center and Eden Park Elementary School to paint sidewalk storm drain murals around three catch basins in the MS4.

In May of 2021 the City provided a letter of support for the Nature Conservancy Pilot Watershed application titled *Restoring water quality and ecological function in the Mashapaug Brook urbanized watershed and sharing lessons learned through training and outreach coordinated by the Providence Stormwater Innovation Center.*

In December of 2021, the City provided a letter of support for the Audubon Society of Rhode Island's and the Providence Stormwater Center's *Monitoring Existing Green Infrastructure Function For Future Planning Success* proposal to the Narragansett Bay Estuary Program

In the reporting period the Stormwater Innovation Center Advisory Committee invited Ed Tally, Environmental Program Manager, to be an ongoing participant. The purpose of the committee is to keep partners abreast of work being conducted and provide a forum for members to share lessons learned and advise of initiatives relevant to the group.

Additional Measurable Goals and Activities

SECTION II. Public Notice Information (Parts IV.G.2.h and IV.G.2.i) *Note: attach copy of public notice

Was the availability of this Annual Report and the Stormwater Management Program Plan (SWMPP) announced via public notice? ☒ YES ☐ NO	If YES, Date of Public Notice: February 29, 2024 – See Appendix G

How was public notified:

☐ List-Serve (Enter # of names in List: __________)	☒ Newspaper Advertising
☐ TV/Radio Notices	☐ Town Hall posting
☒ Website	☐ Other:

Enter Web Page URL: https://www.cranstonri.gov/departments/building-and-public-works/public-works/stormwater/default.aspx

Was public meeting held? ☐ YES ☒ NO

Date: Where:

Summary of public comments received: None

Planned responses or changes to the program: None

MINIMUM CONTROL MEASURE #3:
ILLICIT DISCHARGE DETECTION AND ELIMINATION (Part IV.B.3 General Permit)

SECTION I. OVERALL EVALUATION:

GENERAL SUMMARY, STATUS, APPROPRIATENESS AND EFFECTIVENESS OF MEASURABLE GOALS

Include information relevant to the implementation of each measurable goal, such as activities implemented (when reporting tracked and eliminated illicit discharges, please explain the rationale for targeting the illicit discharge) to comply with on-going requirements, and illicit discharge public education activities, audiences and pollutants targeted. Discuss activities to be carried out during the next reporting cycle. If addressing TMDL requirements, please indicate rationale for the activities chosen to address the pollutant of concern.

(Note: Identify parties responsible for achieving the measurable goals and reference any reliance on another entity for achieving measurable goals. Mark with an asterisk (*) if this person/entity is different from last year.)

Responsible Party Contact Name & Title: Edward Tally, Environmental Program Manager

Phone: (401) 780-3173 **Email:** etally@cranstonri.org

Has *this person* received training on Illicit Discharge Detection and Elimination (IDDE)? Yes

If yes, when and where? Training materials provided by previous Stormwater Coordination, from RI NEMO, 5/3/2022 Practical Illicit Discharge Detection and Elimination hosted by Buzzards Bay National Estuary Program.

If no, who *is* trained on IDDE? N/A

IV.B.3.b.1:	If the outfall map was not completed, use the space below to indicate reasons why, proposed schedule for completion of requirement and person(s)/ Department responsible for completion. (The Department recommends electronic submission of updated EXCEL Tables if this information has been amended.) **Number of Outfalls Mapped within regulated area:** 510 **Percent Complete:** 100% **If 100% Complete, Provide Date of Completion:** December 2010 with continued maintenance

The City's outfall map was completed along with outfall inspections for both wet and dry season. The Excel spreadsheets were submitted in 2010.

In 2015 the City hired a GIS consultant to update our database from multiple source materials, including new as-built plans, the 2003 Fuss and O'Neil field survey, the 2014 Wright Pierce Stormwater System Evaluation data, and existing storm book drawings. The updated data was delivered in December of 2015. The results of this data are reflected throughout this report and will continue to be reviewed in 2022. For example, the original data supported 549 outfalls. The 2016 data has mapped 528 outfalls. QA/QC of the data is still ongoing through the reporting year. As a part of the GIS contract, the City identified a number of locations which need further investigation to address potential issues, including but not limited to, connectivity, flow direction, potential missing structures, incorrect structure types, etc. Addressing these areas will be a continued effort in 2024 and beyond.

The City continued to work on stormwater asset inventory in 2018 with the intent to clarify the ownership attribute on structures included in the City inventory which are likely either State owned, privately property, or should be categorized as 'to-be-determined'. The number of outfalls was updated to 510, according to the results of this effort. No changes were made in 2023 to the data. The Environmental Program Manager at Public Works has been the responsible party for outfall inspections with cooperation from the Highway Division.

IV.B.3.b.2	Indicate if your MS4 chose to implement the tagging of outfalls activity under the IDDE minimum measure, activities and actions undertaken under the 2023 calendar year.

All outfalls have been located with GPS coordinates and implemented into our GIS system. Tagging of outfalls is not necessary as the City of Cranston has developed GIS data with sufficient accuracy to allow the identification of individual pipes and structures when revisiting outfall locations.

IV.B.3.b.3	Use the space below to provide a summary of the implementation of recording of system additional elements (catch basins, manholes, and/or pipes). Indicate if the activity was implemented as a result of the tracing of illicit discharges, new MS4 construction projects, and inspection of catch basins required under the IDDE and Pollution Prevention and Good Housekeeping Minimum Measures, and/or as a result of TMDL related requirements and/or investigations. Assess effectiveness of the program minimizing water quality impacts.

Any new City owned catch basins or other structures are submitted to the GIS Department to update the database. The highway staff also reports any newly discovered structures located in the field to the DPW office, which in turn also goes to the GIS Department.

On November 22, 2013 the City signed a contract with Wright-Pierce (WP) to conduct an extensive stormwater system evaluation in four areas of the city prone to urban flooding (WP Stormwater System Study). In 2015 GIS data from this evaluation was processed through our GIS Department. QA/QC, included the review of as-built plans from years prior, will continue to be an ongoing effort as staffing level permit, where discovered structures will also be reported to the GIS Department. Asset management software (Infonet) managed by our sewer department identifies potential discrepancies between GIS records and field activities. The DPW and GIS manager developed a web based storm structure maintenance log utilizing the ESRI Collector application. A tablet and hotspot were purchased for the Highway Staff to use. The DPW deployed one tablet for real time data collection to the highway staff in 2018.

In response to the RIDEM Audit Letter the city committed $1,500,000 in its capital budget spread over two years to address catch basin cleaning deficiencies. After a formal bidding process, Inland Waters (IW) was awarded a catch basin cleaning and inspection program contract dated August 13, 2019 (IW Contract). Catch basin cleaning was being captured utilizing the ESRI Collector Application. Inland Waters staff had been trained on identifying IDDE in the field and reporting it in the electronic stormwater log. DPW staff did not collect any data in 2023.

IW completed their contract to collect maintenance data on each catch basin, 2 times, usually one to two years apart in 2022. It included the depth of debris removed each time in addition to measure-down distances to the bottom of the sump after cleaning. We used this data to calculate a catch basin fill rate (in/year) based on the amount of debris removed in that period of time. This was used to predict when the next maintenance of that particular structure will be required. In 2023 in conjunction with our GIS manager we implemented an ongoing dynamic cleaning schedule. This work was put out to bid in June of 2023 and awarded to Truax.

In 2020 a total of 3,118 storm structures were cleaned and/or inspected. In 2021 a total of 2,902 storm structures were cleaned and/or inspected. In 2022 a total of 3,582 storm structures were cleaned and/or inspected. Based on the revised cleaning schedule, in 2023, a total of 2,059 storm structures were cleaned and inspected.

City staff is in the process of reviewing the data and committing staff to address concerns. Repairs and illicit discharge investigations will be required for some of the structures.

Expanding web-based electronic records beyond storm structure maintenance will require interdepartmental cooperation to ensure completeness of the records. Continued evaluation will be considered to include BMP inspections, erosion control inspections, repairs, etc.

IV.B.3.b.4	Indicate if the IDDE ordinance was **not** developed, adopted, and submitted to RIDEM, explain reasons why, submit proposed schedule for completion and identify person(s) / Department and/or parties responsible for the completion of this requirement. **Date of Adoption:** April 25, 2005 If the Ordinance was amended in 2023, please indicate why changes were necessary.

IDDE ordinance was adopted in City Code Title 12.04.061. No amendments have been made to this ordinance.

IV.B.3.b.5.ii, iii, iv, & v	Use the space below to provide a summary of the implementation of procedures for receipt and consideration of complaints, tracing the source of an illicit discharge, removing the source of the illicit discharge and program evaluation and assessment as a result of removing sources of illicit discharges. Identify person(s) / Department and/or parties responsible for the implementation of this requirement.

Sources for illicit discharges, once identified, are evaluated for proper handling. Plans are developed and corrective measures are completed by the property owner. The Public Works Department is responsible for assessment and removal of illicit discharges. The current program is complaint based and passive in nature. The Public Works Director provides the letter of notification for repairs or remediation.

In June of 2023, the city finalized the Cranston, Rhode Island, Onsite Wastewater Management Plan (OWMP). The DPW worked with Weston and Sampson to complete the plan in order to participate in the Rhode Island Infrastructure Bank (RIIB) Community Septic System Loan Program. The program is designed to offer low interest loans to property owners that need to repair or replace their deficient or failing septic systems or cesspools. The OWMP was approved by RIDEM. The OWMP and City Council Resolution are included in Appendix H

In early 2024, the City will have loan agreements finalized with Rhode Island Infrastructure Bank to borrow up to $500,000. Property owners can borrow up to $30,000 for failing systems. Public announcements will also be occurring early 2024.

IV.B.3.b.5.vi	Use the space below to provide summary of implementation of catch basin and manhole inspections for illicit connections and non-stormwater discharges. If the required measurable goal of inspecting all catch basins and manholes for this purpose was not accomplished, please indicate reasons why, the proposed schedule of completion and identify person(s) / Department and/or parties responsible for the implementation of this requirement. Evaluate effectiveness of the implementation of this requirement. The operator must keep records of all inspections and corrective actions required and completed. **Number of Catch Basins and Manholes Inspected for illicit connections/IDDE:** 2,059 **Percent Complete:** 40% **Date of Completion:** December 31, 2023

In 2009, the City entered into a contract with Fuss and O'Neill for a citywide inspection of illicit connections in stormwater structures. All structures were inspected by December 2010.

Since the FandO contract, the Highway Department has continued to inspect stormwater structures during their cleaning efforts. Due to limited equipment and staffing, the Highway Department averaged approximately 10-15% of structures inspected per year from 2011 to 2019. During this period, known flooding areas were prioritized for cleaning, and thus inspecting, but proactive cleanings were also a part of the program. In 2019, the Highway Department was given tablets and mobile GIS applications to make real-time updates to the GIS database. In 2023 due to staffing constraints highway staff did not inspect stormwater structures.

Also in 2019, DPW advertised an RFP for a $1.5M project for stormwater structure cleaning and inspections. The project, which was awarded to Inland Waters, includes two visits of citywide structures, which there are 7,157 of, for both cleaning and inspection. Results from this project are entered into a database which is reviewed by the Environmental Program Manager for any comments indicative of illicit connections. Any indications are followed up by DPW personnel. Stormwater maintenance records from the database can be found in Appendix I.

In addition to the Inland Waters and Highway Department inspections, the City completes annual mosquito baiting in all 3,600 catch basins. The baiting involves a cursory inspection of each basin but is not reflected in the number of inspections reported above.

Even with the Inland Waters project and the Highway Department inspections, the 100% inspection requirement of stormwater structures per year has proven to be infeasible. However, the effort the City has made towards this requirement has also proven to be effective. The database created with the Inland Water project has yielded a robust dataset. This has been analyzed and cleaning/inspection schedule has been adjusted based on actual sediment accumulation observed from these inspections. The City now has a 5 year rotating cleaning schedule which is currently being completed by Truax.

IV.B.3.b.5.vii	If dry weather surveys including field screening for non-stormwater flows and field tests of selected parameters and bacteria were not completed, indicate reasons why, proposed schedule for the completion of this measurable goal and person(s) / Department and/or parties for the completion of this requirement. Evaluate effectiveness of the implementation of this requirement. **The results of the dry weather survey investigations should be submitted to RIDEM electronically, if not already submitted or if revised since 2009, in the RIDEM-provided EXCEL Tables and should include visual observations for all outfalls during both the high and low water table timeframes, as well as sampling results for those outfalls with flow. The EXCEL Tables must include a report of all outfalls and indicate the presence or absence of dry weather discharges.** **Number of Outfalls Surveyed Jan-Apr:** 485 **Number of Outfalls Surveyed Jul-Oct:** 549 **Percent Complete:** 100 % **Date of Completion:** December 2010

The Department of Public Works completed the outfall survey and submitted the Excel results to RIDEM electronically in 2010. The wet weather survey was submitted by June (an extension was requested and granted for the extremely wet year) and the dry weather by November 2010. As mentioned in prior annual reports, high levels of fecal coliform near outfalls ST16606 and ST64041 were addressed.

IV.B.3.b.7	Use the space below to provide a description of efforts and actions taken as a result of for coordinating with other physically interconnected MS4s, including State and federal owned or operated MS4s, when illicit discharges were detected or reported. Identify person(s) / Department and/or parties responsible for the implementation of this requirement. Evaluate effectiveness of the implementation of this requirement.

The majority of interconnection in the City are with State-owned assets. During the 2014 Wright-Pierce Stormwater Study, the City received RIDOT's stormwater structure GIS data. However, the data was incomplete and discontinuous with the City's GIS data. In 2015, RIDOT entered into a consent decree with the USEPA, part of which requires the State to identify all of their stormwater structures and connectivity. This data, once shared with the municipalities, should address the majority of interconnections within the City. Nineteen major road arteries in the City are State-owned, including Reservoir Avenue, Elmwood Avenue, parts of Pippins Orchard Road, State Routes 10 and 37, and Interstate Route 95 and 295, to name a few. The City has been discussing GIS asset management solutions with RIDOT but no actions were taken in 2023. The City has coordinated with the RIDOT with their Stormwater Control Plan for the Pocasset River watershed in 2023, specifically along Sockanosset Crossroads, Reservoir Avenue, and Blackamore Pond. It's hopeful that, with the transfer of GIS data, these interconnections will begin to be identified as part of their project.

No illicit connections were identified in 2023 involving interconnections with the Cranston MS4. Edward Tally, Environmental Program Manager, is responsible for this requirement.

IV.B.3.b.8	Use the space below to provide a description of efforts and actions taken for the referral to RIDEM of non-stormwater discharges not authorized in accordance to Part I.B.3 of this permit or another appropriate RIPDES permit, which the operator has deemed appropriate to continue discharging to the MS4, for consideration of an appropriate permit. Identify person(s) / Department and/or parties responsible for the implementation of this requirement. Evaluate effectiveness of the implementation of this requirement.

Only under extraordinary conditions residential sub drains and sump pumps are allowed to connect to the MS4 under the direction of and with the approval of the Public Works Department. A drain connection permit is issued by the DPW and construction is overseen by the Engineering Division. Requests are granted when more conventional solutions are not reasonable or could cause a significant financial hardship. No tie-in requests of a sump pump to the City drainage network were requested or granted in 2023:

IV.B.3.b.9	Use the space below to provide a description of efforts and actions taken to inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste, as well as allowable non-stormwater discharges identified as significant contributors of pollutants. Include a description on how this activity was coordinated with the public education minimum measure and the pollution prevention/good housekeeping minimum measure programs. Identify person(s) / Department and/or parties responsible for the implementation of this requirement. Evaluate effectiveness of the implementation of this requirement.

The Environmental Program Manager has ongoing discussions with Highway department staff regarding accurate data collection, illicit detection, and the overall goals and purpose of the program. Staff from the City's catch basin cleaning program, Truax, was trained during the reporting period on illicit discharge detection and the documentation/reporting process.

Public educational materials such as flyers and materials are available at the libraries and on the City website to inform businesses as well as the general public. The Clean City Coordinator is responsible for managing the trash and recycling program, which includes routine daily phone calls with residents about inquiries regarding proper waste disposal methods. The Public Works Personnel in Room 109 at City Hall are available from 8:30 to 4:30 to answer any questions and provide information to the public. The DPW staff is effectively educating the public on recycling, waste management, and stormwater concerns. The DPW landing page on the cities website is also a source of educational materials. It has been reasonably effective since its inception.

Additional Measurable Goals and Activities:
As previously mentioned in Minimum Control Measures 1 and 2, the City mailed a stormwater flyer in 2018 and updated the City website in 2019.

SECTION II.A Other Reporting Requirements - Illicit Discharge Investigation and System Mapping (Part IV.G.2.m)

# of Illicit Discharges Identified in 2023: 6	# of Illicit Discharges Tracked in 2023: 6
# of Illicit Discharges Eliminated in 2023: 6	# of Complaints Received: 4
# of Complaints Investigated: 4	# of Violations Issued: 3
# of Violations Resolved: 3	# of Unresolved Violations Referred to RIDEM: 0
Total # of Illicit Discharges Identified to Date (since 2003): 61	Total # of Illicit Discharges remaining unresolved at the end of 2023: 0

Summary of Enforcement Actions:
Two SSO discharges to the stormwater system and receiving streams/wetlands were reported to RIDEM and corrected by Veolia Water, as outlined in the 2023 CMOM report issued to the EPA and RIDEM.

The DPW responded to a broken street lateral that was discharging residential sewerage into a pit in the front yard of 109 Hillwood Street. The DPW conducted a field visit, issued a deficiency letter and the building lateral was promptly repaired by the property owner.

After receiving complaints about water discharges into the city ROW the DPW investigated and issued deficiency letters to 73 Hybrid Drive and 39 Poppy Drive due to pool discharges.

In April of 2023, the DPW received a call regarding the dumping of 55 gallon drums and tires on a City owned property on Hope Road (Plat 22 / Lot 13). The highway division removed the tires and the City worked in coordination with RIDEM and Newton B. Washburn to remove the drums and clean the affected soil which had minor oil staining. In total 5.3 tons of soil were removed and confirmatory samples were taken. Close out documentation was provided to RIDEM.

A summary of the 2023 SSO's, deficiency letters, and the Hope Road Oil dumping report can be found in Appendix J.

Total # of Outfalls identified and mapped to date: 510

Total # of Interconnections with other MS4s identified and mapped to date: Unknown (minimum of 159)

Extent to which the MS4 system has been mapped (% complete): Approximately 90% of storm structures and approximately 80% of the connectivity.

Identify how the following components of the MS4 system have been mapped:	Not mapped	GIS	Auto CAD	Paper	Other (please specify)
Catch basins	☐	☒	☐	☐	☐
Manholes	☐	☒	☐	☐	☐
Pipes, ditches, and other conduits	☐	☒	☐	☐	☐
Flow direction and connectivity	☐	☒	☐	☐	☐
Interconnections with other regulated MS4s	☒	☐	☐	☐	☐
MS4-owned stormwater controls (BMPs, not including catch basins or manholes)	☐	☒	☐	☐	☐
Delineation of outfall catchment/drainage areas	☐	☐	☐	☐	☒ We have project based drainage catchment areas delineated. Not mapped on a city wide basis.

SECTION II.B Interconnections (Parts IV.G.2.k and IV.G.2.l)

Interconnection:	Date Found:	Location:	Name of MS4:	Originating Source:	Planned and Coordinated Efforts and Activities with Connectee:
Minimum of 159	2020 - Current	Citywide	RIDOT	TBD	2015 meeting with Providence and RIDOT. More to come in 2024

MINIMUM CONTROL MEASURE #4:
CONSTRUCTION SITE STORMWATER RUNOFF CONTROL
(Part IV.B.4 General Permit)

SECTION I. OVERALL EVALUATION:

GENERAL SUMMARY, STATUS, APPROPRIATENESS AND EFFECTIVENESS OF MEASURABLE GOALS:

Include information relevant to the implementation of each measurable goal, such as activities implemented to support the review, issuance and tracking of permits, inspections and receipt of complaints. Discuss activities to be carried out during the next reporting cycle. If addressing TMDL requirements, please indicate rationale for the activities chosen to address the pollutant of concern.

(Note: Identify parties responsible for achieving the measurable goals and reference any reliance on another entity for achieving measurable goals. Mark with an asterisk (*) if this person/entity is different from last year.)

Responsible Party Contact Name & Title: David Rodio, Building Official

Phone: (401) 780-6010 **Email:** drodio@cranstonri.gov

IV.B.4.b.1	Indicate if the Sediment and Erosion Control and Control of Other Wastes at Construction Sites ordinance was **not** developed, adopted, and submitted to RIDEM, explain reasons why, submit proposed schedule for completion and identify person(s) / Department and/or parties responsible for the completion of this requirement. **Date of Adoption:** April 25, 2005 If the Ordinance was amended in 2023, please indicate why changes were necessary and provide references to the amended portions of the local codes/ordinances.

The ordinance was developed and adopted in City Code Title 12.04.063. There were no changes to the ordinance in the reporting year.

The Building Inspection Department is responsible for this requirement.

IV.B.4.b.6	Use the space below to describe actions taken as a result of receipt and consideration of information submitted by the public.

A significant amount of projects in the City involve public meetings. Building Inspection has the ability to and will stop a project if the contractor is not installing and/or maintaining erosion controls as shown on the approved plans.

IV.B.4.b.8	Use the space below to describe activities and actions taken as a result of referring to the State non-compliant construction site operators. The operator may rely on the Department for assistance in enforcing the provisions of the RIPDES General Permit for Stormwater Discharges Associated with Construction Activity to the MS4 if the operator of the construction site fails to comply with the local and State requirements of the permit and the non-compliance results or has the potential to result in significant adverse environmental impacts.

Oversight of major land developments are subject to review by the Building Inspections Department with assistance from the Engineering Department. In many cases, bonding is necessary for construction projects. Proper erosion and sediment control BMP's must be in place and maintained in order to release the bonds. Deficiencies are required to be addressed by the building inspections department. In 2023, the DPW is not aware of any conditions requiring the referral of non-compliant construction site operators to the State.

Additional Measurable Goals and Activities

SECTION II. A - Plan and SWPPP/SESC Plan Reviews during Year 20 (2023), Part IV.B.4.b.2: Issuance of permits and/or implementation of policies and procedures for all construction projects resulting in land disturbance of greater than 1 acre.
Part IV.B.4.b.4: Review 100% of plans and SWPPPs/SESC Plans for construction projects resulting in land disturbance of 1-5 acres, not reviewed by other State programs, must be conducted by adequately trained personnel and incorporate consideration of potential water quality impacts.

# of Construction Applications Received: 7

# of Construction Reviews Completed: 7

# of Permits/Authorizations Issued: 7

Summary of Reviews and Findings, include an evaluation of the effectiveness of the program.
All site plans and SWPPP/SESC plans have a similar review process, whether they are over an acre of land disturbance or not. However, the personnel/departments that get involved in a plan review differ from project to project. The more major land development projects start with the Planning Department where developers can submit their applications. Depending on the type of development, other departments will be triggered for their specific review.

For subdivision and commercial development projects, the Development Plan Review Committee must approve the project. This committee is comprised of representatives from the Planning Department, Department of Public Works, Engineering Department, Fire Department, Economic Development, and Building Inspections/Zoning.

In the reporting year, there were 5 major land developments, 1 major commercial development, and 1 solar land development on Sharpe Drive.

The protocol currently in place is reliant on interdepartmental cooperation between Planning, Public Works, Engineering, and Building Inspections.

Identify person(s) /Department and/or parties responsible for the implementation of this requirement:
Building Inspections Department is responsible for this requirement with input from the Department of Public Works, Planning Department.

Identify the type and date of training this person(s)/parties has/have received to be considered "adequately trained":
In 2019, the City received Soil Erosion and Sediment Control Online Training provided by the URI Cooperative Extension and StormwaterONE. The training included a 4-level online training program, the first of which was completed in 2020 by the DPW. The other 3 levels are available for purchase. Level 2 and 3 training should be considered for specific staff.

The Planning Department personnel is trained through experience and the City's subdivision and land development regulations, which include a thorough checklist of compliance requirements for applicants to complete prior to project approval. These regulations can be found at the Planning Department's webpage or at the link below:

https://www.cranstonri.gov/departments/planning/

Justin Mateus, Acting Director of Public Works, has years of experience reviewing plans. Other DPW employees, Edward Tally and Kenneth Mason, P.E., have been trained in soil erosion and sediment control and provide insight during the DPW plan review process.

SECTION II.B - Erosion and Sediment Control Inspections during Year 20 (2023), Parts IV.G.2.n and IV.B.4.b.7:

Inspection of 100% of all construction projects within the regulated area that discharge or have the potential to discharge to the MS4. (The program must include two inspections of all construction sites, first inspection to be conducted during construction for compliance of the Erosion and Sediment controls at the site, the second to be conducted after the final stabilization of the site.) Inspections must be conducted by adequately trained personnel.

# of Active Construction Projects: 56 Flagged	
# of Site Inspections: 56 Flagged	# of Complaints Received: 0
# of Violations Issued: 0	# of Unresolved Violations Referred to RIDEM: 0

Summary of Enforcement Actions, include an evaluation of the effectiveness of the program.

Prior to construction, a site inspection is complete to ensure all erosion and sediment control methods have been properly installed. All violations are discussed with the contractor and are resolved before the start of construction. The Building Inspections Department has enforcement abilities and can issue a cease and desist until corrective actions are taken.

The above numbers are based on data from the 2023 building permits flagged for erosion control inspections. See Appendix K. There is currently no specific database dedicated to erosion and sediment control inspections.

Identify person(s) /Department and/or parties responsible for the implementation of this requirement:

Building Inspections Department

Identify the type and date of training this person(s)/parties has/have received to be considered "adequately trained":

The Building Inspection Department has not yet been adequately trained. See Section II. A – Plan and SWPPP/SESC Plan Reviews during Year 18(2021), Part IV.B.4.b.2 for plans to implement Level 2 training.

MINIMUM CONTROL MEASURE #5:
POST CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REVELOPMENT
(Part IV.B.5 General Permit)

SECTION I. OVERALL EVALUATION:

GENERAL SUMMARY, STATUS, APPROPRIATENESS AND EFFECTIVENESS OF MEASURABLE GOALS:

Include information relevant to the implementation of each measurable goal, such as activities implemented to support the review, issuance and tracking of permits, inspections and receipt of complaints, etc. Please indicate if any projects have incorporated the use of Low Impact Development techniques. Discuss activities to be carried out during the next reporting cycle. If addressing TMDL requirements, please indicate rationale for the activities chosen to address the pollutant of concern.

(Note: Identify parties responsible for achieving the measurable goals and reference any reliance on another entity for achieving measurable goals. Mark with an asterisk (*) if this person/entity is different from last year.)

Responsible Party Contact Name & Title: David Rodio, Building Official

Phone: (401) 780-6010 **Email:** drodeo@cranstonri.gov

IV.B.5.b.5	Use the space below to describe activities and actions taken to coordinate with existing State programs requiring post-construction stormwater management.

The Building Inspection Department has been notified of the new inspection requirements for the MS4 program. Prior to bond reduction, the Engineering Department must be contacted to perform a final inspection. During the inspection, they look for any stormwater runoff from impervious surface and discharges to neighboring properties. If the contract follows all the City's plan requirements and passes the final inspection, bond reduction will be authorized for the new stormwater system. The owner is then responsible for maintaining any post-construction BMP's, as well as their associated O&M records. Operations and maintenance records must be available upon DPW request.

The Planning Department is copied of RIPDES permit applications.

IV.B.5.b.6	Use the space below to describe actions taken for the referral to RIDEM of new discharges of stormwater associated with industrial activity as defined in §1.4(A)(111) in the *Regulations for the Rhode Island Pollutant Discharge Elimination System* (RIPDES Regulations) (the operator must implement procedures to identify new activities that require permitting, notify RIDEM, and refer facilities with new stormwater discharges associated with industrial activity to ensure that facilities will obtain the proper permits).

All land development projects greater than 1 acre are required to apply to RIDEM by law. RIDEM permitting requirements are required for the approval of the Planning Department for any land development project. The Planning Department then requires the applicants to provide proof of approved state permits and the Building Inspection Department monitors compliance with the approved plans and specifications.

IV.B.5.b.9	Indicate if the Post-Construction Runoff from New Development and Redevelopment Ordinance was **not** developed, adopted, and submitted to RIDEM, explain reasons why, submit proposed schedule for completion and identify person(s) / Department and/or parties responsible for the completion of this requirement. **Date of Adoption:** April 25, 2005 If the Ordinance was amended in 2023, please indicate why changes were necessary. Please also indicate if amendments have been made based on the 2010 *RI Stormwater Design and Installation Standards Manual*, and provide references to the amended portions of the local codes/ordinances.

Ordinance developed and adopted in City Code Title 12.04.063. Adoption of a Conservation Subdivision or LID ordinance is identified as an objective in the City's Comprehensive Plan. All new and re-development will be subject to follow RIDEM Stormwater Design and Installation Manual (2010).

The Building Inspection Department is responsible for this requirement.

IV.B.5.b.12	Use the space below to describe activities and actions taken to identify existing stormwater structural BMPs discharging to the MS4 with a goal of ensuring long term O&M of the BMPs.

All structural stormwater BMP's have been identified and incorporated into the City's GIS database, and new ones are added as they're installed. The City currently maintains four types of BMP's: 70 retention basins, 5 Vortechnic units, and 2 bioretention basin, and one underground infiltration basin. See Appendix L for the list of City BMP's. In addition, the City will be adding an additional underground infiltration basin in 2024.

The retention basins are subject to annual inspections from the Department of Public Works and/or the Engineering Department. The inspections document deficiencies within the system and any routine maintenance is sent to the Highway Department while more complicated repairs are contracted out. In the reporting year, the inspections were updated to utilize GIS, where a database and queries can be used to better prioritize the inspections. Historical records will be added to the inspection database, as staffing permits.

The Vortechnic units are also subject to an annual cleaning and inspection. Since installed in 2004 and 2006, the Highway Division maintained these structures and the Engineering Department inspected them. Detailed analysis of the sediment removal was performed in 2014, 2015, 2016, 2017, 2018, & 2020. Since the origin of the Inland Water contract, they have been maintaining the Vortechnic units and collecting data to refine the maintenance schedule.

The bioretention basin on Narragansett Boulevard, since its installation, has been maintained by the City. Maintenance activities include clearing the inlet and mowing the grass every 2-3 weeks. Grass mowing should be spaced further apart but the disapproval from neighboring residents make that undesirable. In the spring of 2019, the City hired a landscaper to re-stabilize the vegetation and embankments. In September of 2020, the Edgewood Waterfront Preservation Association and Save the Bay coordinated a landscaping effort to weed and reseed the system. The bioretention basin at the end of Cottage Street is maintained in a similar fashion.

Additional Measurable Goals and Activities:
As staffing permits integrating the BMP inspections with our GIS database.

SECTION II.A. - Plan and SWPPP/SWMP Reviews during Year 20 (2023), Part IV.B.5.b.4: Review 100% of post-construction BMPs for the control of stormwater runoff from new development and redevelopment projects that result in discharges to the MS4 which incorporates consideration of potential water quality impacts (the program requires reviewing 100% of plans for development projects greater than 1 acre, not reviewed by other State programs). Plan reviews must be conducted by adequately trained personnel.

\# of Post-Construction Applications Received: 14
\# of Post-Construction Reviews Completed: 14
\# of Permits/Authorizations Issued: 14

Summary of Reviews and Findings, include an evaluation of the effectiveness of the program.
The plan review process is outline in MCM #4, Section II. A - Plan and SWPPP/SESC Plan Reviews during Year 20 (2023). This process is the same whether or not BMP's are incorporated in the project. If BMP's are incorporated, their functionality and detail drawings are reviewed by the Engineering Department during the plan review process, as well as the O&M manual and hydraulic calculations.

Identify person(s) /Department and/or parties responsible for the implementation of this requirement:
Building Inspections Department and Engineering Department

Identify the type and date of training this person(s)/parties has/have received to be considered "adequately trained":
The Building Inspection Department has not yet been adequately trained. See Section II. A – Plan and SWPPP/SESC Plan Reviews during Year 18(2021), Part IV.B.4.b.2 for plans to implement Level 3 training.

SECTION II.B. - Post Construction Inspections during Year 20 (2023), Parts IV.G.2.o and IV.B.5.b.10 - Proper Installation of Structural BMPs: Inspection of BMPs, to ensure these are constructed in accordance with the approved plans (the program must include inspection of 100% of all development greater than one acre within the regulated areas that result in discharges to the MS4 regardless of whom performs the review). Inspections must be conducted by adequately trained personnel.

# of Active Construction Projects: 4	# of Construction Projects Completed: 4
# of Site Inspections for proper Installation of BMPs: not tracked	# of Complaints Received: not tracked
# of Violations Issued: 0	# of Unresolved Violations Referred to RIDEM: 0

Summary of Enforcement Actions:

All development projects are inspected by the Building Inspection Department. During their inspection, a brief inspection of the BMP's is included. However, a more thorough inspection should be performed on these structures. Once the proper training has been completed by the inspectors, the inspection quality should increase.

Identify person(s) /Department and/or parties responsible for the implementation of this requirement:

Building Inspections Department

Identify the type and date of training this person(s)/parties has/have received to be considered "adequately trained":

The Building Inspection Department has not yet been adequately trained. See Section II. A – Plan and SWPPP/SESC Plan Reviews during Year 18(2021), Part IV.B.4.b.2 for plans to implement Level 2 training.

SECTION II.C. - Post Construction Inspections during Year 20 (2023), Parts IV.G.2.p and IV.B.5.b.11 - Proper Operation and Maintenance of Structural BMPs: Describe activities and actions taken to track required Operations and Maintenance (O&M) actions for site inspections and enforcement of the O&M of structural BMPs. Tracking of required O&M actions for site inspections and enforcement of the O&M of structural BMPs.

# of Site Inspections for proper O&M of BMPs: 0	# of Complaints Received: 0
# of Violations Issued: 0	# of Unresolved Violations Referred to RIDEM: 0

Summary of Activities and Enforcement Actions. Evaluate the effectiveness of the Program in minimizing water quality impacts.

The City has yet to implement a procedure for ensuring proper O&M of privately-owned BMP's. This has been an ongoing discussion between the Department of Public Works and the Building Inspections Department but no resolution has been concluded thus far. It's anticipated that a resolution may come in the next reporting year.

Identify person(s) /Department and/or parties responsible for the implementation of this requirement:

Strategies for requiring the use of non-structural Low Impact Development (LID) site design practices and techniques into stormwater management designs for new and redevelopment projects, check all that apply in your municipality/MS4:

☒ None
☐ Ordinances or by-laws requiring LID standards (e.g. reduced road widths, % conservation land, etc.)
☐ Ordinances or by-laws requiring LID design at conceptual review (i.e., Pre-application and/or Master Plan) stages for municipal review prior to plans being engineered.
☐ Ordinances or by-laws requiring LID standards only in impaired waterbody drainage areas
☐ Local development regulations requiring use of LID to the maximum extent practicable
☐ LID Guidance available in written form
☐ LID Guidance available at pre-application meetings
☐ Other strategies to ensure incorporation of LID to the maximum extent practicable, describe:

____

____

Person(s)/Department responsible for reviewing submissions for LID:

The Planning Department

Person(s)/Department/Board responsible for approving submissions for LID at Preliminary and/or Final Review, if applicable:

The Planning Department

Are you aware of the Municipal LID Self-Assessment that was introduced by the DEM and RI NEMO in 2019 and finalized and distributed in March 2020?

☒ Yes ☐ No

A final version of the Municipal LID Self-Assessment is available on the DEM's website:
http://www.dem.ri.gov/programs/benviron/water/permits/ripdes/stwater/t4guide/lid-checklist-primer.pdf

Additional guidance is also available:

http://www.dem.ri.gov/programs/benviron/water/permits/ripdes/stwater/t4guide/lid-assessment-fs.pdf

http://www.dem.ri.gov/programs/benviron/water/permits/ripdes/stwater/pdfs/lidfactsheet.pdf

http://www.dem.ri.gov/programs/benviron/water/permits/ripdes/stwater/t4guide/lidplan.pdf

Did your community complete the Municipal LID Self-Assessment? ☐ Yes ☒ No
If yes and it was completed in 2023, please provide a copy as an attachment to this Annual Report, if you have not already submitted it.

If no, does your community plan to complete it?

☒ Yes ☐ No
If No, why not? ____

____

Strategies being implemented to ensure long-term Operation and Maintenance (O&M) of privately-owned structural stormwater BMPs, check all that apply in your municipality/MS4:

☐ None
☒ Ordinances or by-laws identify BMP inspection responsible party
☐ Ordinances or by-laws identify BMP maintenance responsible party
☐ Ordinances or by-laws identify BMP inspections and maintenance requirements
☐ Ordinances or by-laws provide for easements or covenants for inspections and maintenance
☐ Ordinances or by-laws require for every constructed BMP an inspections and maintenance agreement
☐ Ordinances or by-laws contain requirements for documenting and detailing inspections
☐ Ordinances or by-laws contain requirements for documenting and detailing maintenance
☐ Ordinances or by-laws contain authority to enforce for lack of maintenance or BMP failure
☐ The MS4 is responsible for inspections of all privately-owned BMPs
☐ The MS4 is responsible for maintenance of all privately-owned BMPs
☐ Establishment of escrow account for use in case of failure of BMP
☒ Other strategies to ensure long-term O&M of privately-owned BMPs, describe:

O&M reporting is being required for privately owned and maintained subdivision. Reports are reviewed by the Engineering Department.

Does your municipality/MS4 require the use BMPs Operations and Maintenance Agreements? ☒ YES ☐ NO

If YES, please indicate if the Operations and Maintenance Agreements include the following:

a. Party responsible for the long-term O&M of permanent stormwater management BMPs	☒ YES ☐ NO
b. A description of the permanent stormwater BMPs that will be operated and maintained	☒ YES ☐ NO
c. The location of the permanent stormwater BMPs that will be operated and maintained	☒ YES ☐ NO
d. A timeframe for routine and emergency inspections and maintenance of all permanent stormwater management BMPs	☒ YES ☐ NO
e. A requirement that all inspections and maintenance activities are documented	☒ YES ☐ NO
f. Annual submission of inspection/maintenance certification/documentation to the MS4	☒ YES ☐ NO
g. Stormwater management easement for access for inspections and maintenance or the preservation of stormwater runoff conveyance, infiltration, and detention areas and other stormwater controls and BMPs by persons other than the property owner	☒ YES ☐ NO
h. Steps available for addressing a failure to maintain the stormwater controls and BMPs	☐ YES ☒ NO

Please elaborate, if appropriate:

For item g, easements are drafted on an as-needed basis and recorded in the land evidence records. Specifics are determined on a project-to-project basis.

Does your municipality/MS4 keep an inventory of privately-owned BMPs?	☒ YES ☐ NO

For privately-owned structural BMPs, does your municipality/MS4 have a system for tracking:

a. Agreements and arrangements to ensure O&M of BMPs?	☒ YES ☐ NO
b. Inspections?	☐ YES ☒ NO
c. Maintenance and schedules?	☐ YES ☒ NO
d. Complaints?	☐ YES ☒ NO
e. Non-Compliance?	☐ YES ☒ NO
f. Enforcement actions?	☐ YES ☒ NO

Do you use an electronic tool (e.g. GIS, database, spreadsheet) to track post-construction BMPs, inspections, and maintenance? ☐ YES ☒ NO

If yes, please elaborate on which tools are used:

The City intends om updating its GIS database to include private BMP's, as staffing permits. The current GIS only contains City-owned BMP's. An independent project would be required in order to inventory privately-owned BMP's.

NOTE: BMP maintenance tasks can be a great way to involve and educate the community to their purpose and function. BMPs have the potential to create a highly interactive environment for community members and volunteers to get involved.

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MINIMUM CONTROL MEASURE #6:
POLLUTION PREVENTION AND GOOD HOUSEKEEPING IN MUNICIPAL OPERATIONS
(Part IV.B.6 General Permit)

SECTION I. OVERALL EVALUATION:

GENERAL SUMMARY, STATUS, APPROPRIATENESS AND EFFECTIVENESS OF MEASURABLE GOALS:

Include information relevant to the implementation of each measurable goal, such as activities and practices used to address on-going requirements, and personnel responsible. Discuss activities to be carried out during the next reporting cycle. If addressing TMDL requirements, please indicate rationale for the activities chosen to address the pollutant of concern.

(Note: Identify parties responsible for achieving the measurable goals and reference any reliance on another entity for achieving measurable goals. Mark with an asterisk (*) if this person/entity is different from last year.)

Responsible Party Contact Name & Title: Edward Tally, Environmental Program Manager

Phone: (401) 780-3173 **Email:** etally@cranstonri.org

IV.B.6.b.1.i

Use the space below to describe activities and actions taken to identify structural BMPs (these include but are not limited to: retention/detention basins, vegetated treatment, infiltration and pre-treatment controls, etc.) owned or operated by the small MS4 operator (the program must include identification and listing of the specific location and a description of all structural BMPs in the SWMPP and update the information in the Annual Report). Evaluate appropriateness and effectiveness of this requirement.

Do you have an inventory of MS4-owned/operated BMPs? ☒ YES ☐ NO

Total # of MS4-owned/operated BMPs (does not include CBs or MHs): 79

All BMP's owned or operated by the City were located by GPS coordinates originally identified in excel spreadsheets. During the 2015 GIS update, 70 retention basins were identified and incorporated into the database under a separate layer. The distinction between privately-owned and City-owned is made during BMP inspections.

In 2006 and 2008, Vortechnic units were installed during the Stillhouse Cove Revetment and Drainage Improvements, and also at the ends of Norwood Avenue and Shaw Avenue. In 2016, the bioretention basin on Narragansett Boulevard was installed. In 2022, the Spectacle Park underground infiltration basin and vegetated infiltration basin was installed, as well as the underground infiltration basin on Barrett Street. In 2024, another underground infiltration basin is scheduled to be installed on Pomham Street. All of these BMP's are/will be added to the GIS database as they're installed.

IV.B.6.b.1.ii

Use the space below to describe activities and actions taken for inspections, cleaning and repair of detention/retention basins, storm sewers and catch basins with appropriate scheduling given intensity and type of use in the catchment area. Evaluate appropriateness and effectiveness of this requirement.

# of MS4-owned/operated BMPs inspected in 2023: 32

# of MS4-owned/operated BMPs maintained/cleaned in 2023: 1

# of MS4-owned/operated BMPs repaired in 2023: 0

Does your municipality/MS4 have a system for tracking:

a.	Inspection schedules of MS4-owned BMPs?	☒ YES	☐ NO
b.	Maintenance/cleaning schedules of MS4-owned BMPs?	☒ YES	☐ NO
c.	Repairs, corrective actions needed?	☒ YES	☐ NO
d.	Complaints?	☐ YES	☒ NO

Do you use an electronic tool (e.g. GIS, database, spreadsheet) to track stormwater BMPs, inspections, and maintenance? ☒ YES ☐ NO

The maintenance procedure for structural BMP's (not including CB's or MH's) is outlined in MCM #5, Section IV.B.5.b.12. The maintenance procedure for CB's and MH's is outlined in MCM #3, Section IV.B.3.b.5.vi.

These maintenance procedures have been effective and are suitable for the City's abilities.

<table>
<tr><td>IV.B.6.b.1.iii</td><td>Use the space below to describe activities and actions taken to support the requirement of yearly inspection and cleaning of all catch basins (a lesser frequency of inspection based on at least two consecutive years of operational data indicating the system does not require annual cleaning might be acceptable). Evaluate appropriateness and effectiveness of this requirement.
Total # of CBs within regulated area (including SRPW and TMDL areas): 5,133 (7,157 including MH's)
# of CBs inspected in 2023: 2,059 % of Total inspected: 40%
# of CBs cleaned in 2023: 2,059 % of Total cleaned: 40%
If determined, approximate quantity of sand/debris collected by cleaning of catch basins: 1,545 tons
Location used for the disposal of debris: The Highway Department – 493 Phenix Avenue, Cranston, RI
Do you use an electronic tool (e.g. GIS, database, spreadsheet) to track the inspections and cleaning of catch basins? ☒ YES ☐ NO</td></tr>
<tr><td colspan="2">The maintenance procedure for CB's is outlined in MCM #3, Section IV.B.3.b.5.vi. As mentioned in that section based on the results of the IW catch basin cleaning evaluation the City. Over the last several years, the City collected maintenance data on each catch basin, 2 times, usually one to two years apart. It included the depth of debris removed each time in addition to measure-down distances to the bottom of the sump after cleaning. We used this data to calculate a catch basin fill rate (in/year) based on the amount of debris removed in that period of time. This was used to predict when the next maintenance of that particular structure will be required. This has been analyzed and cleaning/inspection schedule has been adjusted based on actual sediment accumulation observed from these inspections. Based on this schedule we cleaned 2,059 basins in 2023. The City now has a 5 year rotating cleaning schedule which is currently being completed by Truax.</td></tr>
<tr><td>IV.B.6.b.1.iv</td><td>Use the space below to describe activities and actions taken to minimize erosion of road shoulders and roadside ditches by requiring stabilization of those areas. Evaluate appropriateness and effectiveness of this requirement.</td></tr>
<tr><td colspan="2">Erosion control on road shoulders is evaluated on a case by case basis and is reactive in nature. As an eroded road shoulder is reported, whether by City staff or through a public complaint, the Engineering Department will evaluate the deficiency and the Highway Department will stabilize it until a permanent solution is implemented.</td></tr>
<tr><td>IV.B.6.b.1.v</td><td>Use the space below to describe activities and actions taken to identify and report known discharges causing scouring at outfall pipes or outfalls with excessive sedimentation, for the Department to determine on a case-by-case basis if the scouring or sedimentation is a significant and continuous source of sediments. Evaluate appropriateness and effectiveness of this requirement.</td></tr>
</table>

In general, the City will evaluate outfall effectiveness on a complaint basis. The Department of Public Works and the Highway Department complete a number of investigations throughout the year addressing drainage concerns. The necessary equipment is deployed to address drainage issues on a case by case basis. A full inspection of all outfalls and associated sedimentation has not been completed since 2010. Based on field investigations, there are a number of outfall locations that would require removal of sediments. Outfall sedimentation will be further evaluated in 2024 as staffing and funding permits.

In December 2011, the City contracted Woodward & Curran to determine the rate of sediment accumulation and feasibility of removing the sediment at the 48" outfall on Lake Street (called SpP-F Stormwater Outfall in the report). This location is the outfall for the largest drainage area in the urbanized portion of the City. Woodward and Curran was retained on to produce Lake Street Outfall Maintenance Project Documents, which prepared the City for construction activities, including dredging and headwall repairs. The City has decided not to pursue this improvement until after a TMDL Structural Measures and Internal Pond Management study is completed. See TMDL requirements below for additional information.

IV.B.6.b.1.vi

Use the space below to indicate if all streets and roads within the urbanized area were swept annually and if not indicate reason(s). The operator is required to sweep all streets and roads within the regulated area annually unless a lesser frequency can be justified based on at least two consecutive years of data indicating the street or road does not require annual sweeping. Evaluate appropriateness and effectiveness of this requirement.

Total roadway miles within regulated area (including SRPW and TMDL areas): 318

Roadway miles that were swept in 2023: 478 **% of Total swept:** 150%

Type of sweeper used: ☒ Rotary brush street sweeper ☐ Vacuum street sweeper

If determined, approximate quantity of sand/debris collected by sweeping of streets and roads: 2,074 tons

Location used for the disposal of debris: The Highway Department – 493 Phenix Avenue, Cranston, RI

Do you use an electronic tool (e.g. GIS, database, spreadsheet) to track the annual sweeping of streets and roads? ☐ YES ☒ NO

In July of 2013, a GIS analysis was complete of the roadway centerline data within the City, which yielded the results of 318 City-owned miles, 67.2 States-owned miles, an additional 6.8 State-owned miles within the Pastore Complex, and 6.8 privately-owned miles.

All City streets are swept at least once annually. Since 2013, there's additional street sweeping of the Stillhouse Cove watershed and the TMDL Spectacle Pond watershed.

IV.B.6.b.1.vii	Use the space below to describe activities and actions taken for controls to reduce floatables and other pollutants from the MS4. Evaluate appropriateness and effectiveness of this requirement.

To control floatables before they enter the MS4, the City hires a Clean City Coordinator, who, as mentioned in previous sections, is responsible for overseeing and managing the trash and recycling program in the City. The Clean City Coordinator is constantly educating the public on what they can and can't recycle, which is keeping floatable out of the MS4 and the landfill.

To control floatables that have entered the system, the City installed 5 Vortechnic units on the Providence River waterfront, which have proven to be highly effective in catching floatables before discharging to the river. Also, catch basins in the City were installed, on average, with a 3' sump, which allows for some storage volume before discharged into the piped system. The City also installed a bioretention basin that exposes floatable as they pass through. Due to the frequent maintenance schedule with this system, floatables are often removed before they're able to either pass through or exit the system.

IV.B.6.b.1.viii	Use the space below to describe the method for disposal of waste removed from MS4s and waste from other municipal operations, including accumulated sediments, floatables and other debris and methods for record-keeping and tracking of this information. Do you have a system for tracking actions to remove and dispose of waste? ☒ YES ☐ NO

Sediment from catch basin cleaning and street sweeping activities are collected and stockpiled at the Highway garage for screening to remove the garbage from the reusable granular materials. The garbage removed is then brought to the Rhode Island Resource Recovery Corporation (RIRRC).

In addition to catch basin cleaning and street sweeping, the City services public waste receptacles on public properties throughout the City and participates in numerous neighborhood cleanup events. The City disposes the waste at RIRRC and gets a dumping receipt. A tally of these receipts came to 110.75 tons in 2023. The City also completes an end-of-year report for RIRRC, which highlights the different materials the City disposed of through the reporting year. See Appendix M for the report.

IV.B.6.b.2

Use the space below to describe any operations under the MS4's legal control, including activities and facilities, that have the potential to introduce pollutants into stormwater runoff, such as pesticide/herbicide/fertilizer application, chemical and waste handling and storage, vehicle fueling, vehicle washing, vehicle maintenance, sand/salt storage, snow disposal, facilities such as public works facilities with maintenance and storage yards, waste transfer stations, municipal wastewater and water treatment facilities, and municipal parking owned and operated by the MS4.

Does your MS4 have any salt piles, or piles containing salt, used for deicing?
☒ YES ☐ NO
If yes:
  Are these piles covered to prevent exposure to rain, snow, snowmelt and/or runoff?
  ☒ YES ☐ NO
    If yes, check the type of cover used:
    ☒ Weatherproof permanent structure/shelter
    ☐ A temporary, secured, durable, waterproof covering (e.g., tarpaulin, polyethylene, polyurethane)
  Are these piles located on impermeable surfaces?
  ☒ YES ☐ NO

In 2018, the City prepared a Spill Prevention Control Plan at the Fleet Maintenance building to accommodate the aboveground storage tanks.

During snow removal operations, the City used a sand/salt mixture to treat the roads. The material is stored at the Highway Department under a permanently covered structure.

The municipal wastewater treatment plant (WPCF) has their own RIPDES Multisector General Permit. Veolia, the City's Sewer Department, submits a separate annual report for the stormwater features within the facility.

IV.B.6.b.5	For all facilities with discharges of stormwater associated with industrial activity, use the space below to describe and indicate activities and corrective actions for the evaluation of compliance. This evaluation must include visual quarterly monitoring; routine visual inspections of designated equipment, processes, and material handling areas for evidence of, or the potential for, pollutants entering the drainage system or point source discharges to waters of the State; and inspection of the entire facility at least once a year for evidence of pollution, evaluation of BMPs that have been implemented, and inspection of equipment. A Compliance Evaluation report summarizing the scope of the inspection, personnel making the inspection, major observations related to the implementation of the Stormwater Management Plan (formerly known as a Stormwater Pollution Prevention Plan), and any actions taken to amend the Plan must be kept for record-keeping purposes.

The drain cleaning staff has been trained to inspect the system as they clean it and report any unusual circumstances to Public Works for an engineer to inspect and recommend repairs. All CB's cleaned are recorded utilizing the ESRI Collector application for record keeping purposes, which includes the depth of material removed as well as photographs of the basin.

Commercial and industrial users are required to submit an application with the City's Municipal Industrial Pretreatment Program administered by the City's Sewer Department. This is an effective way to determine if the potential for stormwater pollution exists.

In 2017, the City submitted and received an approved SWMP on behalf of the Cranston Water Pollution Control Facility in accordance with RIPDES Multisector General Permit. In October of 2019 the SWMP was revised to include new and revised permit requirements. Fuss and O'Neill submitted these revisions on the City's behalf to RIDEM. The City GIS database includes storm structures and outfalls located on the WPCF property.

IV.B.6.b.6

Use the space below to describe all employee training programs used to prevent and reduce stormwater pollution from activities such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and stormwater system maintenance for the past calendar year, including MS4 staff participation in trainings offered by other parties (e.g. SNEP, EPA) and all in-house training conducted by the municipality/MS4. Evaluate appropriateness and effectiveness of this requirement.

How many stormwater management trainings have been provided to *municipal/MS4 employees* during this reporting period? 5 were attended

What was the date of the training? ___/___/____
Training Topic(s): ____________
How many *municipal/MS4 employees* attended this training? _____

What was the date of the training? ___/___/____
Training Topic(s): ____________
How many *municipal/MS4 employees* attended this training? _____

[Add additional trainings as necessary.]

What percent of *municipal/MS4 employees* in relevant positions and departments received stormwater management training? 22%

Have *municipal/MS4 employees* that are responsible for inspecting or cleaning catch basins also been trained to detect and report illicit connections or non-stormwater discharges?
☒ YES ☐ NO

See Appendix F for a list of trainings attended by municipal employees in the reporting year.

In 2018, the Highway staff was trained on how to properly collect maintenance data with ArcGIS Collector mobile application. Part of training was also visual inspections and knowing what to look for, such as illicit connections. The benefits of this protocol, such as water quality improvements, were highlighted during the training. Truax, the current catch basin cleaning contractor, was trained in flagging illicit connections in 2023 by City staff.

Unofficial trainings and field 'ride along' events were conducted in 2023 to assist new users on collecting and editing data with the mobile application. Topics discussed was proper data collection, illicit connections, evaluation of observational water quality data, and signs of contamination.

IV.B.6.b.7	Use the space below to describe actions taken to ensure that new flow management projects undertaken by the operator are assessed for potential water quality impacts and existing projects are assessed for incorporation of additional water quality protection devices or practices. Evaluate appropriateness and effectiveness of this requirement.

Evaluation of projects for potential water quality impacts will be assessed for additional water quality protection devices of practices by the Planning Department, Engineering Department, and Building Inspection Department. The MS4 coordinator and Director of Public Works have been working with these departments and RIDEM in order to ensure proper assessments are being conducted.

Additional Measurable Goals and Activities

No additional runoff is allowed from new development projects.

SECTION II.A - Structural BMPs (Part IV.B.6.b.1.i) These include but are not limited to: retention/detention basins, vegetated treatment, infiltration, and pre-treatment controls, etc.

BMP ID:	Location:	Name of BMP Owner/Operator:	Description of BMP:	Frequency of Inspection:
See Appendix L				

SECTION II.B - Discharges Causing Scouring or Excessive Sedimentation (Part IV.B.6.b.1.v)

Outfall ID:	Location:	Description of Problem:	Description of Remediation Taken, include dates:	Receiving Water Body Name/Description:
N/A				

SECTION II.C - Note any planned municipal/MS4-owned construction projects/opportunities to incorporate water quality BMPs, low impact development, or activities to promote infiltration and recharge (Part IV.G.2.j).

As mentioned throughout the report, the City completed 1 SEP project and 1 SNEP grant project in 2022. The SEP project was the Spectacle Pond Phosphorus Reduction Project, which includes an underground infiltration basin and vegetated infiltration basin. The SNEP grant project was for an end-of-road underground infiltration basins on Barrett Street. One additional SNEP project consisting of an end of road underground infiltration basin at the end of Pomham Street will be completed in 2024.

The City has begun coordination with RIDOT to assist in their Stormwater Control Plans for the Pawtuxet River and Pocasset River watersheds. The State is looking to install a large BMP along a state-owned road within the City. Collaboration with RIDOT includes identifying potential locations for BMP installation. Project selection and construction schedule has not yet been generated.

SECTION II.D - Please include a summary of results of any other information that has been collected and analyzed. This includes any type of data (Part IV.G.2.e).

TOTAL MAXIMUM DAILY LOAD (TMDL) or other Water Quality Determination REQUIREMENTS

SECTION I. If you have been notified that discharges from your MS4 require non-structural or structural stormwater controls based on an approved TMDL or other water quality determination, please provide an assessment of the progress towards meeting the requirements for the control of stormwater identified in the approved TMDL (Part IV.G.2.d). Please indicate rationale for the activities chosen to address the pollutant of concern.

(Note: Identify parties responsible for achieving the measurable goals and reference any reliance on another entity for achieving measurable goals. Mark with an asterisk (*) if this person/entity is different from last year.)

Responsible Party Contact Name & Title: Edward Tally, Environmental Program Manager

Phone: (401) 780-3173 **Email:** etally@cranstonri.org

LIST OF IMPAIRED WATERS:			
Impaired Water Body: Spectacle Pond WBID: RI0006017L-07	Pollutants Causing Impairments: Total Phosphorus Dissolved Oxygen	Has TMDL been completed? Has MS4 been notified of TMDL requirements? Has MS4 developed a Scope of Work or TMDL Implementation Plan?	☒ YES ☐ NO ☒ YES ☐ NO ☒ YES ☐ NO
Impaired Water Body: Providence River WBID: RI0007020E-01B	Pollutants Causing Impairments: Total Nitrogen Dissolved Oxygen Fecal Coliform	Has TMDL been completed? Has MS4 been notified of TMDL requirements? Has MS4 developed a Scope of Work or TMDL Implementation Plan?	☐ YES ☒ NO ☐ YES ☒ NO ☐ YES ☒ NO
Impaired Water Body: Pawtuxet River North Branch WBID: RI0006016R-06B	Pollutants Causing Impairments: Lead Mercury in Fish Tissue	Has TMDL been completed? Has MS4 been notified of TMDL requirements? Has MS4 developed a Scope of Work or TMDL Implementation Plan?	☐ YES ☒ NO ☐ YES ☒ NO ☐ YES ☒ NO
Impaired Water Body: Fenner Pond WBID: RI0006017-08	Pollutants Causing Impairments: Total Phosphorus	Has TMDL been completed? Has MS4 been notified of TMDL requirements? Has MS4 developed a Scope of Work or TMDL Implementation Plan?	☐ YES ☒ NO ☐ YES ☒ NO ☐ YES ☒ NO
Impaired Water Body: Pawtuxet River Main Stem WBID: RI0006017R-03	Pollutants Causing Impairments: Non-Native Aquatic Plants Total Phosphorus Mercury in Fish Tissue Enterococcus	Has TMDL been completed? Has MS4 been notified of TMDL requirements? Has MS4 developed a Scope of Work or TMDL Implementation Plan?	☐ YES ☒ NO ☐ YES ☒ NO ☐ YES ☒ NO
Impaired Water Body: Print Works Pond WBID: RI0006018L-05	Pollutants Causing Impairments: Chloride Lead Total Suspended Solids Fecal Coliform	Has TMDL been completed? Has MS4 been notified of TMDL requirements? Has MS4 developed a Scope of Work or TMDL Implementation Plan?	☐ YES ☒ NO ☐ YES ☒ NO ☐ YES ☒ NO
Impaired Water Body: Blackamore Pond WBID: RI0006018L-06	Pollutants Causing Impairments: Total Phosphorus	Has TMDL been completed? Has MS4 been notified of TMDL requirements? Has MS4 developed a Scope of Work or TMDL Implementation Plan?	☐ YES ☒ NO ☐ YES ☒ NO ☐ YES ☒ NO
Impaired Water Body: Pocasset River & Tributaries WBID: RI0006018R-03A	Pollutants Causing Impairments: Benthic-Macroinvertebrates Chloride and Copper Non-Native Aquatic Plants Enterococcus	Has TMDL been completed? Has MS4 been notified of TMDL requirements? Has MS4 developed a Scope of Work or TMDL Implementation Plan?	☐ YES ☒ NO ☐ YES ☒ NO ☐ YES ☒ NO

TOTAL MAXIMUM DAILY LOAD (TMDL) OR OTHER WATER QUALITY DETERMINATION REQUIREMENTS cont'd

Impaired Water Body: Pocasset River & Tributaries WBID: RI0006018R-03B	Pollutants Causing Impairments: Benthic-Macroinvertebrates Enterococcus	Has TMDL been completed? Has MS4 been notified of TMDL requirements? Has MS4 developed a Scope of Work or TMDL Implementation Plan?	☐ YES ☒ NO ☐ YES ☒ NO ☐ YES ☒ NO

What kind of public education and outreach strategy does the MS4 implement to target each pollutant of concern? (e.g., signage on installed stormwater controls, resources on website, pamphlets about litter, pet waste, grass clippings, fertilizer use, etc.)

Pollutant of Concern:	Strategy:	Target Audience:
Total Suspended Solids Oil and Grease Pesticides and Fertilizers Pet Waste Debris and Litter	2018 Stormwater Flyer City Website Storm Drain Murals Resident Engagement	Residential Commercial Industrial Visitors of City Hall

Has the MS4 installed stormwater BMPs or required the installation of stormwater BMPs on private property to address impairments? ☒ YES ☐ NO

If yes, indicate the name of the impaired water body associated with the stormwater control, type of stormwater control, date installed, ownership, and who is responsible for maintenance:

Impaired water body Providence River	Type of Stormwater Control: 5 Vortechnic Swirl Concentrators	Date Installed: 2004 & 2006	☒ Municipally/MS4-Owned ☐ Privately-Owned	Who maintains it? City of Cranston
Impaired water body Providence River	Type of Stormwater Control: Bioretention Basin/Narragansett Blvd	Date Installed: 2022	☒ Municipally Owned ☐ Privately Owned	Who maintains it? City of Cranston
Impaired water body Spectacle Pond	Type of Stormwater Control: Underground Infiltration/ Barrett Street	Date Installed: 2022	☒ Municipally Owned ☐ Privately Owned	Who maintains it? City of Cranston
Impaired water body Spectacle Pond	Type of Stormwater Control: Vegetated surface infiltration basin/ Cottage Street	Date Installed: 2022	☒ Municipally Owned ☐ Privately Owned	Who maintains it? City of Cranston
Impaired water body Spectacle Pond	Type of Stormwater Control: Underground Infiltration/ Speck Field	Date Installed: 2022	☒ Municipally Owned ☐ Privately Owned	Who maintains it? City of Cranston

Additional enhanced minimum measures used to address water quality issues (e.g., increased street sweeping or catch basin cleaning in areas with high pollutant loading, installation of floatable traps/screens, etc.):

On September 27, 2007, the City received the TMDL notice for phosphorus in Spectacle Pond. It indicated that the major sources of phosphorus to Spectacle Pond are stormwater runoff, waterfowl, and internal cycling. On December 15, 2010, the City completed the SWMPP and TMDL Implementation Plan for Spectacle Pond. The TMDL Implementation Plan was submitted to RIDEM for their approval on August 3, 2011 but have not yet received a response.

There are hydraulic issues related to Spectacle Pond as it runs under Route 10 in various open and closed storm water systems to Mashapaug Pond in Providence. A study completed by the Louis Berger Group, Inc., dated February 5, 2001, evaluated improvements to the drainage system in this area. They provided a number of alternatives, mostly increasing pipe size, which is too expensive and not cost effective for the City.

On December 12, 2011 Woodward and Curran delivered a dredge analysis report of the excessive sediment in the Lake Street outfall (identified RIDEM SpP-F). The location is the primary outfall for Spectacle Pond and represents the largest drainage area in the urbanized City. The city signed a contract with Woodward & Curran on January 1, 2013 to produce Lake Street Outfall Maintenance Project Documents to prepare the City for dredging and headwall repair construction activities. On April of 2013, the City received the Lake Street Outfall Maintenance Project Draft Drawings, Documents, and Specifications. On May 23, 2013 the City received a contract amendment from Woodard and Curran for assistance in bidding, contractor selection, and resident engineering services. The City has shelved this project until higher priority projects are completed.

The City has applied for a number of grants to address stormwater pollution in the Spectacle Pond watershed. They are listed below:

1.) October of 2014 the City of Cranston applied for a State Narragansett Bay and Watershed Restoration Grant through RIDEM to initiate the Spectacle Pond TMDL Structural Measures and Internal Pond Management Project. State Narragansett Bay and Watershed Restoration Funds were requested to support the implementation of the City's previously submitted scope of work to develop a management plan to control nutrient sources as documented in the 2011 Spectacle Pond TMDL Implementation Plan. The scope of work consisted of the following phases:

Phase I: Pond assessment, outfall delineation, annual phosphorus load by source, summary report with cost estimates and recommendation.
Phase II: Cost of implementation of structural BMP's investigated; 10% concept designs developed, nutrient management evaluation.

The City was not awarded this grant.

2.) In September 2015, the City provided a letter of support for the City of Providence's NEIWPCC SNEP grant application for Mashapaug and Spectacle Pond Watershed Green Infrastructure Initiative. This grant application was not funded.

3.) In June of 2015 the City provided a letter of support and commitment to matching funds for the Center for Ecosystem Restoration for EPA's 2015 Healthy Communities Grant Program - Stormwater Circuit Rider for the Narragansett Bay Watershed. This outreach and education grant aimed to help identify and prioritize retrofit opportunities on municipal properties, specifically those in TMDL watersheds. This grant application was not funded.

4.) The City partnered with Fuss and O'Neill, Cranston Public School Department, and Save the Bay (STB) on a Southeast New England Program (2018 SNEP) watershed grant application for Comprehensive Watershed Planning & Engagement Demonstration Project, Spectacle Pond, Cranston, RI. Proposed outreach included training of school department staff, development of a stormwater curriculum, and teaching elementary students in a 'living classroom' setting. The total value of the project was $475,400 which included an $156,900 match from the City. The City was invited to submit a full application in June of 2018. Unfortunately, the City was not selected for funding for the project.

5.) The City partnered with Fuss and O'Neill and STB on a 2019 SNEP watershed grant application for Comprehensive Watershed Planning & Green Infrastructure Demonstration Project at Spectacle Pond, Cranston, RI. The total value of the project was $250,000 which included a $62,500 cash match from the City. The City was informed by Restore Americas Estuaries that it was selected for funding. Project tasks are listed broadly below:

- QAPP Development
- Phosphorus Reduction Study
- Demonstration Project Approach and Location
- Demonstration Project Design
- Bidding and Construction
- Community Outreach and Support

The project was completed if 2022 and yielded 3 separate reports including the construction project of an underground infiltration on Barrett Street, the Spectacle Pond Phosphorus Reduction Plan and the Spectacle Pond Limnological Investigation.

The final report for the Barrett Street construction project is included in the executive summary of Appendix C.

The Spectacle Pond Phosphorus Reduction Plan is included in Appendix C. The plan included future potential BMP locations, Potential Funding Sources, Annual Pollutant Load Reductions, and Order of Magnitude Cost Estimates. The report has 14 potential BMP locations which unfortunately if all constructed, would not come close to solving the TMDL phosphorus issues at the pond. The estimated costs for these projects is close to $3,000,000, which is not affordable to the City. It is important to note these costs do not consider the ongoing costs associated with long term operation and maintenance which increases the operating budget of and utilization of City resources. With extremely tight City budgets and the return on investment on a per lb removal basis it will be challenging to secure City match for continued investment in these structural measures. The City will be working closely with RIDEM, funding organizations, and seeking out collaborative partners to make water quality improvements more manageable.

The Spectacle Pond Limnological Investigation Report is included in Appendix C. This investigation was finalized in December of 2022. For background, the estimated phosphorus load to Spectacle Pond is 476 lbs/year. The Total Maximum Daily Loads for Phosphorus to Address 9 Eutrophic Ponds in Rhode Island (TMDL) completed by RIDEM (September 2007) required that the phosphorus load be reduced by 326 lbs/yr, a 68% reduction. The Limnological Investigation was conducted to estimate the relative contribution of internal cycling to total phosphorus loading in the pond. This was achieved by collecting bathymetric data, sediment and water quality sampling, and calculating of internal loading. The results of the study indicate that only 1% of the phosphorus loading or approximately 5.6lbs is from internal sources. External sources including those from stormwater runoff, inlet sources, and waterfowl dominate the P loading at 99%.

6.) The City Partnered with Fuss and O'Neill and the Providence Stormwater Innovation Center (PSIC) on a 2021 SNEP grant for an Urban Green Infrastructure Construction Project within the Spectacle Pond Watershed. The total value of the project was $200,000 which included a $50,000 cash match from the City. This project is intended to build upon the stormwater BMP design implemented in the Pomham Street grant project. Project tasks are listed broadly below:

- QAPP Development
- Project Design
- Bidding and Construction
- Public Outreach and Education with PSIC

The Environmental Program Manager, Edward Tally, is the project lead for the City and will continue to work with the project team in 2024 to continue to implement this grant. Construction at the Pomham Street site and outreach activities will be completed in spring of 2024. Preliminary construction plans are shown in Appendix D.

Continued Compliance Activities:

- We will continue to conduct stormwater system maintenance to identify structures for more frequent cleaning. Street sweeping was increased to two times per year within the watershed of priority TMDL outfalls.
- A brochure entitled "Saving Spectacle Pond" continues to be handed out at the DPW office to enlist the support of the public on this process.
- A yard waste program runs from April 1 through December 15 each year to pick leaves before they enter the system.
- Continued use of phosphorous free fertilizers on City Athletic Fields.
- Work with Fuss and O'Neill, STB, & Restore Americas Estuaries on continued implementation of the 2019 and 2021 SNEP Grants.

SPECIAL RESOURCE PROTECTION WATERS (SRPWs)

SECTION I. In accordance with Title 250 RICR-150-10-1 ("RIPDES Regulations") §1.32(A)(5)(a)(7), on or after March 10, 2008, any discharge from a small municipal separate storm sewer system to any Special Resource Protection Waters (SRPWs) or impaired water bodies within its jurisdiction must obtain permits if a waiver has not been granted in accordance with RIPDES Regulations §1.32(G)(5)(c). A list of SRPWs can be found in Title 250-RICR-150-05-1 ("Water Quality Regulations") §1.28 at this link:
https://rules.sos.ri.gov/regulations/part/250-150-05-1
The State of Rhode Island 2022 Integrated Water Quality Monitoring and Assessment Report (which includes the Section 305(b) State of the State's Waters Report and the Section 303(d) List of Impaired Waters) can be found here: https://dem.ri.gov/sites/g/files/xkgbur861/files/2022-09/RIDEM%202022%20Integrated%20Report%2003-29-2022.pdf

If you have discharges from your MS4 (regardless of its location) to any of the listed SRPWs or impaired waters (including impaired waters when a TMDL has not been approved), please provide an assessment of the progress towards expanding the MS4 Phase II Stormwater Program to include the discharges to the aforementioned waters and adapting the Six Minimum Control Measures to include the control of stormwater in these areas. Please indicate a rationale for the activities chosen to protect these waters. Please note that all of the measurable goals and BMPs required by the 2003 MS4 General Permit may not be applicable to these discharges.

There are no listed Special Resource Protection Waters in the City of Cranston.

RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

Office of Water Resources

INSTRUCTIONS FOR THE RI POLLUTANT DISCHARGE ELIMINATION SYSTEM (RIPDES)
SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEMS AND INDUSTRIAL ACTIVITY AT ELIGIBLE FACILITIES OPERATED BY REGULATED SMALL MS4s
ANNUAL REPORT FORM

WHO MUST SUBMIT AN ANNUAL REPORT:

Owners/Operators of regulated small municipal separate storm sewer systems (MS4s) and industrial activities authorized to discharge stormwater under the Rhode Island Pollutant Discharge Elimination System (RIPDES) Stormwater General Permit for Small Municipal Separate Storm Sewer Systems and Industrial Activity at Eligible Facilities Operated by Regulated Small MS4s (hereafter referred to as "the General Permit"), must submit an Annual Report, outlined in Part IV.G of the permit. The Report must be submitted each year after permit issuance **by March 10th** to track progress of compliance. If you have questions regarding this Annual Report Form contact Jennifer Stout of the Rhode Island Department of Environmental Management (RIDEM), Office of Water Resources, Permitting Section at (401) 222-4700 ext. 2777726.

The Annual Report must be submitted to:
RIDEM Office of Water Resources
RIPDES Municipal and Industrial Stormwater Program
235 Promenade Street
Providence, RI 02908
ATTN: Jennifer Stout

An electronic copy of the Annual Report may be emailed to jennifer.stout@dem.ri.gov.

INSTRUCTIONS FOR COMPLETION:

GENERAL INFORMATION PAGE:

"RIPDES Permit #"
Include your permit ID # to ensure proper tracking.

"Operator of MS4"
Give the legal name of the person, firm, public (municipal) organization, or any other entity that is responsible for day-to-day operations of the MS4 described in this application (as defined in Title 250 RICR-150-10-1 ("RIPDES Regulations") §§1.3 and 1.12). Enter the complete address and telephone number of the operator. Circle the appropriate choice to Indicate the legal status of the operator of the MS4.

"Owner of MS4"
If the owner is the same as the operator do not complete this section. Give the legal name of the person, firm, public (municipal) organization, or any other entity that owns the MS4 described in this application (RIPDES Regulations §§1.3 and 1.12). Do not use a colloquial name. Enter the complete address and telephone number of the owner.

"Certification"
State and federal statutes provide for severe penalties for submitting false information on this application form. State and federal regulations require this application to be signed as follows (RIPDES Regulations §1.12);

For a corporation: by a responsible corporate officer, which means: (i) president, secretary, treasurer, or vice president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information or permit application requirements; and where authority to sign documentation has been assigned or delegated to the manager in accordance with corporate procedures;

For a partnership or sole proprietorship: by a general partner or the proprietor;

For a Municipality, State, Federal or other public site: by either a principal executive officer or ranking elected official.

SECTION I- OVERALL EVALUATION OF BMPS AND MEASURABLE GOALS:

One or more pages, front and back, are provided to report on the status of measurable goals which have been developed to aid in the implementation of strategies, procedures, and programs used to achieve each of the six minimum control measures in Part IV.B of the General Permit. This section provides narrative space for a descriptive explanation and evaluation of the actions taken to satisfy each of the minimum control measures for the 2023 calendar year. Please type or print. If additional space is needed, modify as necessary. Please submit attachments to the appropriate minimum control measure following the format provided.

A Permit ID # has been provided, which refers to the part of the permit where you can find a listing or description of the required measurable goal.

Please provide a general summary of actions taken (implementation of BMPs, development of procedures, events, etc.) to meet the measurable goals of the minimum measure. **Be sure to identify parties responsible for achieving each measurable goal** and reference any reliance on another entity for achieving any measurable goal. Mark with an asterisk (*) if this person/entity is different from last year.

Describe whether each measurable goal was completed within the time proposed in the General Permit or your Stormwater Management Program Plan (SWMPP). Why or why not? Provide a progress report and discussion of activities that will be carried out during the next reporting cycle to satisfy the requirements of the minimum measures. If applicable, assess the appropriateness of the actions taken to meet the requirements of the minimum measure. In determining appropriateness, you may want to consider at a minimum the local population targeted, pollution sources addressed, receiving water concerns, integration with local management procedures, and available resources and violations or environmental impacts eliminated or minimized.

Also, discuss the effectiveness of the implementation of BMPs to meet the requirements of the minimum measure and the overall effectiveness of the minimum measure. Describe your progress towards achieving the overall goal of reducing the discharge of pollutants. Please include assessment parameters/indicators used to measure the success of the minimum measure. Also include a discussion of any proposed changes to BMPs or measurable goals.

After evaluation, it may be necessary to make changes or modifications to your Implementation Schedule if the time frame, appropriateness or effectiveness cannot be assured. If so, please include descriptions of changes or modifications, and detailed justification in the appropriate sections.

SECTION II- ADDITIONAL ANNUAL REPORT REQUIREMENTS

Section II refers to additional reporting requirements that the General Permit requires to be submitted to the Department as part of the Annual Report. Section II requirements apply to Minimum Control Measures 2 through 6.

Minimum Control Measure #2: Section II:
Specify the date of and how the annual report was public noticed. If a public meeting was needed, provide the date and place. Include a summary of public comments received in the public comment period of the draft annual report and planned responses or changes to the program (new or revised BMP's and measurable goals, partnerships, etc.). Be sure to attach a copy of your public notice (Parts IV.G.2.h and IV.G.2.i) to the Annual Report.

Minimum Control Measure #3: Section II.A:
Provide the number of illicit discharges identified in 2023, number of illicit discharges tracked in 2023, number of illicit discharges eliminated in 2023, complaints received, complaints investigated, violations issued and resolved with a summary of enforcement actions, number of unresolved violations that have been referred to RIDEM, the total number of illicit discharges identified to date, and the total number of illicit discharges remaining unresolved at the end of 2023. Include a short narrative describing the extent to which your system has been mapped (Part IV.G.2.m), and the total number of outfalls identified to date.

Minimum Control Measure #3: Section II.B:
List identified MS4 interconnections, including location, date found, operator of the physically interconnected MS4, and originating source of newly identified physical interconnections with other small MS4s. Also note any planned or coordinated activities with the physically interconnected MS4 (Part IV.G.2.k and IV.G.2.l).

Minimum Control Measures #4 & 5: Section II.A:
Identify the number of construction and post-construction plan and SWPPP/SESC Plan reviews completed during Year 20 (2023) and any additional information. This includes, but is not limited to a summary of the reviews, responsible parties, and types of projects reviewed.

Minimum Control Measure #4: Section II.B:
Construction inspection information for erosion and sediment control should be submitted annually as stated in Part IV.G.2.n. Provide a summary of the number of site inspections conducted, inspections that have resulted in enforcement actions, violations that have been resolved and of those unresolved, referred to RIDEM.

Minimum Control Measure #5: Section II.B:
Post-construction inspection information for proper installation of post-construction structural BMPs should be submitted annually as stated in Part IV.G.2.o. This should provide a summary of the number of site inspections conducted, inspections that have resulted in enforcement actions, violations that have been resolved and of those unresolved, referred to RIDEM.

Minimum Control Measure #5: Section II.C:
Inspection information for proper operation and maintenance of post-construction structural BMPs should be submitted annually as stated in Part IV.G.2.p. This should provide a summary of the number of site inspections conducted, inspections that have resulted in

enforcement actions, violations that have been resolved and of those unresolved, referred to RIDEM.

Minimum Control Measure #6: Section II.A:
As prescribed in Part IV.B.6.b.1.i of the General Permit, the MS4 operator must identify and list the specific location and description of all structural BMPs in the SWMPP at the time of application and update the information in the annual report.

Minimum Control Measure #6: Section II.B:
Part IV.B.6.b.1.v of the General Permit states to identify and report annually, as part of the annual report, known discharges causing scouring at outfall pipes or outfalls with excessive sedimentation. Include Outfall ID #, location, description of the problem, any remediation taken, and the ultimate receiving water body.

Minimum Control Measure #6: Section II.C:
As noted in Part IV.G.2.j of the General Permit, specify any planned municipal/MS4-owned construction projects or opportunities to include water quality BMPs, low impact development, or seek to promote infiltration and recharge.

Minimum Control Measure #6: Section II.D:
Please include a summary of results of any other information that has been collected and analyzed. This includes any type of data, including, but not limited to, dry weather survey data (Part IV.G.2.e).

TOTAL MAXIMUM DAILY LOAD (TMDL) or other Water Quality Determination REQUIREMENTS

Section I:
Complete this section only if your MS4 is subject to an approved TMDL. TMDL requirements may require the implementation of the six minimum control measures to address the pollutants of concern, and/or additional structural stormwater controls or measures that are necessary to meet the provisions of the approved TMDL. Be sure to identify the approved TMDL and assess the progress towards meeting the requirements for the control of stormwater (Part IV.G.2.d).

Provide a progress report on the present status and discussion of activities that have been accomplished or will be carried out during the next reporting cycle to satisfy the requirements of the TMDL. If applicable, assess the appropriateness of the BMPs selected under each of the six minimum control measures to meet the requirements of the TMDL. In determining appropriateness, you may want to consider violations or environmental impacts eliminated or minimized.

Please include assessment parameters/indicators that will be used to measure the success of the selected BMPs. Also include a discussion of any proposed changes to BMPs or measurable goals.

SPECIAL RESOURCE PROTECTION WATERS (SRPWs)

Section I:
Complete this section only if your MS4, located outside Urbanized Areas or Densely Populated Areas, discharges to:
a SRPW as listed in §1.28 of Title 250-RICR-150-05-1 ("Water Quality Regulations") at this link:
https://rules.sos.ri.gov/regulations/part/250-150-05-1
or
an impaired water body including water bodies with no approved TMDL as listed in the *State of Rhode Island 2022 Integrated Water Quality Monitoring and Assessment Report* (which includes the *Section 305(b) State of the State's Waters Report* and the *Section 303(d) List of Impaired Waters*) at this link:
https://dem.ri.gov/sites/g/files/xkgbur861/files/2022-09/RIDEM%202022%20Integrated%20Report%2003-29-2022.pdf

In accordance with the RIPDES Regulations §1.32(A)(5)(a)(7), MS4s were required to incorporate any discharges to these waterbodies into their MS4 Program on or after March 10, 2008 unless a waiver has been granted in accordance with RIPDES Regulations §1.32(G)(5)(c).

Provide a progress report on the present status and discussion of activities that have been accomplished or will be carried out during the next reporting cycle to incorporate these areas into the MS4's Phase II Stormwater Program.

Appendix A

2018 Stormwater Flyer

WHAT TO DO IN CASE OF A SEWER BACK-UP

Immediately Call

VEOLIA WATER

401-942-2121

Any time day or night

- An After hours : A message will direct you to the on-call contractor)
- The property owner is responsible to make certain the sewer clean-out is accessible at all times in order for Veolia to service
- Although the property owner is fully responsible for the sewer line from the building to the sewer main in the street, Veolia Water, will inspect and/or clean the portion from the property line to the street.
- If the obstruction is determined to be located between the clean-out and building, the property owner shall be responsible to hire an independent contractor to clear or repair the obstruction.

City of Cranston

Department of Public Works
869 Park Avenue
Cranston, RI 02910
Phone: 401-461-1000

IMPORTANT!

City of Cranston

Stormwater and Sewer Information

We're on the Move!!

Stormwater vs. Sanitary Sewers

In the City of Cranston there are two separate systems to address stormwater and sewage:

Storm Drains

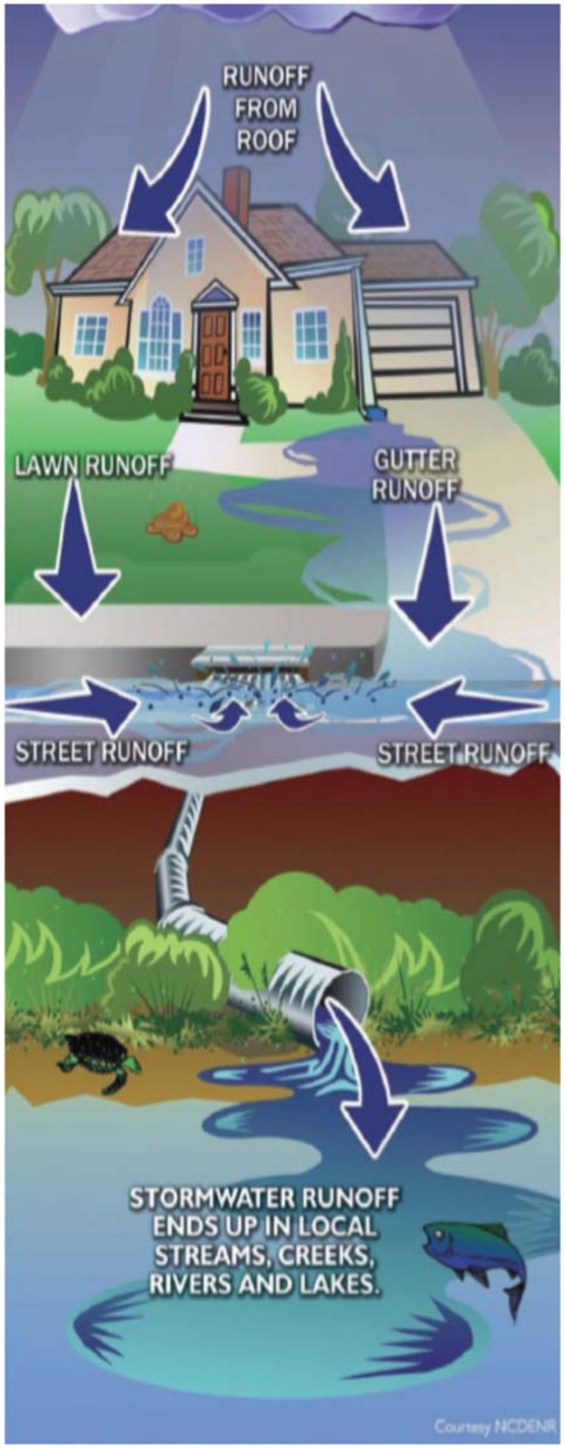
The purpose of storm drains is to collect rain water and channel it away to prevent flooding. As the water passes over the pavement, it picks up whatever is in its path. Pollutants might include:

- ***oil, grease, and automotive fluids;***
- ***fertilizer and pesticides from gardens and homes;***
- ***bacteria from pet waste and improperly maintained septic systems;***
- ***soil from poor construction site management; and***
- ***debris and litter.***

So, the water passing down the street is not just rain water ***… it is polluted water and will end up in our local water bodies or Narragansett Bay!***

Sanitary Sewers

Sanitary sewers carry wastewater or "sewage" from homes and businesses through an entirely separate piping network below city streets. This wastewater flows to a municipal wastewater treatment facility where it is treated, and that treated effluent is discharged to the Pawtuxet River and the Bay. Wastewater treatment facilities have been upgraded to improve the quality of wastewater discharged to local waters.



Courtesy NCDENR

How can I help?

- Reduce Use of Lawn and Garden Pesticides and Fertilizers
- Reduce Runoff...consider directing downspouts to a rain garden;
- Don't Drain Your Swimming Pool Into Stormdrains;
- Don't Dump Household Hazardous Waste (paint, paint thinner, drain and oven cleaners, grease etc.) down storm drains or into the sewer system;
- Be Vigilant. . . report any illegal dumping into storm drains or waterways to DPW at 401-780-3175 or Cranston Police at 401-942-2211;
- Educate family members & neighbors about the hazards of illegal dumping.. Encourage participation in organized clean-up efforts; and
- Go to www.ristormwatersolutions.org for tips & information.

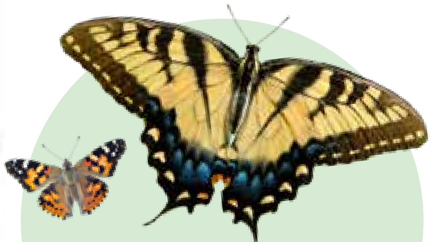
Appendix B

Audubon Spring 2021 Report

Keep in touch with
eWing at www.asri.org

Audubon Society of Rhode Island

REPORT



SAVE THE DATE!
August 7, 2021
AUDUBON ROSE POLLINATOR GARDEN PARTY
Details coming soon!

VOLUME 55 • NO. 2 • SPRING 2021

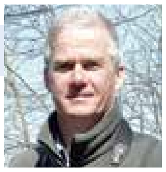
CONNECTING PEOPLE WITH NATURE

STORM WARNINGS

AUDUBON LOOKS TO NATURE-BASED SOLUTIONS IN THE FIGHT AGAINST CLIMATE CHANGE

AUDUBON SOCIETY OF RHODE ISLAND ASRI.ORG SHARE WITH US @AUDUBONRI @RIAUDUBON

From the Desk of the Executive Director



Rewilding Rhode Island

Habitat restoration, green infrastructure and rewilding (a term popular in Europe), are all based on the same principle. They work to restore developed or degraded areas and let nature reclaim space to once again provide much needed ecosystem services.

This can mean removing introduced species of plants and replacing them with native ones, as we do at many Audubon refuges. Other examples include the removal of a dam to allow herring to return up river, or supporting the return of a keystone species to help restore degraded, over-grazed grasslands.

Too often rewilding is an uphill climb – critical natural habitat continues to be destroyed in favor of development for human use. As the effects of climate change (flooding, pollution, excessive heat, etc.) grow and adversely affect human health and well-being, we support the expansion and implementation of nature-based solutions. Restoring our local landscapes is critical for people and wildlife.

This issue of the Report focuses on natural solutions being implemented at both Audubon wildlife refuges and in our towns and cities. You might consider rewilding your own backyard. Options include the creation of pollinator gardens to replace lawn areas, or rain gardens instead of traditional storm drains. We will need to work together to increase the development, awareness and support of these important efforts.

Thank you for your continued support,

Lawrence J. F. Taft

Lawrence J. F. Taft

Keepsakes

Perhaps you have something from your parents or grandparents that you consider a keepsake that brings you joy. According to Webster's dictionary, a keepsake is "anything kept, or given to be kept, as a token of friendship or affection; remembrance."

A bride may keep her wedding dress for years as a treasured keepsake, and pass it to her daughter to wear in her own wedding. An athlete may keep a uniform as a remembrance of the glory days of competition and victory. We all cherish our keepsakes.

Audubon has keepsakes as well. Webster's phrase "anything...given to be kept, as a token of friendship" applies perfectly to our endowments. These have been "given to be kept" in perpetuity as a "token of friendship" and support for our charitable mission.

The principal of an endowment fund is held in a permanent pool of invested funds with only the net earnings, or a portion thereof, used to meet the purposes described in the endowment agreement. The balance is reinvested so the amount available to spend in future years will keep pace with inflation. For example, an endowment designed to provide annual support of the operating budget of the Audubon Society of Rhode Island does just that.

Every year, these keepsakes remind us of the friendship and loyalty of the donors who provided them. Endowments can carry the name of the donors or the name of someone a donor wants to honor or memorialize. Endowments can provide annual "gifts" for the general purposes of Audubon, or be targeted for more specific things.

Endowments can be created with cash, securities, real estate, patents or other assets of value. They may be funded during life or at death, or by a combination of the two.

We have been honored to receive some wonderful keepsakes at Audubon. Would you like to create one as a token of your friendship and support? Please call Jeff Hall, senior director of advancement, at 401-949-5454 x 3017.

STORM WARNINGS

AUDUBON LOOKS TO NATURE-BASED SOLUTIONS IN THE FIGHT AGAINST CLIMATE CHANGE

By Todd McLeish

On Food Truck Fridays at Roger Williams Park, some of those in attendance set up portable picnic tables at what look like attractive patios near the park's carousel and Japanese garden to enjoy the festivities. The park's deputy superintendent, Brian Byrnes, has even received kudos from residents for constructing the patios.

But they're not patios at all. Instead, they are pathways of permeable pavement that direct stormwater to a containment area to remove sediment. The water then travels on to natural filtration zones to decontaminate the roadway runoff while it seeps into the water table. They are among 42 installations constructed throughout the park and used by the Providence Stormwater Innovation Center, where green infrastructure is helping to improve water quality in the park's ponds while demonstrating nature-based solutions to one of the leading causes of water pollution in the state.

"We're getting heavier rains now, and those storms are likely to get even more severe due to climate change. With more roads and more houses, we're replacing natural areas with surfaces that don't allow rainwater to soak in," said Ryan Kopp, Audubon's stormwater coordinator. "With all these impervious surfaces, the water picks up fertilizers, pesticides, oils and sand and runs into the gutter and into the closest water body and eventually into Narragansett Bay. Those pollutants cause major water quality issues in urban ponds that impair habitat, wildlife and people."

The infrastructure installed at Roger Williams Park is helping to rectify the problem. At one site near the seal house, where a large pipe once delivered runoff directly into the adjacent pond, stormwater now runs through a multi-stage system of sediment removal and contaminant filtration areas that look to the uninitiated like an attractive series of natural landscape features.

Nearby, across from the park's bandstand, a 100-yard long bioretention area planted with native wetland plants collects water diverted from the road, through a rocky swale and under a paved walkway, where natural filtration of pollutants occurs.

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What appear to be patios are actually pathways of permeable pavement that direct stormwater to a containment area to remove sediment. The water then travels on to natural filtration zones to decontaminate the roadway runoff while it seeps into the water table.

STORM WARNINGS

Continued from page 3

A bioretention area is another word for a rain garden, Kopp said. It s a wet area where the plants are doing more of the work. The water filters down through the soil, and the plants uptake the pollutants while also providing habitat for pollinators, birds and other wildlife.

While the 42 stormwater installations at the park are designed specifically for each site, all have similar elements: an inlet structure where water enters from the roadway, a weir of rocks that slows the movement of water to allow sediments to settle, a treatment area of sand and soil where microbes attack the pollutants, and aesthetically pleasing plantings to provide wildlife habitat. Many also have an overflow system to reduce flooding when the volume of runoff is especially high.

The stormwater installations were constructed in 2019 and 2020 at a cost of $1.5 million in response to a consent agreement between the City of Providence and the Rhode Island Department of Environmental Management. While it cost a little more to install than traditional stormwater management systems, it is much less expensive to maintain, making it a good investment for the city.

But it s more than just a natural way to reduce the impact of roadway runoff on area ponds. It has also become a valuable tool for training and public education.

The installation and maintenance of these structures has been a learning process for all of us, said Byrnes. But as we trained our staff, I realized we could train the parks and public works staff from other cities as well, most of whom are also facing consent agreements. The Department of Transportation sends their staff, too.

Audubon Stormwater Coordinator Ryan Kopp installs water monitoring equipment at Roger Williams Park.

> ***"There's no question that plants, soil and stormwater installations can help clean polluted water. Our monitoring efforts take it to the next step"***
>
> Ryan Kopp
>
> *Audubon Stormwater Coordinator*

That s how Audubon got involved. Working with the Rhode Island Green Infrastructure Coalition, Audubon applied for a grant from Restore America s Estuaries to turn the Roger Williams Park stormwater management system into a public education and training center for innovative stormwater technologies. In partnership with the City of Providence, Roger Williams Park Conservancy, University of Rhode Island, University of New Hampshire Stormwater Center, Rhode Island Department of Transportation, and The Nature Conservancy, Audubon is showcasing nature-

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Like other areas in Rhode Island, Fisherville Brook Wildlife Refuge in Exeter also saw record-high levels of flooding in 2010. However, nature responds much better to the inundation of water than human landscapes. The water rose very high at Fisherville, but also receded quickly.

Stormwater Outreach

The Providence Stormwater Innovation Center has numerous opportunities for the public to get involved and learn more about how green infrastructure can reduce stormwater runoff and improve water quality in local ponds and other waterways.

Training for parks, public works and other municipal officials, as well as civil engineers, construction workers and others involved in the design, construction and maintenance of stormwater management infrastructure, are offered several times each year. Multiple classes are available each a combination of classroom learning and hands-on training targeting different job responsibilities.

Volunteers are always sought to participate in the URI Watershed Watch program, which monitors water quality at hundreds of water bodies around the state, including the ponds at Roger Williams Park. Several times each year, park volunteers are also needed for the Cyanobacteria Monitoring Program, an EPA-led effort to track algae blooms using a smartphone app or water testing kits.

In addition, ten Picture Posts have been installed around the park where visitors can take pictures of the stormwater infrastructure to document changes in vegetation, sedimentation and the appearance and disappearance of algae blooms over time. Photos can be uploaded to the Picture Post website for review by Stormwater Innovation Center staff.

For those just seeking to learn more about green infrastructure while enjoying a fun day with their family, the second annual Rain Harvest Arts Festival will be held on June 12 at Roger Williams Park, where visual and performance artists, environmental scientists and educators will share their inspirations and engage the public in learning about stormwater and water quality.

Providence
Stormwater
Innovation
Center

Learn more at *stormwaterinnovation.org*

COLLABORATION IS HER SUPERPOWER

AUDUBON SENIOR DIRECTOR OF POLICY MEG KERR HEADS FOR RETIREMENT IN JUNE AFTER THREE DECADES OF ENVIRONMENTAL LEADERSHIP IN RHODE ISLAND.

By Alan Rosenberg

Michael Stultz, DEM

Meg Kerr (left) greets RIDEM Director Janet Coit at the podium for the Bee Rally on June 19, 2018. Kerr orchestrated the event that brought hundreds to the RI Statehouse to support pollinator health and habitats.

Meg Kerr started running regularly in college, and it soon became an addiction. She runs nearly every day, baseball cap on her head, hair pulled back in a ponytail, sensible sweaters or stylish scarves traded -- when weather permits -- for shorts and a T-shirt. Sometimes, says Amy Moses, director of Rhode Island s Conservation Law Foundation, Kerr has been known to run down the steps from a meeting at the State House to get to a tennis match.

It s my mental thinking time, Kerr says, to solve my problems and the world s problems. She has run more than 20 marathons -- including the Boston Marathon, three times. And, she says, running those 26-mile races took determination. The first one I signed up for, I got pregnant. And I was really frustrated, she says with a laugh. I was trained and ready to go, but I couldn t find a doctor anywhere to tell me it was okay. I finally ran 18 miles, because they said that was okay.

Kerr s laugh and smile are ready as she talks about her life and career. And her strength and determination are still evident as she heads for retirement after five years as senior policy director of the Audubon Society of Rhode Island, and three decades as an environmental leader in the state.

Even as COVID-19 has forced a halt to the in-person meetings with other environmentalists that she thrives on, she moved on-line with her work, including virtual training programs and the official launch of the Providence Stormwater Innovation Center, a partnership between Audubon and six other organizations.

She was undaunted, says Janet Coit, director of the Rhode Island Department of Environmental Management. She put on a virtual event, never missing a beat. That s a legacy that will live on long after her. (You can find the center, and its lessons for both the public and professionals, at stormwaterinnovation.org.)

Environmentalism isn t just a job for Kerr. She was raised with it, at a time when Earth Day hadn t yet been invented. I was born in 1955, and my parents recycled, she remembers. They had to drive a couple of towns away to where there were bins, and we recycled. They composted. And my mother hung up laundry, rather than using a dryer. I still hang up my laundry. I like it that way.

Kerr was raised in Pleasantville, in New York s Westchester County, near New York City. She got her bachelor s degree -- with honors -- in marine biology, at Brown University.

That s where she met and married her husband, environmental toxicologist Bob Vanderslice. After graduation, they left Rhode Island, and she worked in a Florida lab for a year before getting her master s in public health from the University of North Carolina.

Please turn to page 6

Meg Kerr (fourth from left) and Audubon intern Caroline Jones (center) celebrate Governor Gina Raimondo signing environmental legislation.

MEG KERR HEADS FOR RETIREMENT

Continued from page 5

But after a decade working in North Carolina, Virginia and Washington, D.C. -- she was a scientist with the U.S. Environmental Protection Agency -- the couple wanted to be closer to their families in the Northeast. So in 1990, they moved back to Rhode Island.

Since then, she has been a mainstay on the state s environmental scene. With three and then four children, she worked part-time at first, then full-time, with the Rhode Island Rivers Council, the Narragansett Bay Estuary Program and Clean Water Action, before joining the Audubon in January 2016.

Among the most important aspects of my job is finding the right people to help lead Audubon, explained Audubon Executive Director Larry Taft. When former policy director Eugenia Marks retired after 32 years of a stellar career, I knew that it would take a special person to fill her shoes and continue to move Audubon s advocacy efforts forward.

I knew Meg s reputation as a respected voice for the environment and witnessed her skills first hand through her volunteer service on the Audubon Issues Committee. I was delighted when she officially joined our team. Meg has been a role model for Audubon staff, volunteers and supporters.

Meg has directed Audubon s policy issues with skill and determination for five years, Taft said. She also developed many strong partnerships along the way -- one of her greatest strengths. Wherever she has gone, she has built coalitions and friendships as well as policies and events.

Collaboration is her superpower, says Sheila Dormody, director of climate and cities for The Nature Conservancy s Rhode Island chapter. When there are disagreements in Rhode Island s environmental movement, she says, Kerr works her magic in a way that does not call attention to itself. She picks up the phone and calls this person and that person, and this person and that person until understanding is reached.

In conversations with groups such as the Chamber of Commerce and Rhode Island s Realtors, says the Conservation Law Foundation s Moses, Kerr does something powerful: She s a really good listener. By listening, she opens lines of communication that can pay off in cooperation. Kerr, she said, can also translate environmental concerns into practical terms lawmakers can understand.

At the State House, Moses said, Kerr testified on a recent climate-change bill. She brought home the impact climate has on birds, and told them about its importance to her [Audubon] members, who are voters. And there are thousands of them. Thousands of voters meant a voice legislators might be willing to heed.

Meg Kerr was instrumental in developing the Nature at Work campaign to support healthy pollinator habitat through the Green Infrastructure Coalition.

Rupert Friday, Meg Kerr, Richard Grant and Representative McEntee at the Land & Water Summit where Grant received the Blueways award for river conservation.

Meg Kerr and her husband Bob Vanderslice testify in support of PFAS Chemical regulation at a pre-pandemic hearing at the Rhode Island State House in 2020.

Advocates at the State House (Kerr is third from left) working on the Rhode Island plastic bag ban.

Priscilla De La Cruz, president of the Environment Council of Rhode Island, has felt the impact of Kerr s gentle persuasion in her own life. While De La Cruz was still in graduate school and taking part in council meetings, she says, Kerr -- then the president -- phoned her: I want to enlist you as president-elect. When De La Cruz protested that she wasn t ready, she recalls, Kerr reminded her that I stepped up to be the president ... because no one else would. Now she was looking for a new generation to take the reins. Besides, De La Cruz would only be agreeing to become president-elect; you have a year to decide whether to actually be president. And after a year, De La Cruz adds with a chuckle, there I was, taking on the role. As she knew I would.

Rupert Friday, executive director of the Rhode Island Land Trust Council, worked with Kerr to found the annual Land and Water Conservation Summits that for a decade and a half brought together hundreds of environmentalists from around the state. Friday recalls her not just rolling up her sleeves to help find a diverse slate of speakers -- equity is a key concern of Kerr s, her colleagues say -- but turning the summits into a family affair. Her mom would volunteer with us, he remembered, helping to organize the other volunteers. And after her mother s death, husband Bob would take part. Her kids would be labeling mailings at night while watching TV.

Kerr s long list of other accomplishments includes leading a climate-change legislation campaign in 2014; organizing the Bee Rally at the State House, which supports pollinators; furthering climate change education and initiatives within the Audubon Society; and being a founder of the Rhode Island Green Infrastructure Coalition, which promotes nature-based solutions to runoff pollution.

State Rep. Lauren Carson, a co-founder of the Coalition, praises the focus, discipline and unique leadership skills Kerr has brought to the group. She s the backbone of it, Carson says. She keeps us on track. Kerr has a wealth of knowledge, she adds, even of things most environmentalists might miss. Recently, Carson wanted to let Kerr know about a bill that wasn t in the environmental affairs committee, but in the small-business committee, where it would be easy to overlook. Lo and behold, Meg had already seen it, Carson says. That says a little about her being thorough. Carson echoes Kerr s other friends and colleagues in saying her retirement leaves huge, huge shoes to fill. But they also emphasize that just because Kerr is leaving her job at Audubon, she s not going to stop being connected to, and involved with, the environmental community. Meg is not going anywhere, Carson says. We re already trying to figure out new roles for her.

Still, Kerr s life will change. And that s okay with her. I m happy to still be here, she said in February, as her retirement neared. I love to work. I love the people I work with. But, she said, she s old enough to retire. And just as she once wanted to spend time with her children, now she wants to be with her grandchildren -- there are three, with a fourth on the way. There s only so many hours in the day, she says, and I ve got other things I want to do. Like run.

Alan Rosenberg is a retired executive editor of The Providence Journal. Reach him at AlanRosenbergRI@gmail.com.

Kerr hikes Fisherville Brook Wildlife Refuge with her family in 2006. Her mother (center) was a skilled naturalist who inspired Meg at a young age to care about nature.

Meg Kerr and Senator Dawn Euer after the Senator received Audubon's legislative award in 2019.

Kerr speaking at an event in the Rhode Island State House.

Kerr and her daughter Rita Kerr-Vanderslice running the Narragansett half marathon in 2018.

Audubon Society of Rhode Island

CLIMATE CHANGE IN THE OCEAN STATE

As temperatures and sea levels rise, and unstable climate patterns increase, humans, birds, animals, fish and plants will all struggle with ecosystem change. Issues of the 2021 Audubon Report will highlight several climate-threatened bird species and their habitats.

Climate Change, Wetlands, and Virginia Rails

By Laura Carberry and Scott Ruhren

Climate change is likely to bring complicated and sometimes unpredictable impacts to Rhode Island's wetlands. More frequent storms have led to flooding of ecosystems. Sea level rise is already degrading coastal marshes. Summer droughts will dry out freshwater wetlands, stressing the plants and animals that live there.

Virginia Rail

Many species that rely on Rhode Island's wetlands will likely be affected. Unfortunately, some birds like Virginia Rails (*Rallus limicola*) may not be able to adapt to these increasing threats. Many Virginia Rails spend their spring and summer in Rhode Island. These small chicken-like wetland birds are elusive. They are well camouflaged and secretive, preferring marshes with dense vegetation where they hide, nest and hunt. One characteristic of rails is their reluctance to fly, preferring to run across the mud and through the cattails. Many birders identify them by their call, unable to spot them.

Laura Carberry, Audubon refuge manager, sees and hears Virginia Rails at many Audubon wildlife refuges. "They live in fresh, brackish and saltwater marshes. I have found them in Bristol in the cattails, Audubon's saltmarsh along Quonochontaug Pond in Charlestown, and in hay fields during fall migration. Overall, they are fairly common in Rhode Island marshes."

For decades Virginia Rails were threatened by hunting and ongoing habitat loss from wetland destruction remains a concern. Audubon continues to protect freshwater and coastal wetlands throughout Rhode Island to support these important birds. Fresh water marshes are rails' preferred hunting and nesting habitats. Now the future of marshes and Virginia Rails is further threatened by climate change.

We have witnessed more frequent freshwater marsh flooding from severe storms and heavy rainfall. This flood water often carries pollutants into marshes. Coastal flooding from sea level rise introduces excess salt to some marshes and endangers nests, eggs and young rails. An opposite climate impact may occur during Rhode Island summers. More frequent droughts and record-breaking heat in recent summers stresses vegetation, dries up wetlands, and reduces food needed by rails.

Virginia Rails are but one example of Rhode Island birds vulnerable to the many impacts of climate change.

Additional New England Climate-threatened Wetland Species:

- Spotted Sandpiper
- American Black Duck
- Swamp Sparrow
- Marsh Wren
- Wood Duck

WHAT CAN YOU DO?

Purchase green power to heat and cool your home and insulate it well.

Reduce energy use. Drive less (walk, bike and use public transportation) and create an energy-efficient home.

Support land conservation. Forests remove CO_2 from the atmosphere, provide shade to keep the landscape cooler, and are critical habitat for birds and wildlife.

Landscape and garden with native plants that provide food, cover and nesting materials for birds and wildlife.

Stay informed. Support legislation and community efforts that reduce carbon emissions. Sign up for advocacy emails by contacting Meg Kerr (mkerr@asri.org)

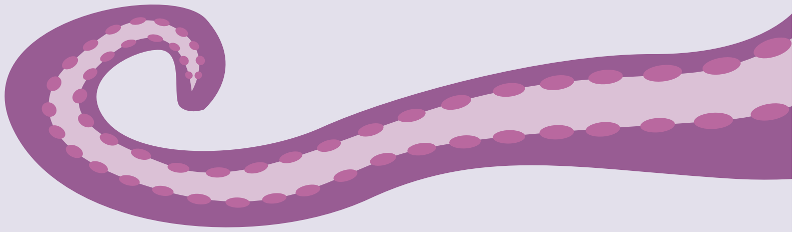
All Things Octopus at the Nature Center and Aquarium!

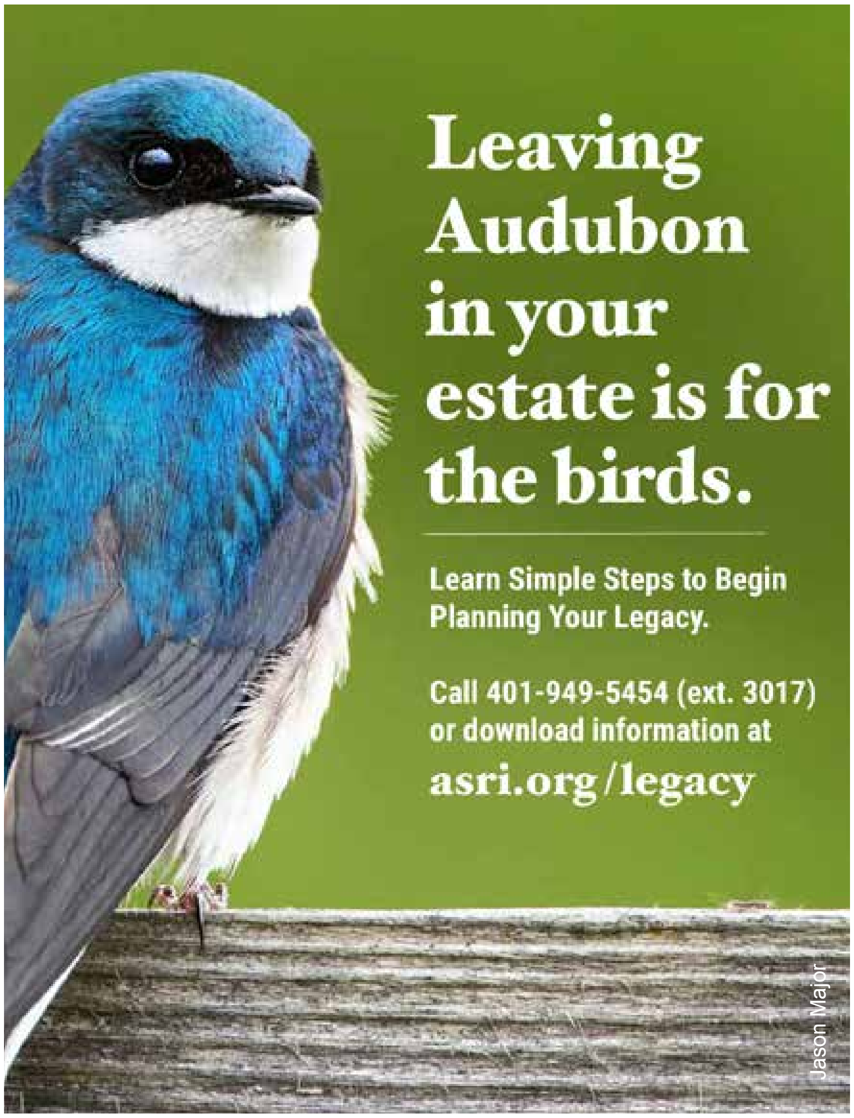
A one-year-old female California two-spot octopus has recently joined the other sea creatures in the aquarium exhibits at Audubon Nature Center and Aquarium. Donated by the Marine Biological Laboratory (MBL) / Marine Resource Center at Wood Hole Oceanographic Institute in Massachusetts, the octopus was bred and raised at the MBL as part of an octopus behavior study. These creatures are native to the Pacific Ocean and the coast of California and their normal lifespan is two years. This is the third octopus the MBL has donated to Audubon.

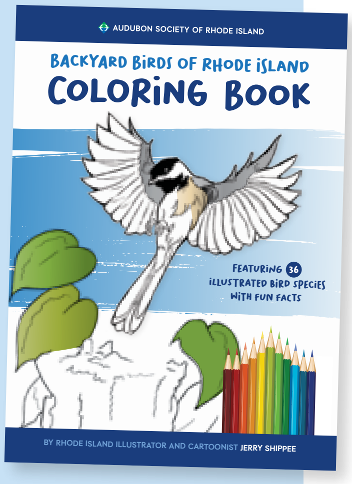
Also new at the Nature Center, beautiful murals enhancing the habitat exhibits have been installed by Claire Hoogeboom, a graduate of University of Rhode Island. Claire worked as an AmeriCorps member for Audubon from 2011 to 2012. She is currently an environmental consultant with LEC Environmental Consultants, Inc. Audubon thanks Claire for her time and talent. The new murals are stunning!

A new mural highlights the California two-spot octopus that visitors can observe at the Audubon Nature Center and Aquarium.

Visit the Nature Center and Aquarium and check out our new resident octopus and the new murals that enhance the exhibit hall.

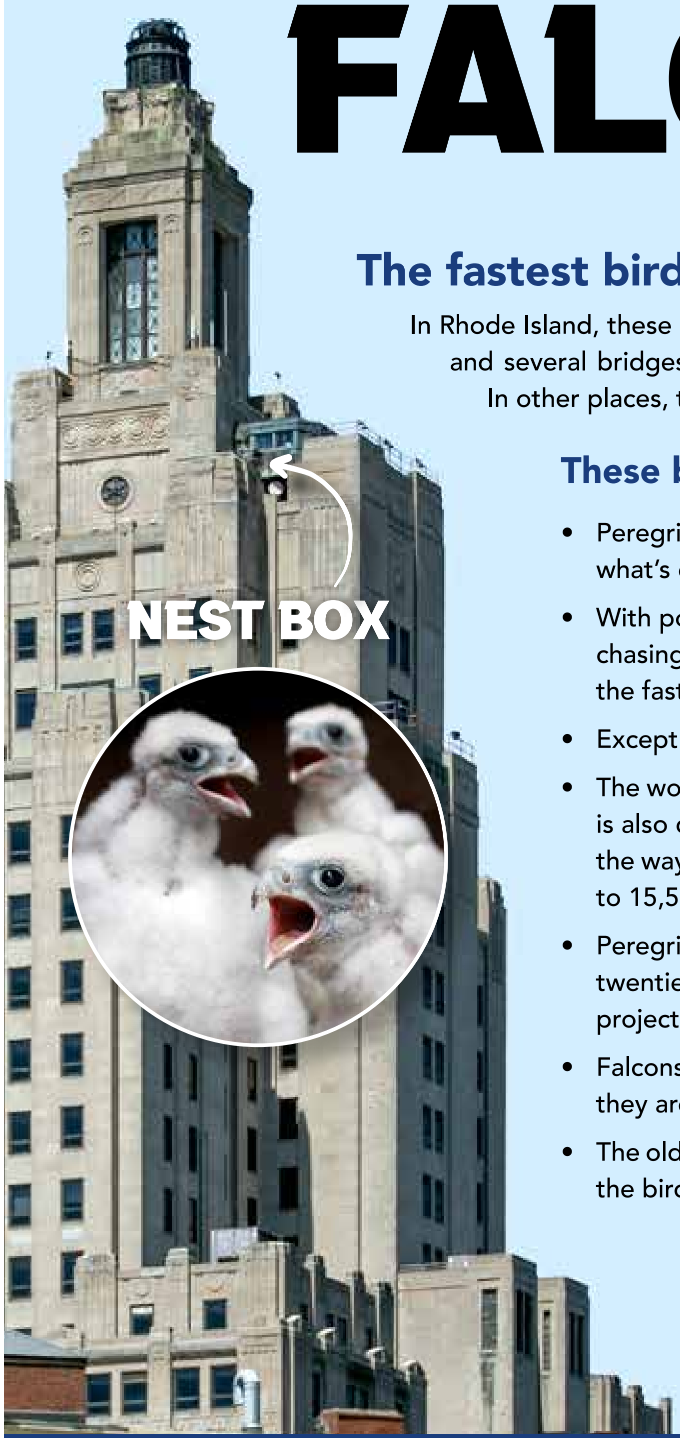






By Lauren Parmelee, Senior Director of Education

PEREGRINE FALCONS



The fastest bird on the planet, Peregrine Falcons like the high life.

In Rhode Island, these amazing birds nest on top of the Superman Building in Providence, City Hall in Pawtucket, and several bridges including the Mount Hope, the Sakonnet, the Newport and the Jamestown/Verrazano. In other places, they nest high on steep cliffs.

These beautiful and fascinating birds have some amazing adaptations:

- Peregrine Falcons hunt medium-sized birds that they catch by diving on them from great heights in what's called a stoop. They sometimes do take-out meals, eating their prey on the wing!
- With pointed wings, Peregrine Falcons are built for speed. They can reach 67 miles per hour when chasing prey. In a stoop, they have been recorded at more than 200 miles per hour, making them the fastest bird on earth.
- Except for Antarctica, Peregrine Falcons can be found on every continent and many islands.
- The word peregrine is from the Latin word *peregrinus*, meaning foreign or coming from abroad but is also defined as roving, wandering, traveling, and migratory. The Tundra subspecies will travel all the way from its breeding grounds in the Artic to South America to winter and then back again – up to 15,500 miles in a year.
- Peregrine Falcons, Ospreys, Bald Eagles and other raptor populations crashed during the mid-twentieth century due to the use of harmful chemical pesticides. Strong environmental laws and projects to reintroduce these birds to New England have helped their populations rebound.
- Falcons have the same sharp talons, curved beaks and sharp eyesight that other raptors have, but they are more closely related to parrots than hawks or owls.
- The oldest Peregrine Falcon recorded was at least 19 years and 9 months old. Scientists had banded the bird in 1992 in Minnesota, and found it again in 2012 in the same state.

WATCH PEREGRINE FALCONS HATCH, GROW AND FLEDGE IN PROVIDENCE!

Visit asri.org/view/peregrine-cam

AUDUBON NATURE TOURS & PROGRAMS

June – August 2021 For more information and to register, visit the events calendar at www.asri.org.

SAFETY NOTICE: Face masks and social distancing are required for all programs. Participants must bring their own masks.

BIRDING WITH AUDUBON

Advance registration is required for all programs.

WEDNESDAY MORNING BIRD WALKS

Locations determined weekly and will be sent to registered participants in advance. *Every Wednesday through June 2021.*

BOATS AND BIRDS!

Two Dates Offered. Join a morning of kayaking and birding on Frying Pan Pond in search of wetland birds. Departs from 203B Arcadia Rd, Hope Valley, RI; *June 3, 10, 2021; 10:00 am–12:00 pm.*

BLUEBIRD WALK AND TALK

Caratunk Wildlife Refuge, 301 Brown Avenue, Seekonk, MA; *June 6, 2021; 8:00–10:00 am.*

BIRD SONGS AND CALLS AT CARATUNK

Caratunk Wildlife Refuge, 301 Brown Avenue, Seekonk, MA; *June 10, 2021; 6:00–8:00 pm.*

NESTING BIRDS AT CARATUNK

Caratunk Wildlife Refuge, 301 Brown Avenue, Seekonk, MA; *June 13, 2021; 8:00–10:00 am.*

BIRD SONGS AND CALLS AT FORT WILDLIFE REFUGE

Fort Nature Refuge, (Rt. 5), 1443 Providence Pike, North Smithfield, RI; *June 14, 2021; 6:00–8:00 pm.*

BREEDING BIRDS AT CARATUNK

Caratunk Wildlife Refuge, 301 Brown Avenue, Seekonk, MA; *June 27, 2021; 8:00–10:00 am.*

FLYING FORAGERS AT CARATUNK

Caratunk Wildlife Refuge, 301 Brown Avenue, Seekonk, MA; *July 9, 2021; 6:00–8:00 pm.*

FLYING FORAGERS AT POWDER MILL LEDGES

Powder Mill Ledges Wildlife Refuge, 12 Sanderson Road, Smithfield, RI; *July 19, 2021; 6:00–8:00 pm.*

SHOREBIRD CLASS - A VIRTUAL PROGRAM

This program pairs nicely with Audubon's Shorebird Van Trip on August 27, 2021. Virtual Program; *August 25, 2021; 7:00–8:00 pm.*

SHOREBIRD VAN TRIP

Hop aboard the Audubon van with an expert guide and visit some of Rhode Island's best shorebird locations. Departs from Fisherville Brook Wildlife Refuge, 99 Pardon Joslin Road, Exeter, RI; *August 27, 2021; 7:00 am–3:00 pm.*

BIRD BANDING

Multiple Dates Offered. Audubon Nature Center and Aquarium, 1401 Hope Street, Bristol, RI; *June 12, July 10, August 14, 2021; 9:15–11:15 am.*

Deirdre Robinson

SAVE THE DATE

BLOCK ISLAND BIRDING WEEKEND

October 1–3, 2021

Block Island in autumn becomes the resting place for thousands of migrating birds. More than 125 species of birds have been seen here on fall weekends! Space is limited so please register early.

Visit the events calendar at asri.org for details.

Peter Green

ALL ABOUT BATS

BATS AT EPPLEY

Join a fascinating presentation on these creatures, and then venture outside in search of the plentiful resident bats in this area.
Marion Eppley Wildlife Refuge, Dugway Bridge Road, West Kingston, RI; *June 18, 2021; 8:00–9:30 pm.*

BATS AND BEER

Join Audubon and learn about the fascinating world of bats while tasting some local brew.
Fisherville Brook Wildlife Refuge, 99 Pardon Joslin Road, Exeter, RI; *July 23, 2021; 7:30–9:00 pm.*

AUDUBON NATURE CENTER AND AQUARIUM

1401 Hope Street (Route 114), Bristol, RI

PROGRAMS, LECTURES & WORKSHOPS FOR ADULTS

TEXTILE RECYCLING EVENT

For a list of accepted items, visit the events calendar at asri.org.
June 9 – 14, 2021; 9:30 am–4:30 pm

SEA GLASS JEWELRY WORKSHOP

Three Dates Offered.
June 6, July 18, August 22, 2021. 1:30–3:00 pm.

BIRD BANDING

Three Dates Offered.
June 12, July 10, August 14, 2021; 9:15–11:15 am.

EDIBLE WILD PLANTS WALK

Join expert forager Russ Cohen for an evening ramble to learn about edible plants.
June 17, 2021; 4:00–6:30 pm

COMPOSTING LECTURE

June 19, 2021; 10:00–11:30 am.

BEECOLOGY: POLLINATOR WORKSHOP

Dr. Rob Gegear, biology professor at UMass Dartmouth, will give an indoor presentation for 30 minutes, followed by a two-hour workshop in the Rose-Pollinator Discovery Garden.
June 26, 2021; 11:00 am–1:30 pm.

DRAWING AND PAINTING CLASS FOR ADULTS: HERONS AND EGRETS

Join watercolor artist Elizabeth O'Connell for an afternoon of art on our covered patio. *June 27, 2021; 1:00–3:30 pm.*

NATURE AS I SEE IT. PHOTOGRAPHY EXHIBIT BY KAREN JOHNSON-NIEUWENDIJK.

July 5 – August 28, 2021; 9:00 am–5:00 pm.

WILDLIFE AND HABITAT CONSERVATION TALK WITH LOU PERROTTI

Roger Williams Park Zoo Director of Conservation Programs Lou Perrotti will discuss the contributions to wildlife and habitat conservation happening in RI and around the globe!
July 8, 2021; 7:00–8:00 pm.

CERAMIC POT PAINTING FOR ADULTS

July 22, 2021; 7:00–9:00 pm.

THE OCEAN IN A CUP

Make a one-of-a-kind ocean scene in a tea cup!
August 28, 2021; 10:00 am–12:00 pm.

FAMILY PROGRAMS & CLASSES FOR CHILDREN

CITIZENS BANK FREE FAMILY FUN DAY

Thanks to Citizens Bank, the Nature Center and Aquarium is open free to the public the first Saturday of every month. Join us for nature stories, animal discoveries, hikes and more. No need to register!
June 5, July 3, August 14, 2021; 10:00 am–3:00 pm

WETLAND WADDLES

July 6, 2021; 10:30 am–11:30 am.

PAINTING NATURE IN WATERCOLOR

Two session program for kids. Children explore watercolor techniques, learn to mix colors, and enjoy painting from nature.
August 4 and August 11, 2021; 9:00–11:00 am.

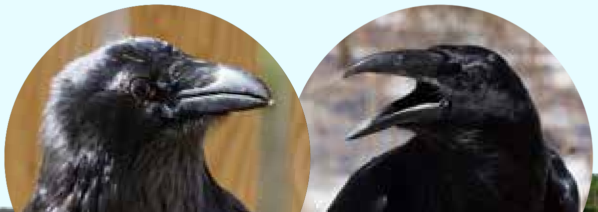
SHORE HIKE WITH AUDUBON

August 11, 2021; 1:00–2:30 pm.

AUDUBON COLORING BOOK WORKSHOP

Kids join artist Jerry Shippee and learn how to draw, ink, and watercolor images of local birds!
August 17, 2021; 1:00–3:00 pm.

Meet Lucy & Zach!



Register online through the events calendar at www.asri.org or call (401) 949-5454 ext. 3014.

POWDER MILL LEDGES WILDLIFE REFUGE

12 Sanderson Road, Smithfield, RI

See page 11 for Powder Mill Ledges Birding Programs.

LET'S TAKE A WALK: PRESCHOOL PROGRAM
June 8, 2021; 10:00–11:00 am: Pine Forest
July 6, 2021; 10:00–11:00 am: Field and Meadow
August 10, 2021; 10:00–11:00 am: Pond

INTRODUCTION TO TREE I.D.
June 26, 2021; 2:00–4:00 pm.

FIREFLIES!
July 9, 2021; 7:00–9:00 pm

CATCHIN' BUGS
July 10, 2021; 2:00–3:30 pm.

SUMMER MEADOW
July 14, 2021; 10:00–11:30 am

SUMMER WILDFLOWERS
July 24, 2021; 10:00 am-12:00 pm.

KOOKY CRAYFISH!
August 14, 2021; 3:00-4:30 pm.

NIGHT SINGERS
August 16, 2021; 6:00 -7:30 pm.

WILD MUSHROOM WORKSHOP
August 28, 2021 ; 10:00 am–1:00 pm

FISHERVILLE BROOK WILDLIFE REFUGE

99 Pardon Joslin Road, Exeter, RI

ICE CREAM AND LIGHTNING BUGS
June 23, 2021; 7:30–9:30 pm.

BATS AND BEER
Join an evening of fun discussing the fascinating world of bats and tasting some local brew.
July 23, 2021; 7:30–9:00 pm.

CARATUNK WILDLIFE REFUGE

301 Brown Avenue, Seekonk, MA

See page 11 for Caratunk Birding Programs.

WHITE BARN STORY TIME
Three Dates and Nature Themes.
June 3, July 1, August 5, 2021; 2:00–3:00 pm.

KID'S INVESTIGATIONS
For ages 8 and up with accompanying adults.
June 16, 2021; 9:00–11:30 am: Hike the Refuge.
July 21, 2021; 9:00–11:30 am: Pond Exploration:
August 18, 2021; 9:00–11:30 am: Field and Forest.

WONDERFUL WILDFLOWER WALK
June 29, 2021 ; 9:00–11:00 am.

COUNT BUTTERFLIES AS THEY FLUTTER BY!
Two Dates Offered.
July 21, August 11, 2021; 10:00 am–12:00 pm.

POND & STREAM EXPLORATION
July 23, 2021; 9:00-11:00 am.

SUMMER NATURE WALK THROUGH CARATUNK
July 25, 2021; 8:00–10:00 am.

NIGHT SINGERS
Enjoy an evening walk to listen for crickets, grasshoppers and katydids. *August 20, 2021; 6:00–8:00 pm.*

FORT WILDLIFE REFUGE

1443 Providence Pike (Route 5), North Smithfield, RI

SKUNK CABBAGE AND LADY SLIPPERS WALK
June 10, 2021; 10:00 am–12:00 pm.

BIRD SONGS AND CALLS
June 14, 2021; 6:00–8:00 pm.

SUMMER TWILIGHT HIKE
August 19, 2021; 7:00–9:00 pm.

A Virtual Program:

AUDUBON MURAL WALKING TOUR

July 29, 2021; 7:00–8:15 pm

The Audubon Bird Mural Project is an impressive effort to create murals of over 300 North American birds. Most are in the Harlem neighborhoods of New York City and all of the species painted are threatened by climate change. Over 40 murals will be shown in a 50-minute virtual slide presentation with live commentary.

Register online through the events calendar at www.asri.org or call (401) 949-5454 ext. 3014.

This infiltration basin, built in 2019, is designed to reduce phosphorous loads by 11.6 lbs/year rather than being discharged directly to the ponds at Roger Williams Park.

Audubon summer camp instructor Joe Koger explains to a young camper how the Caratunk rain garden works.

The Woonasquatucket River Watershed Council worked with homeowners in Elmhurst for stormwater retrofits, including redirecting roof downspouts away from the road and toward existing landscaping, installation of permeable pavers in place of walkways, and construction of rain gardens.

STORM WARNINGS

Continued from page 4

based stormwater practices, coordinating the training of municipal workers, engineers and construction companies on how to build and maintain them, and educating the community about how green infrastructure can improve water quality.

To demonstrate that the technologies actually work, Kopp is overseeing a series of water quality monitoring efforts with citizen scientists, University of New Hampshire experts, and Providence Parks Department personnel.

"There's no question that plants, soil and stormwater installations can help clean polluted water," Kopp said. "Our monitoring efforts take it to the next step."

Some of the monitoring is based on the level of maintenance required. If storm drains get clogged and water isn't diverted off the roadway, then even the best constructed filtration isn't going to work. So time lapse cameras, data loggers and visual assessments are determining whether the system is working effectively. Kopp also oversees volunteers with several water quality monitoring programs, like Watershed Watch at URI, to measure improvements in water quality. Next up will be a stormwater training program for homeowners that will teach residents how to build a rain garden and use a rain barrel to reduce runoff from their roofs, as well as teach other strategies that will reduce human impact on local properties.

Roger Williams Park isn't the only place in the region where green infrastructure is helping to address concerns about flooding and stormwater management. Audubon's Caratunk Wildlife Refuge in Seekonk is a prime example. The refuge parking lot often flooded during spring, making it a muddy mess and impairing access to visitors. The accumulating water also carried silt, salt and other roadway runoff into a nearby pond, which impacted the Wood Ducks and other species that make their home there. Pollutants from runoff can harm or kill pond plants, algae, fish and animals such as ducks, heron and otter that feed in the ponds. Even the soil that erodes is harmful to aquatic life because it blocks sunlight entering water and covers sensitive animals that live on the bottom.

So, in 2018, Audubon installed a permeable pavement system and an adjacent rain garden that has greatly reduced the problems associated with flooding. "It really does work," said Scott Ruhren, Audubon's senior director of conservation. "And it's very visible to refuge visitors, which is what we wanted. It gets people talking about it and asking questions, and it always comes up in conversation when we lead walks." A rain garden was also constructed at the Nature Center and Aquarium in Bristol to capture the flow of stormwater, reduce flooding and stop erosion around the property.

According to Ruhren, green infrastructure is modeled after the natural properties of wetlands, which he said serve as "the kidneys of the world," absorbing and slowly releasing water to alleviate flooding. Wetlands also collect sediments, filter pollutants and reduce downstream flooding.

"We all remember what happened in 2010 when the Pawtuxet River flooded and inundated the malls and other low-lying areas due to the lack of natural streams and wetlands from urbanization," he said. "That's a sharp contrast to what happened at our Fisherville Brook Wildlife Refuge, where

> ***“With many impacts of climate change already being felt, our efforts with green infrastructure will hopefully create more resilient landscapes for people and wildlife.”***
>
> Scott Ruhren
> *Audubon Senior Director of Conservation*

we have streams and ponds and wetlands that responded much better to the inundation of water than happens in human landscapes. The water got high at Fisherville, but it wasn t Armageddon. Scientists expect climate change to lead to more frequent intense storms and flooding. This is not just a prediction; it is happening already, and green infrastructure could play a major role in decreasing impacts to our natural and human communities.

These nature-based stormwater remedies are being installed in all kinds of settings around the state. In the Elmhurst neighborhood of Providence, for instance, the Woonasquatucket River Watershed Council is demonstrating how local residents can manage the stormwater from their properties so it doesn t carry pollutants into the nearby Pleasant Valley Stream. The Council surveyed 120 households in 2017 to gauge interest in the idea, then selected 12 houses for retrofits, which included redirecting roof downspouts away from the road and toward existing landscaping, installation of permeable pavers in place of walkways, and construction of rain gardens. Workshops on the construction of rain barrels reached another 24 households.

The response from the community was very positive, said Alicia Lehrer, executive director of the Council. It was hard to decide where to do the projects because so many people wanted to be included. Some were even willing to pay for it. There s a lot of knowledge in the community now about the value of green infrastructure.

The Council has been an early adopter of innovative stormwater management tools. In 2015, it installed what it calls a green infrastructure showcase at Riverside Park in Olneyville to demonstrate numerous sustainable stormwater strategies and technologies, and later it removed some pavement from a bank parking lot to create a walkway with adjacent bioretention areas. It makes it more like a park instead of the concrete jungle it was for a long time, Lehrer said. Now, as we build a new section of the greenway from Eagle Square to Providence Place Mall, we ll be adding a great deal of additional green infrastructure.

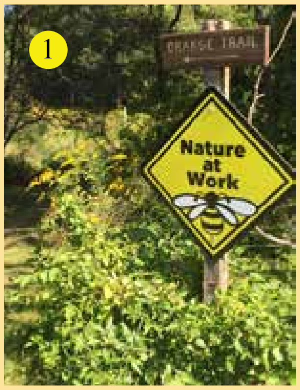
In Cranston, the city s environmental program manager, Ed Tally, is working to install green infrastructure to address water quality and stormwater management issues at Spectacle Pond, Still-

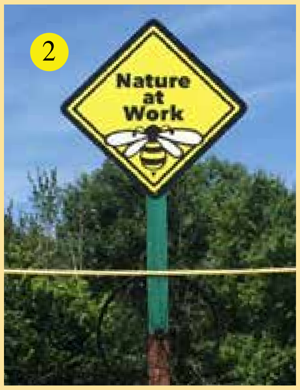
Please turn to page 19

Bee Aware: Nature at Work!

Audubon is a member of the Green Infrastructure Coalition, formed in 2015 to promote nature-based stormwater solutions and to advocate for sustainable funding for stormwater management. The Coalition focuses on training stormwater professionals on construction and maintenance of green stormwater projects. They also work to implement signage to communicate the multiple benefits and encourage support for these projects.

In a partnership with the Rhode Island Department of Transportation (RIDOT), the Green Infrastructure Coalition designs the signs and RIDOT prints them at no cost for Coalition partners. The Nature at Work signs are especially popular and promote healthy habitat for pollinators. They can be spotted around the state, and Audubon has posted them to highlight pollinator plantings at many wildlife refuges.





Nature at Work signs highlight habitat at:
1. Audubon Powder Mill Ledges, Smithfield. 2. Riverside Park, Providence.
3. Rhode Island College, Providence. 4 & 5: Audubon Nature Center and Aquarium, Bristol.

By Scott Ruhren, Senior Director of Conservation

Water Creatures Are Effective Indicators

What lives in and around ponds, lakes, streams and rivers can reveal so much about the health of the ecosystem. Some species are so tightly linked to water quality that their numbers rise and fall as conditions change. We call these indicator species or bioindicators and they are valuable monitoring tools.

Probably the best-known freshwater indicators are insects that spend their juvenile stages in water. Stoneflies, mayflies and caddisflies are used by scientists, environmental organizations, teachers and students to create ranking systems for water quality. Audubon also uses these aquatic insects as indicators to describe the health of systems and to teach about life in water.

Algae can also be a key indicator of aquatic health, but are more difficult to identify. Presence or absence of algae and associated organisms can indicate changes in chemicals, pH, temperature and oxygen in the water. Certain algae are sensitive to changing water characteristics and may disappear, while others thrive in disturbed systems.

Algae are the foundation of food webs in freshwater and marine ecosystems. Algae in lakes and rivers exist as plankton (free-floating or swimming) and attached greenish films. The health and abundance of algae can ultimately affect other organisms within the system. This is called bottom-up control. Unfortunately, these intricate, life-sustaining relationships can get out of balance from habitat disturbance, climate change and pollution.

Some key nutrients for aquatic life can become pollutants when levels rise. Phosphorous is usually the nutrient that keeps freshwater algal communities in check; it is a limiting nutrient. However, in the 60s and 70s large amounts entered ponds, streams and rivers through wastewater. Nitrogen, also a key nutrient for life, can be flushed into bodies of water in unhealthy amounts from sources such as lawn fertilizer and animal and human waste. Eutrophication excessively high nutrients of ponds and lakes disrupts the natural balance and community of freshwater systems. Habitat degradation and road runoff also can lead to eutrophication.

When levels of these nutrients increase, an algal bloom can result. Not all bloom algae are toxic. but the toxic and smelly ones get noticed. Cyanobacteria, often called blue-green algae, are species that dominate many eutrophic systems. When nutrients such as phosphorous and nitrogen increase, many of these algae-like cyanobacteria bloom. Some produce chemicals that are toxic to fish, other pond organisms, and people. They can make water taste and smell foul, and deplete oxygen that can lead to the death of other aquatic organisms such as mollusks and fish.

If Rhode Island s aquatic systems are to remain healthy, productive and safe, sources of pollution need to be reduced. With storms increasing from climate change, stormwater needs to be slowed or captured and steps taken to filter it. The little creatures in the water, bioindicators, can reveal how we are doing.

Top: An algae bloom in Roger Williams Park, Providence. Inset: Cynobacteria. Bottom: Scientists from The Nature Conservancy in Rhode Island engage the public at a water monitoring event.

Providence Stormwater Innovation Center

Rain Harvest Arts Festival

at Roger Williams Park, Providence

A community celebration of water quality and habitat improvements

June 12, 2021; 2:00–6:00 pm. Free and open to the public.

Festivities will include work by local artists and students, storytelling, music, chalk drawings, scavenger hunts, tours of the Stormwater Innovation Center, and more!

Sponsored by Rhode Island Department of Transportation, Wood Environmental, Horsley Witten Group, Restore America's Estuaries, SNEP Network, Robbins De Beaumont Foundation.

Jim Hooper

Run Wild for Nature

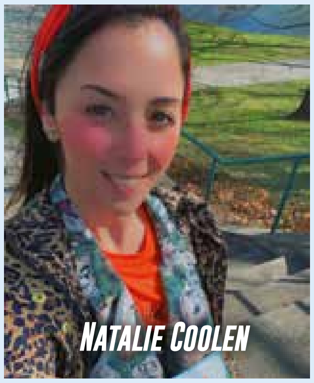
AUDUBON SOCIETY OF RHODE ISLAND

VIRTUAL 5K RUN/WALK

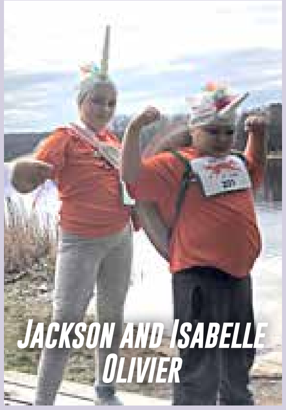
There was an unusually large number of orange foxes running and walking across Rhode Island during Earth Week – they were spotted in nine other states as well!

Thank you to all the individual participants, families, and peer-to-peer fundraisers who made the first Run Wild for Nature a HUGE success! Audubon also wishes to acknowledge Bank of America for their support of this event.

TOP INDIVIDUAL PEER-TO-PEER FUNDRAISER & BEST DRESSED:

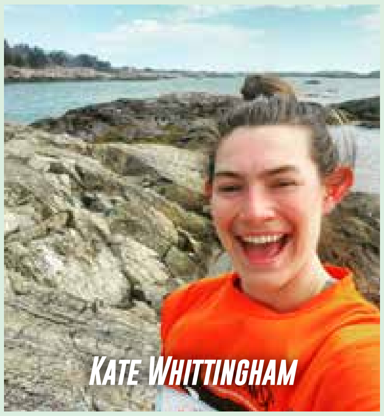

NATALIE COOLEN

MORE BEST DRESSED:


JACKSON AND ISABELLE OLIVIER


REBECCA SHANNON AND FAMILY

BEST SCENERY:


KATE WHITTINGHAM

BEST PLOGGERS: (JOGGERS WHO PICK UP LITTER)


JILL ANN PARRETT


PAMELA CAMPELLONE BARTOLINI


VERÓNICA TOLEDO


TRACY ANDREWS-MELLOUISE


EMILY LEJEUNE

Planning a Celebration or Special Event?

Audubon Nature Center and Aquarium

Located in historic Bristol, Rhode Island, just 30 minutes from Providence, Newport, and Fall River, the award-wining Audubon Nature Center and Aquarium is one of Rhode Island's most unique meeting venues. With beautiful trails, award-winning exhibits and aquarium, large meeting, reception, and outdoor patio space, the Nature Center provides a setting that will captivate guests.

Ideal for weddings, showers, or the site of your next business meeting or off-site retreat.

For availability and reservations, visit asri.org and click on *services* or contact Anne DiMonti at (401) 949-5454 x3116 or adimonti@asri.org.

Act On Climate 2021

April 10, 2021 was a landmark day for Rhode Islanders and the environment. Act On Climate was signed into law by Governor Daniel McKee, preparing Rhode Island for a cleaner and healthier future by reducing greenhouse-gas emissions to net-zero by 2050.

This critical law gives the state enforceable, economy wide greenhouse gas reduction goals that are based on the best science. It sets Rhode Island up for a rapid transition to renewable energy and the green jobs that will accompany the transition. The bill ensures that Rhode Island will plan for an equitable transition for environmental justice populations and a process for these communities to provide input on the plans. With this in place, Rhode Island will not be out-competed by neighboring Connecticut and Massachusetts when the upcoming federal investments in climate infrastructure become available.

Act On Climate

S0078. Senators Euer, Ruggerio, McCaffrey, Goodwin, Sosnowski, Coyne, Cano, Murray, Valverde, Kallman
H5445. Representatives Carson, Cortvriend, Blazejewski, Kazarian, Ruggiero, Donovan, Speakman, Knight, McEntee, and Alzate

Audubon's legislative priorites for 2021 include the following:

The Ocean State Climate Adaptation and Resilience Fund (OSCAR)
Forest Conservation Act
Solar Siting Bill to Close the 10 MW Loophole.
Manage Neonicotinoid Pesticides

To learn more, visit: bit.ly/2021PrioritiesAudubon

Audubon Senior Director of Policy Meg Kerr (front row, second from right) and other environmental advocates with Governor Dan McKee (center) immediately after the bill was signed.

Life Scout Cleans Up at Powder Mill Ledges Wildlife Refuge

Each spring, the wind and snowmelt bring a significant amount of litter to the roadside at Powder Mill Ledges Wildlife Refuge in Smithfield. Heather Richards of Scout Troop 1 Gaspee Plateau, Warwick, completed many hours of community service by picking up trash at Powder Mill Ledges to keep roadside litter off the refuge and the Audubon headquarters entrance clean. She is working toward her Life Scout EPA badge. Audubon thanks Heather for her service.

Heather Richards, Life Scout from Troop 1 Gaspee Plateau, Warwick

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STORM WARNINGS

Continued from page 15

house Cove and other sites around the city. A bioretention swale constructed along Narragansett Boulevard has helped reduce nutrients flowing into Stillhouse Cove and the Providence River and provided the city with a boost of confidence to tackle additional projects.

At Spectacle Pond, where there is limited public property to accommodate green infrastructure, Tally is targeting what he calls end-of-road projects where stormwater can be treated before it runs into the pond. There are a lot of these sites, so if we can get the design right and use it on the next street and the next street, then it doesn't become too costly, Tally said. The repeatability of it is something we like.

With every installation, Tally is learning additional lessons about how to make them more effective without overspending. And having the Providence Stormwater Innovation Center just a few miles up the road makes it easy for him to compare his installations to those at Roger Williams Park to ensure he is doing it right.

 The projects we're doing aren't designed to take the whole watershed and treat every half inch of rain that falls, but in pockets like this, you can start to build that compounding effect where this one is treating this area, that one's treating that area, and hopefully in tandem it will all work out, he said. If we can keep putting them in as the budget becomes available, we can keep making progress.

Scott Ruhren agrees.

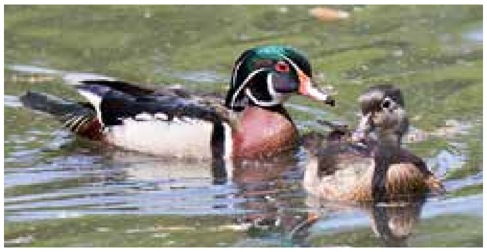
 The overarching goal of all of this is improved water quality, which is why Audubon has taken a leadership role at Roger Williams Park. Everything flows downhill, Ruhren said. Urban areas are traditionally bypassed in conservation programs, so the Providence Stormwater Innovation Center and these other efforts are a way to solve a lot of problems and improve water quality in our urban areas. With many impacts of climate change already being felt, our efforts with green infrastructure will hopefully create more resilient landscapes for people and wildlife.

LET'S GO Birding

By Laura Carberry

Jump Right In!


Peter Green



When most of our winter ducks have headed north to nest, we welcome back one of the most colorful ducks in North America. Once threatened with extinction by habitat loss and hunting, Wood Ducks are now thriving due to habitat protection and nest box programs.

Male or drake Wood Ducks have green helmet-like heads with intricate white chin straps, black cheeks and chestnut chests dotted with white. Their backs are hues of purples, blues, creams and black. The females or hens are made up of browns and grays but also have that tell tale helmet shape head with a white eye ring. These ducks also have clawed webbed feet that help them perch on trees! Wood Ducks have the largest eyes of all ducks, which make it easier for them to navigate through trees. They are also known to have the greatest sense of smell, helping them to find nuts, berries, insects and aquatic plants to eat. They have strong flight skills, and have been known to fly up to 30 mph.

In March and April these spectacular ducks arrive in Rhode Island, looking for nest sites in our wooded swamps. They are secretive but can often be seen or heard when they search for cavities to make their nests. These nest holes can be 5 to 60 feet off the ground. Usually they nest near water, but some nesting cavities have been found over a mile from ponds and rivers if nest sites are limited. To increase nest site availability, human-made nest boxes can be installed near ponds, rivers and wet areas.

Once a site has been picked, the female will lay between 6 to 16 eggs in a downy nest. In some areas with limited nest sites, females are known to egg-dump. This means they lay their eggs in another female s nest. Some hens have been seen with up to 29 eggs! After about a month of incubation, all the chicks hatch. Only one day later, the mother calls her young from the nest. Each chick uses its clawed feet to climb out of the hole and make its jump, sometimes up to 60 feet, to either the ground or water. Because of their small size they just bounce as they land, unhurt. For about two months they follow their mother, learning to survive on their own.

During the summer months these birds can be hard to spot as they hide in the shadows and the reeds. But come fall, Wood Ducks start to flock together in larger groups. This is when the adult males and females molt their feathers. The males resemble the females at this time. The coloring helps them camouflage while they molt their flight feathers, which makes it difficult to fly.

Wood Ducks can be found throughout Rhode Island and nest on most of Audubon s Wildlife Refuges. Although the species tends to be secretive, if you are quiet and one of the first folks on the trails in the morning, you might catch a glimpse. Some less secretive Wood Ducks that are more comfortable around human activity nest at Roger Williams Park. They would be proud to show you their beautiful colors!


Ed Hughes

At Center: Laura Carberry repairs and cleans Wood Duck boxes before the ducks arrive to nest, and has found egg shell remains.

New Audubon Digital Membership Cards

Enjoy a NEW way to access your Audubon Society of Rhode Island membership! Audubon Members can now receive digital membership cards by email, a convenient, eco-friendly alternative to printed cards. Just download and saved to your smartphone.

Going digital means you never have to worry about forgetting your membership card when visiting the Audubon Nature Center and Aquarium, in addition to being more environmentally friendly and helping to reduce administrative costs. After joining or renewing your membership, you will receive an email within a week with a link to download your card.

Digital membership cards provide quick links to our website, information on your membership benefits, Audubon contact information and helpful renewal notifications all in one place your fingertips! If you would prefer to receive a paper membership card, please contact Julius Lundy at jlundy@asri.org or 401-949-5454 ext. 3018.

Thank You!

PARTNERS IN CONSERVATION

The companies listed below have demonstrated their significant commitment to the quality of life in Rhode Island and to conserving natural habitats through stewardship and education.

- **Botanical Center Conservancy**
- **Citizens Bank**
- **Cox Communications**
- **CVS Health**
- **DBVW Architects**
- **Green Energy Consumers Alliance, Inc.**
- **Lyons & Zaremba, Inc.**
- **Partridge Snow & Hahn LLP**
- **R.I. Beekeepers Association**
- **Target**
- **United Natural Foods, Inc.**
- **Van Liew Trust Company**
- **Whole Foods Market**

GIFTS IN HONOR

The people listed below have been honored by family and friends who found a gift to the Audubon Society of Rhode Island to be the most meaningful way to celebrate someone important in their lives.

In Honor of: Sarah Becker
From: Daniel Becker

In Honor of: William Cotton
From: Haley Cotton

In Honor of: Alice Desautels
From: Jeanne and Eugene Desautels

In Honor of: Richard Donnelly
From: Phyllis Kay and Richard Donnelly

In Honor of: Daniel Echt
From: Irene Leddy

In Honor of: Larry Geuss, MD
From: Anne and Michael Szostak

In Honor of: Dana Palka
From: Lindsay Mckeever

In Honor of: Lauren Parmelee
From: Stacy Couto

In Honor of: Cynthia Warren
From: Deborah Linnell

MEMORIALS

Memorials serve and support the conservation and protection of Rhode Island's environment. During the past quarter, the families and friends of people listed below have chosen to remember their loved ones through a gift to the Audubon Society of Rhode Island.

In Memory of: Nancy Lisi-Asprinio
From: Jenny Cunningham
Michael Mort
Brad Goff
Mary Ann Lisi

In Memory of: Clarice Grear
From: Laura Burkett
David Chapman
Jeremy Furtado
Jeffrey Griffin and
Rebecca Martz-Griffin
Margaret Pelletier
Kirby Stephens
Nicole Pichette

In Memory of: Mary MacNeill
From: Jean Cella
Anne and David Wells

In memory of: Robert Mariani
From: Karen Berman
Barb Burke
Maria Franzen
Debbie and Gary Hicks
Paula Izeman

In memory of: Mary Lee Marini
From: Courtney Milan

In memory of: John and Judith McCarthy
From: Patricia and Christian DeFrancesco

In memory of: Michael Officer
From: Judith and Bob Bisceglia

In memory of: Thomas Pitts
From: Sherry and Nick Trepp

In memory of: Dean Rae
From: Paul Anagnostopoulos
H. Chris Der Vartanian
Scott C. Tsagarakis

AUDUBON SOCIETY OF RHODE ISLAND
1897 SOCIETY

Named for the year of the Audubon's founding, the 1897 Society honors those whose leadership gifts enable the Audubon Society of Rhode Island to advance its mission of protecting birds, other wildlife and their habitats through conservation, education and advocacy. Our donors can take satisfaction that their contributions have an immediate and lasting impact on the people, wildlife and natural beauty of Rhode Island.

The 1897 Society celebrates donors who give annually at the $1,000 to $10,000+ level as special contributors to our ongoing mission and shall be recognized at the following levels:

Leader — $1,000 to $2,499
Advocate — $2,500 to $4,999
Conservator — $5,000 to $7,499
Benefactor — $7,500 to $9,999
Visionary — $10,000+

If you wish to join the 1897 Society and help promote the values and mission of Audubon, please visit asri.org/leadership or contact Jeff Hall at 401-949-5454 ext. 3017.

In recognition of their philanthropic charity, members of the 1897 Society enjoy a variety of exclusive benefits, including invitations to member-only events and special communications.

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Audubon Society of Rhode Island 2022 Calendar

Do you have an outstanding bird photo taken in Rhode Island?

Submit your Image for Audubon's new 2022 calendar.

Deadline is September 13, 2021.

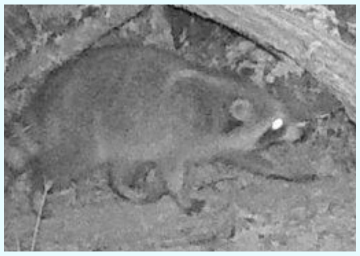
Visit asri.org/audubon-calendar.html for details.

Scott Slusarski

Wildlife Images from the Audubon Refuges

Audubon has unobtrusive wildlife cameras on wildlife refuges across the state. Located well off the trails in remote locations, they are used to monitor wildlife and any activity on the properties.

This winter we recorded a bobcat, racoon and coyote all near the same log, but at different dates and times. It is always fun to see what creatures are out and about on the Audubon Wildlife Refuges!



A Big Year for Osprey Fledglings

In 2020 monitors counted 303 Osprey fledglings, up from 212 fledglings in 2019.

Surprising to some who may notice their many nests along coastlines and riverbanks, Ospreys were listed as an endangered species in the 1970s. Their story of a healthy, rebounding population is a true environmental success story. Audubon Society of Rhode Island volunteers monitored over 239 Osprey nests in 2020, carefully recording the status of this raptor in the Ocean State. Audubon recorded a total of 303 Osprey fledglings in Rhode Island, up from 212 in 2019. There were just 8 fledglings in 1977, the year the program was founded.

For Osprey data by cities, towns and communities in Rhode Island, visit: asri.org/ospreyreport/2020.

Butch Lombardi

Caratunk Barn

The big white barn at Caratunk provides the perfect rural setting for weddings, showers, family reunions or meetings. Birthday parties for children are also offered.

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A Story Well Told

Editorial by Meg Kerr, Senior Director of Policy

Meg Kerr in 1993 with her parents and children at a family cottage on the St. Lawrence River.

Krystal Noiseux, a founding member of the Greater Providence Chapter of The Climate Reality Project, addressed a recent Audubon staff meeting. She encouraged everyone in attendance to develop and then practice a personal climate story to share with neighbors and friends. Personal stories help to engage others in thinking and acting on the climate crisis.

My climate story begins in Pleasantville, New York, a suburb of New York City, where I was born and raised. My life was anchored by two rivers the Hudson River near the Tappan Zee Bridge where my grandmother lived and the St. Lawrence River near its source at Lake Ontario where we spent our summers. I loved these rivers, but they were not clean. I clearly remember times when our Golden Retrievers were not allowed to go swimming because you could see human waste floating in the water.

When I went to college, I knew I wanted to be an environmental scientist with a focus on clean water. I found the perfect graduate program at the University of North Carolina at Chapel Hill and started my career working for the North Carolina state government in the water program focused on implementing the newly minted Clean Water Act.

Over the course of my years working on river and watershed management, I saw real improvements in water quality. Sewage treatment plants were built to treat human and industrial wastes. Water in the St. Lawrence River became visibly cleaner and paddlers can now be seen plying the Hudson River even in New York City. Here in Rhode Island, Narragansett Bay and the rivers that feed it are much cleaner than they were fifty years ago.

I reveled in the improvements. I knew that there were many environmental problems that were not getting better with time, but I took great joy in seeing that water quality was improving.

The floods of 2010 were my wakeup call. In late March, heavy rain fell on a landscape that was already soaked by previous rains. Rivers throughout Rhode Island flooded. The Pawtuxet River crested at 20.79 feet. Flooding shut down portions of Interstate 95, the Warwick Mall and damaged hundreds of homes and businesses, along with several wastewater treatment plants. For several days, essentially untreated wastewater flowed out of the three municipal treatment plants along the Pawtuxet River, discharging millions of gallons of waste into Narragansett Bay.

No one event is caused by climate change, but we know that increasingly intense storms are already happening and will happen with more frequency as climate change continues to affect the world s environment. The floods of 2010 made me realize that wastewater infrastructure throughout the state sits in harm s way because it is located on the coast or along a river. Intense storms also increase stormwater runoff, bringing additional pollutants to local waters. The water quality improvements we have seen in Rhode Island and throughout the world are significantly at risk due to climate change.

After this realization, climate change advocacy has centered my work. All the environmental issues we care about pale in comparison to climate change and we need to be all-in to address the crisis before us.

I am retiring at the end of June but I know that Audubon will continue to lead on climate change. And I will continue to support that work. I hope you do too.

Audubon Senior Director of Policy Meg Kerr heads for retirement after three decades of environmental leadership in Rhode Island. We are grateful for the many years she represented Audubon at the Statehouse and in many partner organizations. Meg has done exceptional policy work on behalf of the environment, and she will truly be missed.

AUDUBON SOCIETY OF RHODE ISLAND
REPORT
Volume 55, Number 2, Spring 2021

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Please pass this copy on to a friend or recycle. Thank you.

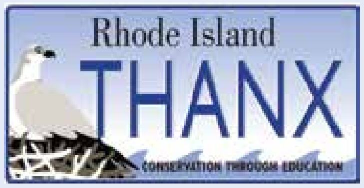
The Report is the Audubon Society's member newsletter and updates members on the current issues and actions of the Society, its staff and volunteers. We encourage your participation and you may send items that will be considered for publication to: Hope Foley, Managing Editor, Audubon Society of Rhode Island, 12 Sanderson Road, Smithfield, RI 02917 or by email to hfoley@asri.org.

Spot the Beetle, Stop the Beetle

Help prevent the spread of Asian Longhorned Beetle. When hiking the trails, look for signs of the beetle.

For more information on how to detect this destructive invasive insect, visit www.asri.org and click on "conservation."

Because of you, the Osprey License Plate has provided hundreds of children with the opportunity to learn about nature. Thank you.



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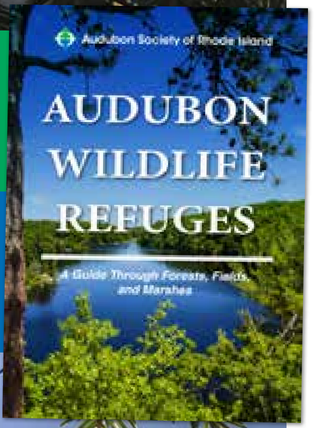

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Appendix C

Spectacle Pond Barrett Street Project

Executive Summary
Comprehensive Watershed Planning and Green Infrastructure Demonstration Project
Spectacle Pond, Cranston, RI

Project Summary

This project developed and began to implement a holistic approach to improve water quality to Spectacle Pond. This included developing a comprehensive plan to better direct the City's resources to address water quality problems in this urban pond. This project also included the construction of a underground infiltration stormwater treatment unit in the adjacent neighborhood as a demonstration project for both neighborhood residents and City DPW maintenance crews.

Applicant Organization Name and Address

City of Cranston
Cranston City Hall
869 Park Avenue
Cranston, RI 02910

Application Point of Contact and Project Leader

Edward Tally
Environmental Engineer
etally@cranstonri.org
401-780-3173

List of Partner Organizations

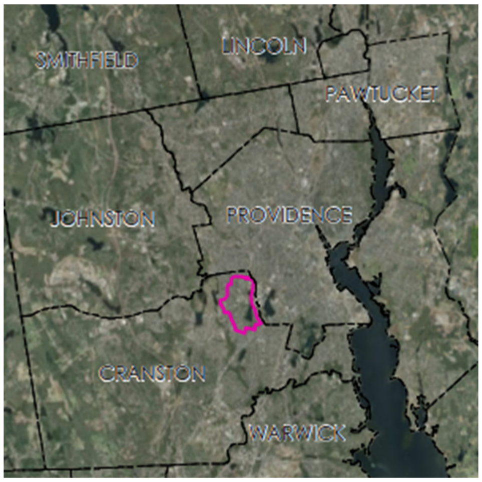
Save The Bay

Location of Project

Spectacle Pond, Cranston, RI
41°47'24.2"N 71°26'34.8"W

Cost

Grant Request $187,500 **Location**
Non-Federal Match $62,500; 33% Grant Match
Total $250,000



Spectacle Pond Watershed

Project Background:

Spectacle Pond is within a highly urbanized watershed located in the City of Cranston, Rhode Island. This pond is part of the Pawtuxet River watershed and is impaired for phosphorus-related impairments. Elevated phosphorus concentrations have resulted in a number of water quality impacts in this urban surface water. These impacts include substantial algal blooms and low dissolved oxygen conditions. A Total Maximum Daily Load (TMDL) has been prepared to restore this pond (September 2007).

Water quality issues in Spectacle Pond also influence water quality and the phosphorous impairment in the Roger Williams Park Pond system. Spectacle Pond serves as the headwaters to the Roger Williams Park Ponds system by overflowing into a culvert that drains to Mashapaug Pond that then discharges to the Roger Williams Park Ponds via culverts.

Spectacle Pond could be a significant surface water resource within this urban watershed. Residential neighborhoods abut the pond with existing road rights-of-ways that could provide access for canoes and kayaks. A public park also abuts the southeastern corner of the pond. Current water quality issues in the pond limit its value to these urban neighborhoods.

Figure 1-1: Spectacle Pond, Watershed, and Surrounding Area

Project Description:

In April, 2019 the City entered into a competitive grant application process with the Southeast New England Program (SNEP), funded by U.S. Environmental Protection Agency (EPA) through a collaboration with Restore America's Estuaries (RAE). In September, 2019 the City was selected for funding and entered into a grant agreement with RAE.

The major elements of this project were to:

- Complete a holistic assessment of the sources of phosphorus that addresses both internal and external sources and then develop a comprehensive plan that would allow the City of Cranston to direct its limited resources where it will achieve the greatest results for its investments.
- Install an underground stormwater treatment unit demonstration project in a watershed neighborhood to build support with residents to implement additional basins in the future.

The project was managed and coordinated by the City of Cranston's Department of Public Works. The City was supported by several other team members as follows:

- Fuss and O'Neill to develop the water quality improvement plans and planning and designing green infrastructure.
- Universal Excavating, a construction contractor, selected through a competitive public bidding process.
- Save the Bay, who collaborated with the City on the outreach components of the project and provide their expertise in site selection.

Major project tasks are described in further detail below.

1. **Prepare QAPP**: QAPP will follow USEPA guidance documents.

1. **Prepare Phosphorous Reduction Feasibility Study:** This study will include several major elements as follows.
   - ***Collect Data on Existing Conditions.*** This included targeted field assessment to better characterize actual watershed conditions as well as locate potential sites for a demonstration project.
   - ***Water Quality and Sediment Sampling.*** Water quality and sediment sampling was conducted to support the assessment of existing pond trophic status and quantification of nutrient loading from selected input tributaries and bottom sediment. Samples were collected to show any potential release of phosphorus from sediment. This included sampling of representative stormwater outfalls.
   - ***Estimate Phosphorus Budget.*** The phosphorus budget was estimated to identify the relative contribution of various sources required to develop a holistic phosphorus reduction plan.
   - ***Develop Strategies:*** Potential strategies to restore water quality were identified that incorporate structural and non-structural approaches that are targeted to maximize cost/benefit of future investments to restore water quality in Spectacle Pond and downstream waters.
   - ***Develop Final Report:*** In addition to documenting completed work and findings this report defined an overall implementation plan prioritizing the action items identified to restore water quality.

2. **Design and Construct Demonstration Project**
   - ***Identify Bioretention Basin Approach:*** Several types of bioretention basins exist. Conceptual designs were considered and ultimately an underground infiltration stormwater treatment unit was selected.
   - ***Identify Potential Demonstration Site:*** Based on potential sites identified in neighborhoods, and feedback from the City, Save the Bay, and neighborhood residents during outreach efforts, a demonstration site was selected.
   - ***Develop Design:*** Included collecting in-situ data on soils and groundwater and completing a site-specific design for the demonstration project including hydraulic and phosphorus removal calculations. Construction documents were prepared.
   - ***Bid Construction of Demonstration Project:*** The City bid the project and awarded the bid for construction to the lowest qualified bidder.
   - ***Complete Construction of Demonstration Project:*** The selected contractor completed the construction of the project under the supervision of the design engineer and the City in October 2022.

3. **Public Engagement:** Understand stormwater quality issues in general and how they impact Spectacle pond and review design plans.
   - **Watershed / Neighborhood and City residents:** On-site meeting with neighborhood residents where demonstration project is planned, where design plans will be reviewed and feedback received from neighbors. Witness demonstration project and how well it fits in their neighborhood.

Budget:

For this grant the City of Cranston did not use grant funding or match for staff and other City resources or to claim any indirect costs for the management of this project. This maximized the value of the SNEP investment in this project to preparing deliverables. The City provided its match as cash as funded by the City's existing budget.

Cost Item or Category	Cost Basis	RAE SNEP Request	Total Non-Fed Match	Match Source	Total Project Cost
Contractual					
Environmental Engineering Consultant	QAPP Development Spectacle Pond Feasibility Study and Bioretention Basin Designs	$146,250	$48,750	Cash from City Budget	$195,000
General Contractor for Bioretention Basin Construction and Engineering	Construction of Bioretention Basin	$41,250	$13,750	Cash from City Budget	$55,000
Total Contractual		$187,500	$62,500		$250,000

Spectacle Pond Limnological Investigation:

The Limnological Investigation was finalized in December of 2022. For background, the estimated phosphorus load to Spectacle Pond is 476 lbs/year. The Total Maximum Daily Loads for Phosphorus to Address 9 Eutrophic Ponds in Rhode Island (TMDL) completed by RIDEM (September 2007) required that the phosphorus load be reduced by 326 lbs/yr, a 68% reduction. The Limnological Investigation was conducted to estimate the relative contribution of internal cycling to total phosphorus loading in the pond. This was achieved by collecting bathymetric data, sediment and water quality sampling, and calculating of internal loading. The results of the study indicate that only 1% of the phosphorus loading or approximately 5.6lbs is from internal sources. External sources including those from stormwater runoff, inlet sources, and waterfowl dominate the P loading at 99%. This study also explored recommendations including infiltration systems, tree filters, bioswales, and limiting access of waterfowl to areas that drain to pond. More detailed review of potential external treatment options was explored in the Spectacle Pond Phosphorus Reduction Plan.

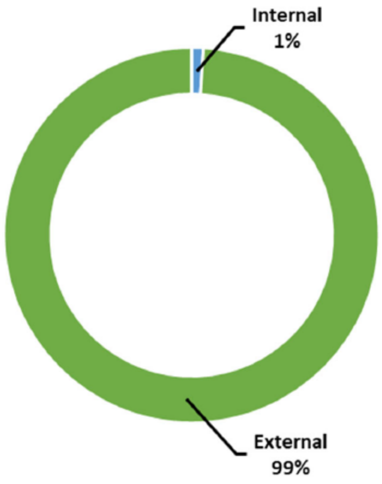


Figure 5-1: Relative Contributions of Internal and External Loading

Construction

- In April of 2022 competitive bids were received from three qualified contractors. Universal Excavating, INC was the lowest bidder at $94,500.00 and was selected by the City to install the stormwater control. Based on the design the underground stormwater treatment unit removes approximately 0.52 lbs of total phosphorus per year.
- In October, 2022 Universal Excavating Inc. mobilized and has ordered materials for the project. There were delays in the construction of the underground infiltration dure mainly to delays in the availability of the proprietary manhole structure, acting as the sediment forebay. The contractor and the DPW communicated with the neighbors on schedule and any coordination.
- Construction occurred over a three-day period with final restoration completed on October 31, 2022.
- $87,350 was spent on the construction of the underground infiltration stormwater treatment unit which include installation of two manholes with proprietary swirl inserts and three rows of underground infiltration chambers. The bid price of $94,500 was reduced because it was determined during construction that the replacement of the sewer main and associated sewer street laterals are in sound condition. The City match was originally budgeted at $13,750 but due to the increase bid pricing (mentioned above) increased to $46,100.00. This increase resulted in the City providing an additional match of $32,350.

Outreach Communications and Project Partners:

- Public meetings were held on at the end of Barrett Street on and October 26, 2022 to discuss the Barrett Street water quality improvement project. An initial invite was sent for an October 13, 2022 meeting onsite however, there was a significant rain event requiring it to be rescheduled.

- The City and FandO solicited input from Save the Bay regarding demonstration site selection included input from Save the Bay. Save the Bay also participated in the outreach activity on October 26, 2022. The City is grateful for the partnership we have with Save the Bay. Specifically, Wenley Ferguson productive review and input produces an improved result.

Spectacle Pond Phosphorus Reduction Plan:

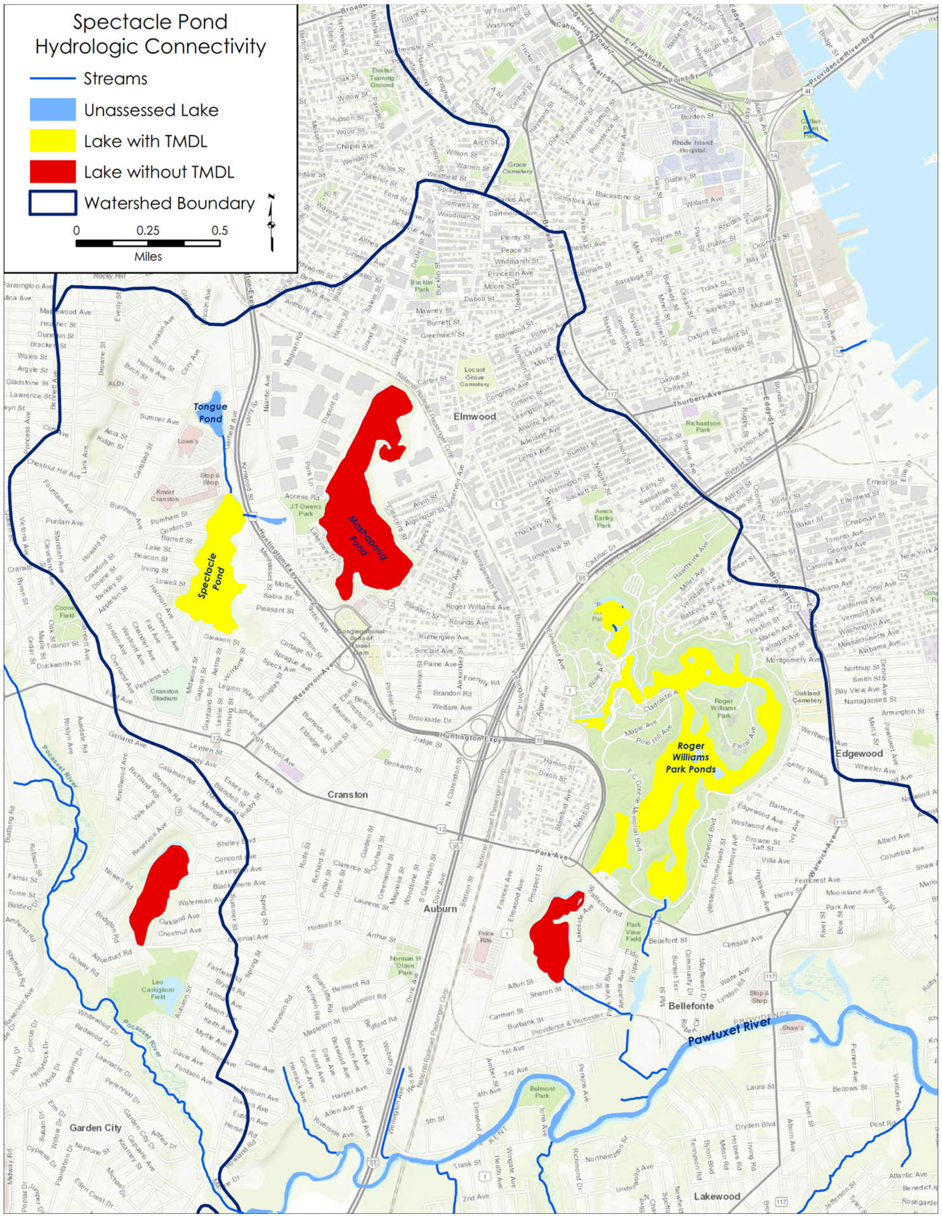
The phosphorus reduction plan was developed through desktop review and site visits. Fourteen (14) locations were selected for consideration. Structural and non-structural BMPs were evaluated for the identified sites. Partnership opportunities were evaluated including Twin Oaks, RIDOT, and Stadium Elementary School. Cost estimates were developed with an estimated $1.85 million in structural projects. The following expected benefits were calculated if all the structural improvements were implemented:

- Total phosphorus removal of 7.8 lbs
- TSS load reduction of 4,195 lbs

It is important to note these costs do not consider the ongoing costs associated with long term operation and maintenance which increases the operating budget of and utilization of City resources. With extremely tight City budgets and the return on investment on a per lb removal basis it will be challenging to secure City match for continued investment in these structural measures. The City will be working closely with RIDEM, funding organizations, and seeking out collaborative partners to make water quality improvements more manageable.

MAPS, PHOTOS, DRAWINGS, AND ADDITIONAL INFORMATION

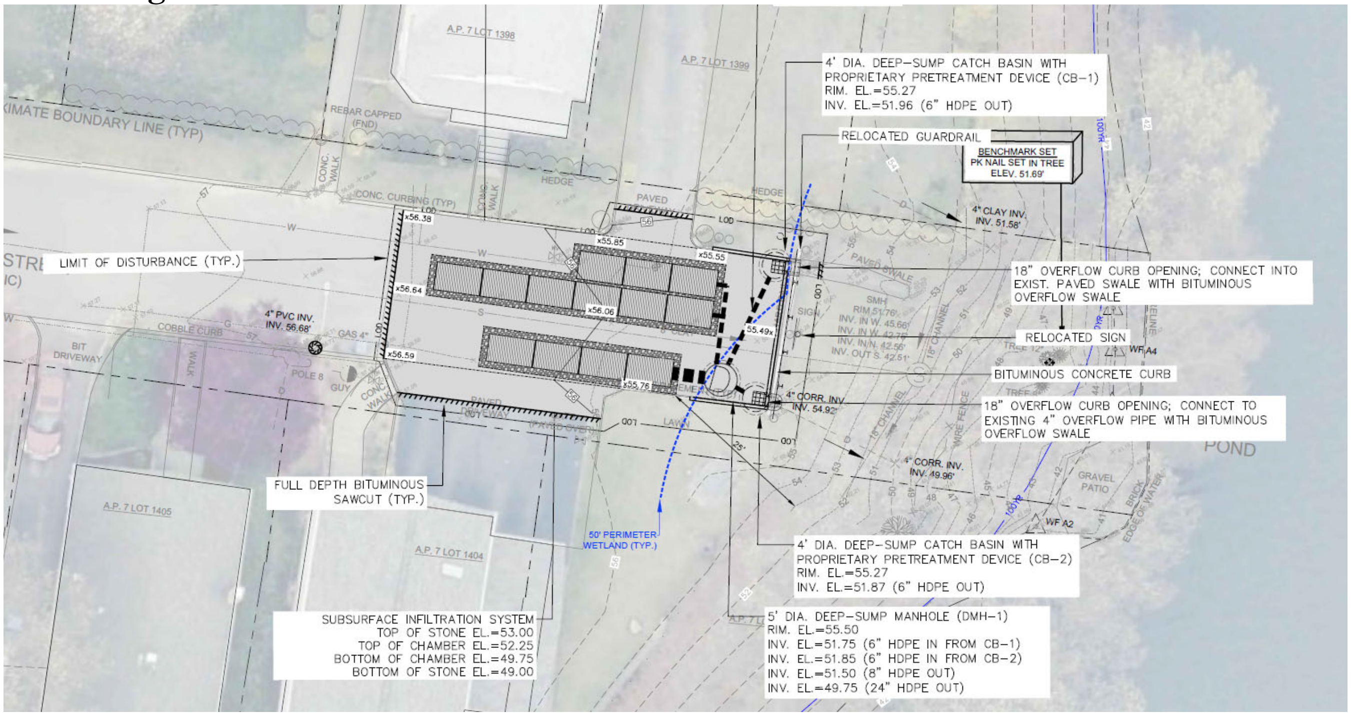
Spectacle Pond Location Relative to Mashapaug and Roger Williams Park Ponds



Dead end portion of Barrett Street selected for the underground infiltration stormwater treatment unit.

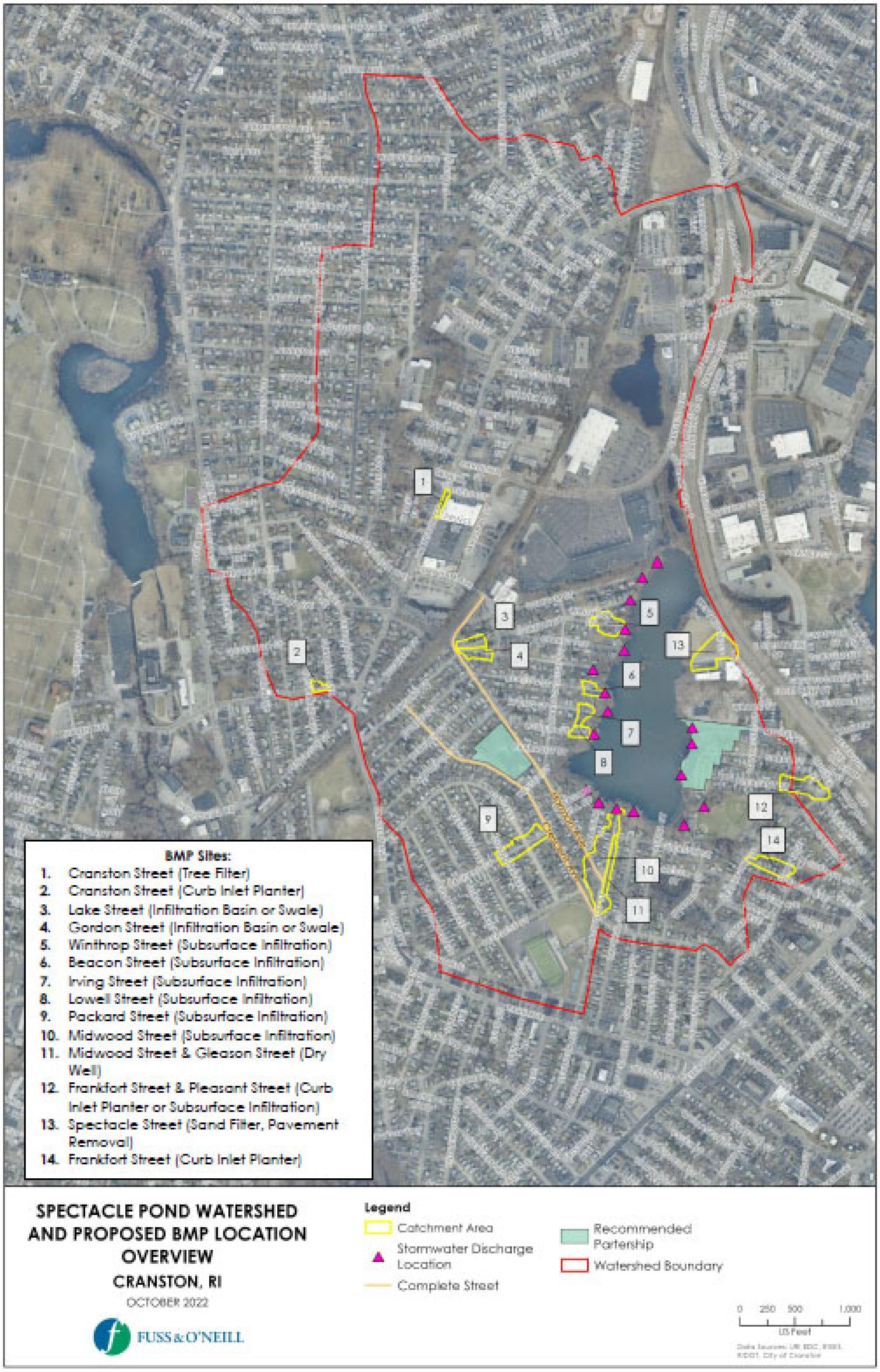
Test pits were dug at the end of Winthrop Street and Barrett Street by Cranston DPW staff.

Final design of stormwater treatment unit at the end of Barrett Street:



Setting deep sump catch basins with pretreatment device and diversion manholes. (October, 2022)

Fourteen locations identified in the Phosphorus Reduction Plan for future consideration to improve water quality in the Spectacle Pond watershed:



SNEP Watershed Grants
City of Cranston Progress Report

1. Cover Information

January 30, 2023

Comprehensive Watershed Planning and Green Infrastructure Demonstration Project at Spectacle Pond, Cranston, RI
Contract Number: SNEPWG19-2-CRAN
September 1, 2019 – February 28, 2022
(extension granted to December 31, 2022)

City of Cranston, Rhode Island
Edward Tally
401-780-3173
etally@cranstonRI.org

Report type:

Final – (Progress Report # 7 – July 1, 2022 – December 31, 2022)

2. Project Report Narrative

This project provided a prioritized plan to reduce nutrient loadings and improve water quality to the impaired Spectacle Pond as well as improve conditions in Mashapaug and Roger Williams Park Ponds further downstream. The project included the construction of a demonstration green infrastructure project in an urban neighborhood to build support for long-term implementation of the plan. The following sections outline the activities the City has undertaken in this project and within this reporting period.

2.A. Results & Progress to Date

The City finalized the contractual activities during this reporting period. Outreach, construction, and final reports were the focus. A more detailed outline of activities throughout the project are listed below:

- During January and February 2020, Fuss & O'Neill developed a QAPP to support data collection activities for the project. The QAPP detailed the methods to be used, the QA/QC to be applied, and the way in which the data will be used to reach conclusions. Fuss & O'Neill followed the QAPP guidance provided by the United States Environmental Protection Agency (US EPA), including *Guidance for Quality Assurance Project* Plan (USEPA, 2001) in development of the QAPP.

- During February 2020, Fuss & O'Neill submitted a draft of the QAPP to Restore America's Estuaries (RAE) and the US EPA for review.
- On March 11, 2020, the US EPA finished reviewing QAPP and responded to Fuss & O'Neill with a list of comments that required clarification.
- The QAPP was finalized based on the comments received by the US EPA and approved by RAE on March 20, 2020 and the US EPA on March 24, 2020.
- During March and April 2020, Fuss & O'Neill reviewed available information on water quality, stormwater infrastructure, and land use within the Spectacle Pond Watershed. Information was collected and reviewed from available water quality data from RIDEM, Rhode Island Watershed Watch, RIGIS, RIDOT, and the City of Cranston's GIS database.
- Prior to sampling, Fuss & O'Neill staff performed field reconnaissance in the study area to locate outfalls and safe access for staff and equipment for water sampling.
- During March and April 2020, Fuss & O'Neill conducted targeted field assessments to further assess watershed conditions, critical resource areas, and potential sediment and nutrient sources. The field assessments helped to identify restoration, pollution prevention, and retrofit opportunities in the stream corridor and upland portions of the watershed to reduce watershed sediment and nutrient loads to the pond. Field assessments were conducted using standards methods and protocols that were detailed in the QAPP. Fuss & O'Neill used the data review and field assessments to determine watershed conditions, areas of potential pollutant sources, and opportunities for nutrient management conditions.
- Prior to sampling, Fuss & O'Neill staff performed field reconnaissance in the study area to locate outfalls and safe access for staff and equipment for water sampling.
- Starting in May 2020, water quality sampling activities were conducted to support the assessment of existing pond trophic status and quantification of nutrient loading from input tributaries and bottom sediment. Methodologies used generally followed the guidance provided in the US EPA *Lake and Reservoir Restoration Guidance Manual* (USEPA, 1990), the University of Rhode Island Watershed Watch Monitoring Manuals (URIWW, 2012; 2013), and the US EPA's volunteer monitoring guidance (USEPA, 1997) and are detailed in the QAPP.
- Three dry weather water sampling events were conducted from May 1 - June 30, 2020. The sampling events occurred on May 8 and 28 and June 26, 2020. Water sampling was originally proposed to begin in April 2020 but the on-set of the COVID-19 pandemic caused Fuss & O'Neill to reschedule the April sampling event to the beginning of May. During the sampling events, water samples were collected from multiple areas around Spectacle Pond and the inlet from Tongue Pond. Nine stormwater outfalls and surface runoff locations were sampled for nutrients, estimated flow, and in-situ water quality parameters including water temperature, dissolved oxygen (DO), and conductivity.
- In-Lake water sampling did not occur during the first two sampling events due to the inability to socially distance two samplers in a boat. However, in-lake sampling did occur during the third sampling event conducted on June 26, 2020.

- Two dry weather and two wet weather water sampling events were conducted from July 1 – November 1, 2020. The dry weather sampling events occurred on July 30 and August 26, 2020. The wet weather sampling events occurred on October 12 and 29, 2020. During the sampling events, water samples were collected from multiple areas around and within Spectacle Pond and the inlet from Tongue Pond. Nine stormwater outfalls and surface runoff locations, as well as one in-pond location, were sampled for nutrients, estimated flow, and in-situ water quality parameters including water temperature, dissolved oxygen (DO), and conductivity.
- One sediment sampling event was conducted on August 26, 2020. Three locations within the pond were sampled for nutrients, including phosphorus and organic matter content.
- Analytical and in-situ data collected during the water quality and sediment sampling events was used to estimate the phosphorus budget of the pond and develop a phosphorous reduction plan.
- A *Stormwater Best Management Practices Conceptual Plan* was developed in October 2020. The plan includes an approximate cost for design, permitting, and construction for proposed best management practices.
- Stormwater BMP selection was conducted, and a dry-well infiltration system was selected for the end of Barrett Street, on the western shore of the pond. Winthrop Street was selected as a backup location, or a potential second BMP installation location should funding be sufficient.
- Some additional water quality sampling was conducted to collect data related to temperature and dissolved oxygen at depth during the spring. Due to COVID-19 in the spring of 2020 it was not possible to collect these profiles.
- Subsurface investigations (test pits) were conducted at two locations selected for BMP construction. (photos previously attached)
- Design, cost estimates, and permitting documents have been prepared for Barrett Street, the location selected for installation of an underground stormwater treatment structure. (files previously attached)
- Design, cost estimates, and permitting documents have been prepared for Barrett Street, the location selected for installation of an underground stormwater treatment structure. (files previously attached)
- Prepare and submit a preliminary Determination Application and associated materials to Freshwater Wetlands Division of RIDEM (file attached)
- Fuss & O'Neill has submitted the final report related to the water quality and sediment quality investigations.
- Early on in the process Fuss and O'Neill desktop analysis identified six (6) potential streets/locations where stormwater BMP's could be implemented on a neighborhood wide potential locations for Green Infrastructure improvements,
- In May of 2021 two locations were evaluated for suitable soils. The City provided the excavator and operator to dig test pits at the end of the roadway at Winthrop Street and Barrett Street. Fuss and O'Neill conducted the soil evaluations. Ultimately, due to site conditions, treatable watershed area, and spacial considerations Barrett Street was chosen as the location for the underground stormwater treatment unit.

- Design, cost estimates, and permitting documents were prepared for Barrett Street, the location selected for installation of an underground stormwater treatment structure. Based on the design the underground stormwater treatment unit removes approximately 0.52 lbs of total phosphorus per year. (files previously attached)
- A Preliminary Determination Application and associated materials to Freshwater Wetlands Division of RIDEM (file previously attached)
- In April of 2022 competitive bids were received from three qualified contractors. Universal Excavating, INC was the lowest bidder at $94,500.00 and was selected by the City to install the stormwater control.
- In October, 2022 Universal Excavating Inc. mobilized and ordered materials for the project. There were delays in the construction of the underground infiltration dure mainly to delays in the availability of the proprietary manhole structure, acting as the sediment forebay. The contractor and the DPW communicated with the neighbors on schedule and any coordination.
- Construction occurred over a three-day period with final restoration completed on October 31, 2022.
- During the reporting period the City met with the neighbors during outreach and construction. The City and the contractor were able to successfully accommodate the impacted neighbors for access to their homes and address other DPW concerns. An example was the relocation of the guardrail at the end of the roadway approximately five (5) feet to provide additional space to mitigate the snow pack at the end of the road that would occasionally block a driveway. The City views the buy-in from the neighborhood as an important outcome. The DPW strives to be an entity that is trust-worthy, follows through, and assists constituents when possible.
- <u>Spectacle Pond Limnological Investigation</u>: The Limnological Investigation was finalized during this reporting period. For background, the estimated phosphorus load to Spectacle Pond is 476 lbs/year. The Total Maximum Daily Loads for Phosphorus to Address 9 Eutrophic Ponds in Rhode Island (TMDL) completed by RIDEM (September 2007) required that the phosphorus load be reduced by 326 lbs/yr, a 68% reduction. The Limnological Investigation was conducted to estimate the relative contribution of internal cycling to total phosphorus loading in the pond. This was achieved by collecting bathymetric data, sediment, and water quality sampling, and calculating of internal loading. The results of the study indicate that only 1% of the phosphorus loading or approximately 5.6lbs is from internal sources. External sources including those from stormwater runoff, inlet sources, and waterfowl dominate the P loading at 99%. This study also explored recommendations including infiltration systems, tree filters, bioswales, and limiting access of waterfowl to areas that drain to pond. More detailed review of potential external treatment options was explored in the Spectacle Pond Phosphorus Reduction Plan.
- <u>Spectacle Pond Phosphorus Reduction Plan:</u> During the reporting period this plan was reviewed and finalized desktop review and site visits were completed. Fourteen (14) sites were selected for consideration. Structural and non-structural BMPs were evaluated for the identified sites. Partnership

opportunities were evaluated including Twin Oaks, RIDOT, and Stadium Elementary School. The following expected benefits were calculated if all of the structural improvements were implemented:

- Total phosphorus removal of 7.8 lbs
- TSS load reduction of 4,195 lbs

It is important to note these costs do not consider the ongoing costs associated with long term operation and maintenance which increases the operating budget of and utilization of City resources. With an extremely tight City budgets and the return on investment on a per lb removal basis it will be challenging to secure City match for continued investment of structural measures. The City will be working closely with RIDEM, funding organizations, and seeking out collaborative partners to make water quality improvements more manageable.

2.B. Work Remaining Under Current Contract

The major tasks of the project are outlined below. All tasks have been completed.

TASKS	STATUS
Task 1: QAPP	Complete
Task 2: Phosphorus Reduction Study	Complete
Task 2.1: Data Gathering and Review	Complete
Task 2.2: Water Quality and Sediment Sampling	Complete
Task 2.3: Phosphorus Budget	Complete
Task 2.4: Water Quality Restoration Strategies	Complete
Task 2.5: Final Report	Complete
Task 3: Demonstration Project Approach and Location	Complete
Task 3.1: Bioretention Basin Alternatives	Complete
Task 3.2: Demonstration Site Selection	Complete
Task 4: Demonstration Project Design	Complete
Task 4.1: Collect Existing Conditions Information	Complete
Task 4.2: Preliminary Design and Opinion of Cost	Complete
Task 4.3: Final Design	Complete
Task 5: Bidding and Construction	Complete
Task 6: Community Outreach and Support	Complete

2.C. Compliance

The QAPP was submitted to RAE and US EPA during February 2020 by Fuss & O'Neill. The QAPP was approved by RAE on March 20, 2020 and the US EPA on March 24, 2020.

Permit documents were prepared for permitting infiltration at the selected BMP location.

October 2021 an Application for Stormwater Construction Permit and Water Quality Certification was submitted.

On March 8, 2022 an Insignificant Alteration- Permit was received from RIDEM

On December 21, 2021 the City requested and received a contract extension to June 30, 2022 due to the following reasons:

- The COVID-19 pandemic created challenges in completing our outreach activities;
- The City's environmental engineering consulting firm, Fuss and O'Neill, experienced early delays in sampling and field activities due to COVID-19 protocols; and
- A contracted professional limnologist experienced delays in analyzing pond data therefore delaying reporting results.

A second contract extension was requested and granted until October 31, 2022 for the following reasons:

- Construction contractor experienced longer than anticipated lead times for equipment related to the infiltration chamber construction

A third extension contract extension was requested and granted until December 31, 2022 for the following reasons:

- Additional time to process final invoicing and the final review of the Limnological Investigation Report and Spectacle Pond Phosphorus Reduction Plan

A site inspection was conducted by the Director of SNEP Watershed Implementation Grants, Tom Ardito, on November 17, 2022. During the site visit plans were reviewed and the work was inspected.

2.D. Project Partners

The City has been in contact with the project partner (F&O) to advise them on the execution of the QAPP and the phosphorous reduction study. The City and F&O solicited input from Save the Bay regarding demonstration site selection included input from Save the Bay. Save the Bay also participated in the outreach activity on October 26, 2022. The City is grateful for the partnership we have with Save the Bay. Specifically, Wenley Ferguson, who provided valuable input and improved outcome.

2.E. Volunteer and Community Involvement

No volunteer and community involvement activities were undertaken during the reporting period.

2.F. Outreach & Communications

Public meetings were held on at the end of Barrett Street on and October 26, 2022 to discuss the Barrett Street water quality improvement project. A copy of the outreach material is included in the supporting details. An initial invite was sent for an October 13, 2022 meeting onsite however, there was a significant rain event and it needed to be rescheduled.

3. Project Budget Report

The funds that were expended during the reporting period are shown in the budget tables below.

3.A. Summary Budget Tables

Summary Budget Table 1: Expenditures by Federal Cost Category

Budget Category	Total Budgeted Funds	Total Budgeted Match	Grant Funds Expended This Period	Grant Funds Expended Cumulative	Match Funds Expended This Period	Match Funds Expended Cumulative	Match Source (note cash or in-kind)
Personnel							
Fringe							
Travel							
Equipment							
Supplies							
Contractual							
Environmental Engineering Consultant	$146,250	$48,750	$16,867.50	$143,647.50	$5,622.50	$47,882.50	Cash
General Contractor for Bioretention Basin Construction and Engineering	$41,250	$13,750	$41,250.00	$41,250.00	$46,100.00	$46,100.00	Cash
Subtotal Contractual	$187,500	$62,500	$58,117.50	$184,897.50	$51,722.50	$93,982.50	
Other							
Total Direct	$187,500	$62,500	$58,117.50	$184,897.50	$51,722.50	$93,982.50	
Indirect							
Total	$187,500	$62,500	$58,117.50	$184,897.50	$51,722.50	$93,982.50	

Summary Budget Table 2: Expenditures by Project Task (Grant Funds Only)

Budget Category	Budgeted Grant Funds	Expended Progress Period 1	Expended Progress Period 2	Expended Progress Period 3	Expended Progress Period 4	Expended Progress Period 5	Expended Progress Period 6	Actual Expended to Date
Task 1 – Environmental Consultant	$146,250	$25,878.75	$46,807.50	$30,367.50	$0	$23,726.25	$16,867.50	$143,647.50
Task 2 – Construction & Engineering	$41,250	$0	$0	$0	$0	$0	$41,250.00	$41,250.00
Total	$62,500	$25,878.75	$46,807.50	$30,367.50	$0	$23,726.25	$58,117.50	$184,897.50

3.B. Budget Narrative

The City of Cranston has not proposed to use grant funding or match for staff and other City resources for the management of this project. While the exact amount of time of City staff was not tracked implementing this project required a significant commitment of City time. The staff completed reports, attended meetings, completed site visits, coordinated test pit activities, mobilized excavators, created mailing lists and sent outreach materials, attended outreach activities, procured the engineering firm and construction firm, tracked billing and invoices. To maximize the value of the work that can be completed under the grant funding, the City provided its match as funded by the City's existing budget. Work invoiced for this reporting period totals $109,840.00.

Contractual Environmental Engineering Budget:
During this reporting period $22,490 was spent on the category. In total, $191,530.00 was expended. The Limnological Investigation, Phosphorus Reduction Plan, and stormwater control design are valuable tools the City will use in the future to inform its decisions. The City is pleased to report the total billed amount came in slightly under budget.

General Contractor for Underground Infiltration Stormwater Treatment Unit:
During this reporting period $87,350 was spent on this category. This work included the construction of the Underground Infiltration Stormwater Treatment unit which include installation of two manholes with proprietary swirl inserts and three rows of underground infiltration chambers. The bid price of $94,500 was reduced because it was determined during construction that the replacement of the sewer main and associated sewer street laterals were in sound condition. A total of $41,250 is eligible to be reimbursed by grant funds. The City match was originally budgeted at $13,750 but due to the increase bid pricing (mentioned above) increased to $46,100.00. This increase resulted in the City providing an additional match of $32,350.

The City has produced a final invoice (#4) under separate cover to RAE in the amount of $58,117.50. This amount represents 75% of the eligible funds expended this reporting period.

4. Supporting Materials

The following supporting materials are attached to this report:

- Spectacle Pond Phosphorus Reduction Plan – October, 2022 Final Report
- Spectacle Pond Limnological Investigation, December 2022
- Green Infrastructure Outreach Meeting Poster, October 2022

5. Certification

The undersigned verifies that the descriptions of activities and expenditures in this progress report are accurate to the best of my knowledge; and that the activities were conducted in agreement with the grant contract. I also understand that matching fund levels established in the grant contract must be met.

By signing this report, I certify to the best of my knowledge and belief that the report is true, complete, and accurate, and the expenditures, disbursements and cash receipts are for the purposes and objectives set forth in the terms and conditions of the Federal award. I am aware that any false, fictitious, or fraudulent information, or the omission of any material fact, may subject me to criminal, civil or administrative penalties for fraud, false statements, false claims or otherwise. (U.S. Code Title 18, Section 1001 and Title 31, Sections 3729–3730 and 3801–3812).

Grantee Signature:

Edward Tally

Environmental Program Manager

City of Cranston

Date: 2/14/23

Come learn what the City of Cranston is doing to improve water quality in Spectacle Pond!

Wednesday, October 26, 2022
5:00 to 6:00pm

End of Barrett Street
Cranston, RI

* * *

Hear from experts in the field!

Learn more about the Barrett Street water quality improvement project. Including the proposed construction of a subsurface infiltration system.

* * *

To Register, please email: *etally@cranstonri.gov*

Presented by the City of Cranston and Fuss & O'Neill, as part of Southeast New England Program (SNEP).

FUSS & O'NEILL
ENGINEERS • SCIENTISTS • PLANNERS

1754 - 1910

SNEP

Spectacle Pond Phosphorus Reduction Plan

City of Cranston, Rhode Island

OCTOBER 2022

FUSS & O'NEILL

317 Iron Horse Way | Suite 204 | Providence, RI 02908

FUSS & O'NEILL

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Spectacle Pond Phosphorus Reduction Plan
City of Cranston

Figures

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1 Overview

The purpose of this Phosphorus Reduction Plan is to identify structural stormwater best management practices (BMPs) to reduce phosphorus and sediment loading to Spectacle Pond. Spectacle Pond (herein referred to as the Pond) is a freshwater body located in the City of Cranston, Rhode Island.

The Pond's watershed is approximately 638 acres, 65% of which is impervious (412 acres)[1]. Residential properties are located to the west and south of the Pond and industrial and commercial properties occupy the northern and eastern shorelines. Throughout the watershed, the City of Cranston (the City) maintains an extensive network of drainage infrastructure that collects and discharges stormwater to seven outfalls. Based on the findings of the Spectacle Pond Limnological Investigation, completed by Fuss & O'Neill in 2020, the primary source of phosphorus, accounting for over 90% of the loading, is stormwater runoff from the Pond's densely developed watershed.

The Rhode Island Department of Environmental Management (RIDEM) established a Total Maximum Daily Load (TMDL) for phosphorus loading in September 2007. According to the TMDL analysis, the annual phosphorus load to maintain healthy water quality is 148 kg/year (326 lbs/yr), while the estimated current annual phosphorus load is 216 kg/year (476 lbs/yr). [2] To achieve the water quality standards outlined by RIDEM, a 68% annual phosphorus load reduction is required.

The City has already identified and implemented multiple structural and non-structural BMPs to reduce the phosphorus load on the Pond. Structural BMP projects at Speck Park, as well as, within the right-of-way at Pomham and Barrett Street have already been completed or are currently being designed. In addition to the installation of new structural BMPs, non-structural measures, such as ongoing maintenance of the existing drainage infrastructure, reduced wintertime sanding, and increased street sweeping, are all being used to reduce the discharge of sediment to the Pond. However, to meet the TMDL goals, additional opportunities to reduce phosphorus will be necessary and are the subject of this report.

2 Approach

The treatment approach recommended in this plan is focused on structural BMPs that infiltrate stormwater into the native soils. According to soil survey data available through the Natural Resources Conservation Service (NRCS), the soils in the Pond's watershed are typically sandy and well-draining, suitable for infiltration-style BMPs.[3] The total phosphorus removal efficiency of infiltration BMPs is

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[1] *Spectacle, Mashapaug, Roger Williams Park Ponds SCP, Spectacle Pond (RI0006017L-07), Cranston, RI*, Rhode Island Department of Transportation (RIDOT), December 30, 2017.

[2] *Total Maximum Daily Loads for Phosphorus to Address 9 Eutrophic Ponds in Rhode Island* (TMDL), Rhode Island Department of Environmental Management (RIDEM), September 2007.

[3] US Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), Web Soil Survey, July 31, 2019.

higher than that of filtration practices, such as bioretention.[4] Because phosphorus is often transported with sediment, reducing sediment loading is also a priority. The City will maximize the total phosphorus load reduction per project dollar spent by prioritizing infiltration and sediment removal projects wherever practical. Therefore, a suite of structural infiltration BMPs were selected and sited for potential implementation based on the following criteria:

1. Effectively infiltrate stormwater into existing soils and remove sediment.
2. Minimal footprint within the City's right-of-way or publicly maintained space.
3. Relatively low maintenance requirements.
4. Are replicable (i.e., can seamlessly integrated into repaving, utility, and tree planting projects).

2.1 Desktop Review & Site Visits

To develop this plan, an initial desktop review of geospatial data within the Pond's watershed was completed to identify potential sites for structural BMPs, as well as to identify opportunities to remove existing pavement or other impervious surfaces. Several data sources were reviewed as part of the desktop review, including:

- Aerial Mapping (Spring 2021)
- City Stormwater Infrastructure
- City Utility Data (Currently available water and sewer data provided by the City.)
- Hydrologic Soil Group (HSG), NRCS Web Soil Survey (2022)
- RIGIS 2-ft Topography (2011)
- RIGIS 2020 Impervious Area (2022)
- Freshwater Wetlands (2021)

From the initial desktop review, six streets were identified as potential "Complete Streets," where stormwater BMPs could be implemented on a neighborhood-wide scale, and over 20 individual structural BMP locations were identified. Site visits were conducted by Fuss & O'Neill, on August 19, 2020, to refine the initial selection. The site visits were used to confirm the accuracy of the geospatial data as well as understand the unique site constraints and considerations for each proposed BMP. Elements reviewed and considered during site inspections included:

- Topographic slope
- Adjacent land use
- Ease of access for maintenance
- Conflicts with existing utilities
- Location of existing drainage infrastructure
- Indicators of Utilities (e.g., overhead wires, curb stops, and vales)

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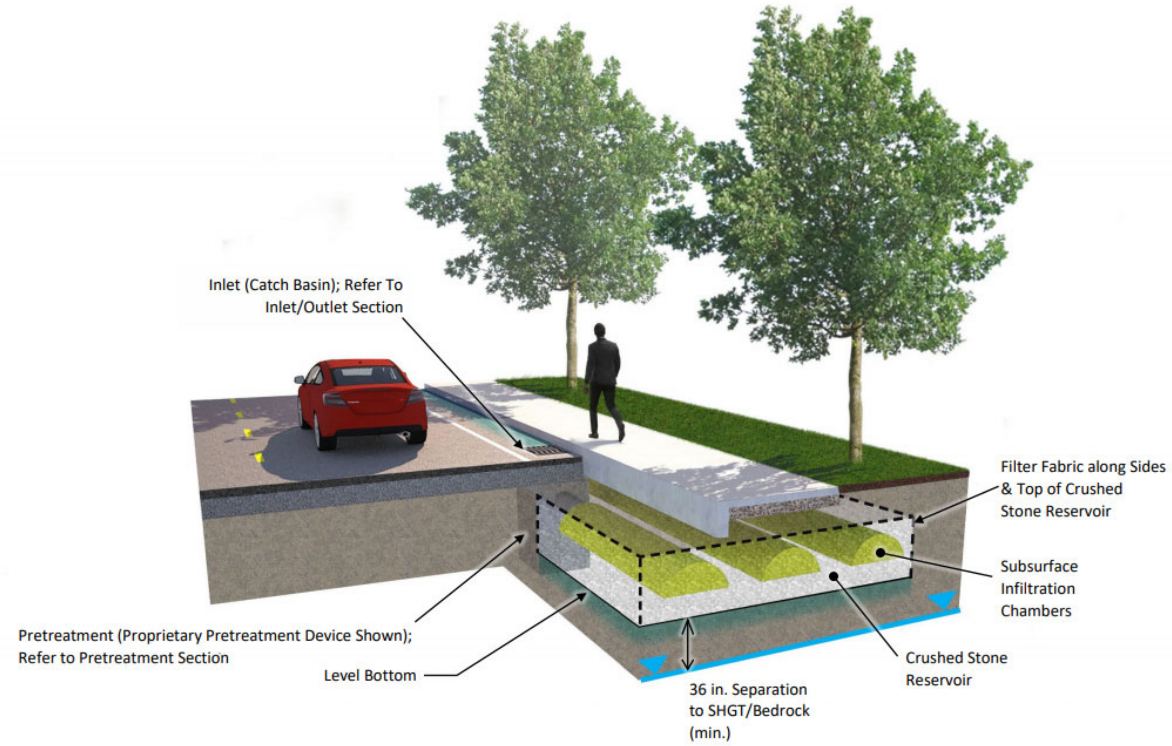
[4] *Table H-3 – Pollutant Removal Efficiency Rating Values for Water Quality BMPs, Rhode Island Stormwater Design and Installation Standards Manual*, RIDEM, Amended March 2015.

2.2 Structural BMP Selection

In order to ensure long-term operation and maintenance of any structural BMPs installed in the Spectacle Pond Watershed, types of practices were first reviewed and vetted with the City. Practices were evaluated on several criteria, including ease of maintenance, space requirements, phosphorus removal efficiency, and cost. Based on these conversations, five BMP types were identified and described in more detail below[5].

- **Subsurface Infiltration Systems**



Subsurface infiltration systems consist of open-bottomed storage chambers in a crushed stone reservoir. The chamber and crushed stone reservoirs provide temporary storage for stormwater before it infiltrates into subsurface soils. These systems require pretreatment systems to remove oil, sediment, and debris before stormwater enters the infiltration system. Subsurface infiltration systems can vary in size, depending on the area of runoff treated. These systems require adequality draining soils and separation from the existing groundwater table to be effective. Subsurface infiltration systems may be used in areas where surface structural BMPs are not feasible.

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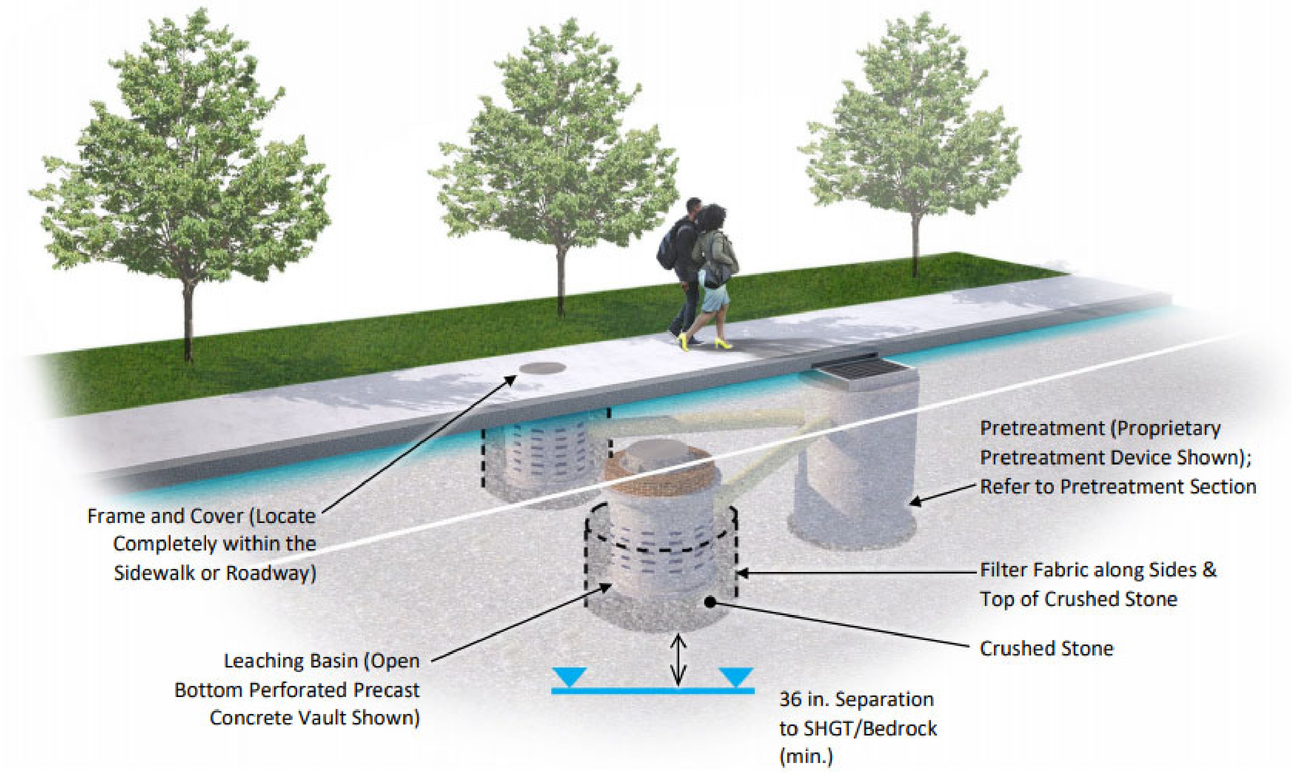
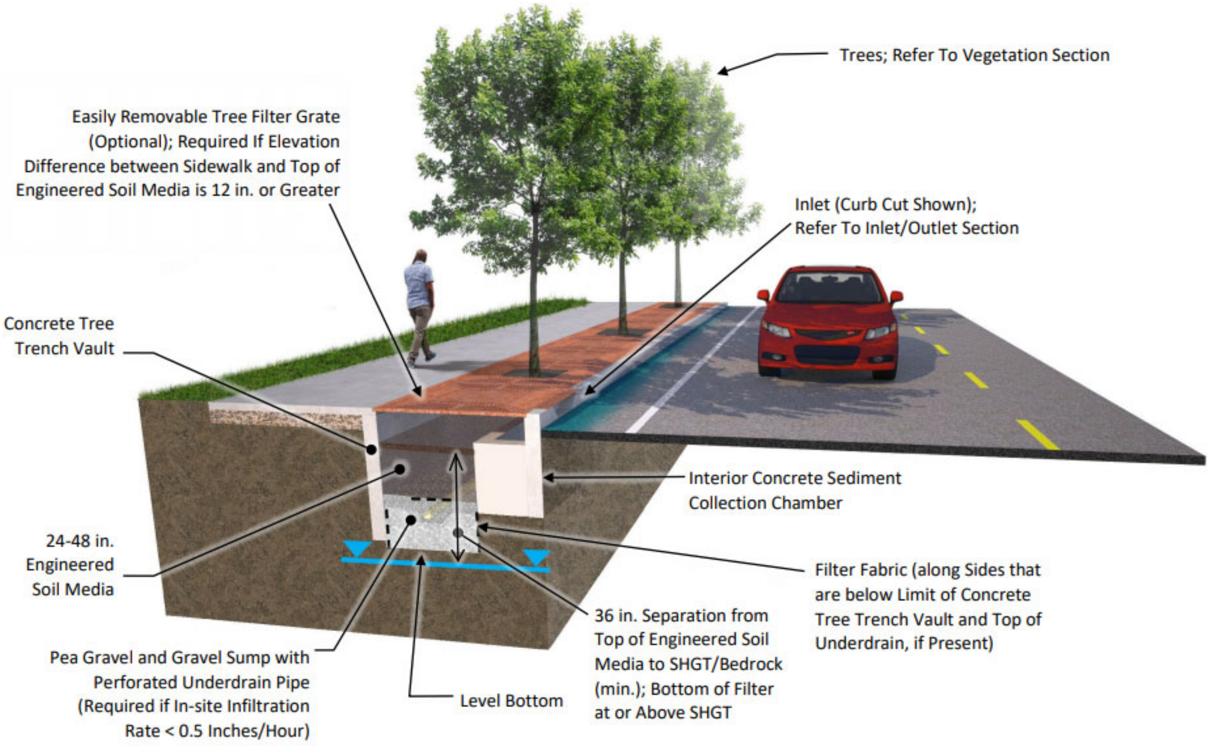
[5] Structural BMP Illustrations are from the *RIDOT Linear Stormwater Manual*, February 2019.

- **Drywells**



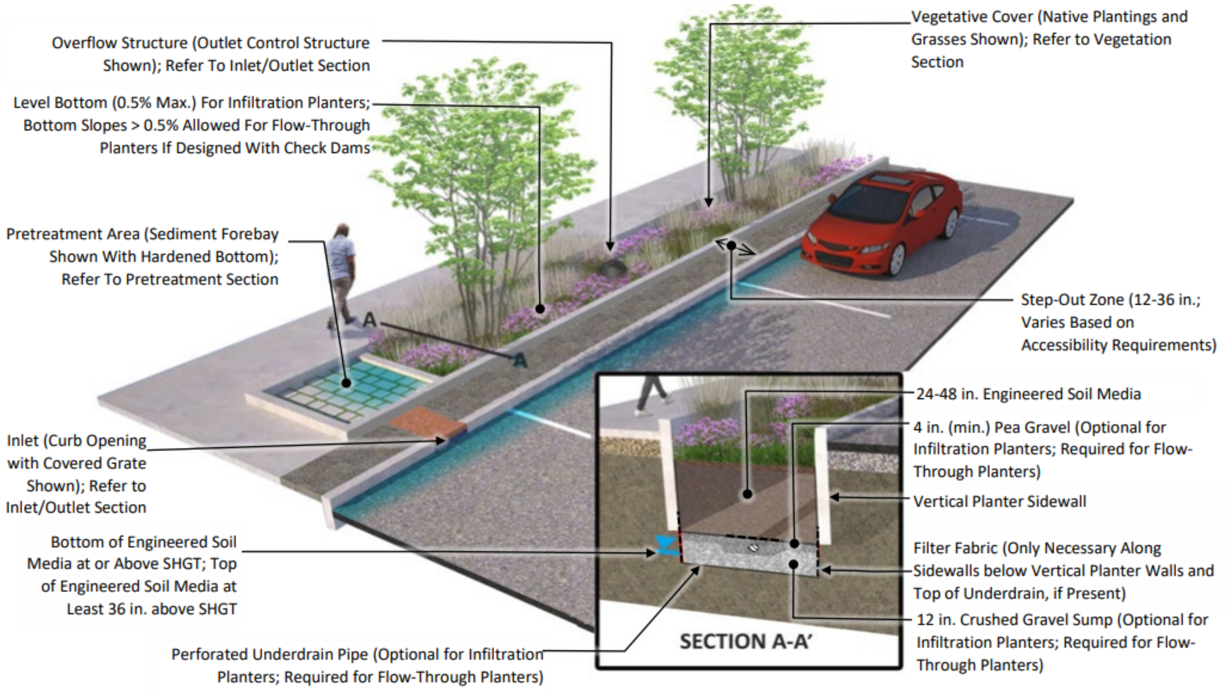
Similar to subsurface infiltration systems, drywells are underground structures that receive, temporarily store, and infiltrate stormwater from impervious surfaces. Drywells typically consist of concrete or plastic perforated chambers surrounded by gravel, which allows runoff to slowly infiltrate to the surrounding area. Drywells require soils and groundwater depths that are suitable for infiltration. Drywells also have a relatively small footprint and can be used in areas where surface structural BMPs are not feasible.

- **Tree Filter**



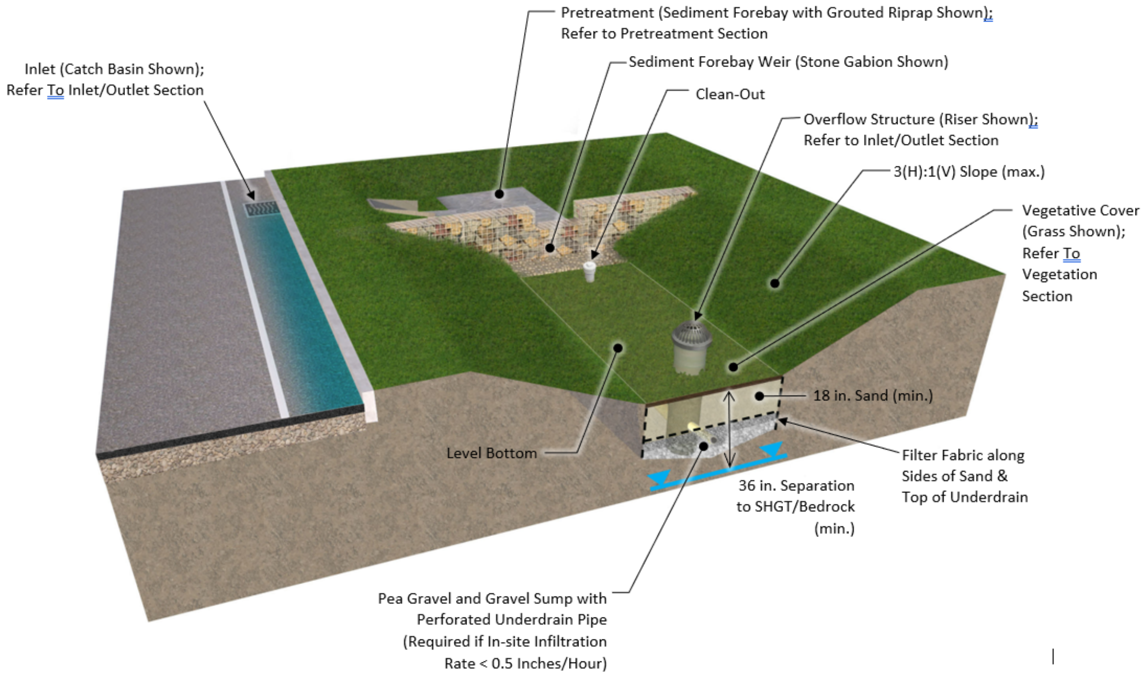
Tree filters are systems that house one or more trees and are filled with engineered soil media atop an optional drainage layer. Tree filters can be designed to infiltrate stormwater or treat stormwater before it discharges to an existing drainage network. These systems are typically installed in sidewalks, along curbs, or in parking lots. In addition to stormwater infiltration, tree filters can provide aesthetic benefits and additional shade coverage.

- **Curb In-let Planters**



Curb inlet planters are a type of system that is located within the roadway right-of-way immediately adjoining roadway curbing. These systems have an engineered soil media below the surface of the planter that facilitates stormwater filtration and vegetative growth. These planters are frequently designed to infiltrate, typically referred to as infiltration planters, but can be designed with an underdrain to capture filtered water and assist with drainage from the system, typically referred to as flow-through planters.

- **Sand Filter**



Sand filters are sand-filled basins or trenches that capture, temporarily store, and filter stormwater runoff. Sand filters require less space than other filtering practices but must be in designed areas with an adequate elevation difference between the inlet and outlet to efficiently move stormwater through the system. Sand filters have higher longevity than other filtering practices and are frequently designed to infiltrate. A typical sand filter design includes an overflow to allow large storm events to bypass the system without causing damage.

2.3 Non-Structural BMPs

In addition to the installation of new structural BMPs, non-structural BMPs, such as waterfowl management and public education, along with the ongoing maintenance and good housekeeping actions that the City currently undertakes, are important for protecting water quality on a watershed-wide scale.

Waterfowl

The TMDL identifies waterfowl as a major source of phosphorus in the Pond. Waterfowl, specifically resident flocks of geese that do not migrate, can become a nuisance and degrade water quality over time. Perimeter fencing and vegetated barriers are currently used by some property owners to inhibit waterfowl access to their properties. Feeding waterfowl is currently banned by RIDEM in Rhode Island. Informational signage detailing why feeding the waterfowl is banned is important to keep waterfowl from congregating in public areas. Coordination with RIDEM to reduce the waterflow population is one mechanism that the City could use to manage waterfowl. Such efforts would require communication on a neighborhood-wide scale to ensure public support.

Privately Owned Impervious Area

While this report focuses on identifying potential structural BMPs that the City can execute and maintain within the public right-of-way, improvements on privately owned properties, including public education and outreach or public-private partnerships, have the potential for significant water quality impacts. Approximately 70% of the total impervious surface within the watershed is on private property (e.g., commercial parking lots, residential roofs and driveways, private walkways, etc.), while the other 30% is publicly owned and maintained (roadways, City and State-owned parcels, etc.). Potential partnership opportunities are discussed further below.

Communities within Rhode Island, and to a larger extent across New England, have used websites and social media platforms to educate residents on best management practices relating to stormwater management at their residences, including practices related to pet waste, lawn and grass clippings, fertilizer use, winter driveway maintenance, leaf litter, and waterfowl. One example is the Town of Ashland, MA, which produced an interactive ArcGIS storymap for residents on "dos" and "don'ts" relating to stormwater best management practices at home.[7] Additionally, educational materials are available through the Massachusetts Think Blue campaign, which focuses on educating residents and businesses on ways to reduce pollution to local waterbodies.[8] The Central Massachusetts Regional Stormwater Coalition (CMRSWC) also provides resources on effectively conducting social media outreach to spread awareness and educate residents on non-structural best management practices.[9]

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[7] Website: https://storymaps.arcgis.com/stories/eb1dd8e42b574a509cacd8c80433b50d

[8] Website: https://www.thinkbluemassachusetts.org/

[9] Website: https://www.centralmastormwater.org/toolbox/pages/social-media-outreach

3 Potential Structural BMP Locations

An overview of the BMP sites that have been identified for implementation is provided in *Figure 1*. The approximate footprint of each BMP within the right-of-way, a description of the system, and the corresponding contributing watersheds are provided in *Figures 2-15*. This study represents a conceptual-level assessment, future design phases are required for any selected BMP to provide a comprehensive understanding of its feasibility.

As shown in *Table 1*, not all locations have the available space to treat the entire water quality volume. However, due to the large impervious area treated, some of these sites still have the potential to significantly reduce pollutant loadings to the Pond. Because the Pond has a TMDL, the full water quality volume was the target volume for conceptual design (in accordance with Appendix C of the RI Stormwater Design and Installation Standards Manual, 2015). *Table 2* shows annual pollutant loadings and reductions for each of the BMPs.

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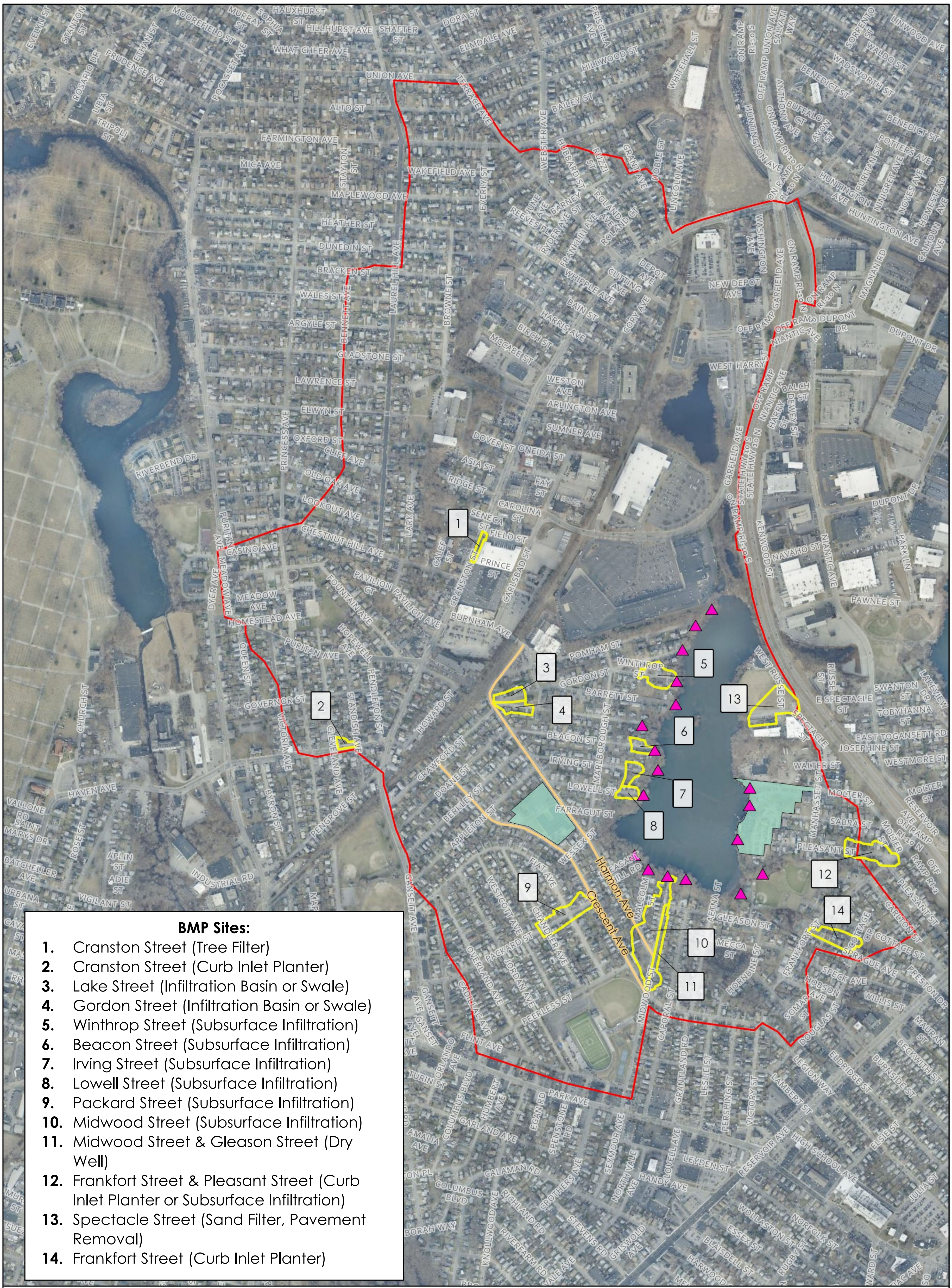


BMP Sites:

1. Cranston Street (Tree Filter)
2. Cranston Street (Curb Inlet Planter)
3. Lake Street (Infiltration Basin or Swale)
4. Gordon Street (Infiltration Basin or Swale)
5. Winthrop Street (Subsurface Infiltration)
6. Beacon Street (Subsurface Infiltration)
7. Irving Street (Subsurface Infiltration)
8. Lowell Street (Subsurface Infiltration)
9. Packard Street (Subsurface Infiltration)
10. Midwood Street (Subsurface Infiltration)
11. Midwood Street & Gleason Street (Dry Well)
12. Frankfort Street & Pleasant Street (Curb Inlet Planter or Subsurface Infiltration)
13. Spectacle Street (Sand Filter, Pavement Removal)
14. Frankfort Street (Curb Inlet Planter)

SPECTACLE POND WATERSHED AND PROPOSED BMP LOCATION OVERVIEW

CRANSTON, RI

OCTOBER 2022

FUSS & O'NEILL

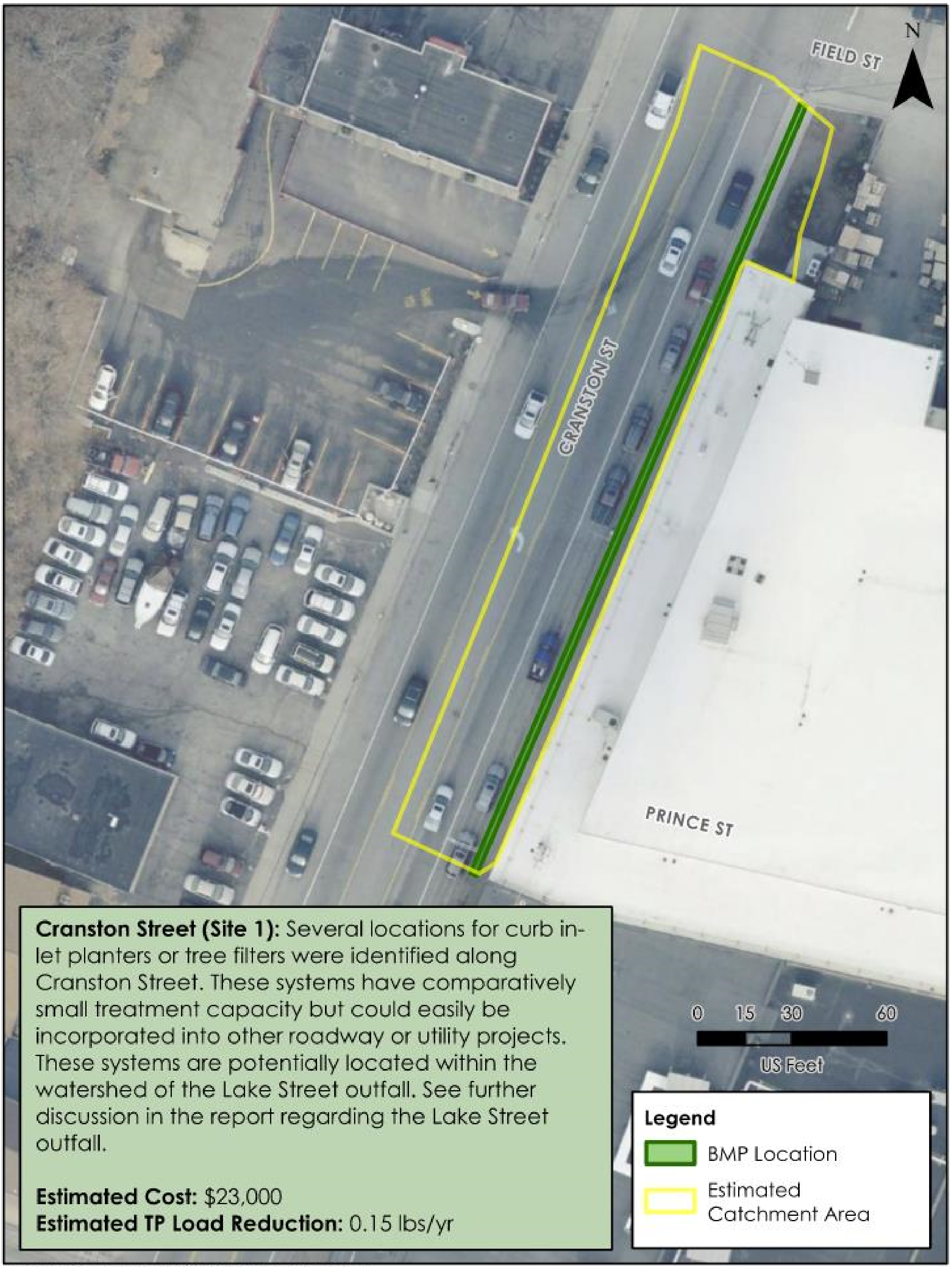
Legend

- ▭ Catchment Area
- ▲ Stormwater Discharge Location
- ― Complete Street
- 🟩 Recommended Partership
- ▭ Watershed Boundary

0 250 500 1,000
US Feet

Data Sources: URI EDC, RIGIS, RIDOT, City of Cranston

Spectacle Pond Phosphorus Reduction Plan
Site 1. Cranston Street



Cranston Street (Site 1): Several locations for curb inlet planters or tree filters were identified along Cranston Street. These systems have comparatively small treatment capacity but could easily be incorporated into other roadway or utility projects. These systems are potentially located within the watershed of the Lake Street outfall. See further discussion in the report regarding the Lake Street outfall.

Estimated Cost: $23,000
Estimated TP Load Reduction: 0.15 lbs/yr

Data Sources: URI EDC, RIGIS, RIDOT, City of Cranston

Spectacle Pond Phosphorus Reduction Plan
Site 2. Cranston Street

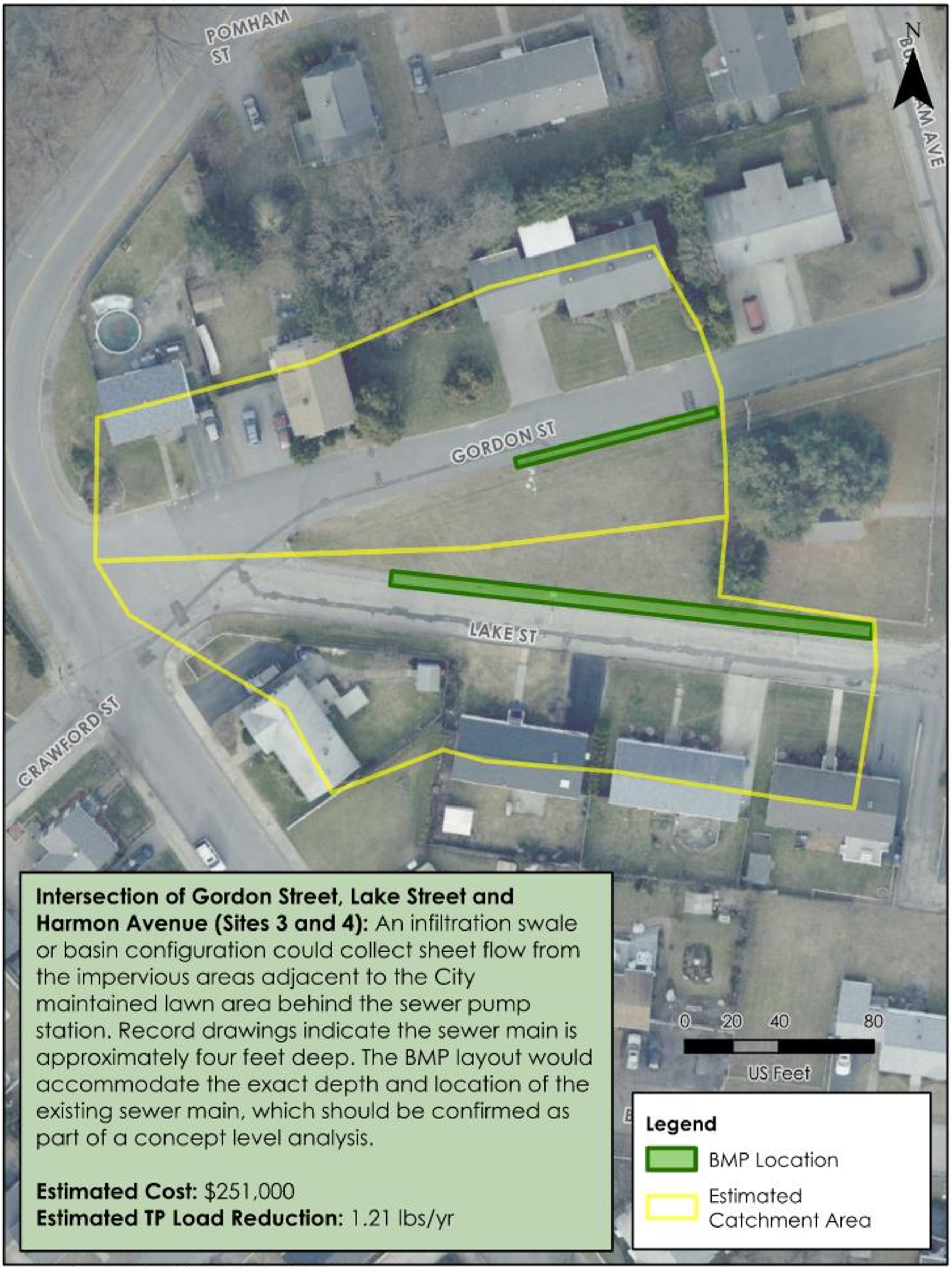
Cranston Street (Site 2): Several locations for curb inlet planters or tree filters were identified along Cranston Street. These systems have comparatively small treatment capacity but could easily be incorporated into other roadway or utility projects. These systems are potentially located within the watershed of the Lake Street outfall. See further discussion in the report regarding the Lake Street outfall.

Estimated Cost: $13,000
Estimated TP Load Reduction: 0.06 lbs/yr

Legend
🟩 BMP Location
▭ Estimated Catchment Area

Data Sources: URI EDC, RIGIS, RIDOT, City of Cranston

Spectacle Pond Phosphorus Reduction Plan
Sites 3 and 4. Intersection of Gordon Street, Lake Street and Harmon Avenue



Intersection of Gordon Street, Lake Street and Harmon Avenue (Sites 3 and 4): An infiltration swale or basin configuration could collect sheet flow from the impervious areas adjacent to the City maintained lawn area behind the sewer pump station. Record drawings indicate the sewer main is approximately four feet deep. The BMP layout would accommodate the exact depth and location of the existing sewer main, which should be confirmed as part of a concept level analysis.

Estimated Cost: $251,000
Estimated TP Load Reduction: 1.21 lbs/yr

Data Sources: URI EDC, RIGIS, RIDOT, City of Cranston

Spectacle Pond Phosphorus Reduction Plan
Site 5. Winthrop Street

Winthrop Street (Site 5): Subsurface infiltration systems within the right-of-way at the east dead-end of Winthrop Street would likely be possible upon relocation of existing utilities.

Estimated Cost: $81,000
Estimated TP Load Reduction: 0.38 lbs/yr

Data Sources: URI EDC, RIGIS, RIDOT, City of Cranston

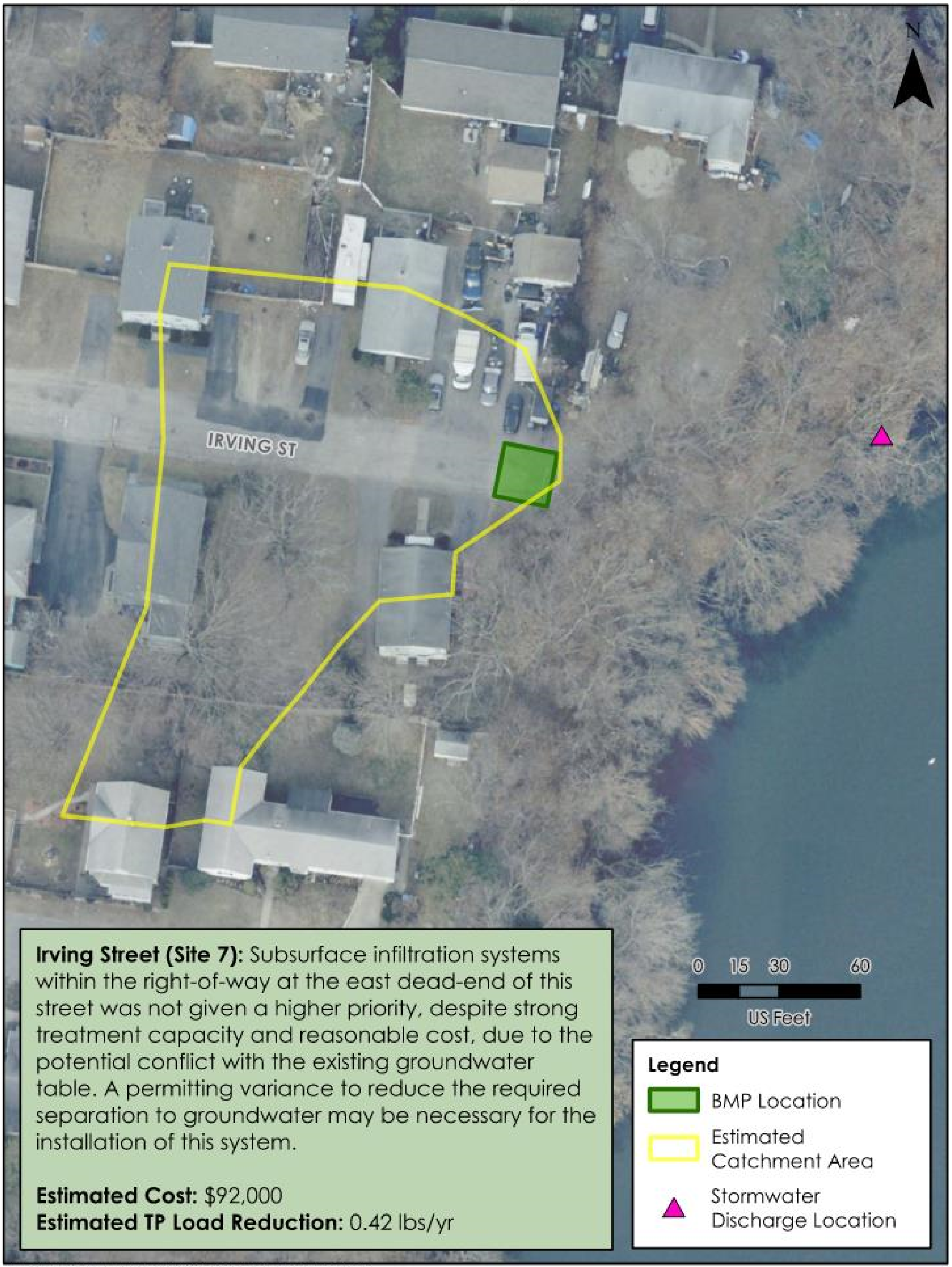
Spectacle Pond Phosphorus Reduction Plan
Site 6. Beacon Street

Beacon Street (Site 6): A subsurface infiltration system within the right-of-way at the east dead-end of the street could be installed, similar to the systems installed on Barret & Popham Street. Catch basins would collect stormwater and redirect it underground to infiltrate into the native soils.

Estimated Cost: $122,000
Estimated TP Load Reduction: 0.55 lbs/yr

Data Sources: URI EDC, RIGIS, RIDOT, City of Cranston

Spectacle Pond Phosphorus Reduction Plan
Site 7. Irving Street



Irving Street (Site 7): Subsurface infiltration systems within the right-of-way at the east dead-end of this street was not given a higher priority, despite strong treatment capacity and reasonable cost, due to the potential conflict with the existing groundwater table. A permitting variance to reduce the required separation to groundwater may be necessary for the installation of this system.

Estimated Cost: $92,000
Estimated TP Load Reduction: 0.42 lbs/yr

Data Sources: URI EDC, RIGIS, RIDOT, City of Cranston

Spectacle Pond Phosphorus Reduction Plan
Site 8. Lowell Street

Lowell Street (Site 8): A subsurface infiltration system within the right-of-way at the east dead-end of the street could be installed, similar to the systems installed on Barret & Popham Street. Catch basins would collect stormwater and redirect it underground to infiltrate into the native soils.

Estimated Cost: $108,000
Estimated TP Load Reduction: 0.49lbs/yr

Data Sources: URI EDC, RIGIS, RIDOT, City of Cranston

Spectacle Pond Phosphorus Reduction Plan
Site 9. Packard Street

Packard Street (Site 9): A subsurface infiltration system within the right-of-way along this street would result in the largest proposed annual load reduction, despite the relatively low percent treatment capacity. This is due to the large contributing watershed area.

Estimated Cost: $169,000
Estimated TP Load Reduction: 0.76 lbs/yr

Data Sources: URI EDC, RIGIS, RIDOT, City of Cranston

Spectacle Pond Phosphorus Reduction Plan
Site 10. Midwood Street

Midwood Street (Site 10): A subsurface infiltration system within the right-of-way along this street would result in the largest proposed annual load reduction, despite the relatively low percent treatment capacity. This is due to the large contributing watershed area.

Estimated Cost: $178,000
Estimated TP Load Reduction: 0.81 lbs/yr

Data Sources: URI EDC, RIGIS, RIDOT, City of Cranston

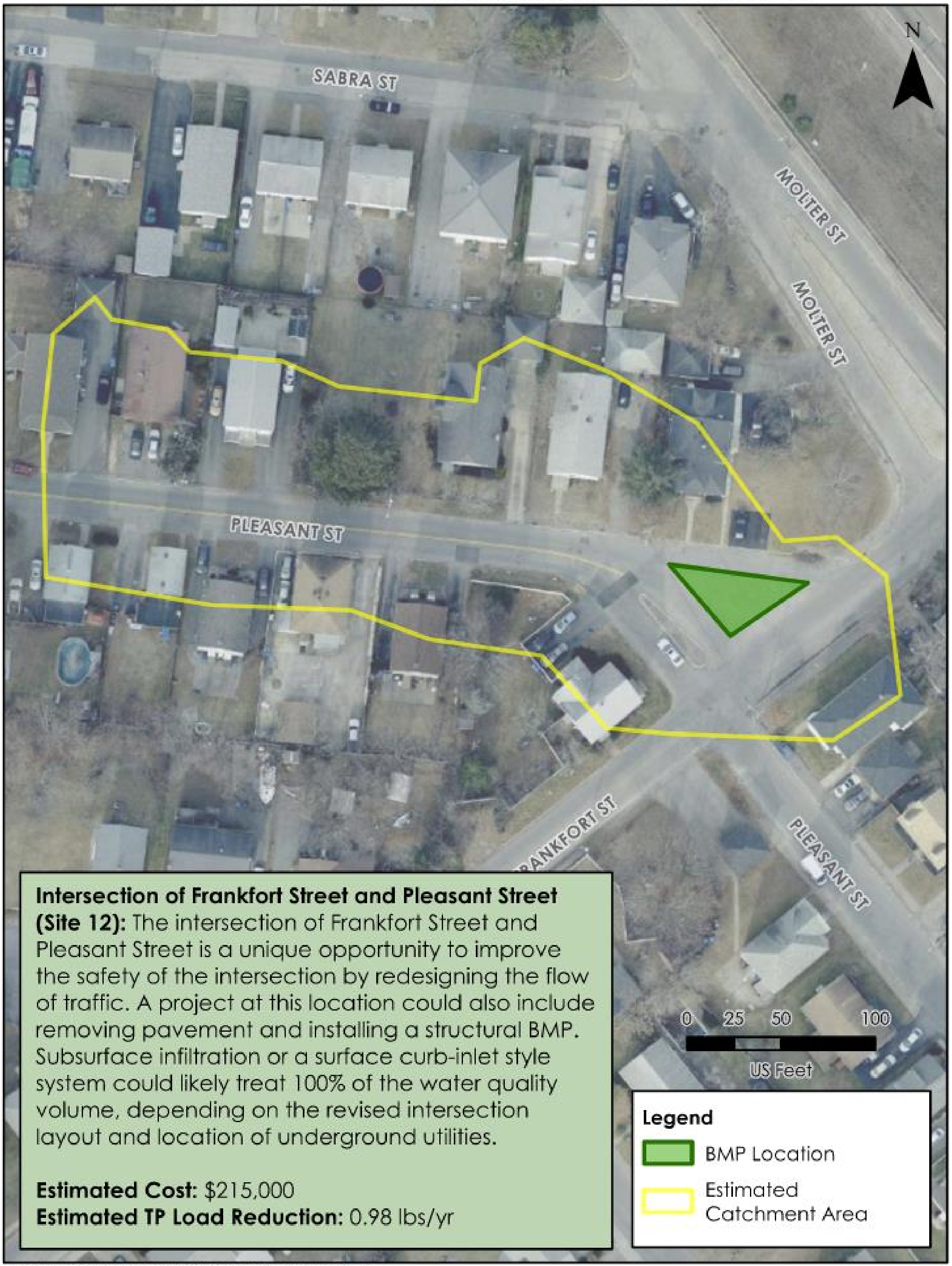
Spectacle Pond Phosphorus Reduction Plan
Site 11. Intersection of Midwood Street and Gleason Street

Intersection of Midwood Street and Gleason Street (Site 11): A pair of drywells at the intersection of Midwood Street Gleason Street could collect sheet flow from the west side of Midwood Street. Although the dry wells would only treat a quarter of the water quality volume, the cost per phosphorus reduction is significantly less than other treatment practices. Upon confirming the configuration of existing utilities, a subsurface infiltration system could be possible.

Estimated Cost: $115,000
Estimated TP Load Reduction: 0.23 lbs/yr

Data Sources: URI EDC, RIGIS, RIDOT, City of Cranston

Spectacle Pond Phosphorus Reduction Plan
Site 12. Intersection of Frankfort Street and Pleasant Street

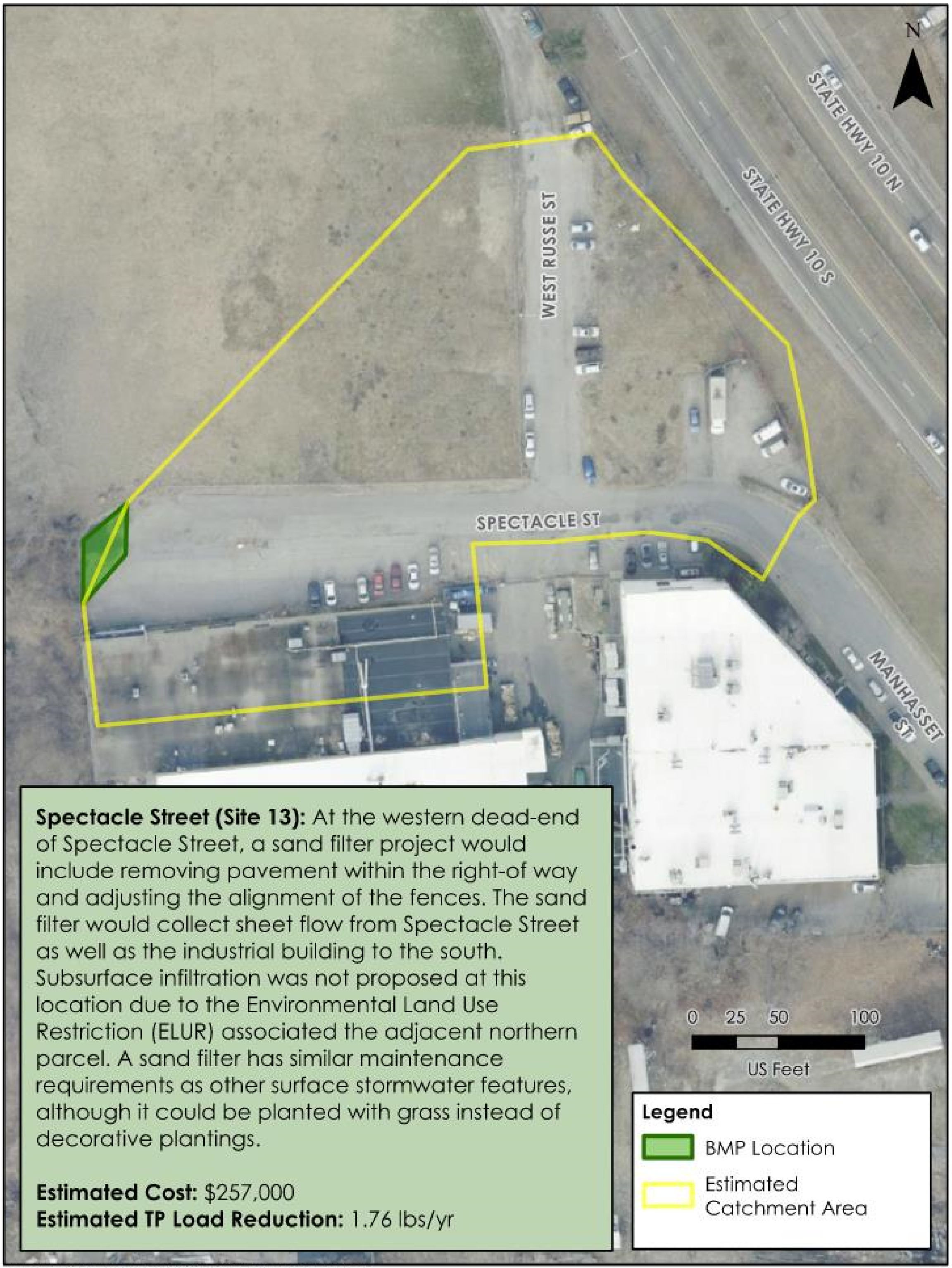


Intersection of Frankfort Street and Pleasant Street (Site 12): The intersection of Frankfort Street and Pleasant Street is a unique opportunity to improve the safety of the intersection by redesigning the flow of traffic. A project at this location could also include removing pavement and installing a structural BMP. Subsurface infiltration or a surface curb-inlet style system could likely treat 100% of the water quality volume, depending on the revised intersection layout and location of underground utilities.

Estimated Cost: $215,000
Estimated TP Load Reduction: 0.98 lbs/yr

Data Sources: URI EDC, RIGIS, RIDOT, City of Cranston

Spectacle Pond Phosphorus Reduction Plan
Site 13. Spectacle Street

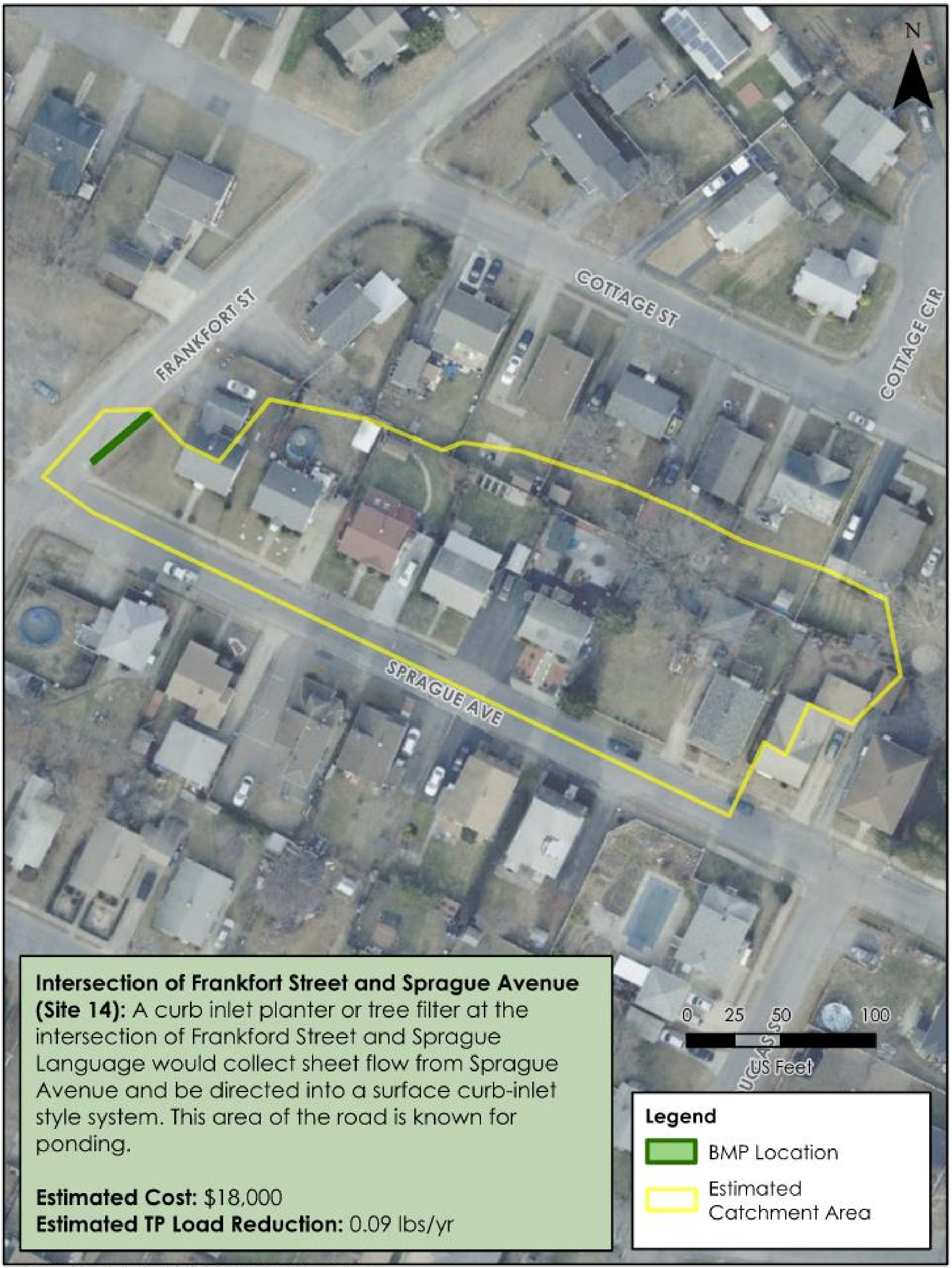


Spectacle Street (Site 13): At the western dead-end of Spectacle Street, a sand filter project would include removing pavement within the right-of way and adjusting the alignment of the fences. The sand filter would collect sheet flow from Spectacle Street as well as the industrial building to the south. Subsurface infiltration was not proposed at this location due to the Environmental Land Use Restriction (ELUR) associated the adjacent northern parcel. A sand filter has similar maintenance requirements as other surface stormwater features, although it could be planted with grass instead of decorative plantings.

Estimated Cost: $257,000
Estimated TP Load Reduction: 1.76 lbs/yr

Data Sources: URI EDC, RIGIS, RIDOT, City of Cranston

Spectacle Pond Phosphorus Reduction Plan
Site 14. Intersection of Frankfort Street and Sprague Avenue



Intersection of Frankfort Street and Sprague Avenue (Site 14): A curb inlet planter or tree filter at the intersection of Frankford Street and Sprague Language would collect sheet flow from Sprague Avenue and be directed into a surface curb-inlet style system. This area of the road is known for ponding.

Estimated Cost: $18,000
Estimated TP Load Reduction: 0.09 lbs/yr

Data Sources: URI EDC, RIGIS, RIDOT, City of Cranston

3.1 Opportunities for Further Analysis

- **Lake Street Outfall Watershed Analysis**
    - It is likely that the drainage network at the intersection of Gordon Street and Burnham Avenue ties into the drainage network that outfalls on Lake Street; however, the available drainage data from the City does not clearly depict an interconnection. If an interconnection exists, the Lake Street outfall watershed is roughly 150 acres and includes a large section of Cranston Street. Targeting structural BMPs in this watershed would have additional positive benefits to phosphorus reduction and overall water quality. It would be important to identify and delineate the extent of the catchment prior to siting additional BMPs. A targeted BMP campaign in this watershed would have a significant impact on water quality and should be the focus of future analysis.

- **Gordon Street Outfall Watershed Analysis**
    - The watershed that contributes to the outfalls at Speck Park from the Gordon Street neighborhood is over six (6) acres. The drainage network that contributes to this outfall is incongruous with both the 2007 TMDL RIDEM watershed and the 2017 watershed revised by RIDOT for their Stormwater Control Plan (SCP), which are typically accepted by RIDEM. Further investigations confirming the layout of the drainage network should be performed to confirm the contributing area to this outfall and adequately size potential BMPs.

- **Marlborough Street & Laurel Hill Avenue**
    - Structural BMPs were originally proposed within both of these rights-of-way, however, due to these streets being recently paved, these streets were designated for future analysis.

3.2 Complete Streets

Crescent Avenue and Harmon Avenue: A cost-effective approach to reducing stormwater runoff in large areas of the watershed is to incorporate structural BMPs into proposed traffic calming projects. The Crescent Avenue and Harmon Avenue neighborhoods have wide roadways with long hills, where drivers are prone to increased speeds. Reducing the width of the road with curb in-let planters and tree filters, between areas of formalized parallel parking, can be used as a mechanism to slow down traffic. Such projects can be used to address pedestrian and bicycle safety as well.

Complete Streets not only provide the benefit of increased vehicular and pedestrian safety but are also an opportunity for phosphorus reduction through stormwater structural BMP installation. The Crescent Avenue and Harmon Avenue neighborhoods would be ideal candidates for a Complete Streets approach, where structural BMPs are proposed on a neighborhood-wide scale to improve safety and water quality.

3.3 Partnership Opportunities

Partnership opportunities between the City and other local stakeholders can be leveraged to improve water quality, through both structural and non-structural BMPs. Two partnership opportunities were identified during this study.

- **Twin Oaks Restaurant**
    - The restaurant and parking lots consist of approximately six (6) acres of impervious area on the western shore of the Pond. Stormwater enters the pond at this location via sheetflow from the impervious surface as well as from three City-owned outfalls. Structural BMPs could be incorporated into a design to formalize and maximize the number of parking spaces as well as treat runoff from Molter Street, Sabra Street, and Pleasant Street. The City maintains a strong relationship with the restaurant owners. Non-structural BMPs, such as eliminating the use of sand in the parking lot during the winter, could also be coordinated with the property owners.

- **Rode Island Department of Transportation (RIDOT)**
    - RIDOT is currently under a Consent Decree with USEPA to implement stormwater quality improvements for their infrastructure in every impaired watershed impacted by RIDOT runoff, including Spectacle Pond. While RIDOT is responsible for implementing controls on nearby state roads, USEPA does allow RIDOT to partner with municipalities to address up to 25% of their stormwater quality requirements, even when the drainage is not on RIDOT-maintained roads. Opportunities for RIDOT to contribute funding to municipalities to implement these types of controls are ongoing. One advantage of RIDOT funding is that it can be used as a match for other grant programs.

- **Stadium Elementary School**
    - The approximately one-acre asphalt play area behind the elementary school offers a unique opportunity to leverage a partnership between the City and public school. Green infrastructure elements, such as permeable play surface tree filters and/or subsurface infiltration systems, could be incorporated into the area. A BMP project at the school would also provide an educational and interactive opportunity to teach students about environmental science.

4 Potential Funding Sources

State Revolving Fund (SRF) Loan Program

The SRF provides a low-cost financing option for communities through multiple programs. The Clean Water Program provides loans to help municipalities comply with federal and state water quality requirements by focusing on watershed management priorities, stormwater management, and green infrastructure, as well as community septic system repair programs and riverbank restoration projects. Open space acquisitions related to water quality protection are also eligible for financing.

One program, the Bay and Watershed Restoration Fund (BWRF), is administered by RIDEM to fund programs allocated by previous bond referenda. The fund is meant to provide assistance for the feasibility analysis, design, construction, or rehabilitation of: nonpoint source water pollution control facilities, stormwater pollution control projects, riparian buffer and aquatic habitat restoration projects, and projects which prevent or mitigate flooding.

Website: http://www.dem.ri.gov/programs/water/finance/state-revolving-fund.php

RIIB Stormwater Project Accelerator

The Stormwater Project Accelerator is administered by the Rhode Island Infrastructure Bank and the Department of Transportation. The program provides upfront funding to municipalities for infrastructure funding to support green stormwater infrastructure in Rhode Island that will ultimately be reimbursed through state and local reimbursement grants. Eligible projects must first secure state or local funding.

Website: https://riib.org/solutions/programs/stormwater-project-accelerator/

Municipal Resilience Preparedness (MRP) Action Grant Program

The MRP Action Grant Program is administered through the RI Infrastructure Bank, in partnership with the Nature Conservancy. To be eligible for funding, communities must complete the MRP Planning Grant process, which Cranston has not yet participated in. The MRP Action Grant offers financial assistance to municipalities that are interested in implementing climate adaptation actions to address the impacts of climate change in their communities (extreme weather, sea level rise, inland, and coastal flooding, severe heat, etc.). The program funds projects relating to planning, assessments, and regulatory updates; nature-based solutions for ecological and public health; and resilient redesigns and retrofits for critical facilities and infrastructure. In past funding rounds, project amounts ranged from $150,000 to $400,000. A 25% match, either through cash or in-kind services, is required.

Website: https://riib.org/solutions/programs/municipal-resilience-program/

Clean Water Act, Section 319 Nonpoint Source Implementation Grants

Section 319 Grants are available for projects that promote restoration and protection of water quality through reducing and managing nonpoint source pollution. These grants are made possible by federal funds provided to RIDEM by the USEPA under Section 319 of the Clean Water Act. Eligible applicants include municipal, state, or regional governments, quasi-state agencies, public schools and universities, and non-profit watershed, environmental, or conservation organizations. Pursuant to federal guidelines for Section 319 funding, projects can only be funded in those areas in which a Watershed-Based Plan has been completed.

Clean Water Act Section 319 grants may be used for green stormwater infrastructure projects (if not mandated by a stormwater permit) and certain restoration activities. Projects should be in line with the state's 2019 guidance document "Nonpoint Source Management Program Plan." Annual funding is approximately $750,000 and requires a 33% match.

RIDEM 319 website: https://dem.ri.gov/environmental-protection-bureau/water-resources/research-monitoring/water-quality-resources/nonpoint-source-pollution

Southeast New England Program (SNEP) Network

Southeast New England Watershed Grant Program: Over the last 5 years, the US Environmental Protection Agency (USEPA) has administered this grant program providing $22 million in funding for water quality and sustainability projects for the Narragansett Bay and Buzzard's Bay watersheds. This watershed includes almost all of Rhode Island and most of Southeastern Massachusetts and Cape Cod. These grant applications typically require a 50% match. Stormwater quality projects are fundable under this grant program, however, these grants are very competitive with less than half of the grant applications typically being funded. As a result, it is important that the projects proposed with these grant applications incorporate a unique element that provides a differentiator compared to other applications.

Tables

Table 1: Conceptual BMP Sizing & Load Reduction Analysis

Site	Street Name	BMP Type	Drainage Area (Acres)	Impervious Area (%)	Water Quality Volume (Cubic feet)	Percent of Water Quality Volume Treated[1]
13	Spectacle Street	Sand Filter (Pavement Removal)	1.99	56	4,012	100%
12	Frankford Street & Pleasant Street	Curb Inlet Planter or Subsurface Infiltration	1.43	84	4,332	50%
8	Lowell Street	Subsurface Infiltration	0.38	88	1,231	100%
6	Beacon Street	Subsurface Infiltration	0.40	92	1,339	100%
5	Winthrop Street	Subsurface Infiltration	1.00	60	2,184	40%
3	Lake Street (At Gordon St.)	Infiltration Basin or Swale	0.56	65	1,322	100%
4	Gordon St. (At Harmon Ave.)	Infiltration Basin or Swale	0.59	71	1,533	100%
11	Midwood Street & Gleason Street	Dry Well	0.87	75	2,350	20%
7	Irving Street	Subsurface Infiltration	0.48	64	1,126	90%
9	Packard Street	Subsurface Infiltration	1.55	90	5,022	40%
10	Midwood Street	Subsurface Infiltration	2.91	75	7,915	20%
1	Cranston Street	Tree Filter	0.23	100	850	40%
14	Frankford Street	Curb Inlet Planter	1.09	64	2,515	10%
2	Cranston Street	Curb Inlet Planter	0.25	94	857	20%

Footnotes:

1 *Percent of the WQv treated is based on sizing calculations from the Rhode Island Stormwater Design and Installation Standards Manual (RISDISM)* .

Table 2: Annual Pollutant Load Reduction[1]

Site	Street Name	TSS Loading (lbs/yr)	TP Loading (lbs/yr)	TSS Load Reduction (%)	TP Load Reduction (%)	TSS Load Reduction[2] (lbs/yr)	TP Load Reduction[2] (lbs/yr)
13	Spectacle Street	1,049	3.15	88%	56%	918	1.76
12	Frankford Street & Pleasant Street	1,098	3.29	46%	30%	509	0.98
8	Lowell Street	311	0.93	86%	52%	267	0.49
6	Beacon Street	337	1.01	89%	54%	299	0.55
5	Winthrop Street	567	1.70	36%	22%	206	0.38
3	Lake Street (At Gordon St.)	341	1.02	90%	55%	306	0.56
4	Gordon St. (At Harmon Ave.)	393	1.18	90%	55%	355	0.65
11	Midwood Street & Gleason Street	600	1.80	14%	9%	87	0.16
7	Irving Street	291	0.87	79%	48%	230	0.42
9	Packard Street	1,268	3.80	33%	20%	416	0.76
10	Midwood Street	2,021	6.06	22%	13%	444	0.81
14	Frankford Street	650	1.95	7%	4%	44	0.09
1	Cranston Street	213	0.64	39%	24%	82	0.15
2	Cranston Street	216	0.65	15%	10%	32	0.06

Footnotes

[1] *Pollutant Loadings, Reduction Capacity, and Load Reduction were determined based on Appendix H Section H.3 of the RISDISM*

[2] *Reduction Capacity was determined by multiplying the treatment efficiency value for bioretention reported in Table H-3 of the RISDISM by the Treatment Capacity (Percent of WQv that can be treated in the area available at each site) in Table 2.*

Table 3: Order of Magnitude Cost Estimates

Order of Magnitude Cost Range												
Site Number	**Location and BMP Type**		**Construction**					**Planning and Design**		**Cost Range**		
			Unit Cost	**Unit**	**Adjustment Factor**	**Quantity**	**Base Cost**	**Allowance**	**Cost**	**Total Cost**	**-30%**	**+ 50%**
1	Cranston Street	SilvaCell	$16.02	cf storage volume	3.0	365.00	$17,538	30%	$5,260	$23,000	$16,000	$35,000
2	Cranston Street	Bioretention	$81,528.00	acre impervious cover treated	3.0	0.04	$9,979	30%	$2,990	$13,000	$9,000	$20,000
3	Gordon Street	Bioretention	$81,528.00	acre impervious cover treated	3.0	0.36	$89,100	30%	$26,730	$116,000	$81,000	$174,000
4	Gordon Street (at Harmon Avenue)	Bioretention	$81,528.00	acre impervious cover treated	3.0	0.42	$103,788	30%	$31,140	$135,000	$95,000	$203,000
5	Winthrop Street	Subsurface Infiltration	$23.58	cf of runoff treated	3.0	879.00	$62,180	30%	$18,650	$81,000	$57,000	$122,000
6	Beacon Street	Subsurface Infiltration	$23.58	cf of runoff treated	3.0	1,319.00	$93,306	30%	$27,990	$122,000	$85,000	$183,000
7	Irving Street	Subsurface Infiltration	$23.58	cf of runoff treated	3.0	991.00	$70,103	30%	$21,030	$92,000	$64,000	$138,000
8	Lowell Street	Subsurface Infiltration	$23.58	cf of runoff treated	3.0	1,172.00	$82,907	30%	$24,870	$108,000	$76,000	$162,000
9	Packard Street	Subsurface Infiltration	$23.58	cf of runoff treated	3.0	1,831.00	$129,525	30%	$38,860	$169,000	$118,000	$254,000
10	Midwood Street	Subsurface Infiltration	$23.58	cf of runoff treated	3.0	1,934.00	$136,811	30%	$41,040	$178,000	$125,000	$267,000
11	Midwood Street & Gleason Street	Dry Well	$14,737.50	ea	3.0	2.00	$88,425	30%	$26,530	$115,000	$81,000	$173,000
12	Frankfort Street & Pleasant Street	Bioretention	$81,528.00	acre impervious cover treated	3.0	0.64	$157,170	30%	$47,150	$205,000	$144,000	$308,000
		Subsurface Infiltration	$23.58	cf of runoff treated	3.0	2,333.00	$165,036	30%	$49,510	$215,000	$151,000	$323,000
13	Spectacle Street	Sand Filter	$16.40	cf storage volume	3.0	4,012.00	$197,372	30%	$59,210	$257,000	$180,000	$386,000
14	Frankfort Street	Bioretention	$81,528.00	acre impervious cover treated	3.0	0.06	$13,501	30%	$4,050	$18,000	$13,000	$27,000
									Total	***$1,847,000***	***$1,295,000***	***$2,775,000***

Notes:
Costs are based on screening-level evaluations of site characteristics and should be used for planning purposes only. Construction costs could vary significantly.
Quanties were determined through sizing calculations according to recommended formulas. BMP size may vary slightly on the concept sheets provided, as these images are provided for illustrative purposes only.

Spectacle Pond Limnological Investigation

City of Cranston

Cranston, Rhode Island

December 2022

FUSS & O'NEILL

317 Iron Horse Way, Suite 204
Providence, RI 02908

Project No. 20170900.B10

Table of Contents

Spectacle Pond Limnological Investigation
City of Cranston

Table of Contents

Spectacle Pond Limnological Investigation
City of Cranston

1 Project Purpose and Goals

1.1 Project Purpose and Goals

According to the *Total Maximum Daily Loads for Phosphorus To Address 9 Eutrophic Ponds in Rhode Island* (TMDL) prepared by RIDEM in September 2007, the estimated annual phosphorus load to Spectacle Pond is 216 kg/year (476 lbs/yr). The TMDL required that the load be reduced by 148 kg/year (326 lbs/yr), a 68% reduction. In order to reach the reduction goal, RIDEM recommended the City of Cranston address external loading sources through stormwater management, deposited sediment management, and waterfowl management. The TMDL also recommended that the City work with a consultant to confirm the significance of internal cycling as a source of phosphorus to the pond and, if this is a significant source, identify appropriate measures to address internal phosphorus loading from sediments at the bottom of the pond.

This limnological assessment of Spectacle Pond was conducted to estimate the relative contribution of internal cycling to total phosphorus loading in the pond. Management recommendations to address the phosphorus impairment will differ based on the relative contributions of internal and external sources. Field data collection in the form of a bathymetric survey, sediment and water quality sampling, and calculations of internal phosphorus loading were conducted. This report documents the findings of the limnological assessment by summarizing the methods (**Section 2**) and results of the field work (**Section 3**) and the internal phosphorus loading calculation (**Section 4**). This report also discusses the relative significance of internal cycling on the water quality of Spectacle Pond and recommends next steps to address the phosphorus impairment in the pond (**Section 5**).

1.2 Background

Spectacle Pond is located in Cranston, Rhode Island within the Pawtuxet River watershed. The pond's watershed, which is approximately 637 acres in size, contains 55% high density residential development with residential properties located west and south of the pond. Industrial and commercial properties occupy the northern and eastern shorelines. The northern basin of Spectacle Pond is connected to Tongue Pond by a manmade ditch that weaves between three wetland replication areas. According to the *Total Maximum Daily Loads for Phosphorus To Address 9 Eutrophic Ponds in Rhode Island* (TMDL) prepared by RIDEM in September 2007, the manmade ditch appears to flow only during periods of high water. The three small wetland replication areas are located adjacent to the manmade ditch but are not hydrologically connected to the stream or to Spectacle Pond (**Figure 1-2**). Spectacle Pond receives inflow via groundwater, surface water runoff, stormwater runoff, tributary inflow, and direct precipitation. There are 19 storm drains and 13 areas of concentrated surface flow that discharge to Spectacle Pond, its tributary, and Tongue Pond. The pond discharges to the northeast via a 48-inch culvert under Route 10 connected to Mashapaug Brook and Mashapaug Pond. Mashapaug Pond is connected to the ponds in Roger Williams Park via a buried stream, ultimately discharging to the Pawtuxet River and Narragansett Bay.

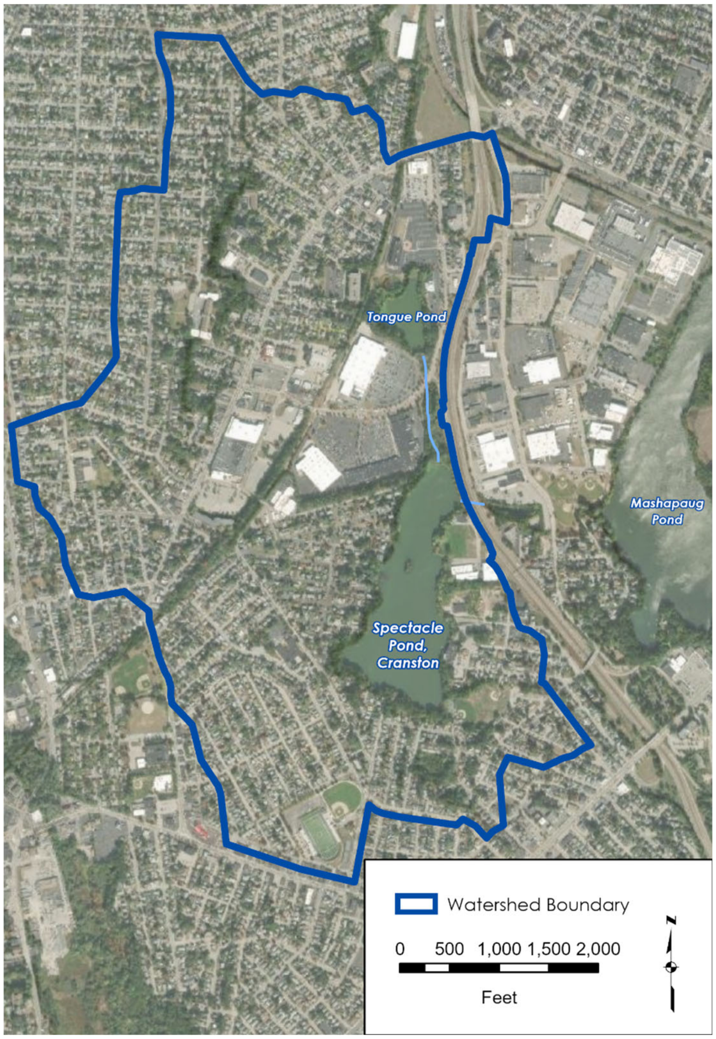


Figure 1-1: Spectacle Pond, Watershed, and Surrounding Area

1.3 Water Quality Data Review

Plant litter, fertilizer, and animal waste contribute the majority of phosphorous to stormwater in residential areas while roads are significant contributors of phosphorous in more commercial and industrial areas (**Figure 1-4**) (Waschbusch et. al, 1999). In the 2007 TMDL, RIDEM attributed phosphorus and phosphorus-related impairments at Spectacle Pond to stormwater, waterfowl, and internal cycling. Stormwater was noted as the major external source of phosphorus with seven outfalls discharging directly to Spectacle Pond. The outfall located on the western side of the pond on Lake Street was noted as the most significant source of phosphorus due to the catchment area draining approximately 41% of the Spectacle Pond watershed (RIDEM, 2007). A large delta of eroded sedimentation was observed located at the end of Lake Street, extending 30 to 50 meters into the pond (RIDEM, 2007).

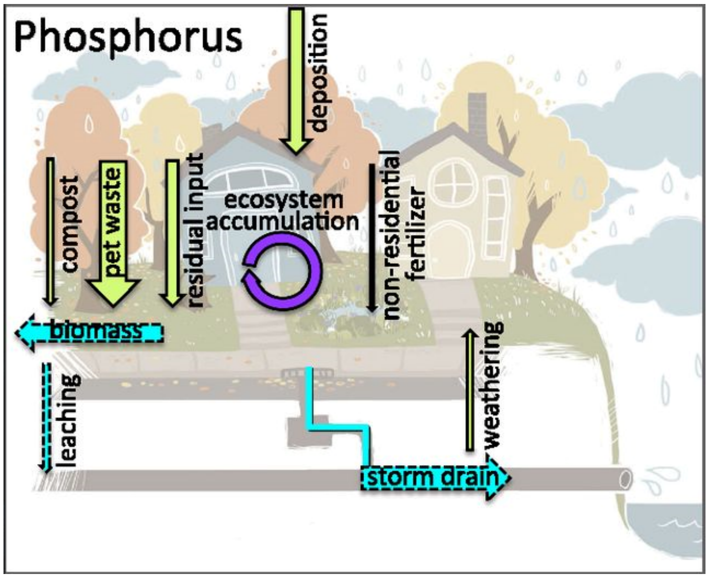


Figure 1-2: Typical external phosphorus sources to a waterbody

Internal loading was also noted as a potential major contributor to phosphorus loading. This internal phosphorus loading can occur when phosphorus is released from lake-bottom sediments, when dissolved oxygen concentrations fall below 1 mg/L, termed anoxia (). Anoxic conditions at the lake bottom trigger biological, chemical, and physical processes that cause phosphorus bound to sediments, and unavailable to aquatic plants and algae, to be released into the water column. This released phosphorus becomes available to algae and aquatic plants, causing rapid algae growth, or blooms. As algae cells die, they settle back to the bottom of the lake, with the phosphorus they consumed bound up, ready to be released into the water column again when the lake next becomes anoxic.

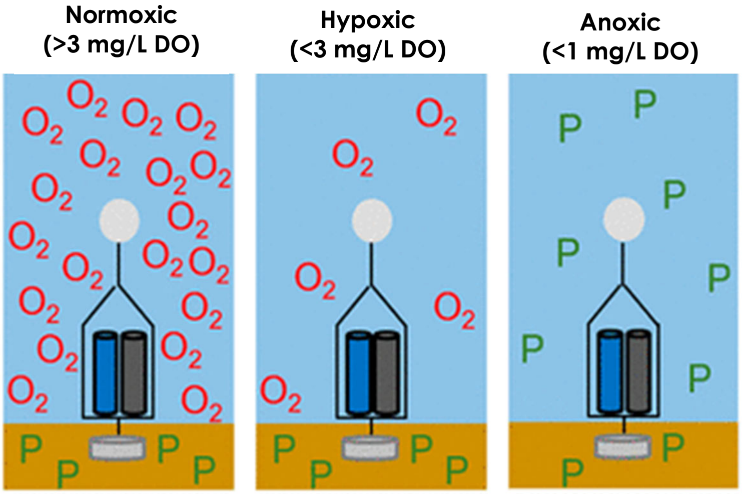


Figure 1-3: Representation of internal phosphorus loading under a range of dissolved oxygen (DO) levels. Image credit: Anderson et al. 2021

1.3.1 University of Rhode Island Watershed Watch Data

The University of Rhode Island Watershed Watch (URIWW) has been collecting water quality data, including total phosphorus (TP), Secchi disk depth, dissolved oxygen (DO), and pH in Spectacle Pond since 1999. From 1999 to 2017, TP was above RIDEM's recommended concentration of 25 µg/L and the yearly average Secchi disk depth transparency was consistently within eutrophic range, which is when the environment becomes enriched with nutrients, increasing the amount of plant and algae growth. Between 2015 and 2018, URIWW found that DO concentrations at three meters were generally lower than at one meter below the surface, following the trend of producing anoxic conditions in the summer and recovering in late fall. During those three years, URIWW also found pH values in Spectacle Pond to generally be within the acceptable range of pH 6.5-9.0, as defined by RIDEM's Water Quality Standards (See Section 3 for more detailed information about URIWW data collected).

2 Field Work Methods

2.1 Bathymetry and Soft Sediment Measurement

A pond bathymetry and soft sediment measurement survey of Spectacle Pond was performed to obtain pond depth and sediment thickness data in order to create a pond bottom contour map and calculate the volume of sediment in the pond. Fuss & O'Neill staff collected bathymetric survey information from a boat using a sturdy metal rod, a weighted tape measure, and a Trimble Geo7X handheld submeter Global Positioning System (GPS).

Pond bathymetry and sediment depth in Spectacle Pond were measured on August 26, 2020. Three transects covered the pond. The ends of each transect extended from one shore to the opposite shore. This coverage was sufficient given the limited variation in bathymetry.

A total of 16 survey points were recorded (**Figure 2-1**). At each measurement location, a weighted tape measure was lowered until slack was felt in the tape. That depth was noted as the top of soft sediment. Concurrently, an extendable rod was used to determine the depth of soft sediment at each point in order to map the extent of soft sediment on the pond bottom. The measuring pole was lowered through the water column and slowly pressed into the soft sediment until resistance was met. Resistance was defined as the sediment not yielding to moderate pressure applied by arm strength. The water surface was marked on the measuring pole and the total depth recorded. Sediment thickness was calculated as the difference between these two measurements. The GPS was used to log the location of each measurement point. All depths were recorded relative to the shoreline elevation, 40.3 feet, listed by the University of Rhode Island Watershed Watch (URIWW).

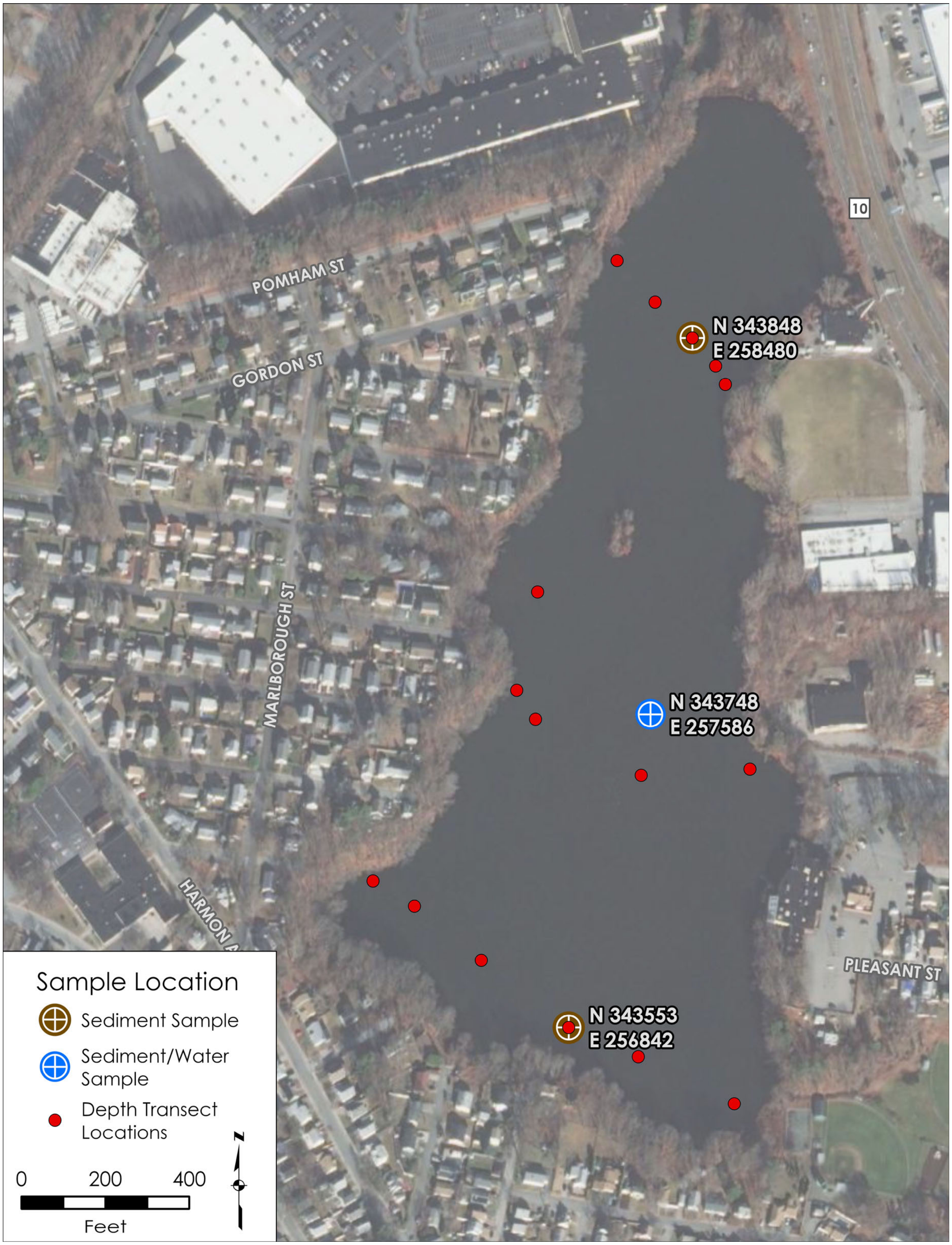


Figure 2-1: Bathymetry of Spectacle Pond. A sediment delta from the outfall at the end of Lake St was identified and measured. Sediment sample locations are noted in RI State Plane Feet (NAD83).

2.2 Sediment Sampling

Sediment sampling and analysis was performed to evaluate sediment characteristics that may impact water quality. On August 26, 2020, three shallow (surficial) sediment samples were collected from pre-determined locations in the pond. Sample locations were chosen prior to the field sampling based upon the soft sediment distribution results from the bathymetric and soft sediment survey.

Samples were collected from a boat using a hand auger. Sediment sample depth was approximately 0 to 6 inches below the water/soft sediment interface. The hand auger was lowered through the water column and advanced through the soft sediment. The auger bucket was filled with sediment and pulled back into the boat, where the sediment was then placed in a stainless-steel bowl to be composited. Three subsamples from each sample location were well homogenized prior to being placed in laboratory-provided glass sample jars with Teflon caps. Following collection, the samples were cooled prior to submittal to Northeast Laboratories, Inc. (Northeast) located in Berlin, Connecticut. Sediment was tested for total phosphorus, loosely bound phosphorus, iron-bound phosphorus, organic matter, and percent solids. Analysis of phosphorus and total solids was outsourced by Northeast to Phoenix Laboratory located in Manchester, Connecticut. Results from these analyses were used to provide estimates of phosphorus released from the sediments and are described in **Sections 3 and 4** and **Appendix A**.

2.3 Water Quality Sampling

Water quality sampling and analysis was performed to record water quality characterization throughout the recreational season (April to September 2020). A total of seven sampling events were conducted throughout the season (**Table 2-1**). Five sampling events occurred during dry weather while the remaining two occurred during wet weather. Water quality sampling consisted of the following sample locations (**Figure 2-2**):

- In-lake sampling at the location used for University of Rhode Island Watershed Watch (URIWW) sampling (41.790244 N, 71.442558 W)
- Inlet from Tongue Pond
- Eight (8) external discharge locations identified as Twin Oaks Outfall, Twin Oaks Surface Water, Speck Field Surface Water, Midwood Street Surface Water, Lake Street Surface Water, Lake Street Manhole, Stop & Shop Outfall and Stop & Shop Surface Water

Water quality sampling at the Stop & Shop Outfall was dependent on observed flow. During the June 26, July 30, and August 26, 2020 sampling events no flow was observed from the outfall. Therefore, no sampling was conducted.

The in-lake water quality samples were collected from a boat using a VanDorn Sampler. Samples were collected at the surface (0.5 feet below water surface), the midpoint of the water column (7-8 feet below water surface), and the pond bottom above sediment (approximately 13 feet below water surface) of the water column. Due to COVID-19 protocols, in-lake sampling did not occur during the first two sampling events on May 8 and 28, 2020. Two samplers could not socially distance in a boat to collect the samples. The remaining five sampling events included the in-lake sampling.

Water column characteristics, including temperature and dissolved oxygen profiles, were recorded at 1-foot intervals at the in-lake sampling location, at the inlet from Tongue Pond and at the eight stormwater outfalls using an In-Situ SmarTROLL. Water samples were collected into plastic pre-preserved sample containers supplied by the laboratories. Samples were submitted to New England Testing Laboratory, Inc. (NET) in West Warwick, Rhode Island, and Phoenix Environmental Laboratories (Phoenix) in Manchester, Connecticut.

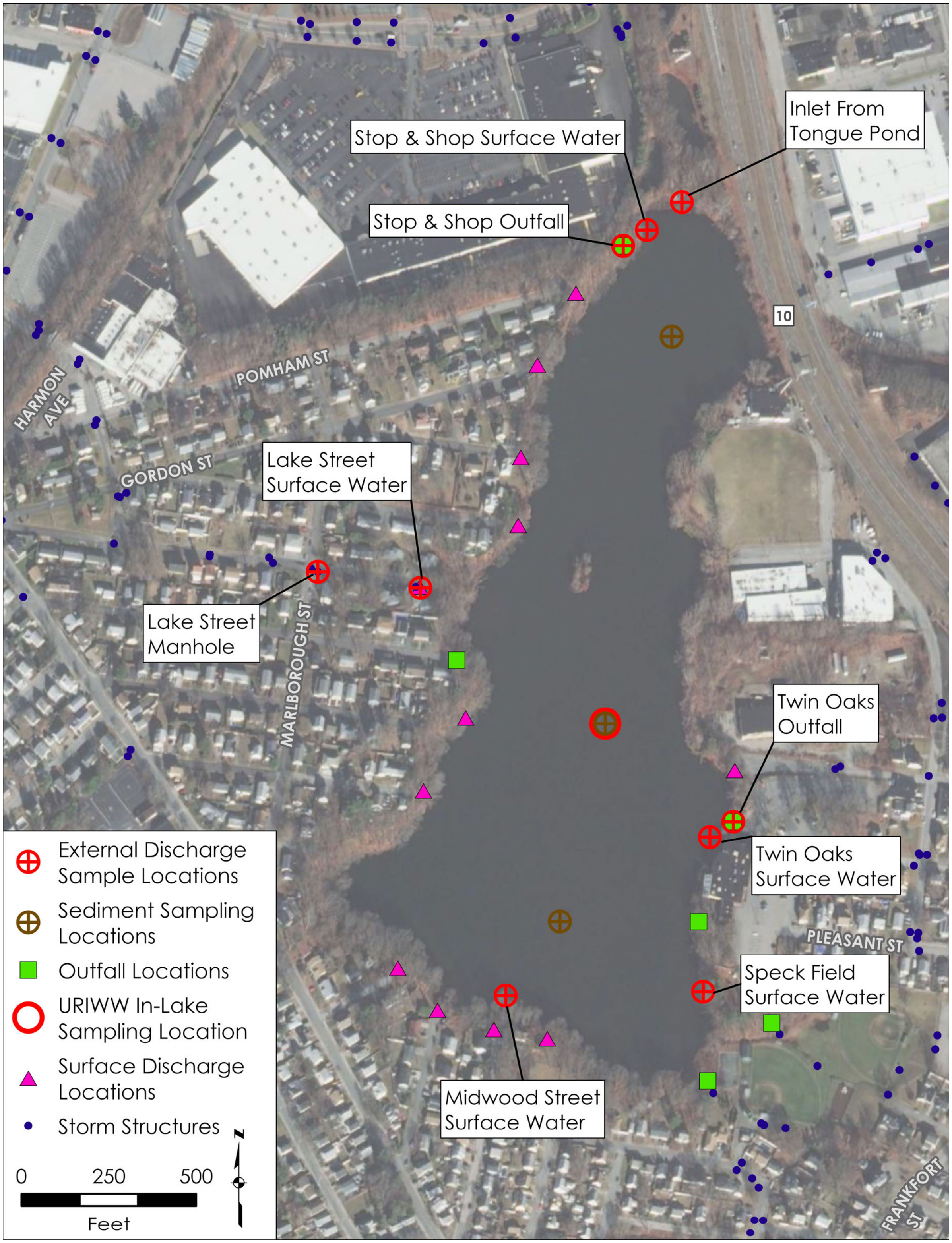


Figure 2-2: Sampling Locations

Table 2-1
Water Quality Sampling Summary

Sample Date	Measured Water Column Characteristics	Laboratory Analytical Parameters
May 8, 2020	pH Temperature Specific Conductivity Dissolved Oxygen Oxidation/Reduction Potential	Alkalinity ($CaCO_3$) Total Phosphorus Turbidity
May 28, 2020	pH Temperature Specific Conductivity Dissolved Oxygen Oxidation/Reduction Potential	Alkalinity ($CaCO_3$) Total Phosphorus Turbidity
June 26, 2020	pH Temperature Specific Conductivity Dissolved Oxygen Oxidation/Reduction Potential	Alkalinity ($CaCO_3$) Total Iron Total Phosphorus Turbidity
July 30, 2020	pH Temperature Specific Conductivity Dissolved Oxygen Oxidation/Reduction Potential	Alkalinity ($CaCO_3$) Total Iron Total Phosphorus Turbidity
August 26, 2020	pH Temperature Specific Conductivity Dissolved Oxygen Oxidation/Reduction Potential	Alkalinity ($CaCO_3$) Total Iron Total Phosphorus Turbidity
October 12, 2020	pH Temperature Specific Conductivity Dissolved Oxygen Oxidation/Reduction Potential	Alkalinity ($CaCO_3$) Total Iron Total Phosphorus Turbidity
October 29, 2020	pH Temperature Specific Conductivity Dissolved Oxygen Oxidation/Reduction Potential	Alkalinity ($CaCO_3$) Total Iron Total Phosphorus Turbidity

3 Field Work Results

3.1 Bathymetry and Soft Sediment Depth

Using the methods described above, measured soft sediment depths ranged from 0.0 to 3.2 feet, with a mean depth of 1.6 feet. Total sediment volume, calculated in ArcGIS according to methods described by Price (2002), was approximately 113,800 cubic yards (cy). Total pond water volume was calculated by the same methods as approximately 390,000 cy (240 acre-feet). The total volume, including sediment is 312 ac-ft. create A sediment thickness surface was interpolated in ArcGIS via a regularized spline to create a raster of sediment depths **(Figure 3-1) (**
Figure 3-2). Interpolation techniques only cover the extent of input data, which leaves as undefined those areas that were not accessible by boat. To compensate for that, the pond shoreline as digitized by RIGIS at 1:5000 scale was set to zero sediment depth and merged with the measured sediment depths. Interpolation was performed on this merged layer. The interpolated surface was analyzed with the Cut/Fill function in ArcGIS relative to a base surface of zero feet derived from the same lake outline obtained from RIGIS.

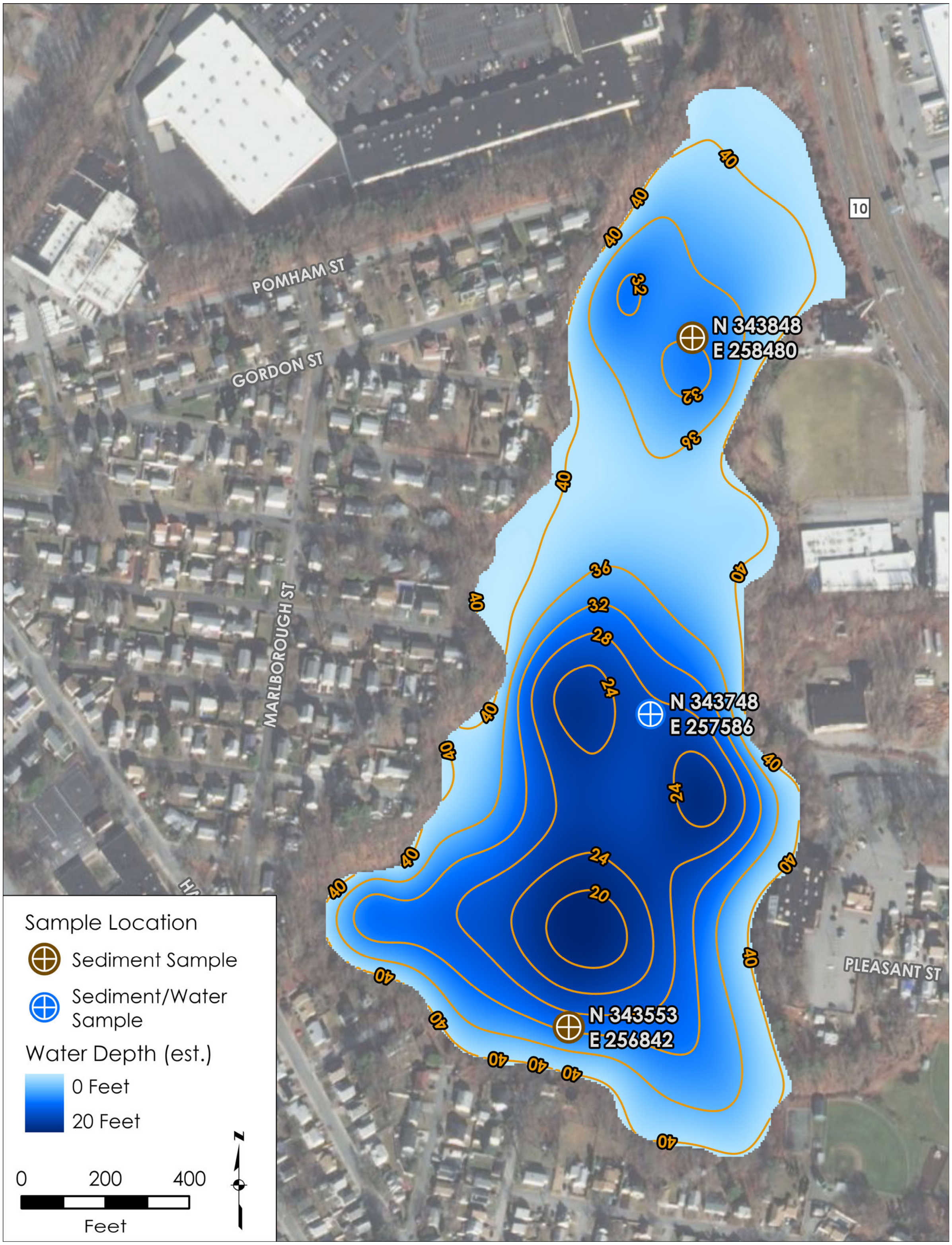


Figure 3-1: Bathymetry of Spectacle Pond

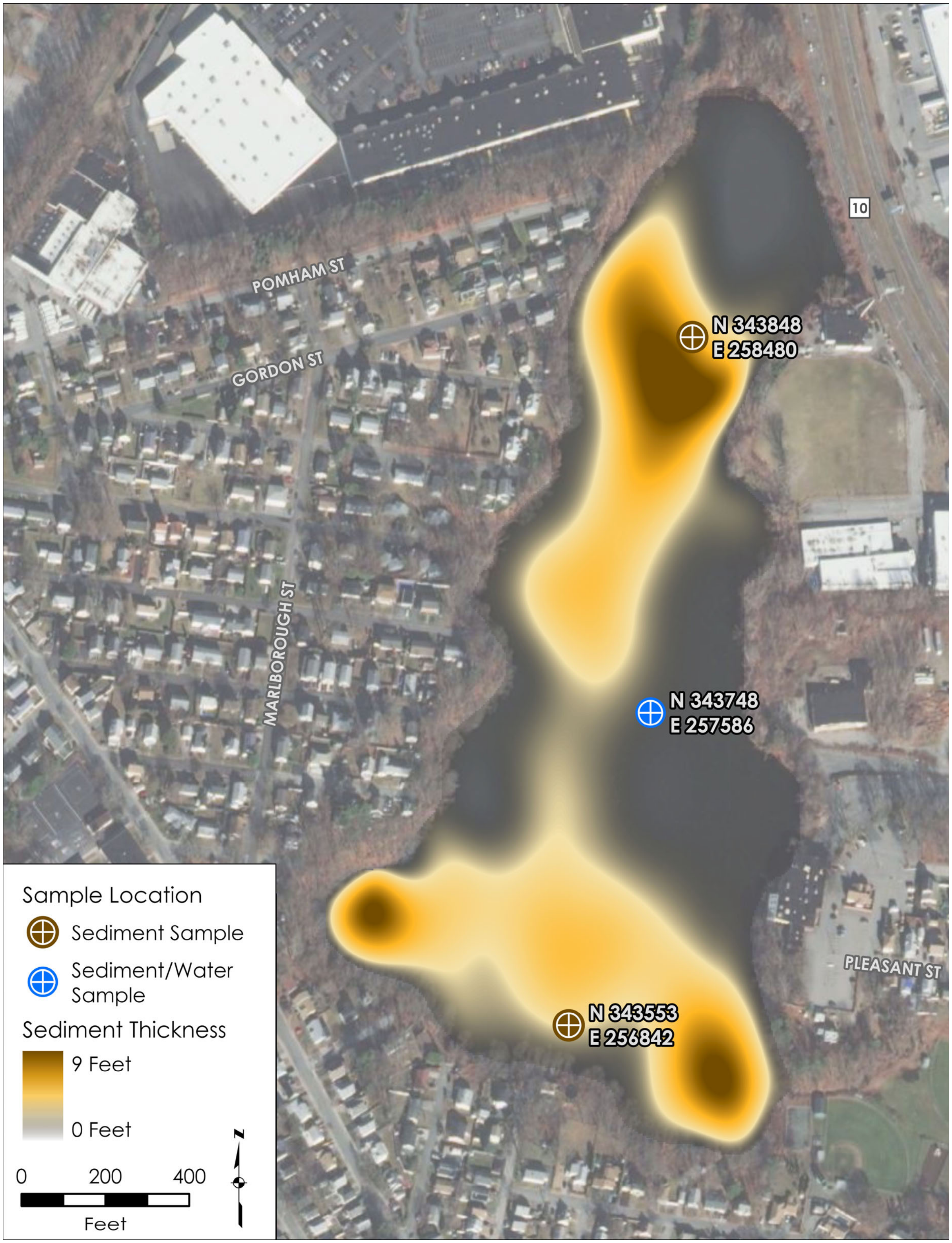


Figure 3-2: Bathymetry of Spectacle Pond. A sediment delta from the outfall at the end of Lake St was identified and measured. Sediment sample locations are noted in RI State Plane Feet (NAD83).

3.2 Sediment

Total phosphorus (TP) concentrations in the three sediment samples collected from Spectacle Pond on August 26, 2020 were 5,810 mg/kg, 175 mg/kg, and 3,810 mg/kg. The lowest sediment TP concentration was measured in sediment collected from the southern sampling site in the pond. The southern sampling site had the highest concentration of percent solids and percent organic matter. Available sediment phosphorus (P), which is the sum of loosely-bound and iron-bound P, ranges from 48.4 mg/kg to 386.1 mg/kg (**Table 3-1**).

Table 3-1:
Spectacle Pond In-Lake Sediment Samples

Sample Parameter	Center of Pond	South End of Pond	North End of Pond
Total Phosphorus (mg/kg)	5,810	175	3,810
Total Solids (%)	14.6	66.4	13.7
Organic Matter (%)	10.29	60.83	6.96
Iron-Bound Phosphorus (mg/kg)	376	44.0	78.2
Loosely Bound Phosphorus (mg/kg)	10.1	4.4	3.0
Sum of loosely bound and iron-bound P	386.1	48.4	81.2

3.3 In-lake Water Quality

3.3.1 Temperature and Dissolved Oxygen

Water temperature in Spectacle Pond varied from 12.95°C to 28.54°C (**Figure 3-3**), reaching its peak of in mid-summer. By early fall the pond cooled, mixed, and temperatures became consistent with depth. Dissolved oxygen (DO) profiles created from the seven sampling events at reveal a thermocline that developed around 6 feet depth in the late spring and summer, producing anoxic conditions below in the hypolimnion (**Figure 3-4**). The following spring, conditions became hypoxic to anoxic below 10 feet. Hypoxia, more commonly known as a dead zone, refers to low or depleted oxygen levels in a water body, typically less than less than 2-3 milligrams of oxygen per liter of water. Anoxia is when oxygen levels in a waterbody reach zero milligrams per liter.

The URIWW measured DO during their sampling events from one and three meters below the surface from 2015 to 2018. According to their data, the DO concentrations reported at three meters were generally lower than the one meter. The DO concentrations followed the trend of producing anoxic conditions in the summer and recovering in late fall. At one meter, the DO ranged from 0.95 to 11.9 mg/L with an average of 7.95 mg/L. At three meters, the DO ranged from 0.0 to 11.9 mg/L with an average of 3.27 mg/L.

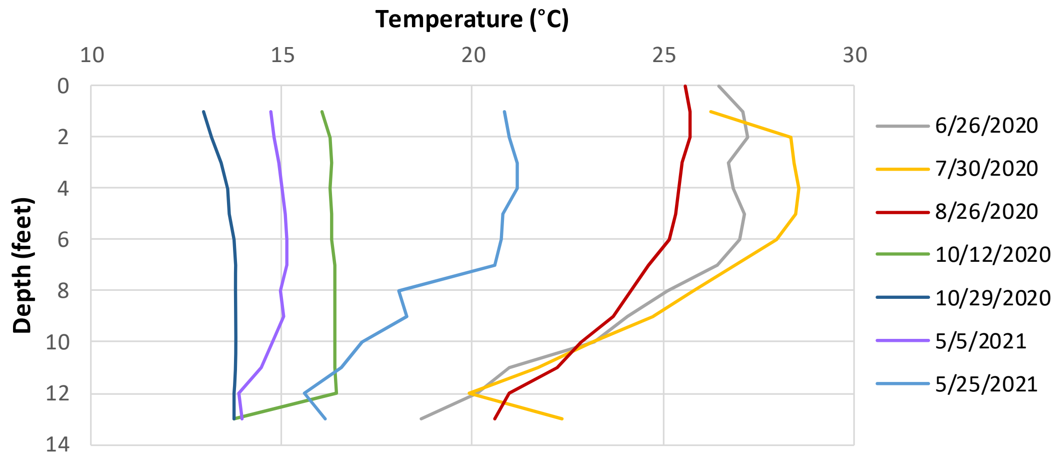


Figure 3-3: Depth Profile of Temperature Measurements in Spectacle Pond

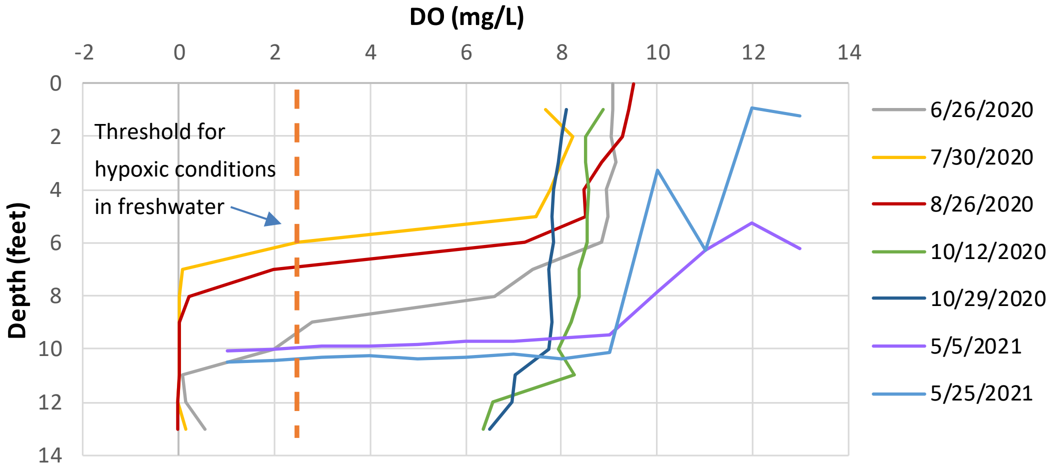


Figure 3-4: Depth Profile of Dissolved Oxygen Measurements in Spectacle Pond

3.3.2 Conductivity

Specific conductivity varied from 0.90 (µS/cm) to 840.9 (µS/cm) (**Figure 3-5**). Conductivity remained consistent with depth during the fall. During the summer, conductivity developed a gradient, reaching a peak of 840.9 µS/cm. An outlier value collected on July 30, 2020 at 1-foot depth was removed from the dataset due to a suspected input error.

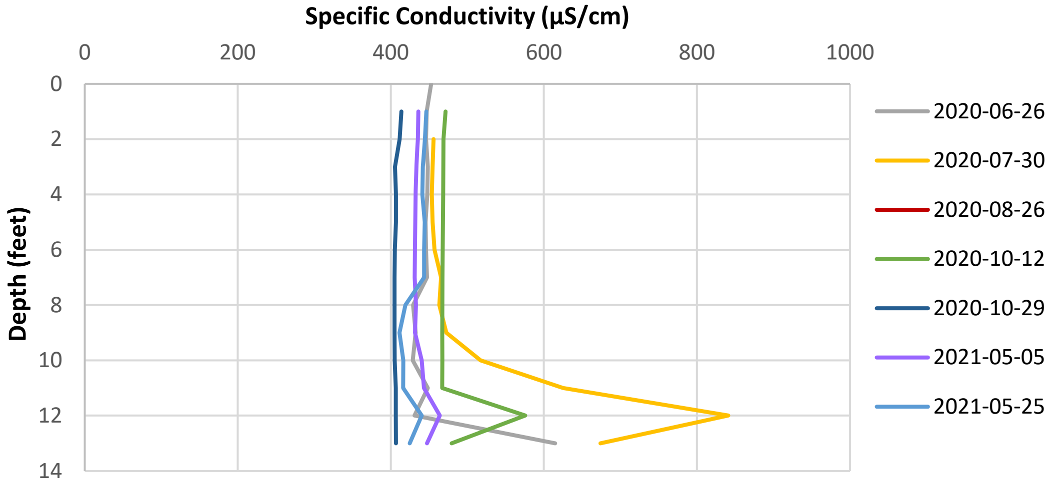


Figure 3-5: Depth Profile of Specific Conductivity Measurements in Spectacle Pond

3.3.3 Redox Potential

Redox potential describes Spectacle Pond's overall reducing/oxidizing capacity. Redox potential decreased greatly with depth for all but one of the four sampling events (October 29, 2020) (**Figure 3-6**). This pattern is in agreement with the dissolved oxygen results described earlier, as the October 29, 2020 samples had consistent concentrations of dissolved oxygen with a slight decrease. Lower redox potential creates conditions conducive to phosphorus release from sediments as discussed in **Section 4**.

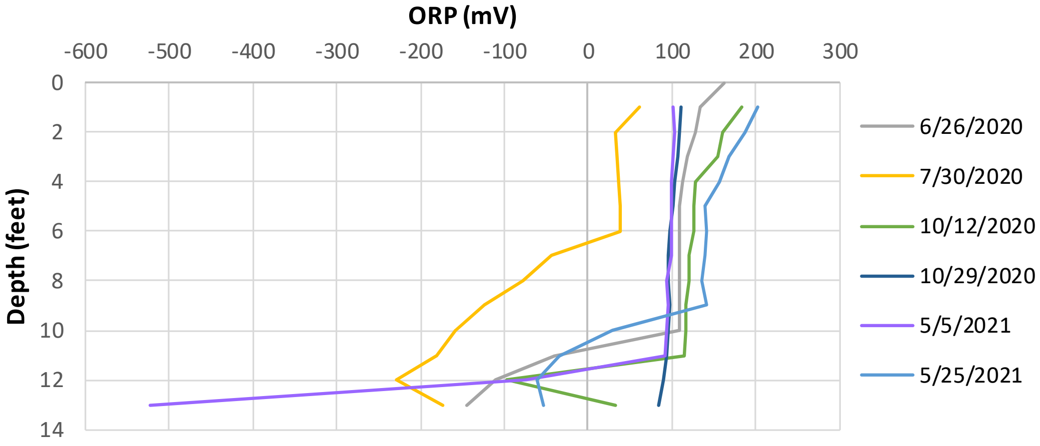


Figure 3-6: Depth Profile of Oxidation Reduction Potential Measurements in Spectacle Pond

3.3.4 pH

pH values in Spectacle Pond were slightly acidic to neutral, which is typical for freshwater ponds in New England. pH values varied from 5.93 to 8.58 with an average value of 7.06, with more neutral measurements in the fall and late spring followed by higher pH values in the late spring, and even higher values in the summer (**Figure 3-7**). These results fall within the acceptable range of pH 6.5-9.0, as defined by RIDEM's Water Quality Standards. Based on URIWW data from 2015 to 2018 the pond is generally within the RIDEM standard with a recorded high value of 7.9. Wu et al. (2014) demonstrated that more P is released from lake bottom sediments under alkaline conditions than acidic conditions, but the least amount of P is released under neutral pH.

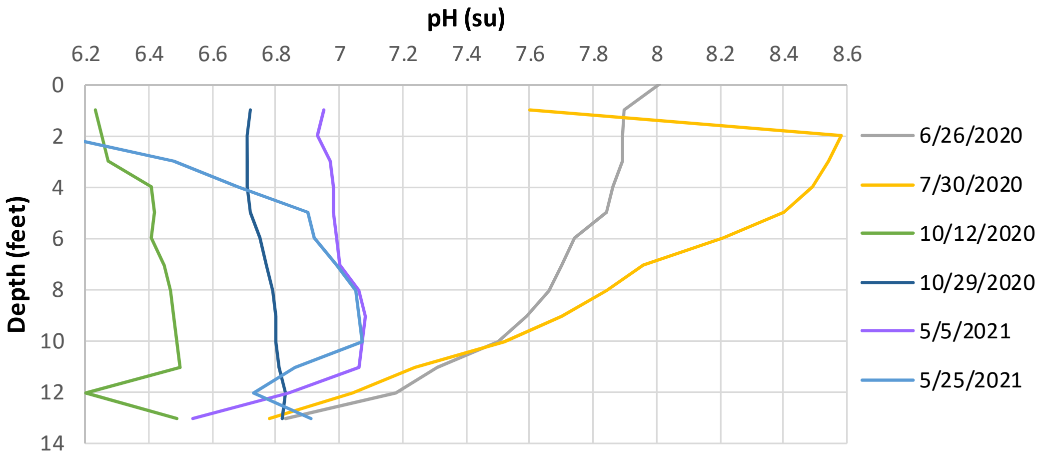


Figure 3-7: Depth Profile of pH Measurements in Spectacle Pond

3.3.5 Turbidity

Turbidity ranged from 4 NTU to 656 NTU with a median of 13.2 NTU (**Figure 3-8**). Few samples met RIDEM's Water Quality Standard for turbidity of 10 NTU. During the late summer and early fall sampling no turbidity readings met the RIDEM standard. Surface and midpoint measurements met water quality standards during the June 26, 2020 and July 30, 2020 sampling events. Turbidity generally increased with depth.

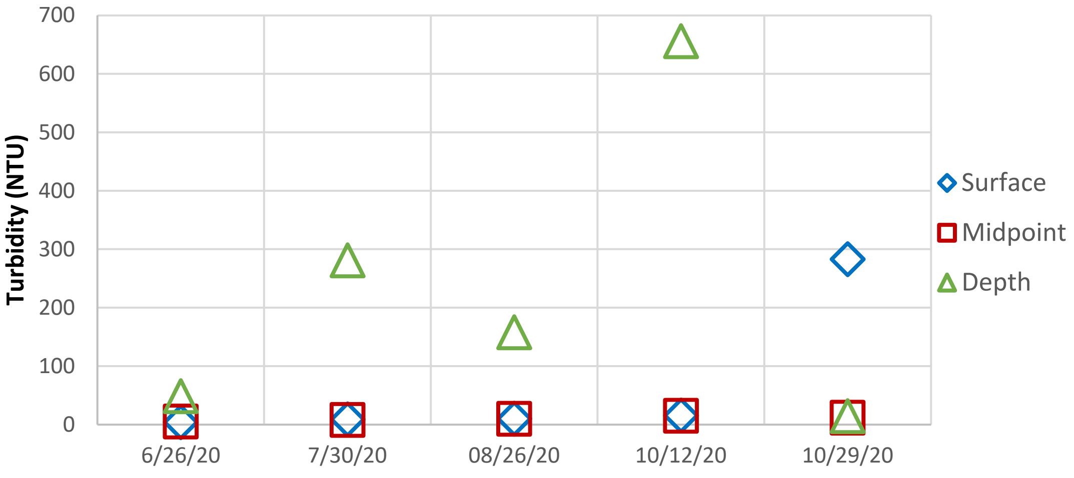


Figure 3-8: Turbidity Measurements in Spectacle Pond

3.3.6 Alkalinity

Alkalinity influences pH by providing a buffering capacity. Higher alkalinity means that there is less likely to be fluctuations in pH. Alkalinity ranged from 31 mg/L to 100 mg/L over the five sampling events at Spectacle Pond (**Figure 3-9**). An alkalinity of 20 mg/L or higher indicates a lake with low sensitivity to pH variations resulting from the input of acidic (low pH) rainfall (Godfrey et al. 1996). Data collected in this study indicates no sensitivity to acidification with alkalinity values of 30 mg/L or higher. Alkalinity values measured during this study were slightly higher than historic alkalinity data obtained from Spectacle Pond by URI Watershed Watch from 2015 to 2018, which had alkalinity values range from 23 to 40 mg/L with an average of 30 mg/L collected from approximately one meter below the surface.

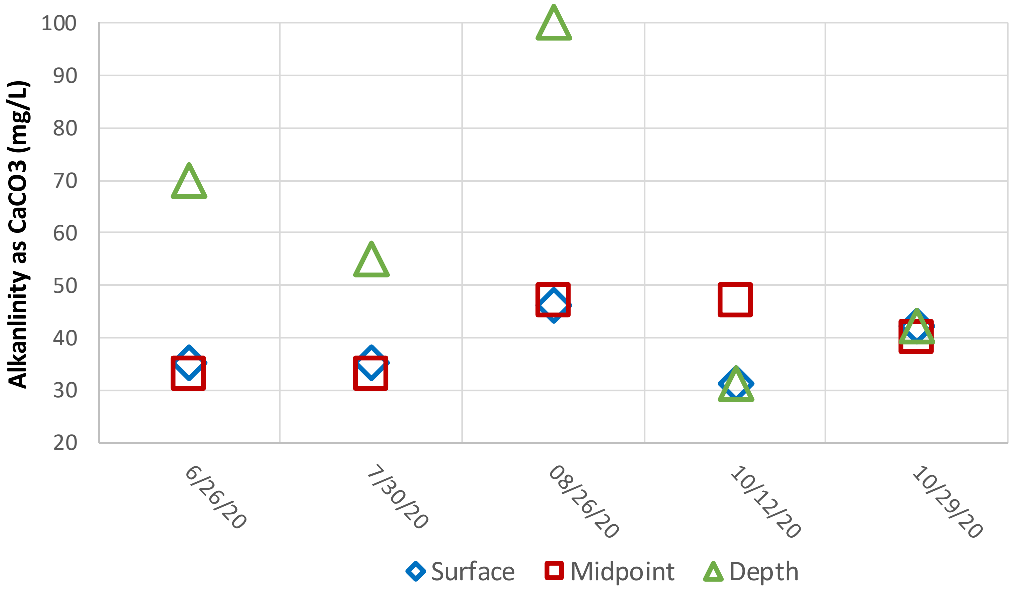


Figure 3-9: Alkalinity Measurements in Spectacle Pond

3.3.7 Phosphorus

Total phosphorus (TP) concentrations in many of the samples from Spectacle Pond exceeded RIDEM's recommended concentration of 25 µg/L (0.025 mg/L) for lakes, ponds, kettle holes, and reservoirs. TP was measured on all dates sampled usually directly at the surface (~0.5 foot), mid-pond depth (~7 to 8 feet) and deep-water depth (~13 feet) (**Figure 3-10**). Duplicate samples, when collected, were averaged for internal loading calculations in **Section 4**. Surface TP ranged from 46 µg/L to 79 µg/L and averaged 60.8 µg/L. Mid-pond depth samples ranged from 44 µg/L to 95 µg/L and averaged 66 µg/L. Deep-water pond samples ranged from 46 µg/L to 11,300 µg/L with a median of 69 µg/L. The outlier in the deep-water sample suggests a median value is a more representative value of the dataset.

These values were compared to the values measured through the University of Rhode Island Watershed Watch (URIWW) that typically measured TP in May, July, September, and October. URIWW has been measuring TP in Spectacle Pond since 1999. From 1999 to 2017 the TP ranged from approximately 30 to 70 µg/l. The program measured an integrated surface sample that collected water from the surface to about the two-meter depth. According to the TMDL, during the sampling periods from 1999 to 2003 the average total phosphorus was 50 µg/L in spring, 62 µg/L in summer, and 61 µg/L in fall with a mean of 57 µg/L.

The surface and mid-point TP measured during the 2020 sampling events were slightly higher than past measurements. There were no historic TP measurements for the depth. Generally, the depth samples had the highest amount of TP, with a high of 11,300 µg/L collected on October 12, 2020.

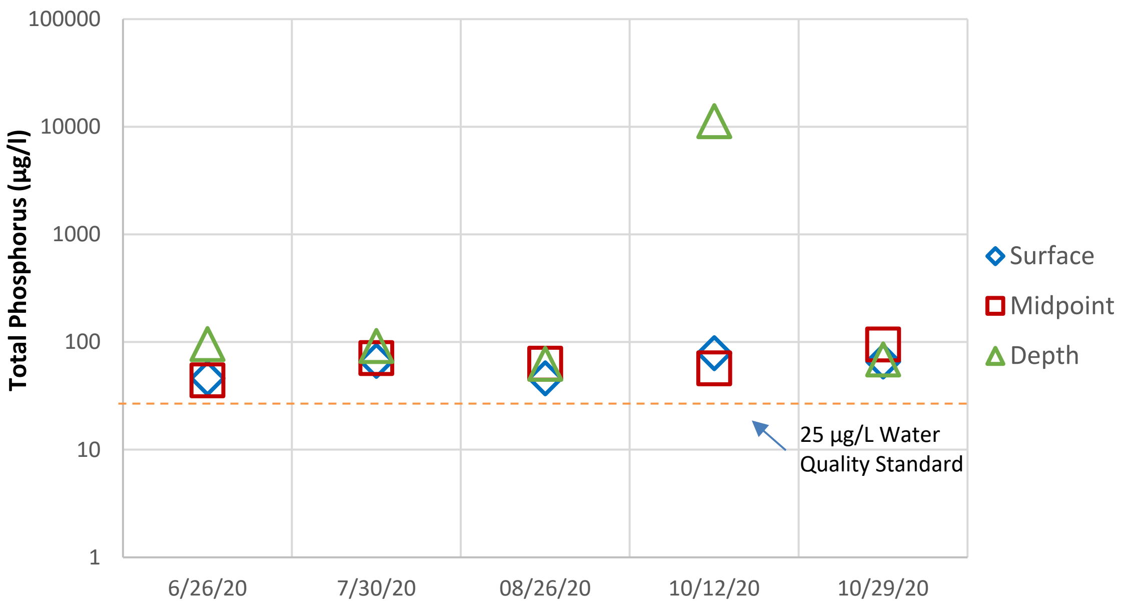


Figure 3-10: Total Phosphorus Concentrations in Spectacle Pond

3.3.8 Total Iron

Total iron in Spectacle Pond varied between 0.161 mg/L and 102 mg/L with an average value of 10.11 mg/L (**Figure 3-11**). The samples from depth returned the largest values of total iron. Iron concentrations are of interest since phosphorus can bind to iron in oxic conditions (i.e., when dissolved oxygen is abundant), and be subsequently released in anoxic conditions such as those observed at depth in Spectacle Pond in the summer months.

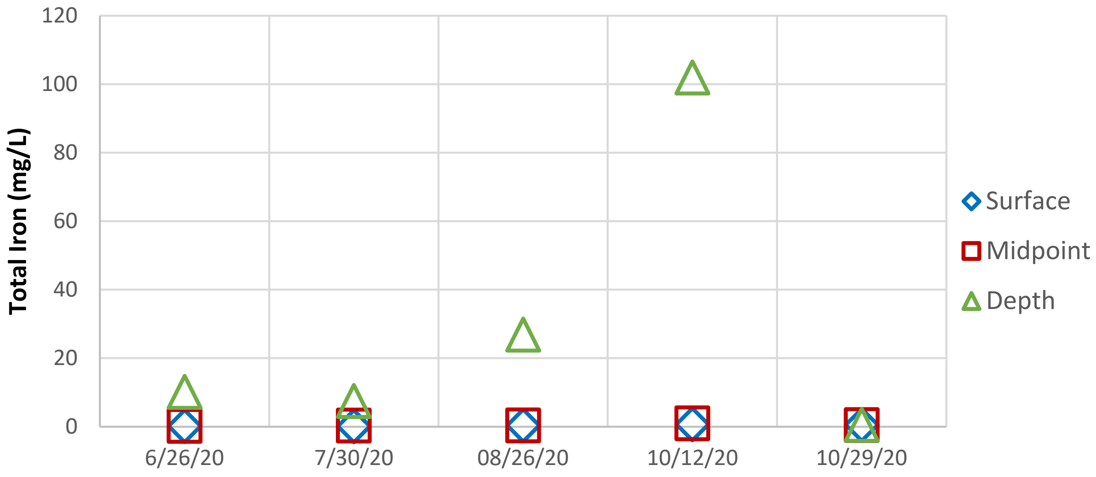


Figure 3-11: Total Iron Concentrations in Spectacle Pond

3.3.9 Secchi Disk Depth

Secchi disk depth was not recorded as part of this assessment. However, the URIWW has measured Secchi disk depth during their sampling events since 1999. From 1999 to 2017 the yearly average Secchi depth transparency was within eutrophic range with depths from approximately 0.5 to 1.5 meters. Based on historically available data, visual observations, and recorded parameters (i.e., dissolved oxygen) during the 2020 sampling events, Spectacle Pond has consistent eutrophic conditions.

3.4 Stormwater Outfalls and Tributary Water Quality

3.4.1 Temperature and Dissolved Oxygen

Water temperatures from the Tongue Pond inlet and eight outfall locations ranged from 13.4°C to 31.87°C (**Figure 3-12**). Water temperatures followed the trend of the in-lake sampling, reaching a peak in mid-summer and cooling down by early fall. Additionally, DO followed the in-lake trend of lowering in the summer, producing anoxic conditions (**Figure 3-13**).

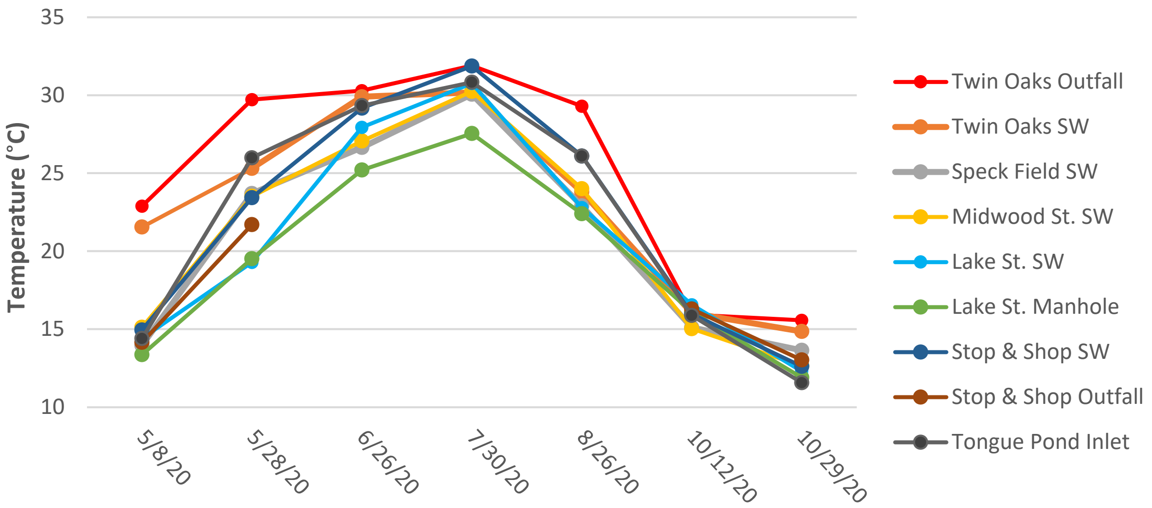


Figure 3-12: Temperature Measurements from Tributary and Outfall Sampling

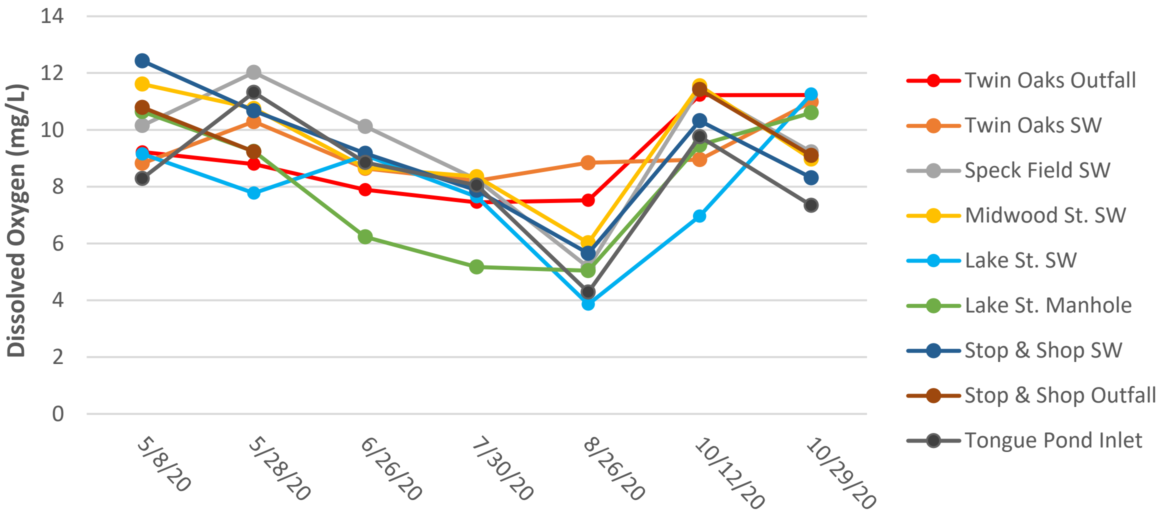


Figure 3-13: Dissolved Oxygen Concentrations from Tributary and Outfall Sampling

3.4.2 Conductivity

Specific conductivity varied from 27.2 (µS/cm) to 534.9 (µS/cm) (**Figure 3-14**). Generally, conductivity peaked during the summer and remained consistent during the fall.

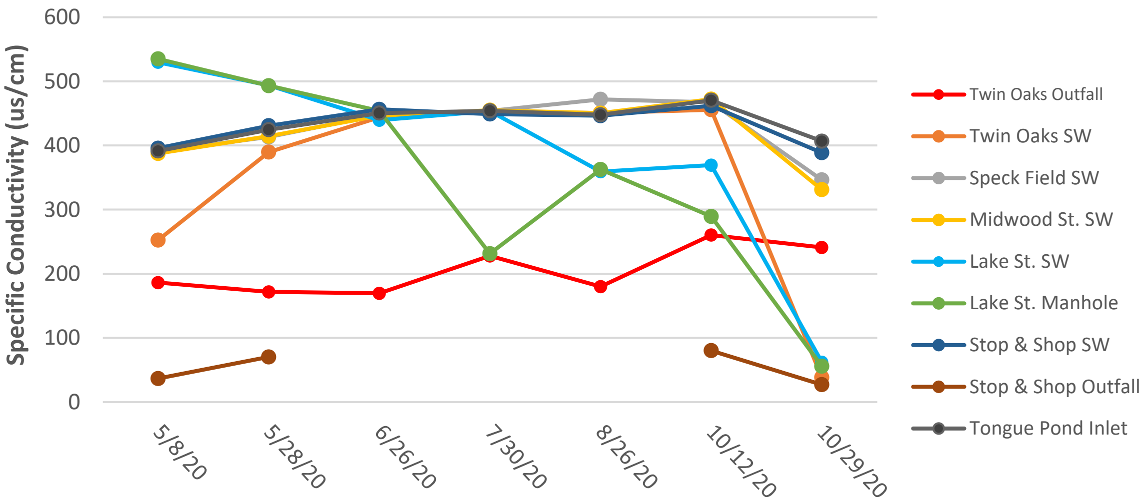


Figure 3-14: Specific Conductivity Measurements from Tributary and Outfall Sampling

3.4.3 Redox Potential

As mentioned above, lower redox potential creates conditions conducive to phosphorus release from sediments. Generally, the redox potential from the tributary and outfall samples were within the same range as the in-lake samples (**Figure 3-15**). This pattern is in agreement with the dissolved oxygen results described earlier.

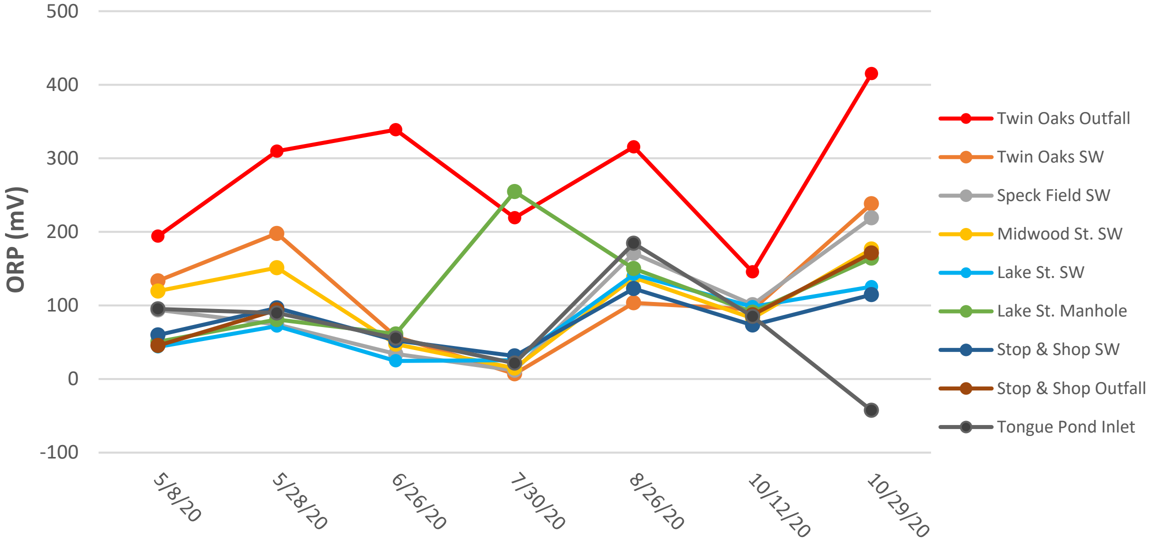


Figure 3-15: Oxidation-Reduction Potential measurements from Tributary and Outfall Sampling

3.4.4 pH

pH values at the tributary and outfalls were slightly acidic to neutral. pH values varied from 5.81 to 9.2 with an average of 7.0 (**Figure 3-16**). The pH values were generally within RIDEM standards for pH and does not appear to have an effect on pH value of Spectacle Pond.

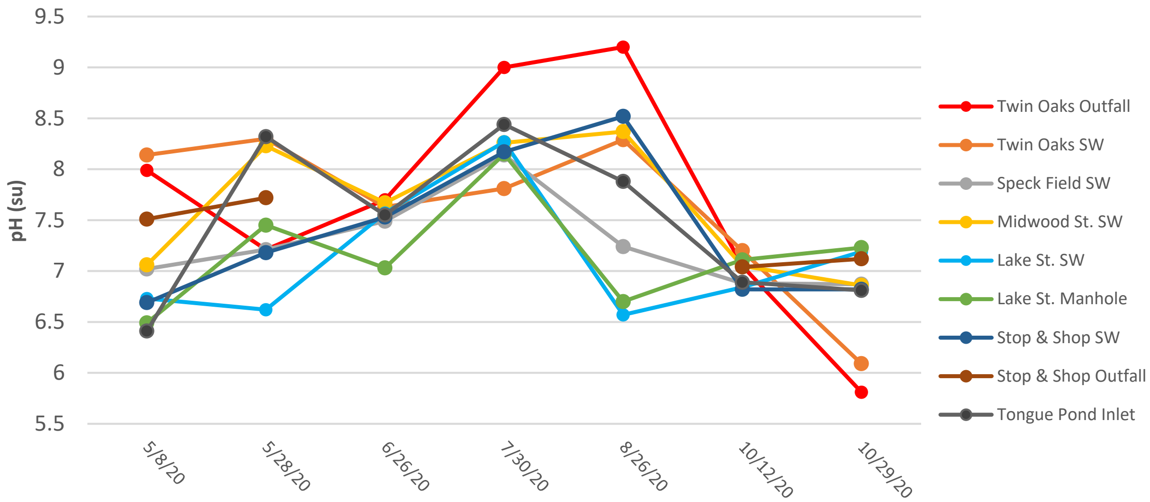


Figure 3-16: pH Measurements from Tributary and Outfall Sampling

3.4.5 Turbidity

Turbidity ranged from 0.1 NTU to 772 NTU (**Figure 3-17**). The highest turbidity reading was collected from the Tongue Pond inlet during the October 29, 2020 wet-weather sampling event. During late spring and early summer, the majority of samples met RIDEM's Water Quality Standard for turbidity in class B fresh waters of 10 NTU. Turbidity followed the in-lake sample trend of increasing into late summer and early fall.

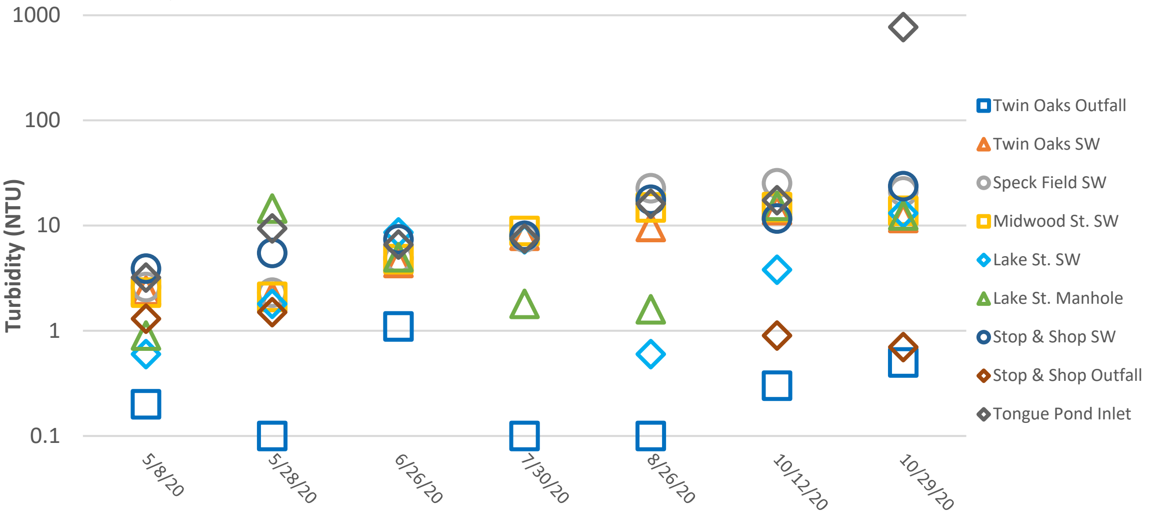


Figure 3-17: Turbidity Measurements from Tributary and Outfall Sampling

3.4.6 Alkalinity

Alkalinity ranged from 6.0 mg/L to 64 mg/L over the seven tributary and outfall sampling events (**Figure 3-18**). The tributary and outfall samples are within the same range as the in-lake samples. Data collected at the outfalls and tributaries under this study indicate that water coming into the pond are unlikely to increase sensitivity to acidification due to the majority of alkalinity values of 20 mg/L or higher.

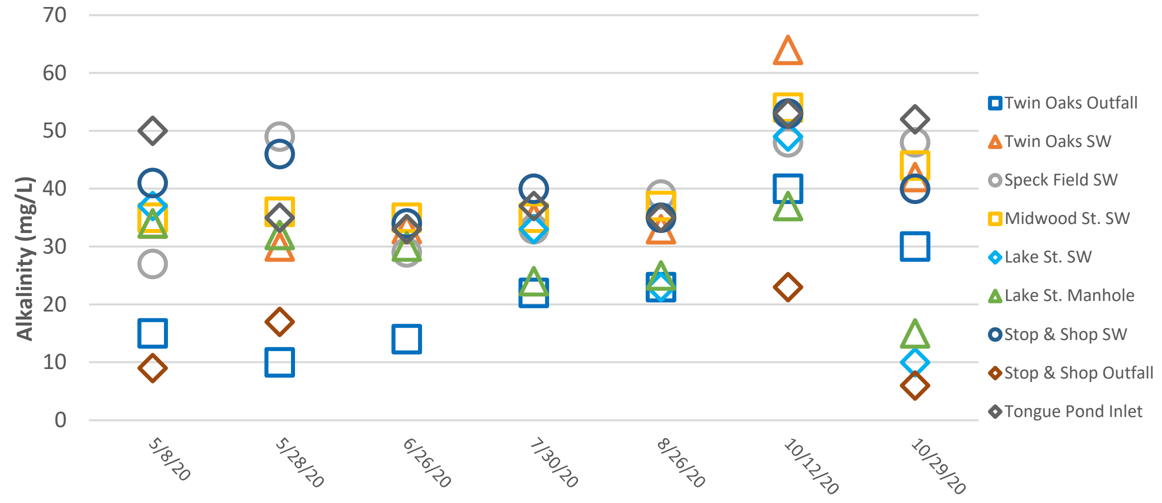


Figure 3-18: Alkalinity of Tributary and Outfall Sampling

3.4.7 Phosphorus

TP ranged from 6.0 to 3,410 µg/L with an average of 109 µg/L (**Figure 3-19**). The September 2007 TMDL indicated stormwater runoff as a significant source of phosphorus. Generally, all samples collected from the tributary and outfalls exceed RIDEM's recommended concentration of 25 µg/L. TP is present at outfall locations flowing into Spectacle Pond.

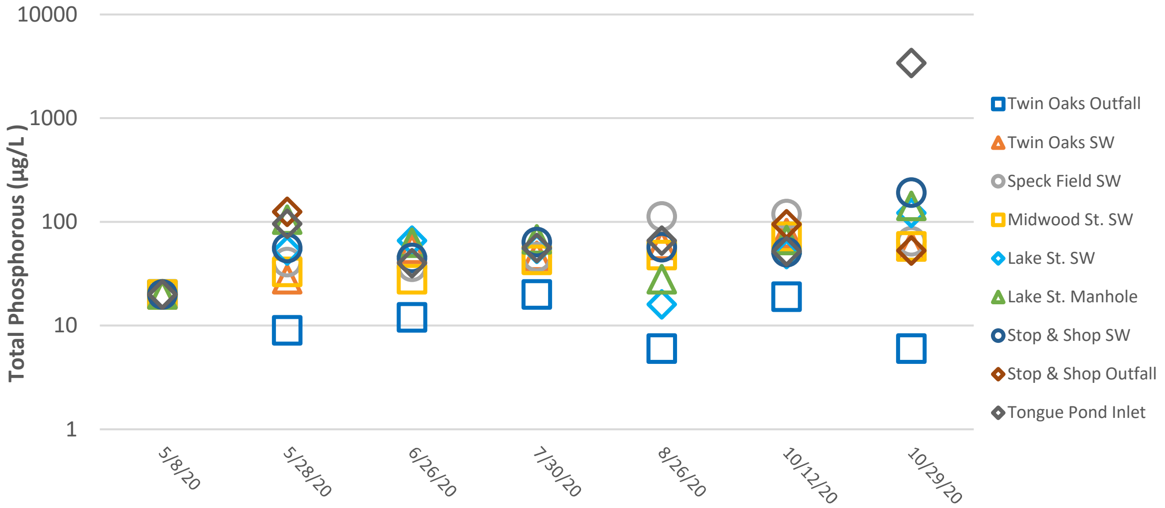


Figure 3-19: Total Phosphorus Concentrations from Tributary and Outfall Sampling

3.4.8 Total Iron

Total iron in Spectacle Pond varied between 0.046 mg/L and 12.7 mg/L with an average value of 0.74 mg/L (**Figure 3-20**). Total iron was present in the tributary and outfall locations. Iron concentrations were highest during the late summer and early fall sampling events. Iron was not analyzed during the May 8 and 28, 2020 sampling events.

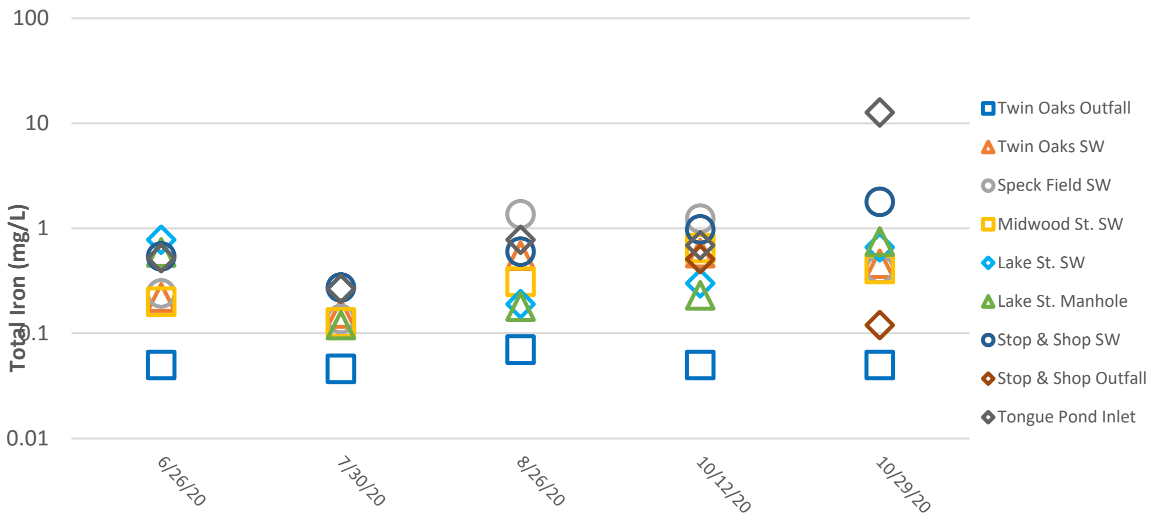


Figure 3-20: Total Iron concentrations from Tributary and Outfall Sampling

3.5 Visual Observations

Fuss & O'Neill field staff visited Spectacle Pond, its outfalls and tributaries seven times over the course of the 2020 recreational season in order to complete this limnological assessment. Dry-weather outfall sampling in May 2020 identified an outfall and manhole on Lake Street with possible visual and olfactory evidence of illicit discharges. Lake edge water samples collected throughout the sampling effort were occasionally noted for having suspended sediment.

4 Estimations of Internal Phosphorus Loading

4.1 Approach

During winter and summer thermal stratification (**Figure 4-1**), when any mixing is limited to surface waters (epilimnion), the lower waters of a lake or pond (hypolimnion) can become anoxic due to chemical and biological activity associated with the breakdown of organic matter by microbes (Wetzel 1983). This can also occur directly at the sediment-water interface of shallow lakes during calm conditions as releases have been documented in waters as shallow as 20 cm (Søndergaard et al 2013). In anoxic conditions, sediments that have acted as a nutrient sink with oxygen present will release P into the hypolimnion. This may eventually influence the productivity of the epilimnion through spring and fall mixis, or turnover, events depending on the extent of P release and the extent of the difference in volumes between the anoxic hypolimnion water and the normoxic epilimnion, with a normal oxygen concentration. Parameters such as organic content, and content of iron, aluminum, manganese, calcium, clay, and other elements with the capacity to bind and release phosphorus may all influence sediment–water interactions and determine the net amount of P released (Søndergaard et al., 2003) from the sediments. Forms of mobile P, consisting of the loosely sorbed and Fe-P redox sensitive fractions, are most likely to contribute to internal P loading (Pilgrim et al. 2007). Thus, the sediment samples for this study were analyzed for total, loosely sorbed and iron-bound P fractions to explore that potential (See Spectacle Pond P fraction sediment results in).

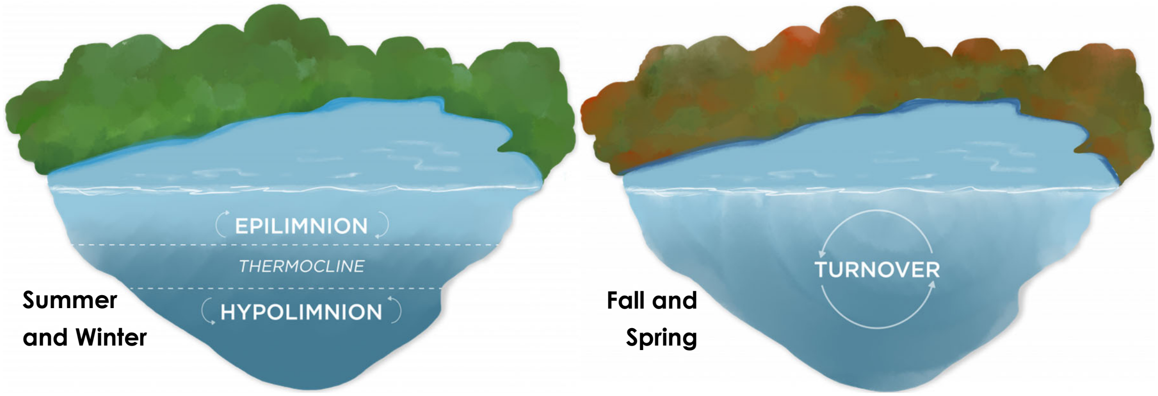


Figure 4-1: Seasonal pond stratification. Image adapted from the Lilly Center for Lakes and Streams at Grace College.

There are four ways to estimate internal P load for a lake (Holdren et al. 2001). These methods range from gross estimates, which approximate the total internal P load, to net estimates, which account for some P loss through the pond outlet and losses to the sediment.

1. Net (and gross) estimates from a complete phosphorus budget through mass balance of inflows, outflows, and internal fluxes on an annual basis. This is the most accurate methods but requires at least monthly measurements of P inputs from all sources, P losses from the outlet, and the P concentration and volume of each lake stratum (epilimnion, metalimnion, and hypolimnion) as they develop over spring and summer.

2. Partially net estimates from in-situ P increases accumulating in the hypolimnion during summer stratification compared to the surface water P concentrations.

3. Gross and net estimates from the in-situ P mass increases throughout the lake over the summer less the P sequestered at fall turnover.

4. Gross estimates from measured or estimated sediment phosphorus release rates and the measured or estimated anoxic area (dissolved O2 concentrations less than or equal to 2.0 mg/L) and time, the sediment release rates and anoxic factor of Nürnberg (1988; et al. 2012).

With the scope of this study limited to spring through fall sampling, Methods 2 through 4 were employed to estimate the internal P load of Spectacle Pond. While previous work on shallow ponds in Rhode Island suggests that Method 2 yields more accurate P load estimates (J. Schloss, pers. comm.), all three methods were calculated. Comparing results from all three methods can provide additional insight into the difference between gross and net internal P loading. In addition, because Spectacle Pond is deeper and has more-urban land cover than previously studied RI ponds, and because sample collection was impacted by COVID-19 safety protocols, relying on Method 2 alone may not be the most appropriate comparison. Winter internal loadings for Spectacle Pond were assumed to be negligible given the low spring P concentrations measured. This assumption is supported by previous studies showing that P release is significantly reduced in low temperatures (Nürnberg et al. 2013).

Fuss & O'Neill monitored in-lake conditions between post-spring mixis (May 2020) and fall mixis (October 2020). An additional sample and profile was collected in early May 2021 to provide additional temporal coverage that was not available in 2020 due to COVID-19 safety protocols. Total phosphorus (TP) concentrations were measured on all dates sampled at the surface (0.5-1 foot depth), mid-depth (7 feet), and deep-water depth (13 feet, about a foot from the pond bottom).

4.2 Estimates

Applying DO profiles to the GIS-derived pond bathymetry, collected through the sampling season, provides calculated estimates of areas and volumes of anoxia in Spectacle Pond (**Figure 4-2**). Combining anoxic areas and volumes with measured P concentrations provides estimates of nutrient accumulation in the hypolimnion as it became anoxic and calculation of post-mixis gross internal load settling and sequestration. During the 2020 sampling season, anoxia was first identified in late May below 12 feet depth. In late July, anoxia was present below 6 feet, descending to below 7 feet in August. Fall mixis occurred prior to mid-October.

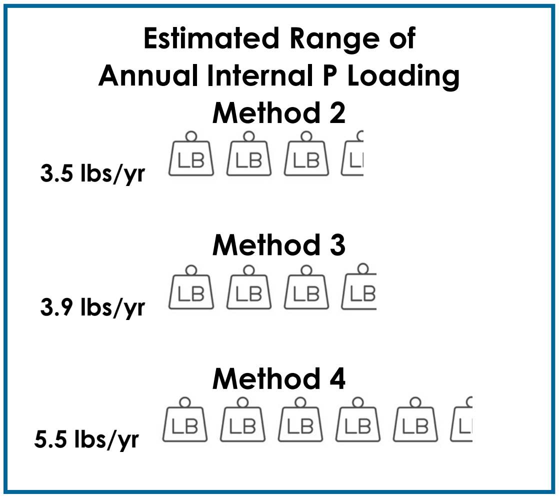


Figure 4-2: Estimated Range of Annual Internal Phosphorous Loading

4.2.1 Method 2

Partially net internal P load using Method 2 was determined by summing the monthly hypolimnetic load as the difference in concentration between the bottom water and upper water TP for the measured anoxic water volume (as concentration multiplied by volume yields the load) divided by the relative volume of the anoxic zone to the oxic lake volume. This resulted in a partial net summer internal P load of 3.5 lbs P/year. It should be noted that epilimnetic TP concentrations varied considerably throughout the sampling period, with significant increases observed over the course of the summer. The less substantial increases observed in the bottom waters suggest that this method produced an underestimate of internal loading due to runoff events that impacted the net difference between the upper and lower waters. Analysis indicated that internal P loading occurred primarily between late May and late August, with the maximum monthly loading occurring in July (1.8 lbs P), when >34% of the pond volume was anoxic. Conditions during the June sampling event had the largest concentration difference between the upper and lower waters of the Pond. Approximately 15% of pond volume was anoxic at that time, and the internal TP yield estimate was 0.7 lbs P.

4.2.2 Method 3

For Method 3, conditions in late May were selected to represent the initial spring pond P mass, late July for the maximum accumulated hypolimnetic P loading, and mid-October for the post-mixis conditions. Epilimnetic TP concentrations were assumed to be equivalent in this mixed layer. Metalimnetic and hypolimnetic TP concentrations were interpolated at each foot interval assuming an increasing TP gradient from below the thermocline to pond bottom. This method yielded a gross internal loading estimate of 5.6 lbs P/year and a net loading estimate of 3.9 lbs P/year. This results in a calculated P resequestration at fall mixis of 31%. Given that mixis most likely occurred in mid to late September in 2020 (a month not sampled during this study), the resequestered P at mixis may have been underestimated here. However, this 31% loss of P to resequestering at mixis does fall into the lower range of expected percent loss as the net P_{int} load is typically 50-72% of the gross loading (Cooke et al. 1993).

4.2.3 Method 4

For Method 4, equations in Nürnberg et al. (2012) yielded an estimate of 42 days of anoxia in Spectacle Pond and an anoxic factor of 13.7 days. Given the significant difference between the deepest site (13 foot) Fe-bound TP concentration and the shallower site samples, a weighted average accounting for the relative surface areas between the sites was employed. Using estimates of sediment release rates based on regressions from Nürnberg (1988) resulted in a P release rate of 1.32 mg/m3 day. Multiplying the anoxic factor by the sediment release rate and the area of the lake resulted in a gross internal loading estimate of 5.5 lbs P/year.

4.2.4 Method Comparison

The estimations from the three methods compare very well. Method 2 resulted in the lowest estimate that can be explained by the variability of summer external loadings due to storm events in this very urban watershed causing this to be an underestimate. This method is the most sensitive to these occurrences as it relies in the net difference between the TP concentration in the upper and lower waters during each month sampled. Method 2 most likely offers a more accurate estimate for gross and net summer internal P loading as it is based on the initial, late summer and post-mixis occurrences which would be less affected by short term storm events. This conclusion is further supported by the results of Method 4, which yielded only slightly lower estimates.

5 Conclusion and Recommendations

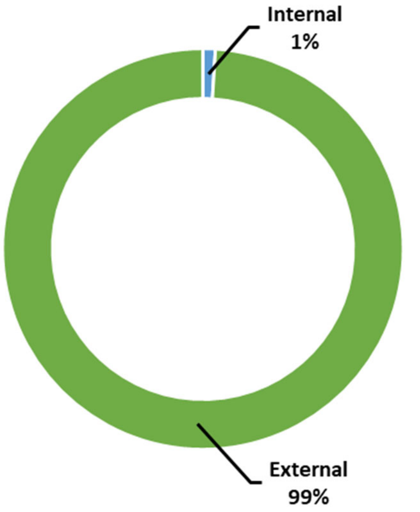


Figure 5-1: Relative Contributions of Internal and External Loading

Management recommendations to address internal and external sources contributing to P concentrations in Spectacle Pond depend on the relative contribution of P from those sources. Based on the water and sediment quality analyses described in **Sections 2 and 3** and the internal P loading analysis described in **Section 4**, using the highest estimate of internal phosphorus loading of 5.6 lbs P/yr, internal loading represents approximately 1% of the total phosphorus load of 476 lbs P/yr, estimated in the TMDL (**Figure 5-1**). Consequently, while internal loading does contribute to total phosphorus concentrations in Spectacle Pond, external sources (i.e., stormwater runoff, inlet sources, and waterfowl) appear to dominate the loading and it is recommended that these sources be addressed first.

5.1 Recommendations

Based on information collected in this study, and the prior 2007 TMDL, a plan focused on reducing phosphorus and sediment inputs from stormwater, supported by a secondary focus on discouraging waterfowl use of the pond and minimizing winter-time sanding is recommended. This report provides some general recommendations in more detail than described in the TMDL. The Spectacle Pond Phosphorus Reduction Plan that accompanies this report identifies additional specific locations where opportunities exist to retrofit the storm drain system and provide additional phosphorus load reductions.

Stormwater

In 2007, RIDEM identified 18 outfalls discharging directly to the pond (**Figure 5-2**). Four stormwater outfalls were identified as the most significant potential sources of phosphorus to Spectacle Pond (**Table 5-1**).

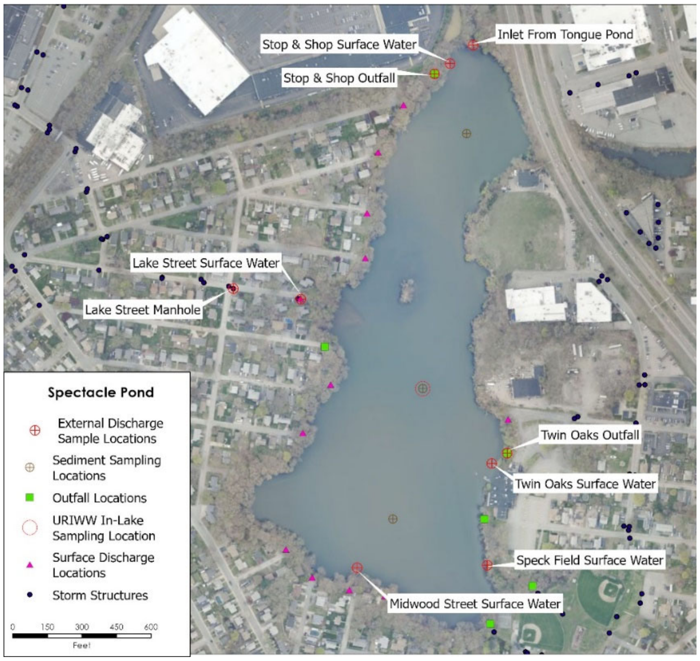


Figure 5-2: External Sources Discharging to Spectacle Pond

The City has already identified several opportunities for stormwater management BMPs, including at Speck Field, and on Pomham and Barrett Streets, and has secured funding for their construction. These future opportunities depend upon the characteristics of underlying soils, the ownership/easement status of the outfalls, and available space (in roadway rights-of-way and public spaces such as parks).

Table 5-1: Priority Outfalls Identified in the TMDL

Outfall ID	Diameter (inches)	Location	Previously Reported Ownership	TMDL Comments
SpP-F	48	Lake Street	City of Cranston	Major sediment delta at end of waste stream
SpP-E	36	Speck Park	City of Cranston	
SpP-D	24	Speck Park	City of Cranston	
SpP-A	15	Molter Street	City of Cranston	Outfall is apparently completely blocked with sediment

Soils in these areas are generally characterized by the US Department of Agriculture Natural Resources Conservation Service (USDA NRCS) based on the soil properties that affect the capacity of the soil to be drained, incorporating factors like depth to a water table, sand content, hydraulic conductivity, and soil density. Rhode Island GIS mapping shows soils are dominated by Hydrologic Soil Group A and B soils with generally good infiltration capacity (**Figure 5-3**) and significant potential for implementing more cost-effective stormwater controls. However, soils at the north and south shores and a portion of the west shore are mapped as having shallower separation to groundwater. In particular, the area of HSG B soil and shallower groundwater suggests an area that may previously have been an area where stormwater accumulated, such as a tributary stream, which is supported by a sediment delta that appears to stem from the Lake Street outfall. Stormwater solutions in these areas with shallower groundwater separation may require an underdrain and rely primarily on filtration, rather than infiltration, to remove phosphorus from stormwater.

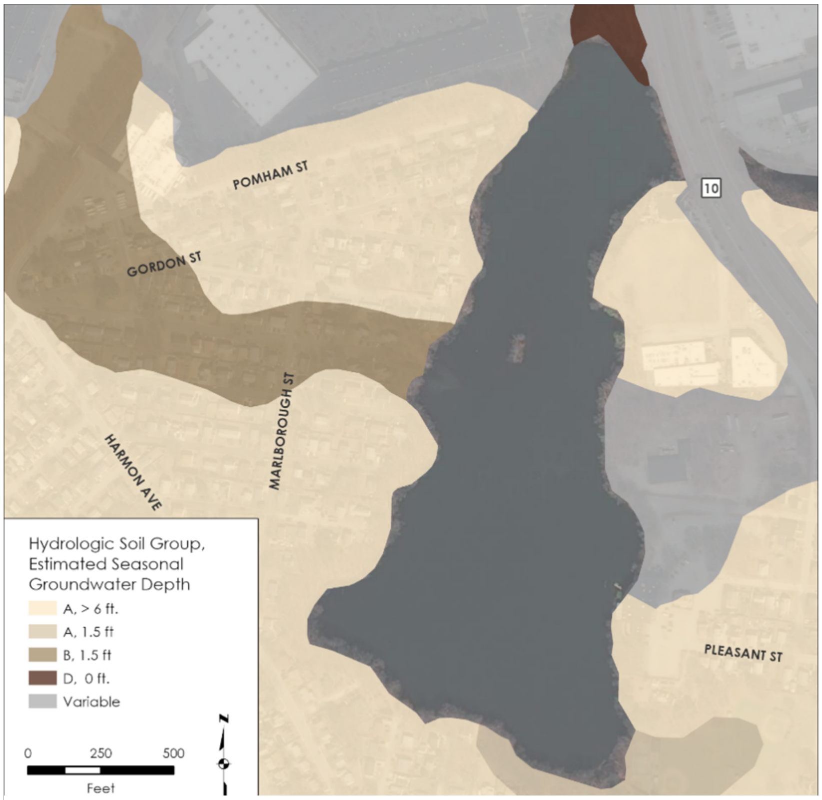


Figure 5-3: Hydrologic Soil Group Characteristics in the Spectacle Pond Watershed

Possible options for stormwater management should be focused on designs that remove sediments and nutrients (i.e., phosphorus). Options that disconnect runoff from roads that now drain directly to the pond and infiltrate that runoff will often be the most effective methods to manage stormwater quality problems. These options have been further analyzed separately to confirm their feasibility. While these options will be effective, they may not be sufficient to reduce the phosphorus loading from the watershed. Such systems may be applicable elsewhere in the watershed but will require additional study to determine their feasibility.

- **Infiltration systems** (**Figure 5-4**) are systems that capture and temporarily store stormwater runoff, allowing it to soak into the native soil below. These systems prevent a volume of stormwater from discharging to Spectacle Pond and so more closely mimicking pre-development hydrologic conditions. Infiltration systems are typically more efficient at P removal than filtration-based systems, with even small practices providing substantive removal. Infiltration-based practices can be placed at ground level when space exists, or below the surface to accommodate existing surface uses, such as a road, sidewalk, or parking lot. Groundwater separation is a critical design factor for infiltration-based practices. Pretreatment in the form of a forebay or catch basin would be used to remove coarse particulates and allow easier maintenance.

  We understand that the widths of the rights-of-way (ROWs) are limited in the neighborhoods around the pond. As a result, the best opportunities for these types of systems would be within easement areas for existing stormwater outfalls. Runoff from the outfalls could be diverted into a bioretention basin (depending on actual elevations and space) where the runoff would be treated.

- **Tree Filters and Bioswales** (**Figure 5-5**) generally consist of open bottomed systems that include one or more trees or native plants. Street runoff is directed to drain into the surface of the practice where it drains through an engineered soil media that also serves as a growing media for the plants. The engineered soil media removes sediment and particulate-bound phosphorus. The roots also uptake some of the dissolved nutrients. Plants are selected that are resistant to dry and wet conditions and predicted climate change impacts to temperature, rainfall and pests, as well as from chlorides from road salt. Street sand will also accumulate in these filters. The best way to remove this sediment will be with a vacuum truck with a design that prevents the vacuum truck from removing the engineered soils.

  Some municipalities have incorporated tree filters and sidewalk bioswales as part of the town's street tree and stormwater management program. Neighbors volunteer to have trees planted in the ROW in front of their homes. A simplified design of a tree filter can then be incorporated to promote stormwater runoff to drain through the filter and disconnect from the conventional drainage system.

In addition to the installation of new BMPs, maintenance and housekeeping actions including reduced wintertime sanding, and increased street sweeping and catch basin cleaning in the watershed could be implemented to reduce sediment loads to the pond. Because phosphorus is often transported with sediment, reduction in sediment can lead to reduced phosphorus loading.

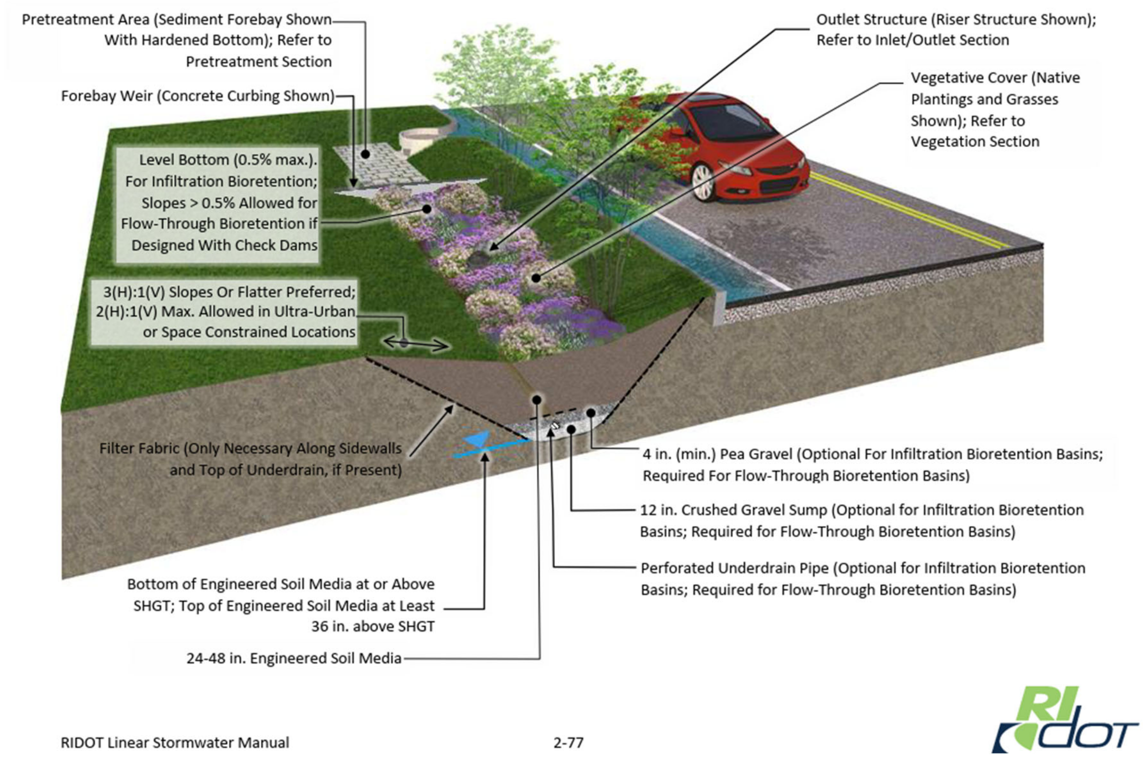


Figure 5-4: Linear Bioretention Basin Example from RIDOT Linear Manual

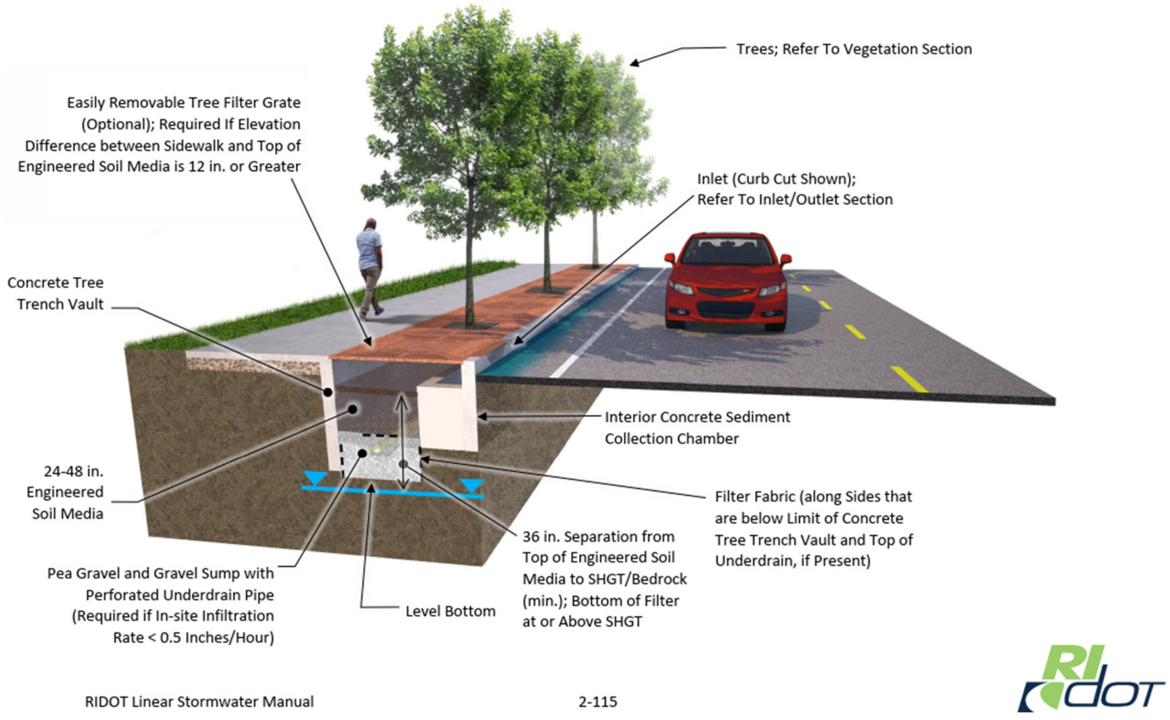


Figure 5-5: Tree Filter Example from RIDOT Linear Manual

Waterfowl

The 2007 TMDL notes repeated observations of 30-40 waterfowl at a commercial parking area at the northern end of the parking lot. Given steep slopes and dense vegetation, the parking lot and a nearby dirt embankment appear to be the only location where waterfowl congregate. Fencing or vegetated barriers can limit this access. Informational signage to discourage feeding waterfowl installed at public access points may also deter waterfowl from congregating in those locations.

5.2 Potential Funding Sources

In Rhode Island, there are two primary funding sources that are typically available to municipalities to implement stormwater practices to address water quality issues consistent to what is now proposed for Spectacle Pond.

State Revolving Fund (SRF) Loan Program

The SRF provides a low-cost financing option for communities through multiple programs. The Clean Water Program provides loans to help municipalities comply with federal and state water quality requirements by focusing on watershed management priorities, stormwater management, and green infrastructure, as well as community septic system repair programs and riverbank restoration projects. Open space acquisitions related to water quality protection are also eligible for financing.

One program, the Bay, and Watershed Restoration Fund (BWRF) is a program administered by RIDEM to fund programs allocated by previous bond referenda. The fund is meant to provide funding assistance for the feasibility analysis, design, construction, or rehabilitation of nonpoint source water pollution control facilities, stormwater pollution control projects, riparian buffer and aquatic habitat restoration projects, and projects which prevent or mitigate flooding.

Website: http://www.dem.ri.gov/programs/water/finance/state-revolving-fund.php

RIIB Stormwater Project Accelerator

The Stormwater Project Accelerator is administered by the Rhode Island Infrastructure Bank and the Department of Transportation. The program provides upfront funding to municipalities for infrastructure funding to support green stormwater infrastructure in Rhode Island that will ultimately be reimbursed through state and local reimbursement grants. Eligible projects must first secure state or local funding.

Website: https://www.riib.org/spa

Additionally, while RIDOT does not have a formal grant program for stormwater quality, they are currently under a Consent Decree with USEPA to implement stormwater quality improvements for their infrastructure for every impaired watershed that is being impacted by runoff such as the Spectacle Pond watershed. While they are responsible for implementing controls on nearby state roads, USEPA does allow RIDOT to partner with municipalities to address up to 25% of their stormwater quality requirements, even when the drainage is not on RIDOT-maintained roads. RIDOT does have active programs where they contribute funding to municipalities to implement these types of controls so that they can record the treatment credits. One advantage of this RIDOT funding is to use it as a match for other grant programs.

Municipal Resilience Preparedness (MRP) Action Grant Program

The MRP Action Grant Program is administered through the RI Infrastructure Bank, in partnership with the Nature Conservancy. To be eligible for funding, communities must complete the MRP Planning Grant process, in which Cranston has not yet participated. The MRP Action Grant offers financial assistance to municipalities that are interested in implementing climate adaptation actions to address the impacts of climate change (extreme weather, sea level rise, inland and coastal flooding, severe heat, etc.). The program funds projects relating to planning, assessments, and regulatory updates; nature-based solutions for ecological and public health; and resilient redesigns and retrofits for critical facilities and infrastructure. In past funding rounds, project amounts ranged from $150,000 to $400,000. A 25% match, either through cash or in-kind services, is required.

Website: https://www.riib.org/mrp

Clean Water Act, Section 319 Nonpoint Source Implementation Grants

Section 319 Grants are available for projects that promote restoration and protection of water quality through reducing and managing nonpoint source pollution. These grants are made possible by federal funds provided to RIDEM by the USEPA under Section 319 of the Clean Water Act. Eligible applicants include municipal, state, or regional governments, quasi-state agencies, public schools and universities, and non-profit watershed, environmental, or conservation organizations. Pursuant to federal guidelines for Section 319 funding, projects can only be funded in those areas in which a Watershed-Based Plan has been completed.

Clean Water Act Section 319 grants may be used for green stormwater infrastructure projects (if not mandated by a stormwater permit) and certain restoration activities. Projects should be in line with the state's 2019 guidance document "Nonpoint Source Management Program Plan". Annual funding is approximately $750,000 and requires a 33% match.

RIDEM 319 website: http://www.dem.ri.gov/programs/water/finance/nonpoint-source-funding.php

Southeast New England Program Network

Southeast New England Watershed Grant Program: Over the last 5 years, the US Environmental Protection Agency (USEPA) has administered this grant program providing $22 million in funding for water quality and sustainability projects for the Narragansett Bay and Buzzard's Bay watersheds. This watershed includes almost all of Rhode Island and most of Southeastern Massachusetts and Cape Cod. These grant applications typically require a 50% match. Stormwater quality projects such as those proposed for Upper Dam Pond are fundable under this grant program, however, these grants are very competitive with less than half of the grant applications typically being funded. As a result, it is important that the projects proposed with these grant applications incorporate a unique element that provides a differentiator compared to other applications.

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Appendix A

Internal Loading Calculations

Spectacle Pond Internal Nutrient Loading Calculations

Used anoxic threshold <= 2.0 mg/L

IF anoxic threshold = 2mg/L									
Sampling Date	**noxic Sediment Area (ft**	**noxic Sediment Area (m**	**noxic Volume (ft**	**Anoxic Volume (m^3)**	**% Anoxia**	**Epi- Volume (ft3)**	**Epi- Volume (m3)**	**Total Volume (ft^3)**	**Total Volume (m^3)**
5/5/2021	0	0	0	0	0	9,899,899	280,334	9,899,899	280,334
5/25/2021	97,422	9,052	646,552	18,308	6.5%	9,253,347	262,026	9,899,899	280,334
6/26/2020	217,403	20,200	1,442,827	40,856	14.6%	8,457,072	239,478	9,899,899	280,334
7/30/2020	510,567	47,439	3,388,450	95,950	34.2%	6,511,449	184,384	9,899,899	280,334
8/26/2020	459,004	42,648	3,046,246	86,260	30.8%	6,853,653	194,074	9,899,899	280,334
10/12/2020	0	0	0	0	0	9,899,899	280,334	9,899,899	280,334
10/29/2020	0	0	0	0	0	9,899,899	280,334	9,899,899	280,334

Method 2 Calculations Difference between the hypolimnetic and epilimnetic TP concentration accounting for Anoxic Volume and % that volume is to total lake volume measured during summer stratification

	TP Diff		
Sampling Date	**mg/L**	**Kg P**	**Lbs P**
5/5/2021	0		
5/25/2021	0.012	0.014348357	0.031632387
6/26/2020	0.050	0.297723103	0.656360354
7/30/2020	0.025	0.821024679	1.810031007
8/26/2020	0.017	0.45122472	0.994770018
10/12/2020	0		
10/29/2020	0		
	Totals	**1.58**	**3.49**

Method 3 Calculations

Sampling Date	**Kg TP**	**Monthly Kg diff**	**Monthly LBS diff**
5/5/2021			
5/25/2021	17.39630082		
6/26/2020			
7/30/2020	19.93686787	2.540567048	5.600934115
8/26/2020			0
10/12/2020	19.15615154	-0.78071633	-1.721167221
10/29/2020			
Net Load		**1.76**	**3.88**
Gross Load		**2.54**	**5.60**
Percent TP resequestered at fall turnover		**30.7%**	

Method 4 Calculations

Using sediment release rate estimated from Fe Bound P in sediments and Anoxic Factor (Nürnberg)

RR	1.316	mg/m2-day
Days Anoxic	42.045	days
Anoxic Factor	13.664	days-m2/m2
Lp Summer	**2.493**	**kg**
	5.496	**lbs**

Parameters:

Mean Depth	2.0	meters
Lake Area	0.13860	km2
	138,600	m2

Days anoxic is most likely an underestimate uisng the Nurenberg equations compared to DO2 measurements made by field staff but compensated by using the average anoxic sediment area as the average of the July and August

Method	**Gross Internal P Load kg (lbs)**	**Net Internal P Load kg (lbs)**	**Percent P Resequesterd**
Method 2	--	1.58 (3.49)	--
Method3	2.54 (5.60)	1.76 (3.88)	30.7%
Method 4	2.49 (5.50)	--	--

Appendix B

Field and Laboratory Data

Table 8
Summary of In Pond SmartTroll Readings

Spectacle Pond
Cranston, Rhode Island

June 26, 2020

Depth (ft)	Temp (C)	RDO (mg/L)	RDO Sat (%)
0.55	26.47	9.07	112.7
1	27.1	9.06	114.2
2	27.2	9.05	114.3
3	26.7	9.15	114.5
4	26.85	8.95	112.2
5	27.15	8.98	113.3
6	27.02	8.83	111.2
7	26.42	7.4	91.6
8	25.13	6.61	80.6
9	24.08	2.77	32.9
10	23.17	1.97	23.3
11	20.97	0.07	0.8
12	20.13	0.13	1.4
13	18.66	0.53	5.8

NOTES: Created by: APT

mg/L: milligrams per liter
ft: feet
C: Celsius
% - Percentage

Table 9
Summary of In Pond SmartTroll Readings

Spectacle Pond
Cranston, Rhode Island

July 30, 2020

Depth (ft)	Temp (C)	RDO (mg/L)	RDO Sat (%)
1	26.26	7.67	95.2
2	28.36	8.24	106
3	28.45	8	103.2
4	28.54	7.77	100.5
5	28.46	7.46	96.3
6	27.99	2.5	32
7	26.88	0.09	1.1
8	25.8	0.02	0.3
9	24.74	0.01	0.1
10	23.16	0.01	0.2
11	21.71	0	0
12	19.9	-0.01	-0.2
13	22.33	0.15	1.7

NOTES:

Created by: APT

mg/L: milligrams per liter
ft: feet
C: Celsius
% - Percentage

Table 10
Summary of In Pond SmartTroll Readings

Spectacle Pond
Cranston, Rhode Island

August 26, 2020

Depth (ft)	Temp (C)	RDO (mg/L)	RDO Sat (%)
0.21	25.6	9.5	116.5
1	25.71	9.42	115.5
2	25.69	9.29	113.9
3	25.51	8.83	108.1
4	25.4	8.48	103.5
5	25.33	8.5	102.4
6	25.15	7.22	87.8
7	24.6	2	24.1
8	24.17	0.21	2.5
9	23.68	0.01	0.1
10	22.85	0.01	0.1
11	22.22	0	0
12	20.97	-0.01	-0.1
13	20.57	-0.01	-0.1

NOTES:

Created by: APT

mg/L: milligrams per liter
ft: feet
C: Celsius
% - Percentage

Table 11
Summary of In Pond SmartTroll Readings

Spectacle Pond
Cranston, Rhode Island

October 12, 2020

Depth (ft)	Temp (C)	RDO (mg/L)	RDO Sat (%)
1	16.07	8.87	88.7
2	16.25	8.5	85.5
3	16.29	8.49	85.4
4	16.25	8.57	86.1
5	16.29	8.54	85.9
6	16.33	8.54	86
7	16.38	8.36	84.3
8	16.38	8.36	84.3
9	16.4	8.19	82.6
10	16.4	7.95	80.2
11	16.41	8.28	83.5
12	16.43	6.58	66.5
13	13.77	6.36	60.1

NOTES: Created by: APT

mg/L: milligrams per liter
ft: feet
C: Celsius
% - Percentage

Table 12
Summary of In Pond SmartTroll Readings

Spectacle Pond
Cranston, Rhode Island

October 29, 2020

Depth (ft)	Temp (C)	RDO (mg/L)	RDO Sat (%)
1	12.95	8.09	77
2	13.17	7.99	76.5
3	13.4	7.93	76.2
4	13.58	7.83	75.6
5	13.64	7.81	75.5
6	13.77	7.84	76
7	13.79	7.75	75.2
8	13.8	7.78	75.5
9	13.81	7.8	75.7
10	13.81	7.75	75.3
11	13.78	7.03	68.2
12	13.77	6.97	67.6
13	13.77	6.49	63

NOTES: Created by: APT

mg/L: milligrams per liter
ft: feet
C: Celsius
% - Percentage

Log: Allen
Report Created: 2020-07-12 11:01:53
Site: Spec Pond June
GPS: 41 51 18.92 -71 -26 -25.78
Log Created: **2020-06-26 12:55:22**
Number Readings:
Battery Type: SmarTROLLâ„¢ Battery Pack
Battery SN: 372895
Device Type: SmarTROLLâ„¢ MP
Device SN: 483011

Created	Baro (mbar)	Temp (C)	RDO (mg/L)	RDO Sat (%)	pH (pH)	ORP (mV)	Act Cond (ÂµS/cm)	Sp Cond (ÂµS/cm)	Salinity (ps	Resist (Oh	Density (g/cm^3)	TDS (ppt)	Depth (ft)	Pressure (psi)	Air Temp (C)
6/26/2020 12:55	1011.5	26.47	9.07	112.7	8.01	161.6	464.2	452.8	0.2	2154	0.997	0	0.55	0.237	29.2
6/26/2020 12:56	1011.4	27.1	9.06	114.2	7.9	132.7	464.5	446.8	0.2	2153	0.997	0	0.87	0.377	29.1
6/26/2020 12:57	1011.4	27.2	9.05	114.3	7.89	128.3	464.6	446	0.2	2152	0.997	0	2.06	0.891	29.1
6/26/2020 12:59	1011.5	26.7	9.15	114.5	7.89	118	462.9	448.4	0.2	2161	0.997	0	3.02	1.308	28.9
6/26/2020 13:00	1011.4	26.85	8.95	112.2	7.86	113.5	463	447.7	0.2	2160	0.997	0	4.17	1.806	28.9
6/26/2020 13:01	1011.3	27.15	8.98	113.3	7.84	109	463.5	445.3	0.2	2157	0.997	0	5.15	2.231	28.8
6/26/2020 13:02	1011.2	27.02	8.83	111.2	7.74	108.3	463.3	446.1	0.2	2159	0.997	0	6.31	2.735	28.7
6/26/2020 13:02	1011.2	26.42	7.4	91.6	7.7	108.9	456.3	447.3	0.2	2191	0.997	0	7.1	3.076	28.7
6/26/2020 13:02	1011.2	25.13	6.61	80.6	7.66	109.4	430.7	429.1	0.2	2322	0.997	0	8.28	3.588	28.6
6/26/2020 13:03	1011.1	24.08	2.77	32.9	7.59	109.5	423.3	432.5	0.2	2362	0.997	0	9.09	3.94	28.6
6/26/2020 13:03	1011.2	23.17	1.97	23.3	7.5	109.5	417	428.6	0.2	2398	0.998	0	10.05	4.355	28.7
6/26/2020 13:04	1011.1	20.97	0.07	0.8	7.31	-39	413.5	448.3	0.2	2419	0.998	0	11.2	4.856	28.8
6/26/2020 13:04	1011.1	20.13	0.13	1.4	7.18	-111.3	400	431	0.2	2500	0.998	0	12.01	5.205	28.9
6/26/2020 13:10	1011.1	18.66	0.53	5.8	6.83	-144.2	545.4	614.6	0.3	1833	0.999	0	13.09	5.674	29.3

Log: Spec Pond July
Report Created: 2020-08-06 08:48:18
Site: Spec Pond July
GPS:
Log Created: **2020-07-30 09:04:37**
Number Readings:
Battery Type: SmarTROLLâ„¢ Battery Pack
Battery SN: 426755
Device Type: SmarTROLLâ„¢ MP
Device SN: 483011

Created	Baro (mbar)	Temp (C)	RDO (mg/L)	RDO Sat (%)	pH (pH)	ORP (mV)	Act Cond (ÂµS/cm)	Sp Cond (ÂµS/cm)	Salinity (psu)	Resist (Ohm-cm)	Density (g/cm^3)	TDS (ppt)	Depth (ft)	Pressure (	Air Temp (C)
7/30/2020 9:02	1012.3	26.26	7.67	95.2	7.6	61.3	0.9	0.9	0	1141028	0.997	0	0.94	-0.114	30.4
7/30/2020 9:04	1012.3	28.36	8.24	106	8.58	33.3	484.8	455.9	0.2	2063	0.996	0	2.24	0.972	31.5
7/30/2020 9:05	1012.3	28.45	8	103.2	8.54	35.1	484.4	454.5	0.2	2065	0.996	0	3.01	1.307	31.7
7/30/2020 9:06	1012.3	28.54	7.77	100.5	8.49	36.3	484	453.4	0.2	2066	0.996	0	4.02	1.742	32
7/30/2020 9:06	1012.4	28.46	7.46	96.3	8.4	38.3	484.8	454.5	0.2	2063	0.996	0	5.02	2.176	32.1
7/30/2020 9:06	1012.3	27.99	2.5	32	8.21	39.1	483.6	457.2	0.2	2068	0.996	0	6	2.602	32.2
7/30/2020 9:07	1012.3	26.88	0.09	1.1	7.96	-43.5	482.9	465.7	0.2	2071	0.997	0	6.91	2.996	32.4
7/30/2020 9:08	1012.3	25.8	0.02	0.3	7.84	-78.3	470.5	463.4	0.2	2126	0.997	0	7.93	3.44	32.6
7/30/2020 9:09	1012.4	24.74	0.01	0.1	7.7	-124.7	470.2	472.5	0.2	2127	0.997	0	9.01	3.898	32.7
7/30/2020 9:09	1012.3	23.16	0.01	0.2	7.52	-157.3	499.2	517.4	0.3	2003	0.998	0	10.03	4.341	32.8
7/30/2020 9:10	1012.3	21.71	0	0	7.24	-181	586	625.2	0.3	1706	0.998	0	10.98	4.76	33
7/30/2020 9:12	1012.2	19.9	-0.01	-0.2	7.04	-228.1	759.1	840.9	0.4	1317	0.999	1	11.98	5.06	33.5
7/30/2020 9:18	1012.4	22.33	0.15	1.7	6.78	-172.5	642.2	674	0.3	1557	0.998	0	13.11	5.404	35.2

Log: Kristin Connel

Report Created: 2020-08-26

Site: Spec Pond August

Temp (C)	RDO (mg/L)	RDO Sat (%)	Depth (ft)
25.6	9.5	116.5	0.21
25.71	9.42	115.5	1
25.69	9.29	113.9	2
25.51	8.83	108.1	3
25.4	8.48	103.5	4
25.33	8.5	102.4	5
25.15	7.22	87.8	6
24.6	2	24.1	7
24.17	0.21	2.5	8
23.68	0.01	0.1	9
22.85	0.01	0.1	10
22.22	0	0	11
20.97	-0.01	-0.1	12
20.57	-0.01	-0.1	13

Log: Kristin Connel
Report Created: 2020-10-12
Site: Spec Pond October

Depth (ft)	Temp (C)	RDO (mg/L)	RDO Sat (%)	ORP (mV)	pH (pH)	Sp Cond (ÂµS/cm)
1.02	16.07	8.87	88.7	183.1	6.23	471.5
1.95	16.25	8.5	85.5	160.3	6.25	468.9
3.2	16.29	8.49	85.4	154.1	6.27	468.3
4.24	16.25	8.57	86.1	128.4	6.41	468.5
5.29	16.29	8.54	85.9	126.8	6.42	468.1
6.38	16.33	8.54	86	125.6	6.41	467.9
7.27	16.38	8.36	84.3	120.9	6.45	467.3
8.32	16.38	8.36	84.3	119.3	6.47	467.1
9.33	16.4	8.19	82.6	117.2	6.48	467.3
10.06	16.4	7.95	80.2	115.7	6.49	467.4
10.98	16.41	8.28	83.5	115.3	6.5	467
11.66	16.43	6.58	66.5	-97.7	6.2	575.5
13	13.77	6.36	60.1	32.2	6.49	479.4

Depth	Temp	RDO	RDO Sat	ORP	pH	SP Conductivity
0.73	12.95	8.09	77	110.3	6.72	413.8
1.94	13.17	7.99	76.5	108.1	6.71	411.6
3.07	13.4	7.93	76.2	106.1	6.71	405.5
4.18	13.58	7.83	75.6	103.7	6.71	406.8
5.32	13.64	7.81	75.5	101.8	6.72	406.7
5.96	13.77	7.84	76	98.2	6.75	405.3
6.98	13.79	7.75	75.2	95.7	6.77	404.8
8.07	13.8	7.78	75.5	96.2	6.79	404.9
8.75	13.81	7.8	75.7	97.3	6.8	404.7
10.16	13.81	7.75	75.3	95.8	6.8	405
11.22	13.78	7.03	68.2	92.7	6.81	406.5
11.93	13.77	6.97	67.6	89.7	6.83	406.6
12.62	13.77	6.49	63	83.7	6.82	406.8

Depth	Temp	RDO	RDO Sat	ORP	pH	SP Conductivity
0.98	14.7	10.08	100.2	101.8	6.95	436
1.81	14.81	10.03	99.8	102.2	6.93	435.4
2.8	14.94	9.88	98.8	100.3	6.97	433.4
4.06	15.03	9.88	98.9	100.1	6.98	432.5
4.95	15.09	9.83	98.6	99.7	6.98	431.9
6.01	15.12	9.73	97.6	99.2	6.99	431.5
7.12	15.12	9.69	97.3	98.4	7.00	431.1
8.05	14.98	9.59	95.9	93.3	7.06	432.8
8.99	15.06	9.45	94.7	96.2	7.08	431.5
10.07	14.76	7.86	78.3	93	7.07	440.4
11.05	14.45	6.31	62.4	91.5	7.06	443.4
12.12	13.89	5.27	51.7	-74.7	6.84	463.9
12.84	13.96	6.22	61.2	-522	6.54	447.3

Depth	Temp	RDO	RDO Sat	ORP	pH	SP Conductivity
1.01	20.84	10.52	116.5	202	5.93	446.3
1.89	20.97	10.42	115.9	187.8	6.11	444.5
2.87	21.18	10.34	115.4	168.8	6.48	441.8
3.93	21.16	10.28	114.8	156.2	6.68	441.3
4.78	20.8	10.37	115.1	140.2	6.9	444.4
6.18	20.75	10.31	114.3	140.5	6.92	443.6
6.85	20.57	10.21	113.4	140.2	6.99	443.5
8.05	18.09	10.38	108.8	136.2	7.05	419.1
9.02	18.27	10.14	108.6	140.9	7.06	411.3
9.99	17.12	3.3	33.8	28.6	7.07	416.4
11.07	16.56	6.3	64.5	-34.7	6.86	416.2
11.8	15.61	0.94	9.4	-60.6	6.73	440.4
12.81	16.15	1.21	12.3	-53.3	6.91	424.7

Table 8
Summary of Sediment Results

Spectacle Pond
Cranston, Rhode Island

August 26, 2020

		Sample Location	SED-01 (Center of Pond)	SED-02 (Southern end of pond)	SED-03 (Northern end of pond)
		Sample Number	0508-01	0508-02	0508-03
		Sample Date	8/26/20	8/26/20	8/26/20
		Labortory	Northeast	Northeast	Northeast
		Sample Type	Grab	Grab	Grab
Analysis Request	Units	Reporting Limit			
Total Phosphorus	mg/kg	NA	5810	175	3810
Iron Bound Phosphorus	mg/kg	NA	376	44	78.2
Loosely Bound Phosphorus	mg/kg	NA	10.1	4.4	3
Total Solids	%	NA	14.6	66.4	13.7
Organic Matter	%	NA	10.29	60.83	6.96

NOTES:

Created by: APT

mg/kg: milligrams per kilogram
Only the last six digits of the sample numbers are given.
NA: Not applicable
Northeast: Northeast Laboratories, Inc.

Table 1
Summary of Surface Water Results

Spectacle Pond
Cranston, Rhode Island

May 08, 2020

		Sample Location	Twin Oaks Outfall	Twin Oaks SW	Speck Field SW	Midwood SW	Lake St SW	Lake St Manhole	Stop & Shop Outfall	Stop & Shop SW	Tongue Pond Inlet
		Sample Number	0508-01	0508-02	0508-03	0508-04	0508-05	0508-06	0508-07	0508-08	0508-10
		Sample Date	5/8/20	5/8/20	5/8/20	5/8/20	5/8/20	5/8/20	5/8/20	5/8/20	5/8/20
		Labortory	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab
		Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Analysis Request	Units	Reporting Limit									
Alkalinity (Method SM2320-B)	mg/L	2	15	34	27	35	37	34	9	41	50
Total Phospherous (Method SM4500-P-E)	mg/L	0.02	ND<0.02	ND<0.02	ND<0.02	ND<0.02	ND<0.02	ND<0.02	ND<0.02	ND<0.02	ND<0.02
Turbidity (SM2130-B)	NTU	0.1	0.2	2.4	2.6	2	0.6	0.9	1.3	3.9	3.2
pH	pH	NA	7.99	8.14	7.02	7	6.73	6.5	7.51	6.69	6.41
Temperature	(C)	NA	22.89	21.55	13.96	15	14.41	13.4	14.15	14.95	14.4
Specific Conductivity	(ÂµS/cm)	NA	186.3	252.5	390.6	388	529.8	534.9	36.6	395.8	391.4
Dissolved Oxygen	mg/L	NA	9.22	8.82	10.15	12	9.15	10.6	10.79	12.43	8.29
Dissolved Oxygen Saturation	%	NA	107.8	100.7	103.5	106.7	90.5	102.7	105.1	124.1	81.5
Oxidation-Reduction Potential	mV	NA	194.1	133.4	93.9	120	43.6	50.7	45.5	59.8	95.3

NOTES:

mg/L: milligrams per liter
NTU: Nephelometric Turbidity Unit
pH: Potential for hydrogen
C: Celsius
ÂµS/cm: Conductivity Microsiemens per centimeter

mV: millivolts
Only the last six digits of the sample numbers are given.
ND<X: compound not detected above laboratory reporting limit
NA: Not applicable
SW: Stormwater

REQUIRED DETECTION LIMITS FROM QAPP

TOTAL PHOSPHORUS	0.008 mg/L
ALKALINITY	2.0 mg/L
TURBIDITY	0.1 NTU

Created by: APT
Reviewed by: WG

Table 2
Summary of Surface Water Results

Spectacle Pond
Cranston, Rhode Island

May 28, 2020

		Sample Location	Twin Oaks Outfall	Twin Oaks SW	Midwood SW	Lake St Manhole	Lake St SW	Speck Field SW	Stop & Shop Outfall	Stop & Shop SW	Tongue Pond Inlet
		Sample Number	0528-01	0528-02	0528-03	0528-04	0528-05	0528-06	0528-07	0528-08	0528-09
		Sample Date	5/28/20	5/28/20	5/28/20	5/28/20	5/28/20	5/28/20	5/28/20	5/28/20	5/28/20
		Laboratory *	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab
		Laboratory **	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix
		Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Analysis Request	Units	Reporting Limit									
Alkalinity (Method SM2320-B)	mg/L	2	10	30	36	32	35	49	17	46	35
Total Phospherous (Method SM4500-P-E)	mg/L	0.01	0.009	0.028	0.033	0.105	0.053	0.041	0.125	0.056	0.096
Turbidity (SM2130-B)	NTU	0.1	ND<0.1	2.1	2.1	15	1.8	2.3	1.5	5.5	9.4
pH	pH	NA	7.21	8.30	8.23	7.45	6.62	7.21	7.72	7.18	8.32
Temperature	(C)	NA	29.72	25.31	23.52	19.52	19.28	23.70	21.70	23.43	25.99
Specific Conductivity	(ÂµS/cm)	NA	171.80	389.60	414.40	493.20	493.70	413.20	70.30	430.80	424.6
Dissolved Oxygen	mg/L	NA	8.79	10.29	10.75	9.24	7.77	12.02	9.23	10.67	11.32
Dissolved Oxygen Saturation	%	NA	114.20	124.80	125.70	100.30	83.90	141.60	104.50	125.00	138.9
Oxidation-Reduction Potential	mV	NA	309.60	197.80	151.30	80.80	71.90	74.10	94.00	96.60	89.7

NOTES:

mg/L: milligrams per liter
NTU: Nephelometric Turbidity Unit
pH: Potential for hydrogen
C: Celsius
ÂµS/cm: Conductivity Microsiemens per centimeter
mV: millivolts
SW: Stormwater

Only the last six digits of the sample numbers are given.
Laboratory*
Laboratory**
ND<X: compound not detected above laboratory reporting limit
NA: Not applicable

REQUIRED DETECTION LIMITS FROM QAPP

TOTAL PHOSPHORUS	0.008 mg/L
ALKALINITY	2.0 mg/L
TURBIDITY	0.1 NTU

Created by:	APT
Reviewed by:	WG

Table 3
Summary of Surface Water Results

Spectacle Pond
Cranston, Rhode Island

June 26, 2020

		Sample Location	Twin Oaks Outfall	In lake Sample (1 fbs)	In lake Sample (7 fbs)	In lake Sample (13 fbs)	Speck Field SW	Midwood SW	Lake St SW	Stop & Shop SW	Tongue Pond Inlet	Twin Oaks SW	Lake St Manhole	Stop & Shop Outfall
		Sample Number	0626-01	0626-04	0626-02	0626-03	0626-05	0626-06	0626-07	0626-08	0626-10	0626-11	0626-12	0626-13
		Sample Date	6/26/20	6/26/20	6/26/20	6/26/20	6/26/20	6/26/20	6/26/20	6/26/20	6/26/20	6/26/20	6/26/20	6/26/20
		Laboratory *	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab
		Laboratory **	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix
		Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Analysis Request	Units	Reporting Limit												
Alkalinity (Method SM2320-B)	mg/L	2	14	35	33	70	29	35	33	34	33	33	30	Dry
Total Phospherous (Method SM4500-P-E)	mg/L	0.003	0.012	0.046	0.044	0.096	0.037	0.028	0.066	0.045	0.04	0.055	0.063	Dry
Total Iron (EPA 6010C)	mg/L	0.05	ND<0.05	0.2	0.24	10.2	0.24	0.2	0.78	0.54	0.52	0.22	0.59	Dry
Turbidity (SM2130-B)	NTU	0.1	1.1	4	5.3	48.7	4.9	4.8	8.6	7.4	6.6	4.4	5	Dry
pH	pH	NA	7.7	6.89	7.54	6.98	7.49	7.67	7.57	7.53	7.55	7.63	7.03	Dry
Temperature	(C)	NA	30.29	25.34	26.2	24.17	26.65	27.06	279.40	29.17	29.33	29.9	25.2	Dry
Specific Conductivity	(ÂµS/cm)	NA	169.60	457.90	450.00	505.90	447.80	446.50	439.50	456.30	450.4	443.9	454	Dry
Dissolved Oxygen	mg/L	NA	7.89	8.89	8.66	4.55	10.12	8.67	9.1	9.17	8.85	8.64	6.23	Dry
Dissolved Oxygen Saturation	%	NA	105.20	108.80	107.50	54.30	126.70	109.40	116.70	120.20	116.2	113	76.1	Dry
Oxidation-Reduction Potential	mV	NA	338.90	-53.10	44.20	-101.40	34.10	47.30	24.70	52.30	55.5	57.8	61.2	Dry

NOTES:
mg/L: milligrams per liter
NTU: Nephelometric Turbidity Unit
pH: Potential for hydrogen
C: Celsius
ÂµS/cm: Conductivity Microsiemens per centimeter
mV: millivolts
SW: Stormwater

Only the last six digits of the sample numbers are given.
Laboratory*
Laboratory**
ND<X: compound not detected above laboratory reporting limit
NA: Not applicable
fbs: Feet below surface

REQUIRED DETECTION LIMITS FROM QAPP

TOTAL PHOSPHORUS	0.008 mg/L
ALKALINITY	2.0 mg/L
TURBIDITY	0.1 NTU
TOTAL IRON	0.1 mg/L

Created by: APT
Reviewed by: WG

Table 4
Summary of Surface Water Results

Spectacle Pond
Cranston, Rhode Island

July 30, 2020

		Sample Location	In Lake Sample (13 fbs)	In lake Sample (7.5 fbs)	In lake Sample (1 fbs)	Twin Oaks SW	Speck Field SW	Midwood SW	Lake St SW	Stop & Shop SW	Tongue Pond Inlet	Twin Oaks Outfall	Lake Street Manhole	Stop & Shop Outfall
		Sample Number	0730-01	0730-02	0730-03	0730-04	0730-05	0730-06	0730-07	0730-08	0730-10	0730-11	0730-12	0626-13
		Sample Date	7/30/20	7/30/20	7/30/20	7/30/20	7/30/20	7/30/20	7/30/20	7/30/20	7/30/20	7/30/20	7/30/20	7/30/20
		Laboratory *	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab
		Laboratory **	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix
		Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Analysis Request	Units	Reporting Limit												
Alkalinity (Method SM2320-B)	mg/L	2	55	33	35	35	33	35	33	40	37	22	24	Dry
Total Phospherous (Method SM4500-P-E)	mg/L	0.003	0.092	0.071	0.067	0.047	0.046	0.043	0.055	0.064	0.056	0.02	0.068	Dry
Total Iron (EPA 6010C)	mg/L	0.05	7.530	0.317	0.161	0.155	0.137	0.127	0.266	0.274	0.266	0.046	0.120	Dry
Turbidity (SM2130-B)	NTU	0.1	281	8.0	9.0	8.0	7.7	8.9	7.4	8.0	7.5	ND<0.1	1.8	Dry
pH	pH	NA	6.85	7.19	7.56	7.81	8.14	8.26	8.27	8.17	8.44	9.00	8.15	Dry
Temperature	(C)	NA	26.33	27.80	28.91	30.19	30.06	30.25	30.76	31.87	30.83	31.90	27.55	Dry
Specific Conductivity	(ÂµS/cm)	NA	534.50	467.70	457.50	452.80	453.90	455.00	453.70	449.00	454	227.80	231.3	Dry
Dissolved Oxygen	mg/L	NA	3.03	4.45	8.41	8.21	8.25	8.35	7.64	7.87	8.05	7.45	5.17	Dry
Dissolved Oxygen Saturation	%	NA	37.70	96.60	109.40	109.30	109.50	111.30	102.90	108.00	108.2	102.00	65.2	Dry
Oxidation-Reduction Potential	mV	NA	-103.80	-15.70	-22.90	7.10	11.80	14.90	25.60	31.40	21.5	219.3	254.7	Dry

NOTES:

mg/L: milligrams per liter
NTU: Nephelometric Turbidity Unit
pH: Potential for hydrogen
C: Celsius
ÂµS/cm: Conductivity Microsiemens per centimeter
mV: millivolts
SW: Stormwater

Only the last six digits of the sample numbers are given.
Laboratory*
Laboratory**
ND<X: compound not detected above laboratory reporting limit
NA: Not applicable
fbs: Feet below surface

REQUIRED DETECTION LIMITS FROM QAPP

TOTAL PHOSPHORUS	0.008 mg/L
ALKALINITY	2.0 mg/L
TURBIDITY	0.1 NTU
TOTAL IRON	0.1 mg/L

Created by: APT
Reviewed by:

Table 5
Summary of Surface Water Results

Spectacle Pond
Cranston, Rhode Island

August 26, 2020

		Sample Location	In lake Sample (1 fbg)	In Lake Sample (7-8 fbs)	In Lake Sample (12 fbs)	Twin Oaks Outfall	Twin Oaks SW	Spec Field Surface	Midwood SW	Lake St Manhole	Lake St SW	Stop & Shop SW	Tongue Pond Inlet	Stop & Shop Outfall
		Sample Number	0826-01	0826-02	0826-03	0826-07	0826-08	0826-09	0826-10	0826-11	0826-12	0826-14	0826-15	0826-16
		Sample Date	08/26/20	08/26/20	08/26/20	08/26/20	08/26/20	08/26/20	08/26/20	08/26/20	08/26/20	08/26/20	08/26/20	08/26/20
		Laboratory *	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab
		Laboratory **	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix
		Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Analysis Request	Units	Reporting Limit												
Alkalinity (Method SM2320-B)	mg/L	2	46	47	100	23	33	39	37	25	23	35	35	Dry
Total Phospherous (Method SM4500-P-E)	mg/L	0.003	0.046	0.063	0.063	0.006	0.06	0.113	0.048	0.028	0.016	0.057	0.066	Dry
Total Iron (EPA 6010C)	mg/L	0.05	0.390	0.37	26.9	0.07	0.55	1.36	0.31	0.18	0.19	0.600	0.78	Dry
Turbidity (SM2130-B)	NTU	0.1	10.2	10.0	158.0	ND<0.1	9.7	22.7	14.9	1.6	0.6	17.6	16.1	Dry
pH	pH	NA	NA	NA	NA	9.2	8.29	7.24	8.37	6.7	6.57	8.52	7.88	Dry
Temperature	(C)	NA	25.71	24.60	20.97	29.3	23.8	22.90	24.00	22.4	22.8	26.10	26.1	Dry
Specific Conductivity	(ÂµS/cm)	NA	NA	NA	NA	180.10	450.70	472.00	450.30	362.60	359.3	446.40	447.9	Dry
Dissolved Oxygen	mg/L	NA	9.42	2.00	-0.01	7.52	8.84	5.16	6.02	5.04	3.86	5.65	4.29	Dry
Dissolved Oxygen Saturation	%	NA	115.50	24.10	-0.10	98.40	104.30	60.00	71.80	58.00	44.9	70.00	53.1	Dry
Oxidation-Reduction Potential	mV	NA	NA	NA	NA	315.50	103.50	170.90	137.90	150.10	142.1	122.9	184.4	Dry

NOTES:

mg/L: milligrams per liter
NTU: Nephelometric Turbidity Unit
pH: Potential for hydrogen
C: Celsius
ÂµS/cm: Conductivity Microsiemens per centimeter
mV: millivolts

Only the last six digits of the sample numbers are given.
Laboratory*
Laboratory**
ND<X: compound not detected above laboratory reporting limit
NA: Not applicable
fbg: Feet below surface

REQUIRED DETECTION LIMITS FROM QAPP

TOTAL PHOSPHORUS	0.008 mg/L
ALKALINITY	2.0 mg/L
TURBIDITY	0.1 NTU
TOTAL IRON	0.1 mg/L

Created by: APT
Reviewed by:

Table 6
Summary of Surface Water Results

Spectacle Pond
Cranston, Rhode Island

October 12, 2020

		Sample Location	In lake Sample (13 fbg)	In Lake Sample (7-8 fbs)	In Lake Sample (1 fbs)	Twin Oaks Outfall	Twin Oaks SW	Midwood SW	Lake St Manhole	Lake St SW	Spec Field SW	Stop & Shop Outfall	Stop & Shop SW	Tongue Pond Inlet
		Sample Number	1012-01	1012-02	1012-03	1012-04	1012-05	1012-06	1012-07	1012-08	1012-09	1012-10	1012-11	1012-12
		Sample Date	10/12/20	10/12/20	10/12/20	10/12/20	10/12/20	10/12/20	10/12/20	10/12/20	10/12/20	10/12/20	10/12/20	10/12/20
		Laboratory *	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab
		Laboratory **	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix
		Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Analysis Request	Units	Reporting Limit												
Alkalinity (Method SM2320-B)	mg/L	2	31	47	56	40	64	54	37	49	48	23	53	53
Total Phospherous (Method SM4500-P-E)	mg/L	0.003	11.3	0.057	0.079	0.019	0.078	0.072	0.067	0.049	0.119	0.095	0.051	0.052
Total Iron (EPA 6010C)	mg/L	0.05	102.000	0.99	0.71	ND<0.05	0.58	0.65	0.23	0.3	1.24	0.510	0.98	0.69
Turbidity (SM2130-B)	NTU	0.1	656.0	15.2	15.6	0.3	14.0	15.0	15.4	3.8	25.3	0.9	11.7	17.4
pH	pH	NA	6.49	6.55	6.58	7.05	7.2	7.05	7.11	6.84	6.88	7.04	6.82	16.89
Temperature	(C)	NA	13.77	14.04	14.25	15.93	16.03	15.03	16.10	16.56	15.11	16.29	15.97	15.88
Specific Conductivity	(ÂµS/cm)	NA	479.40	478.30	474.50	260.40	455.70	472.10	289.30	369.40	467.3	80.30	462	470.4
Dissolved Oxygen	mg/L	NA	6.36	9.81	10.18	11.22	8.95	11.55	9.46	6.96	11.44	11.42	10.32	9.76
Dissolved Oxygen Saturation	%	NA	60.10	94.20	97.30	111.50	84.50	113.60	95.10	70.50	112.5	115.10	103.5	97.6
Oxidation-Reduction Potential	mV	NA	32.20	40.80	49.60	145.60	94.40	82.60	90.80	98.20	101.00	87.2	73.3	85.1

NOTES:
mg/L: milligrams per liter
NTU: Nephelometric Turbidity Unit
pH: Potential for hydrogen
C: Celsius
ÂµS/cm: Conductivity Microsiemens per centimeter
mV: millivolts

Only the last six digits of the sample numbers are given.
Laboratory*
Laboratory**
ND<X: compound not detected above laboratory reporting limit
NA: Not applicable
fbs: Feet below surface

REQUIRED DETECTION LIMITS FROM QAPP

TOTAL PHOSPHORUS	0.008 mg/L
ALKALINITY	2.0 mg/L
TURBIDITY	0.1 NTU
TOTAL IRON	0.1 mg/L

Created by: APT
Reviewed by:

Table 7
Summary of Surface Water Results

Spectacle Pond
Cranston, Rhode Island

October 29, 2020

		Sample Location	Twin Oaks Outfall	Twin Oaks SW	Spec Field SW	Midwood SW	Lake St Manhole	Lake St SW	Stop & Shop Outfall	Stop & Shop SW	Tongue Pond Inlet	In Lake Sample (13 fbs)	In Lake Sample (7-8 fbs)	In Lake Sample (1 fbs)
		Sample Number	1029-01	1029-02	1029-03	1029-04	1029-05	1029-06	1029-07	1029-08	1029-10	1029-11	1029-12	1029-13
		Sample Date	10/29/20	10/29/20	10/29/20	10/29/20	10/29/20	10/29/20	10/29/20	10/29/20	10/29/20	10/29/20	10/29/20	10/29/21
		Laboratory *	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab	Net Lab
		Laboratory **	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix
		Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Analysis Request	Units	Reporting Limit												
Alkalinity (Method SM2320-B)	mg/L	2	30	42	48	44	15	10	6	40	52	42	40	38
Total Phospherous (Method SM4500-P-E)	mg/L	0.003	0.006	0.058	0.065	0.058	0.143	0.122	0.053	0.192	3.41	0.069	0.095	0.066
Total Iron (EPA 6010C)	mg/L	0.05	ND<0.05	0.46	0.41	0.41	0.75	0.66	0.12	1.79	12.700	0.55	0.46	0.57
Turbidity (SM2130-B)	NTU	0.1	0.5	11.8	21.1	13.8	12.5	13.1	0.7	23.7	772	14.5	11.8	283
pH	pH	NA	5.81	6.09	6.87	6.86	7.23	7.19	7.12	6.82	6.81	6.91	6.99	68.4
Temperature	(C)	NA	15.57	14.85	13.64	12.65	11.9	12.30	13.03	12.61	11.57	11.39	12.31	13.42
Specific Conductivity	(ÂµS/cm)	NA	241.10	38.34	346.40	331.10	55.80	62.20	27.20	388.70	406.70	363	398.2	407.2
Dissolved Oxygen	mg/L	NA	11.23	10.98	9.22	8.97	10.6	11.26	9.1	8.31	7.34	9.06	8.87	6.54
Dissolved Oxygen Saturation	%	NA	112.70	108.60	88.80	84.50	98.00	105.30	86.60	78.50	67.60	83.3	83.2	72.7
Oxidation-Reduction Potential	mV	NA	415.20	238.30	219.00	176.70	164.20	125.40	171.30	114.60	-42.5	120.1	91.2	83.9

NOTES:

mg/L: milligrams per liter
NTU: Nephelometric Turbidity Unit
pH: Potential for hydrogen
C: Celsius
ÂµS/cm: Conductivity Microsiemens per centimeter
mV: millivolts

Only the last six digits of the sample numbers are given.
Laboratory*
Laboratory**
ND<X: compound not detected above laboratory reporting limit
NA: Not applicable
fbs: Feet below surface

REQUIRED DETECTION LIMITS FROM QAPP

TOTAL PHOSPHORUS	0.008 mg/L
ALKALINITY	2.0 mg/L
TURBIDITY	0.1 NTU
TOTAL IRON	0.1 mg/L

Created by: APT
Reviewed by:

		Sample Location
		Sample Number
		Sample Date
		Laboratory *
		Laboratory **
		Sample Type
Analysis Request	Units	Reporting Limit
Alkalinity (Method SM2320-B)	mg/L	2
Total Phospherous (Method SM4500-P-E)	mg/L	0.02
Total Iron (EPA 6010C)	mg/L	NA
Turbidity (SM2130-B)	NTU	0.1
pH	pH	NA
Temperature	(C)	NA
Specific Conductivity	(ÂµS/cm)	NA
RDO	mg/L	NA
RDO Saturation	%	NA
ORP	mV	NA

NOTES:

mg/L: milligrams per liter
NTU: Nephelometric Turbidity Unit
pH: Potential for hydrogen
C: Celsius
ÂµS/cm: Conductivity Microsiemens per centimeter
mV: millivolts
Only the last six digits of the sample numbers are given.
Laboratory*
Laboratory**

ND<X: compound not detected above
NA: Not applicable
SW: Stormwater

REQUIRED DETECTION LIMIT

TOTAL PHOSPHORUS
ALKALINITY
TURBIDITY
TOTAL IRON

Table 1
Summary of Surface Water Results

Spectacle Pond
Cranston, Rhode Island

May - October 2020

Stop & Shop (DUP)	Tongue Pond Inlet (DUP)	Stop & Shop SW (DUP)	Stop & Shop SW DUP
0508-09	0528-10	0626-09	0730-09
5/8/20	5/28/20	6/26/20	7/30/20
Net Lab	Net Lab	Net Lab	Net Lab
Net Lab	Phoenix	Phoenix	Phoenix
Grab	Grab	Grab	Grab
35	36	32	35
ND<0.02	0.096	0.043	0.067
NA	NA	0.71	0.284
3.8	5.6	6.3	8.4
6.69	8.32	7.53	8.17
14.95	25.99	29.17	31.87
395.8	424.6	456.30	449.00
12.43	11.32	9.17	7.87
124.1	138.9	120.20	108.00
59.8	89.7	52.30	31.40

laboratory reporting limit

TS FROM QAPP
0.008 mg/L
2.0 mg/L
0.1 NTU

Lake St SW (DUP)	Tongue Pond Inlet (DUP)	Stop & Shop SW DUP
0826-13	1012-12	1029-09
08/26/20	10/12/20	10/29/20
Net Lab	Net Lab	Net Lab
Phoenix	Phoenix	Phoenix
Grab	Grab	Grab
25	57	32
0.016	0.075	0.216
0.18	0.83	1.49
0.7	15.2	20.7
6.57	16.89	6.82
22.8	15.88	12.67
359.3	470.4	388.7
3.86	9.76	8.31
44.9	97.6	78.5
142.1	85.1	114.60

Created by: APT
Reviewed by:

Appendix C

Laboratory Analytical Reports

New England Testing Laboratory, Inc.
(401) 353-3420

REPORT OF ANALYTICAL RESULTS

NETLAB Work Order Number: 0E08041
Client Project: 20170900.B10 - Spectacle Pond, Cranston

Report Date: 18-May-2020

Prepared for:

Alan Tevyaw
Fuss & O'Neill
317 Iron Horse Way
Providence, RI 02908

Richard Warila, Laboratory Director
New England Testing Laboratory, Inc.
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West Warwick, RI 02893
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Samples Submitted :

The samples listed below were submitted to New England Testing Laboratory on 05/08/20. The group of samples appearing in this report was assigned an internal identification number (case number) for laboratory information management purposes. The client's designations for the individual samples, along with our case numbers, are used to identify the samples in this report. This report of analytical results pertains only to the sample(s) provided to us by the client which are indicated on the custody record. The case number for this sample submission is 0E08041. Custody records are included in this report.

Lab ID	Sample	Matrix	Date Sampled	Date Received
0E08041-01	1604200508-01	Water	05/08/2020	05/08/2020
0E08041-02	1604200508-02	Water	05/08/2020	05/08/2020
0E08041-03	1604200508-03	Water	05/08/2020	05/08/2020
0E08041-04	1604200508-04	Water	05/08/2020	05/08/2020
0E08041-05	1604200508-05	Water	05/08/2020	05/08/2020
0E08041-06	1604200508-06	Water	05/08/2020	05/08/2020
0E08041-07	1604200508-07	Water	05/08/2020	05/08/2020
0E08041-08	1604200508-08	Water	05/08/2020	05/08/2020
0E08041-09	1604200508-09	Water	05/08/2020	05/08/2020
0E08041-10	1604200508-10	Water	05/08/2020	05/08/2020

Request for Analysis

At the client's request, the analyses presented in the following table were performed on the samples submitted.

1604200508-01 (Lab Number: 0E08041-01)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Total Phosphorous	SM4500-P-E (11)
Turbidity	SM2130-B (11)

1604200508-02 (Lab Number: 0E08041-02)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Total Phosphorous	SM4500-P-E (11)
Turbidity	SM2130-B (11)

1604200508-03 (Lab Number: 0E08041-03)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Total Phosphorous	SM4500-P-E (11)
Turbidity	SM2130-B (11)

1604200508-04 (Lab Number: 0E08041-04)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Total Phosphorous	SM4500-P-E (11)
Turbidity	SM2130-B (11)

1604200508-05 (Lab Number: 0E08041-05)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Total Phosphorous	SM4500-P-E (11)
Turbidity	SM2130-B (11)

1604200508-06 (Lab Number: 0E08041-06)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Total Phosphorous	SM4500-P-E (11)
Turbidity	SM2130-B (11)

1604200508-07 (Lab Number: 0E08041-07)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Total Phosphorous	SM4500-P-E (11)
Turbidity	SM2130-B (11)

1604200508-08 (Lab Number: 0E08041-08)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Total Phosphorous	SM4500-P-E (11)
Turbidity	SM2130-B (11)

Request for Analysis (continued)

1604200508-09 (Lab Number: 0E08041-09)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Total Phosphorous	SM4500-P-E (11)
Turbidity	SM2130-B (11)

1604200508-10 (Lab Number: 0E08041-10)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Total Phosphorous	SM4500-P-E (11)
Turbidity	SM2130-B (11)

Method References

Standard Methods for the Examination of Water and Wastewater, 20th Edition, APHA/ AWWA-WPCF, 1998

Case Narrative

Sample Receipt:

The samples associated with this work order were received in appropriately cooled and preserved containers. The chain of custody was adequately completed and corresponded to the samples submitted.

Exceptions: None

Analysis:

All samples were prepared and analyzed within method specified holding times and according to NETLAB's documented standard operating procedures. The results for the associated calibration, method blank and laboratory control sample (LCS) were within method specified quality control requirements and allowances. Results for all soil samples, unless otherwise indicated, are reported on a dry weight basis.

Exceptions: None

Results: General Chemistry

Sample: 1604200508-01
Lab Number: 0E08041-01 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**15**		2	mg/L	05/09/20	05/09/20
Total Phosphorous	ND		0.02	mg/L	05/15/20	05/15/20
Turbidity	**0.2**		0.1	NTU	05/09/20 8:45	05/09/20 8:45

Results: General Chemistry

Sample: 1604200508-02

Lab Number: 0E08041-02 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**34**		2	mg/L	05/09/20	05/09/20
Total Phosphorous	ND		0.02	mg/L	05/15/20	05/15/20
Turbidity	**2.4**		0.1	NTU	05/09/20 8:45	05/09/20 8:45

Results: General Chemistry

Sample: 1604200508-03

Lab Number: 0E08041-03 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**27**		2	mg/L	05/09/20	05/09/20
Total Phosphorous	ND		0.02	mg/L	05/15/20	05/15/20
Turbidity	**2.6**		0.1	NTU	05/09/20 8:45	05/09/20 8:45

Results: General Chemistry

Sample: 1604200508-04

Lab Number: 0E08041-04 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**35**		2	mg/L	05/09/20	05/09/20
Total Phosphorous	ND		0.02	mg/L	05/15/20	05/15/20
Turbidity	**2.3**		0.1	NTU	05/09/20 8:45	05/09/20 8:45

Results: General Chemistry

Sample: 1604200508-05

Lab Number: 0E08041-05 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**37**		2	mg/L	05/09/20	05/09/20
Total Phosphorous	ND		0.02	mg/L	05/15/20	05/15/20
Turbidity	**0.6**		0.1	NTU	05/09/20 8:45	05/09/20 8:45

Results: General Chemistry

Sample: 1604200508-06

Lab Number: 0E08041-06 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**34**		2	mg/L	05/09/20	05/09/20
Total Phosphorous	ND		0.02	mg/L	05/15/20	05/15/20
Turbidity	**0.9**		0.1	NTU	05/09/20 8:45	05/09/20 8:45

Results: General Chemistry

Sample: 1604200508-07

Lab Number: 0E08041-07 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**9**		2	mg/L	05/09/20	05/09/20
Total Phosphorous	ND		0.02	mg/L	05/15/20	05/15/20
Turbidity	**1.3**		0.1	NTU	05/09/20 8:45	05/09/20 8:45

Results: General Chemistry

Sample: 1604200508-08

Lab Number: 0E08041-08 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**41**		2	mg/L	05/09/20	05/09/20
Total Phosphorous	ND		0.02	mg/L	05/15/20	05/15/20
Turbidity	**3.9**		0.1	NTU	05/09/20 8:45	05/09/20 8:45

Results: General Chemistry

Sample: 1604200508-09

Lab Number: 0E08041-09 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**35**		2	mg/L	05/09/20	05/09/20
Total Phosphorous	ND		0.02	mg/L	05/15/20	05/15/20
Turbidity	**3.8**		0.1	NTU	05/09/20 8:45	05/09/20 8:45

Results: General Chemistry

Sample: 1604200508-10

Lab Number: 0E08041-10 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**50**		2	mg/L	05/09/20	05/09/20
Total Phosphorous	ND		0.02	mg/L	05/15/20	05/15/20
Turbidity	**3.2**		0.1	NTU	05/09/20 8:45	05/09/20 8:45

Quality Control

General Chemistry

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: B0E0298 - Turbidity										
Blank (B0E0298-BLK1)					Prepared & Analyzed: 05/09/20					
Turbidity	ND		0.1	NTU						
Blank (B0E0298-BLK2)					Prepared & Analyzed: 05/09/20					
Turbidity	ND		0.1	NTU						
LCS (B0E0298-BS1)					Prepared & Analyzed: 05/09/20					
Turbidity	1.0		0.1	NTU	1.00		95.0	0-200		
LCS (B0E0298-BS2)					Prepared & Analyzed: 05/09/20					
Turbidity	1.0		0.1	NTU	1.00		98.0	0-200		
Duplicate (B0E0298-DUP1)		**Source: 0E08041-01**			Prepared & Analyzed: 05/09/20					
Turbidity	0.2		0.1	NTU		0.2			0.00	200
Batch: B0E0319 - Alkalinity										
Blank (B0E0319-BLK1)					Prepared & Analyzed: 05/09/20					
Alkalinity as CaCO3	ND		2	mg/L						
LCS (B0E0319-BS1)					Prepared & Analyzed: 05/09/20					
Alkalinity as CaCO3	46		2	mg/L	50.0		91.9	90-110		
Duplicate (B0E0319-DUP1)		**Source: 0E05096-02**			Prepared & Analyzed: 05/09/20					
Alkalinity as CaCO3	35		2	mg/L		40			11.8	20
Matrix Spike (B0E0319-MS1)		**Source: 0E05096-02**			Prepared & Analyzed: 05/09/20					
Alkalinity as CaCO3	78		2	mg/L	50.0	40	76.0	80-120		

Quality Control

(Continued)

General Chemistry (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: B0E0572 - Total phosphate										
Blank (B0E0572-BLK1)					Prepared & Analyzed: 05/15/20					
Total Phosphorous	ND		0.02	mg/L						
Blank (B0E0572-BLK2)					Prepared & Analyzed: 05/15/20					
Total Phosphorous	ND		0.02	mg/L						
LCS (B0E0572-BS1)					Prepared & Analyzed: 05/15/20					
Total Phosphorous	1.04		0.02	mg/L	1.00		104	90-110		
LCS (B0E0572-BS2)					Prepared & Analyzed: 05/15/20					
Total Phosphorous	1.04		0.02	mg/L	1.00		104	90-110		
Duplicate (B0E0572-DUP1)		**Source: 0E08027-02**			Prepared & Analyzed: 05/15/20					
Total Phosphorous	ND		0.02	mg/L		ND				20
Matrix Spike (B0E0572-MS1)		**Source: 0E08027-02**			Prepared & Analyzed: 05/15/20					
Total Phosphorous	0.82		0.02	mg/L	1.00	ND	82.5	80-120		

Notes and Definitions

Item	Definition
Wet	Sample results reported on a wet weight basis.
ND	Analyte NOT DETECTED at or above the reporting limit.

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501

CHAIN-OF-CUSTODY RECORD 0570

Turnaround
☐ 1 Day* ☐ 3 Days* ☐ Other ______ (days)
☐ 2 Days* ☑ Standard (____ days) *Surcharge Applies

PROJECT NAME Spectacle Pond	PROJECT LOCATION Cranston, RI	PROJECT NUMBER 20170900.B10	LABORATORY Net lab

REPORT TO: Allen Tevyaw atevyaw@fando.com
INVOICE TO: Allen Tevyaw atevyaw@fando.com
P.O. NO.: 160420170900.B10
Sampler's Signature: Date: 5/8/20

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Sediment A=Air
X=Other ______

Analysis Request / Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Total Phosphorus (SM 4500 PB/H)	Alkalinity (SM 2320B)	Turbidity (SM 2130B)						Soil VOA Vial, [ ] methanol	Soil VOA Vial, [ ] water [ ] Na(SO4)2	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H2SO4	Plastic - As is, [ ] 250 ml [ ] 500 [✓] 1000 ml	Plastic - H2SO4 ✓ [ ] 250 ml [.] 500 ml 16oz	Plastic - HNO3, 250 ml [ ] Filtered [ ] Unfiltered	Plastic - NaOH, 250 ml	Comments
1	✓				1604200508-01	SW	5/8/20		X	X	X													X	X			
2	✓				1604200508-02	SW	↓		X	X	X													X	X			
3	✓				1604200508-03	SW			X	X	X													X	X			
4	✓				1604200508-04	SW			X	X	X													X	X			
5	✓				1604200508-05	SW			X	X	X													X	X			
6	✓				1604200508-06	SW			X	X	X													X	X			
7	✓				1604200508-07	SW			X	X	X													X	X			
8	✓				1604200508-08	SW			X	X	X													X	X			
9	✓				1604200508-09	SW			X	X	X													X	X			
10	✓				1604200508-10	SW			X	X	X													X	X			

Transfer Number	Relinquished By	Accepted By	Date	Time
1			5/8	1540 1633
2			5/8/20	15:45
3				5°
4			@	

Reporting and Detection Limit Requirements: Total P: 0.0008 mg/L
Alkalinity: 2 mg/L
Turbidity: 0.1 NTU

Additional Comments: Rep to Limits →

New England Testing Laboratory, Inc.
(401) 353-3420

REPORT OF ANALYTICAL RESULTS

NETLAB Work Order Number: 0E28060
Client Project: 20170900.B10 - Spectacle Pond, Cranston

Report Date: 02-June-2020

Prepared for:

Alan Tevyaw
Fuss & O'Neill
317 Iron Horse Way
Providence, RI 02908

Richard Warila, Laboratory Director
New England Testing Laboratory, Inc.
59 Greenhill Street
West Warwick, RI 02893
rich.warila@newenglandtesting.com

Samples Submitted :

The samples listed below were submitted to New England Testing Laboratory on 05/28/20. The group of samples appearing in this report was assigned an internal identification number (case number) for laboratory information management purposes. The client’s designations for the individual samples, along with our case numbers, are used to identify the samples in this report. This report of analytical results pertains only to the sample(s) provided to us by the client which are indicated on the custody record. The case number for this sample submission is 0E28060. Custody records are included in this report.

Lab ID	Sample	Matrix	Date Sampled	Date Received
0E28060-01	1604200528-01	Water	05/28/2020	05/28/2020
0E28060-02	1604200528-02	Water	05/28/2020	05/28/2020
0E28060-03	1604200528-03	Water	05/28/2020	05/28/2020
0E28060-04	1604200528-04	Water	05/28/2020	05/28/2020
0E28060-05	1604200528-05	Water	05/28/2020	05/28/2020
0E28060-06	1604200528-06	Water	05/28/2020	05/28/2020
0E28060-07	1604200528-07	Water	05/28/2020	05/28/2020
0E28060-08	1604200528-08	Water	05/28/2020	05/28/2020
0E28060-09	1604200528-09	Water	05/28/2020	05/28/2020
0E28060-10	1604200528-10	Water	05/28/2020	05/28/2020

Request for Analysis

At the client's request, the analyses presented in the following table were performed on the samples submitted.

1604200528-01 (Lab Number: 0E28060-01)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Turbidity	SM2130-B (11)

1604200528-02 (Lab Number: 0E28060-02)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Turbidity	SM2130-B (11)

1604200528-03 (Lab Number: 0E28060-03)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Turbidity	SM2130-B (11)

1604200528-04 (Lab Number: 0E28060-04)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Turbidity	SM2130-B (11)

1604200528-05 (Lab Number: 0E28060-05)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Turbidity	SM2130-B (11)

1604200528-06 (Lab Number: 0E28060-06)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Turbidity	SM2130-B (11)

1604200528-07 (Lab Number: 0E28060-07)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Turbidity	SM2130-B (11)

1604200528-08 (Lab Number: 0E28060-08)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Turbidity	SM2130-B (11)

1604200528-09 (Lab Number: 0E28060-09)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Turbidity	SM2130-B (11)

1604200528-10 (Lab Number: 0E28060-10)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)

Request for Analysis (continued)

1604200528-10 (Lab Number: 0E28060-10) (continued)

Analysis	**Method**
Turbidity	SM2130-B (11)

Method References

Standard Methods for the Examination of Water and Wastewater, 20th Edition, APHA/ AWWA-WPCF, 1998

Case Narrative

Sample Receipt:

The samples associated with this work order were received in appropriately cooled and preserved containers. The chain of custody was adequately completed and corresponded to the samples submitted.

Exceptions: None

Analysis:

All samples were prepared and analyzed within method specified holding times and according to NETLAB's documented standard operating procedures. The results for the associated calibration, method blank and laboratory control sample (LCS) were within method specified quality control requirements and allowances. Results for all soil samples, unless otherwise indicated, are reported on a dry weight basis.

Exceptions:

Alkalinity: The Matrix Duplicate for the '1604200528-01' sample recovered outside of the recommended QC parameters.

Results: General Chemistry

Sample: 1604200528-01

Lab Number: 0E28060-01 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**10**		2	mg/L	05/29/20	05/29/20
Turbidity	ND		0.1	NTU	05/28/20 16:15	05/28/20 16:15

Results: General Chemistry

Sample: 1604200528-02

Lab Number: 0E28060-02 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**30**		2	mg/L	05/29/20	05/29/20
Turbidity	**2.1**		0.1	NTU	05/28/20 16:15	05/28/20 16:15

Results: General Chemistry

Sample: 1604200528-03

Lab Number: 0E28060-03 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**36**		2	mg/L	05/29/20	05/29/20
Turbidity	**2.1**		0.1	NTU	05/28/20 16:15	05/28/20 16:15

Results: General Chemistry

Sample: 1604200528-04

Lab Number: 0E28060-04 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**32**		2	mg/L	05/29/20	05/29/20
Turbidity	**14.5**		0.1	NTU	05/28/20 16:15	05/28/20 16:15

Results: General Chemistry

Sample: 1604200528-05

Lab Number: 0E28060-05 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**35**		2	mg/L	05/29/20	05/29/20
Turbidity	**1.8**		0.1	NTU	05/28/20 16:15	05/28/20 16:15

Results: General Chemistry

Sample: 1604200528-06

Lab Number: 0E28060-06 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**49**		2	mg/L	05/29/20	05/29/20
Turbidity	**2.3**		0.1	NTU	05/28/20 16:15	05/28/20 16:15

Results: General Chemistry

Sample: 1604200528-07

Lab Number: 0E28060-07 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**17**		2	mg/L	05/29/20	05/29/20
Turbidity	**1.5**		0.1	NTU	05/28/20 16:15	05/28/20 16:15

Results: General Chemistry

Sample: 1604200528-08

Lab Number: 0E28060-08 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**46**		2	mg/L	05/29/20	05/29/20
Turbidity	**5.5**		0.1	NTU	05/28/20 16:15	05/28/20 16:15

Results: General Chemistry

Sample: 1604200528-09

Lab Number: 0E28060-09 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**35**		2	mg/L	05/29/20	05/29/20
Turbidity	**9.4**		0.1	NTU	05/28/20 16:15	05/28/20 16:15

Results: General Chemistry

Sample: 1604200528-10

Lab Number: 0E28060-10 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as $CaCO_3$	**36**		2	mg/L	05/29/20	05/29/20
Turbidity	**5.6**		0.1	NTU	05/28/20 16:15	05/28/20 16:15

Quality Control

General Chemistry

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: B0E1077 - Turbidity										
Blank (B0E1077-BLK1)					Prepared & Analyzed: 05/28/20					
Turbidity	ND		0.1	NTU						
Blank (B0E1077-BLK2)					Prepared & Analyzed: 05/28/20					
Turbidity	ND		0.1	NTU						
LCS (B0E1077-BS1)					Prepared & Analyzed: 05/28/20					
Turbidity	1.0		0.1	NTU	1.00		95.0	0-200		
LCS (B0E1077-BS2)					Prepared & Analyzed: 05/28/20					
Turbidity	0.9		0.1	NTU	1.00		92.0	0-200		
Duplicate (B0E1077-DUP1)		**Source: 0E28060-01**			Prepared & Analyzed: 05/28/20					
Turbidity	ND		0.1	NTU		ND				200
Batch: B0E1135 - Alkalinity										
Blank (B0E1135-BLK1)					Prepared & Analyzed: 05/29/20					
Alkalinity as CaCO3	ND		2	mg/L						
LCS (B0E1135-BS1)					Prepared & Analyzed: 05/29/20					
Alkalinity as CaCO3	50		2	mg/L	50.0		101	90-110		
Duplicate (B0E1135-DUP1)		**Source: 0E28060-01**			Prepared & Analyzed: 05/29/20					
Alkalinity as CaCO3	13		2	mg/L		10			26.1	20
Matrix Spike (B0E1135-MS1)		**Source: 0E28060-01**			Prepared & Analyzed: 05/29/20					
Alkalinity as CaCO3	66		2	mg/L	50.0	10	113	80-120		

Notes and Definitions

Item	Definition
Wet	Sample results reported on a wet weight basis.
ND	Analyte NOT DETECTED at or above the reporting limit.

0 E 2 8060 a

E, LLC

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☒ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601

CHAIN-OF-CUSTODY RECORD 0577

Turnaround
☐ 1 Day* ☐ 3 Days* ☐ Other ______ (days)
☐ 2 Days* ☒ Standard (____ days) *Surcharge Applies

PROJECT NAME: Spectacle Pond
PROJECT LOCATION: Cranston, RI
PROJECT NUMBER: 20170900.B10
LABORATORY: Net Lab

REPORT TO: Allen Teryaw (ateryaw@fando.com)
INVOICE TO: Allen Teryaw (ateryaw@fando.com)
P.O. NO.: 160420170900.B10
Sampler's Signature: Date: 5/28/2020

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Sediment A=Air
X=Other ______

Analysis Request / Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Alkalinity (SM 2320B)	Turbidity (SM 2130B)							Soil VOA Vial, [ ] methanol	Soil VOA Vial, [ ] water	Glass Soil Container ( ) oz [ ] Na(SO4)2	Glass Soil Container ( ) oz	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H2SO4	Plastic - As is, [ ] 250 ml [ ] 500 [ ] 1000 ml 16oz	Plastic - H2SO4, [ ] 250 ml [ ] 500 ml	Plastic - HNO3, 250 ml [ ] Filtered [ ] Unfiltered	Plastic - NaOH, 250 ml	Comments
1	✓				1604200528-01	SW	5/28/20	1015	X	X														1				
2	✓				-02			1023	X	X														1				
3	✓				-03			1052	X	X														1				
4	✓				-04			1116	X	X														1				
5	✓				-05			1140	X	X														1				
6	✓				-06			1215	X	X														1				
7	✓				-07			1255	X	X														1				
8	✓				-08			1312	X	X														1				
9	✓				-09			1352	X	X														1				
10	✓				-10			1355	X	X														1				

Transfer Number	Relinquished By	Accepted By	Date	Time
1			5/28/20	1500
2			5/28/20	
3				
4				

Reporting and Detection Limit Requirements: Alkalinity: 2mg/L
Turbidity: 0.1 NTU

Additional Comments: ~~reporting limits~~

New England Testing Laboratory, Inc.
(401) 353-3420

REPORT OF ANALYTICAL RESULTS

NETLAB Work Order Number: 0F26039
Client Project: 20170900.B10 - Spectacle Pond, Cranston

Report Date: 02-July-2020

Prepared for:

Alan Tevyaw
Fuss & O'Neill
317 Iron Horse Way
Providence, RI 02908

Richard Warila, Laboratory Director
New England Testing Laboratory, Inc.
59 Greenhill Street
West Warwick, RI 02893
rich.warila@newenglandtesting.com

Samples Submitted :

The samples listed below were submitted to New England Testing Laboratory on 06/26/20. The group of samples appearing in this report was assigned an internal identification number (case number) for laboratory information management purposes. The client's designations for the individual samples, along with our case numbers, are used to identify the samples in this report. This report of analytical results pertains only to the sample(s) provided to us by the client which are indicated on the custody record. The case number for this sample submission is 0F26039. Custody records are included in this report.

Lab ID	Sample	Matrix	Date Sampled	Date Received
0F26039-01	1604200626-01	Water	06/26/2020	06/26/2020
0F26039-02	1604200626-02	Water	06/26/2020	06/26/2020
0F26039-03	1604200626-03	Water	06/26/2020	06/26/2020
0F26039-04	1604200626-04	Water	06/26/2020	06/26/2020
0F26039-05	1604200626-05	Water	06/26/2020	06/26/2020
0F26039-06	1604200626-06	Water	06/26/2020	06/26/2020
0F26039-07	1604200626-07	Water	06/26/2020	06/26/2020
0F26039-08	1604200626-08	Water	06/26/2020	06/26/2020
0F26039-09	1604200626-09	Water	06/26/2020	06/26/2020
0F26039-10	1604200626-10	Water	06/26/2020	06/26/2020
0F26039-11	1604200626-11	Water	06/26/2020	06/26/2020
0F26039-12	1604200626-12	Water	06/26/2020	06/26/2020

Request for Analysis

At the client's request, the analyses presented in the following table were performed on the samples submitted.

1604200626-01 (Lab Number: 0F26039-01)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1604200626-02 (Lab Number: 0F26039-02)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1604200626-03 (Lab Number: 0F26039-03)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1604200626-04 (Lab Number: 0F26039-04)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1604200626-05 (Lab Number: 0F26039-05)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1604200626-06 (Lab Number: 0F26039-06)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1604200626-07 (Lab Number: 0F26039-07)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1604200626-08 (Lab Number: 0F26039-08)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

Request for Analysis (continued)

1604200626-09 (Lab Number: 0F26039-09)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1604200626-10 (Lab Number: 0F26039-10)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1604200626-11 (Lab Number: 0F26039-11)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1604200626-12 (Lab Number: 0F26039-12)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

Method References

Standard Methods for the Examination of Water and Wastewater, 20th Edition, APHA/ AWWA-WPCF, 1998

Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW846, USEPA

Case Narrative

Sample Receipt:

The samples associated with this work order were received in appropriately cooled and preserved containers. The chain of custody was adequately completed and corresponded to the samples submitted.

Exceptions: None

Analysis:

All samples were prepared and analyzed within method specified holding times and according to NETLAB's documented standard operating procedures. The results for the associated calibration, method blank and laboratory control sample (LCS) were within method specified quality control requirements and allowances. Results for all soil samples, unless otherwise indicated, are reported on a dry weight basis.

Exceptions: None

Results: General Chemistry

Sample: 1604200626-01

Lab Number: 0F26039-01 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**14**		2	mg/L	06/29/20	06/29/20
Turbidity	**1.1**		0.1	NTU	06/27/20 10:15	06/27/20 10:15

Results: General Chemistry

Sample: 1604200626-02

Lab Number: 0F26039-02 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**33**		2	mg/L	06/29/20	06/29/20
Turbidity	**5.3**		0.1	NTU	06/27/20 10:15	06/27/20 10:15

Results: General Chemistry

Sample: 1604200626-03

Lab Number: 0F26039-03 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as $CaCO_3$	**70**		2	mg/L	06/29/20	06/29/20
Turbidity	**48.7**		0.5	NTU	06/27/20 10:15	06/27/20 10:15

Results: General Chemistry

Sample: 1604200626-04

Lab Number: 0F26039-04 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**35**		2	mg/L	06/29/20	06/29/20
Turbidity	**4.1**		0.1	NTU	06/27/20 10:15	06/27/20 10:15

Results: General Chemistry

Sample: 1604200626-05

Lab Number: 0F26039-05 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**29**		2	mg/L	06/29/20	06/29/20
Turbidity	**4.9**		0.1	NTU	06/27/20 10:30	06/27/20 10:30

Results: General Chemistry

Sample: 1604200626-06

Lab Number: 0F26039-06 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**35**		2	mg/L	06/29/20	06/29/20
Turbidity	**4.8**		0.1	NTU	06/27/20 10:30	06/27/20 10:30

Results: General Chemistry

Sample: 1604200626-07

Lab Number: 0F26039-07 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**33**		2	mg/L	06/29/20	06/29/20
Turbidity	**8.6**		0.1	NTU	06/27/20 10:30	06/27/20 10:30

Results: General Chemistry

Sample: 1604200626-08

Lab Number: 0F26039-08 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**34**		2	mg/L	06/29/20	06/29/20
Turbidity	**7.4**		0.1	NTU	06/27/20 10:30	06/27/20 10:30

Results: General Chemistry

Sample: 1604200626-09

Lab Number: 0F26039-09 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**32**		2	mg/L	06/29/20	06/29/20
Turbidity	**6.3**		0.1	NTU	06/27/20 10:30	06/27/20 10:30

Results: General Chemistry

Sample: 1604200626-10

Lab Number: 0F26039-10 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**33**		2	mg/L	06/29/20	06/29/20
Turbidity	**6.6**		0.1	NTU	06/27/20 10:45	06/27/20 10:45

Results: General Chemistry

Sample: 1604200626-11

Lab Number: 0F26039-11 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**33**		2	mg/L	06/29/20	06/29/20
Turbidity	**4.4**		0.1	NTU	06/27/20 11:00	06/27/20 11:00

Results: General Chemistry

Sample: 1604200626-12

Lab Number: 0F26039-12 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**30**		2	mg/L	06/29/20	06/29/20
Turbidity	**5.0**		0.1	NTU	06/27/20 11:00	06/27/20 11:00

Results: Total Metals

Sample: 1604200626-01

Lab Number: 0F26039-01 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	ND		0.05	mg/L	06/29/20	06/30/20

Results: Total Metals

Sample: 1604200626-02

Lab Number: 0F26039-02 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.24**		0.05	mg/L	06/29/20	06/30/20

Results: Total Metals

Sample: 1604200626-03

Lab Number: 0F26039-03 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**10.2**		0.05	mg/L	06/29/20	06/30/20

Results: Total Metals

Sample: 1604200626-04

Lab Number: 0F26039-04 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.20**		0.05	mg/L	06/29/20	06/30/20

Results: Total Metals

Sample: 1604200626-05

Lab Number: 0F26039-05 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.24**		0.05	mg/L	06/29/20	06/30/20

Results: Total Metals

Sample: 1604200626-06

Lab Number: 0F26039-06 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.20**		0.05	mg/L	06/29/20	06/30/20

Results: Total Metals

Sample: 1604200626-07

Lab Number: 0F26039-07 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.78**		0.05	mg/L	06/29/20	06/30/20

Results: Total Metals

Sample: 1604200626-08

Lab Number: 0F26039-08 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.54**		0.05	mg/L	06/29/20	06/30/20

Results: Total Metals

Sample: 1604200626-09

Lab Number: 0F26039-09 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.71**		0.05	mg/L	06/29/20	06/30/20

Results: Total Metals

Sample: 1604200626-10

Lab Number: 0F26039-10 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.52**		0.05	mg/L	06/29/20	06/30/20

Results: Total Metals

Sample: 1604200626-11

Lab Number: 0F26039-11 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.22**		0.05	mg/L	06/29/20	06/30/20

Results: Total Metals

Sample: 1604200626-12

Lab Number: 0F26039-12 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.59**		0.05	mg/L	06/29/20	06/30/20

Quality Control

General Chemistry

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: B0F1195 - Turbidity										
Blank (B0F1195-BLK1)					Prepared & Analyzed: 06/27/20					
Turbidity	ND		0.1	NTU						
Blank (B0F1195-BLK2)					Prepared & Analyzed: 06/27/20					
Turbidity	ND		0.1	NTU						
LCS (B0F1195-BS1)					Prepared & Analyzed: 06/27/20					
Turbidity	1.0		0.1	NTU	1.00		102	0-200		
LCS (B0F1195-BS2)					Prepared & Analyzed: 06/27/20					
Turbidity	1.0		0.1	NTU	1.00		104	0-200		
Duplicate (B0F1195-DUP1)		**Source: 0F26039-01**			Prepared & Analyzed: 06/27/20					
Turbidity	1.3		0.1	NTU		1.1			13.9	200
Batch: B0F1198 - Turbidity										
Blank (B0F1198-BLK1)					Prepared & Analyzed: 06/27/20					
Turbidity	ND		0.1	NTU						
Blank (B0F1198-BLK2)					Prepared & Analyzed: 06/27/20					
Turbidity	0.1		0.1	NTU						
LCS (B0F1198-BS1)					Prepared & Analyzed: 06/27/20					
Turbidity	1.0		0.1	NTU	1.00		104	0-200		
LCS (B0F1198-BS2)					Prepared & Analyzed: 06/27/20					
Turbidity	1.1		0.1	NTU	1.00		110	0-200		

Quality Control
(Continued)

General Chemistry (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: B0F1198 - Turbidity (Continued)										
Duplicate (B0F1198-DUP1)		**Source: 0F26039-11**			Prepared & Analyzed: 06/27/20					
Turbidity	4.2		0.1	NTU		4.4			5.08	200
Batch: B0F1241 - Alkalinity										
Blank (B0F1241-BLK1)					Prepared & Analyzed: 06/29/20					
Alkalinity as CaCO3	ND		2	mg/L						
LCS (B0F1241-BS1)					Prepared & Analyzed: 06/29/20					
Alkalinity as CaCO3	50		2	mg/L	50.0		101	90-110		
Duplicate (B0F1241-DUP1)		**Source: 0F26034-04**			Prepared & Analyzed: 06/29/20					
Alkalinity as CaCO3	ND		2	mg/L		ND				20
Matrix Spike (B0F1241-MS1)		**Source: 0F26034-04**			Prepared & Analyzed: 06/29/20					
Alkalinity as CaCO3	37		2	mg/L	50.0	ND	73.6	80-120		

Quality Control
(Continued)

Total Metals

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: B0F1229 - Metals Digestion Waters										
Blank (B0F1229-BLK1)					Prepared: 06/29/20 Analyzed: 06/30/20					
Iron	ND		0.05	mg/L						
LCS (B0F1229-BS1)					Prepared: 06/29/20 Analyzed: 06/30/20					
Iron	11.4		0.05	mg/L	10.0		114	85-115		

Notes and Definitions

Item	Definition
Wet	Sample results reported on a wet weight basis.
ND	Analyte NOT DETECTED at or above the reporting limit.

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☐ 108 Myrtle Street, Suite 502, Quincy, MA 02171
☐ 540 North Commercial Street,
☐ 276 Newport Road, New Lond
☐ 205 Billings Farm Road, Suite 6B,
☐ 5 Fletcher Street, Suite 1, Kenne
☐ 23046 Avenida de la Carlota, Su

0 F 2 60390

CHAIN-OF-CUSTODY RECORD 43446

☐ 24-Hour* ☐ 72-Hour* ☐ Other ______ (days)
☐ 48-Hour* ☒ Standard (___ days) *Surcharge Applies

PROJECT NAME: Spectacle Pond
PROJECT LOCATION: Cranston, RI
PROJECT NUMBER: 20170900.B10
LABORATORY: NET CAB

REPORT TO: Allen Tevyaw atevyaw@fando.com
INVOICE TO: Allen Tevyaw atevyaw@fando.com
P.O. NO.: 1604 20170900.B10
Sampler's Signature: Date: 6/26/2020

Source Codes:
MW=Monitoring Well PW=Potable Water T=Treatment Facility S=Soil B=Sediment
SW=Surface Water ST=Stormwater W=Waste A=Air C=Concrete
X=Other ______

Analysis Request / Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Alkalinity (SM 2320B)	Turbidity (SM 2130 B)	Total Iron						Soil VOA Vial, ☐ methanol	Soil VOA Vial, ☐ water	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, ☐ As is ☐ HCl	Glass Amber ( ) ml, ☐ As is ☐ H₂SO₄	Plastic - As is, ☐ 250 ml ☐ 500 ☒ 1000 ml	Plastic - H₂SO₄, ☐ 250 ml ☐ 500 ml 16oz	Plastic - HNO₃, 250 ml ☐ Filtered ☐ 0.45μ ☐ 10μ	Plastic - NaOH, 250 ml	Comments
1					1604200626-01	SW	6/26/2020	1054	X	X	X													✓	✓			
2					-02	↓	↓	1323	X	X	X													✓	✓			
3					-03	↓	↓	1328	X	X	X													✓	✓			
4					-04	↓	↓	1337	X	X	X													✓	✓			
5					-05	↓	↓	1348	X	X	X													✓	✓			
6					-06	↓	↓	1355	X	X	X													✓	✓			
7					-07	↓	↓	1405	X	X	X													✓	✓			
8					-08	↓	↓	1410	X	X	X													✓	✓			
9					-09	↓	↓	1415	X	X	X													✓	✓			
10					-10	↓	↓	1420	X	X	X													✓	✓			

Transfer Number	Relinquished By	Accepted By	Date	Time
1				
2				
3				
4			6/26/20	15:57

Charge Exceptions: ☐ CT Tax Exempt ☐ QA/QC ☐ Other ______
____ Duplicates ____ Blanks (Item Nos:)

Reporting and Detection Limit Requirements: ☐ RCP Deliverables ☐ MCP CAM Cert.
Alkalinity: 2mg/L Turbidity: 0.1 NTU

Additional Comments:
29°

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☐ 540 North Commercial Street, Manchester, NH 03101
☐ 276 Newport Road, New London, NH 03257
☐ 205 Billings Farm Road, Suite 6B, White River Junction, VT 05001
☐ 5 Fletcher Street, Suite 1, Kennebunk, ME 04043
☐ 23046 Avenida de la Carlota, Suite 600, Laguna Hills, CA 92653
☐ Other

CHAIN-OF-CUSTODY RECORD 43441

Turnaround
☐ 24-Hour* ☐ 72-Hour* ☐ Other ______ (days)
☐ 48-Hour* [✓ ☒ Standard (___ days)] *Surcharge Applies

PROJECT NAME	PROJECT LOCATION	PROJECT NUMBER	LABORATORY
Spectacle Pond	Cranston, RI	20170900.B10	NET LAB

REPORT TO: Allen Tevyaw atevyaw@fando.com
INVOICE TO: Allen Tevyaw atevyaw@fando.com
P.O. NO.: 1604 20170900.B10
Sampler's Signature: Date: 6/26/2020

Source Codes:
MW=Monitoring Well
SW=Surface Water
PW=Potable Water
ST=Stormwater
T=Treatment Facility
W=Waste
A=Air
S=Soil
C=Concrete
B=Sediment
X=Other ______

Analysis Request

Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Alkalinity (SM 2320B)	Turbidity (SM 2130B)	Total Iron						Soil VOA Vial, ☐ methanol	Soil VOA Vial, ☐ water ☐ Na(SO4)2	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, ☐ As is ☐ HCl	Glass Amber ( ) ml, ☐ As is ☐ H2SO4	Plastic - As is, ☐ 250 ml ☐ 500 ☒ 1000 ml	Plastic - H2SO4, ☐ 250 ml ☐ 500 ml 16oz	Plastic - HNO3, 250 ml ☐ Filtered ☐ 0.45µ ☐ 10µ	Plastic - NaOH, 250 ml	Comments
11					1604200626- 11	SW	6/26/2020	1436	X	X	X													✓	✓			
12					- 12	↓	↓	1515	X	X	X													✓	✓			

Transfer Number	Relinquished By	Accepted By	Date	Time
1				
2				
3				
4			6/29/20	15157

Charge Exceptions: ☐ CT Tax Exempt ☐ QA/QC ☐ Other ______
____ Duplicates ____ Blanks (Item Nos:)
Reporting and Detection Limit Requirements: ☐ RCP Deliverables ☐ MCP CAM Cert.
✓
Additional Comments:
27

New England Testing Laboratory, Inc.
(401) 353-3420

REPORT OF ANALYTICAL RESULTS

NETLAB Work Order Number: 0G30045
Client Project: 20170900.B10 - Spectacle Pond, Cranston

Report Date: 05-August-2020

Prepared for:

Alan Tevyaw
Fuss & O'Neill
317 Iron Horse Way
Providence, RI 02908

Richard Warila, Laboratory Director
New England Testing Laboratory, Inc.
59 Greenhill Street
West Warwick, RI 02893
rich.warila@newenglandtesting.com

Samples Submitted :

The samples listed below were submitted to New England Testing Laboratory on 07/30/20. The group of samples appearing in this report was assigned an internal identification number (case number) for laboratory information management purposes. The client's designations for the individual samples, along with our case numbers, are used to identify the samples in this report. This report of analytical results pertains only to the sample(s) provided to us by the client which are indicated on the custody record. The case number for this sample submission is 0G30045. Custody records are included in this report.

Lab ID	Sample	Matrix	Date Sampled	Date Received
0G30045-01	1604200730-01	Water	07/30/2020	07/30/2020
0G30045-02	1604200730-02	Water	07/30/2020	07/30/2020
0G30045-03	1604200730-03	Water	07/30/2020	07/30/2020
0G30045-04	1604200730-04	Water	07/30/2020	07/30/2020
0G30045-05	1604200730-05	Water	07/30/2020	07/30/2020
0G30045-06	1604200730-06	Water	07/30/2020	07/30/2020
0G30045-07	1604200730-07	Water	07/30/2020	07/30/2020
0G30045-08	1604200730-08	Water	07/30/2020	07/30/2020
0G30045-09	1604200730-09	Water	07/30/2020	07/30/2020
0G30045-10	1604200730-10	Water	07/30/2020	07/30/2020
0G30045-11	1604200730-11	Water	07/30/2020	07/30/2020
0G30045-12	1604200730-12	Water	07/30/2020	07/30/2020

Request for Analysis

At the client's request, the analyses presented in the following table were performed on the samples submitted.

1604200730-01 (Lab Number: 0G30045-01)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 200.8
Turbidity	SM2130-B (11)

1604200730-02 (Lab Number: 0G30045-02)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 200.8
Turbidity	SM2130-B (11)

1604200730-03 (Lab Number: 0G30045-03)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 200.8
Turbidity	SM2130-B (11)

1604200730-04 (Lab Number: 0G30045-04)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 200.8
Turbidity	SM2130-B (11)

1604200730-05 (Lab Number: 0G30045-05)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 200.8
Turbidity	SM2130-B (11)

1604200730-06 (Lab Number: 0G30045-06)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 200.8
Turbidity	SM2130-B (11)

1604200730-07 (Lab Number: 0G30045-07)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 200.8
Turbidity	SM2130-B (11)

1604200730-08 (Lab Number: 0G30045-08)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 200.8
Turbidity	SM2130-B (11)

Request for Analysis (continued)

1604200730-09 (Lab Number: 0G30045-09)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 200.8
Turbidity	SM2130-B (11)

1604200730-10 (Lab Number: 0G30045-10)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 200.8
Turbidity	SM2130-B (11)

1604200730-11 (Lab Number: 0G30045-11)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 200.8
Turbidity	SM2130-B (11)

1604200730-12 (Lab Number: 0G30045-12)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 200.8
Turbidity	SM2130-B (11)

Method References

Methods for the Determination of Metals in Environmental Samples EPA-600/R-94/111, USEPA, 1994

Standard Methods for the Examination of Water and Wastewater, 20th Edition, APHA/ AWWA-WPCF, 1998

Case Narrative

Sample Receipt:

The samples associated with this work order were received in appropriately cooled and preserved containers. The chain of custody was adequately completed and corresponded to the samples submitted.

Exceptions: None

Analysis:

All samples were prepared and analyzed within method specified holding times and according to NETLAB's documented standard operating procedures. The results for the associated calibration, method blank and laboratory control sample (LCS) were within method specified quality control requirements and allowances. Results for all soil samples, unless otherwise indicated, are reported on a dry weight basis.

Exceptions: None

Results: General Chemistry

Sample: 1604200730-01

Lab Number: 0G30045-01 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**55**		10	mg/L	08/03/20	08/03/20
Turbidity	**281**		1.0	NTU	07/30/20 16:15	07/30/20 16:15

Results: General Chemistry

Sample: 1604200730-02

Lab Number: 0G30045-02 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**33**		2	mg/L	08/03/20	08/03/20
Turbidity	**8.0**		0.1	NTU	07/30/20 16:15	07/30/20 16:15

Results: General Chemistry

Sample: 1604200730-03

Lab Number: 0G30045-03 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**35**		2	mg/L	08/03/20	08/03/20
Turbidity	**9.0**		0.1	NTU	07/30/20 16:15	07/30/20 16:15

Results: General Chemistry

Sample: 1604200730-04

Lab Number: 0G30045-04 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**35**		2	mg/L	08/03/20	08/03/20
Turbidity	**8.0**		0.1	NTU	07/30/20 16:15	07/30/20 16:15

Results: General Chemistry

Sample: 1604200730-05

Lab Number: 0G30045-05 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**33**		2	mg/L	08/03/20	08/03/20
Turbidity	**7.7**		0.1	NTU	07/30/20 16:15	07/30/20 16:15

Results: General Chemistry

Sample: 1604200730-06

Lab Number: 0G30045-06 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**35**		2	mg/L	08/03/20	08/03/20
Turbidity	**8.9**		0.1	NTU	07/30/20 16:15	07/30/20 16:15

Results: General Chemistry

Sample: 1604200730-07

Lab Number: 0G30045-07 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**33**		2	mg/L	08/03/20	08/03/20
Turbidity	**7.4**		0.1	NTU	07/30/20 16:15	07/30/20 16:15

Results: General Chemistry

Sample: 1604200730-08

Lab Number: 0G30045-08 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**40**		2	mg/L	08/03/20	08/03/20
Turbidity	**8.0**		0.1	NTU	07/30/20 16:15	07/30/20 16:15

Results: General Chemistry

Sample: 1604200730-09

Lab Number: 0G30045-09 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**35**		2	mg/L	08/03/20	08/03/20
Turbidity	**8.4**		0.1	NTU	07/30/20 16:15	07/30/20 16:15

Results: General Chemistry

Sample: 1604200730-10

Lab Number: 0G30045-10 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**37**		2	mg/L	08/03/20	08/03/20
Turbidity	**7.5**		0.1	NTU	07/30/20 16:15	07/30/20 16:15

Results: General Chemistry

Sample: 1604200730-11

Lab Number: 0G30045-11 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**22**		2	mg/L	08/03/20	08/03/20
Turbidity	ND		0.1	NTU	07/30/20 17:10	07/30/20 17:10

Results: General Chemistry

Sample: 1604200730-12

Lab Number: 0G30045-12 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**24**		2	mg/L	08/03/20	08/03/20
Turbidity	**1.8**		0.1	NTU	07/30/20 17:10	07/30/20 17:10

Results: Total Metals

Sample: 1604200730-01

Lab Number: 0G30045-01 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**7.53**		0.001	mg/l	07/31/20	07/31/20

Results: Total Metals

Sample: 1604200730-02

Lab Number: 0G30045-02 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.317**		0.001	mg/l	07/31/20	07/31/20

Results: Total Metals

Sample: 1604200730-03

Lab Number: 0G30045-03 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.161**		0.001	mg/l	07/31/20	07/31/20

Results: Total Metals

Sample: 1604200730-04

Lab Number: 0G30045-04 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.155**		0.001	mg/l	07/31/20	07/31/20

Results: Total Metals

Sample: 1604200730-05

Lab Number: 0G30045-05 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.137**		0.001	mg/l	07/31/20	07/31/20

Results: Total Metals

Sample: 1604200730-06

Lab Number: 0G30045-06 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.127**		0.001	mg/l	07/31/20	07/31/20

Results: Total Metals

Sample: 1604200730-07

Lab Number: 0G30045-07 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.266**		0.001	mg/l	07/31/20	07/31/20

Results: Total Metals

Sample: 1604200730-08

Lab Number: 0G30045-08 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.274**		0.001	mg/l	07/31/20	07/31/20

Results: Total Metals

Sample: 1604200730-09

Lab Number: 0G30045-09 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.284**		0.001	mg/l	07/31/20	07/31/20

Results: Total Metals

Sample: 1604200730-10

Lab Number: 0G30045-10 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.266**		0.001	mg/l	07/31/20	07/31/20

Results: Total Metals

Sample: 1604200730-11

Lab Number: 0G30045-11 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.046**		0.001	mg/l	07/31/20	07/31/20

Results: Total Metals

Sample: 1604200730-12

Lab Number: 0G30045-12 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.120**		0.001	mg/l	07/31/20	07/31/20

Quality Control

General Chemistry

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: B0G1291 - Turbidity										
Blank (B0G1291-BLK1)					Prepared & Analyzed: 07/30/20					
Turbidity	ND		0.1	NTU						
Blank (B0G1291-BLK2)					Prepared & Analyzed: 07/30/20					
Turbidity	ND		0.1	NTU						
LCS (B0G1291-BS1)					Prepared & Analyzed: 07/30/20					
Turbidity	1.0		0.1	NTU	1.00		105	0-200		
LCS (B0G1291-BS2)					Prepared & Analyzed: 07/30/20					
Turbidity	1.0		0.1	NTU	1.00		102	0-200		
Duplicate (B0G1291-DUP1)		**Source: 0G30045-01**			Prepared & Analyzed: 07/30/20					
Turbidity	302		1.0	NTU		281			7.20	200
Batch: B0G1297 - Turbidity										
Blank (B0G1297-BLK1)					Prepared & Analyzed: 07/30/20					
Turbidity	ND		0.1	NTU						
Blank (B0G1297-BLK2)					Prepared & Analyzed: 07/30/20					
Turbidity	0.1		0.1	NTU						
LCS (B0G1297-BS1)					Prepared & Analyzed: 07/30/20					
Turbidity	1.1		0.1	NTU	1.00		108	0-200		
LCS (B0G1297-BS2)					Prepared & Analyzed: 07/30/20					
Turbidity	1.0		0.1	NTU	1.00		96.0	0-200		

Quality Control
(Continued)

General Chemistry (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: B0G1297 - Turbidity (Continued)										
Duplicate (B0G1297-DUP1)	**Source: 0G30045-11**				Prepared & Analyzed: 07/30/20					
Turbidity	0.1		0.1	NTU		ND				200
Batch: B0H0074 - Alkalinity										
Blank (B0H0074-BLK1)					Prepared & Analyzed: 08/03/20					
Alkalinity as CaCO3	ND		2	mg/L						
LCS (B0H0074-BS1)					Prepared & Analyzed: 08/03/20					
Alkalinity as CaCO3	54		2	mg/L	50.0		108	90-110		
Duplicate (B0H0074-DUP1)	**Source: 0G30039-01**				Prepared & Analyzed: 08/03/20					
Alkalinity as CaCO3	5		2	mg/L		4			22.2	20
Matrix Spike (B0H0074-MS1)	**Source: 0G30039-01**				Prepared & Analyzed: 08/03/20					
Alkalinity as CaCO3	55		2	mg/L	50.0	4	103	80-120		

Quality Control
(Continued)

Total Metals

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: B0G1303 - Metals Digestion Waters										
Blank (B0G1303-BLK1)					Prepared & Analyzed: 07/31/20					
Iron	ND		0.001	mg/l						
LCS (B0G1303-BS1)					Prepared & Analyzed: 07/31/20					
Iron	0.181		0.001	mg/l	0.200		90.6	85-115		

Notes and Definitions

Item	Definition
Wet	Sample results reported on a wet weight basis.
ND	Analyte NOT DETECTED at or above the reporting limit.

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☐ 1550 Main Street, Suite 400, Springfield, MA 01103
☐ 108 Myrtle Street, Suite 502, Quincy, MA 02171
☐ 540 North Commercial Street, Manches
☐ 276 Newport Road, New London, NH
☐ 205 Billings Farm Road, Suite 6B, White
☐ 5 Fletcher Street, Suite 1, Kennebunk,
☐ 23046 Avenida de la Carlota, Suite 600,

0G3 0045

CHAIN-OF-CUSTODY RECORD 43451

Turnaround
☐ 24-Hour* ☐ 72-Hour* ☐ Other ______ (days)
☐ 48-Hour* ☒ Standard (____ days) *Surcharge Applies

Project Name	Project Location	Project Number	Laboratory
Spectacle Pond	Cranston, RI	20170900.B10	Net LAB

Report To: Allen Tevyaw (atevyaw@fando.com)
Invoice To: Allen Tevyaw (atevyaw@fando.com)
P.O. No.: 1604 20170900.B10
Sampler's Signature: Date: 7/30/2020

Source Codes:
MW=Monitoring Well PW=Potable Water T=Treatment Facility S=Soil B=Sediment
SW=Surface Water ST=Stormwater W=Waste A=Air C=Concrete
X=Other ______

Analysis Request / Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	ALKALINITY (SM 2320B)	TURBIDITY (SM 2130B)	IRON TOTAL						Soil VOA Vial, ☐ methanol	Soil VOA Vial, ☐ water	Glass Soil Container ( ) oz ☐ Na(SO4)2	Other:	Other:	Water VOA Vial, ☐ As is ☐ HCl	Glass Amber ( ) ml, ☐ As is ☐ H2SO4	Plastic - As is, ☐ 250 ml ☐ 500 ☐ 1000 ml	Plastic - H2SO4, ☐ 250 ml ☐ 500 ml	Plastic - HNO3, 250 ml ☐ Filtered ☐ 0.45µ ☐ 10µ 1602	Plastic - NaOH, 250 ml	Comments
1					1604200730-01	SW	7/30/20	928	X	X	X													1		1		
2					-02			935	X	X	X													1		1		
3					-03			945	X	X	X													1		1		
4					-04			953	X	X	X													1		1		
5					-05			956	X	X	X													1		1		
6					-06			1008	X	X	X													1		1		
7					-07			1015	X	X	X													1		1		
8					-08			1024	X	X	X													1		1		
9					-09			1026	X	X	X													1		1		
10					-10	↓	↓	1033	X	X	X													1		1		

Transfer Number	Relinquished By	Accepted By	Date	Time
1			7/30/20	1302
2				
3				
4				

Charge Exceptions: ☐ CT Tax Exempt ☐ QA/QC ☐ Other ______
____ Duplicates ____ Blanks (Item Nos:)

Reporting and Detection Limit Requirements: ☐ RCP Deliverables ☐ MCP CAM Cert.
Alkalinity: 2mg/L Turbidity: 0.1NTU

Additional Comments:

W 23°

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☐ 540 North Commercial Street, Manchester, NH 03101
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☐ 205 Billings Farm Road, Suite 6B, White River Junction, VT 05001
☐ 5 Fletcher Street, Suite 1, Kennebunk, ME 04043
☐ 23046 Avenida de la Carlota, Suite 600, Laguna Hills, CA 92653
☐ Other ______

CHAIN-OF-CUSTODY RECORD 43455

Turnaround
☐ 24-Hour* ☐ 72-Hour* ☐ Other ______ (days)
☐ 48-Hour* ☒ Standard (____ days) *Surcharge Applies

PROJECT NAME: Spectacle Pond
PROJECT LOCATION: Cranston, RI
PROJECT NUMBER: 20170900.B10
LABORATORY: NET CAB

REPORT TO: Allen Tevyaw (atevyaw@fando.com)
INVOICE TO: Allen Tevyaw (atevyaw@fando.com)
P.O. NO.: 160420170900.B10
Sampler's Signature: Maelle Syn Date: 7/30/2020

Source Codes:
MW=Monitoring Well PW=Potable Water T=Treatment Facility S=Soil B=Sediment
SW=Surface Water ST=Stormwater W=Waste A=Air C=Concrete
X=Other ______

Analysis Request / Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	ALKALINITY (SM2320B)	TURBIDITY (SM 2130 B)	IRON TOTAL						Soil VOA Vial, ☐ methanol	Soil VOA Vial, ☐ water	Glass Soil Container ( ) oz ☐ Na(SO4)2	Other:	Other:	Water VOA Vial, ☐ As is ☐ HCl	Glass Amber ( ) ml, ☐ As is ☐ H2SO4	Plastic - As is, ☐ 250 ml ☐ 500 ☐ 1000 ml 1602	Plastic - H2SO4, ☐ 250 ml ☐ 500 ml	Plastic - HNO3, 250 ml ☐ Filtered ☐ 0.45µ ☐ 10µ	Plastic - NaOH, 250 ml	Comments
11					1604200730 - 11	SW	7/30/20	1105	X	X	X													1		1		
12					- 12	↓	↓	1133	X	X	X													1		1		

Transfer Number	Relinquished By	Accepted By	Date	Time
1	Maelly Synn		7/30/20	1302
2				
3				
4				

Charge Exceptions: ☐ CT Tax Exempt ☐ QA/QC ☐ Other ______
____ Duplicates ____ Blanks (Item Nos:)

Reporting and Detection Limit Requirements: ☐ RCP Deliverables ☐ MCP CAM Cert.

Additional Comments:

23°

New England Testing Laboratory, Inc.
(401) 353-3420

REPORT OF ANALYTICAL RESULTS

NETLAB Work Order Number: 0H26049
Client Project: 20170900.B10 - Spectacle Pond, Cranston

Report Date: 01-September-2020

Prepared for:

Alan Tevyaw
Fuss & O'Neill
317 Iron Horse Way
Providence, RI 02908

Richard Warila, Laboratory Director
New England Testing Laboratory, Inc.
59 Greenhill Street
West Warwick, RI 02893
rich.warila@newenglandtesting.com

Samples Submitted :

The samples listed below were submitted to New England Testing Laboratory on 08/26/20. The group of samples appearing in this report was assigned an internal identification number (case number) for laboratory information management purposes. The client's designations for the individual samples, along with our case numbers, are used to identify the samples in this report. This report of analytical results pertains only to the sample(s) provided to us by the client which are indicated on the custody record. The case number for this sample submission is 0H26049. Custody records are included in this report.

Lab ID	Sample	Matrix	Date Sampled	Date Received
0H26049-01	1604200826-01	Water	08/26/2020	08/26/2020
0H26049-02	1604200826-02	Water	08/26/2020	08/26/2020
0H26049-03	1604200826-03	Water	08/26/2020	08/26/2020
0H26049-04	1604200826-07	Water	08/26/2020	08/26/2020
0H26049-05	1604200826-08	Water	08/26/2020	08/26/2020
0H26049-06	1604200826-09	Water	08/26/2020	08/26/2020
0H26049-07	1604200826-10	Water	08/26/2020	08/26/2020
0H26049-08	1604200826-11	Water	08/26/2020	08/26/2020
0H26049-09	1604200826-12	Water	08/26/2020	08/26/2020
0H26049-10	1604200826-13	Water	08/26/2020	08/26/2020
0H26049-11	1604200826-14	Water	08/26/2020	08/26/2020
0H26049-12	1604200826-15	Water	08/26/2020	08/26/2020

Request for Analysis

At the client's request, the analyses presented in the following table were performed on the samples submitted.

1604200826-01 (Lab Number: 0H26049-01)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1604200826-02 (Lab Number: 0H26049-02)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1604200826-03 (Lab Number: 0H26049-03)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1604200826-07 (Lab Number: 0H26049-04)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1604200826-08 (Lab Number: 0H26049-05)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1604200826-09 (Lab Number: 0H26049-06)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1604200826-10 (Lab Number: 0H26049-07)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1604200826-11 (Lab Number: 0H26049-08)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

Request for Analysis (continued)

1604200826-12 (Lab Number: 0H26049-09)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1604200826-13 (Lab Number: 0H26049-10)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1604200826-14 (Lab Number: 0H26049-11)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1604200826-15 (Lab Number: 0H26049-12)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

Method References

Standard Methods for the Examination of Water and Wastewater, 20th Edition, APHA/ AWWA-WPCF, 1998

Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW846, USEPA

Case Narrative

Sample Receipt:

The samples associated with this work order were received in appropriately cooled and preserved containers. The chain of custody was adequately completed and corresponded to the samples submitted.

Exceptions: None

Analysis:

All samples were prepared and analyzed within method specified holding times and according to NETLAB's documented standard operating procedures. The results for the associated calibration, method blank and laboratory control sample (LCS) were within method specified quality control requirements and allowances. Results for all soil samples, unless otherwise indicated, are reported on a dry weight basis.

Exceptions: None

Results: General Chemistry

Sample: 1604200826-01

Lab Number: 0H26049-01 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**46**		2	mg/L	08/27/20	08/27/20
Turbidity	**10.2**		0.1	NTU	08/27/20 14:10	08/27/20 14:10

Results: General Chemistry

Sample: 1604200826-02

Lab Number: 0H26049-02 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**47**		2	mg/L	08/27/20	08/27/20
Turbidity	**10.0**		0.1	NTU	08/27/20 14:10	08/27/20 14:10

Results: General Chemistry

Sample: 1604200826-03

Lab Number: 0H26049-03 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**100**		2	mg/L	08/27/20	08/27/20
Turbidity	**158**		1.0	NTU	08/27/20 14:10	08/27/20 14:10

Results: General Chemistry

Sample: 1604200826-07

Lab Number: 0H26049-04 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**23**		2	mg/L	08/27/20	08/27/20
Turbidity	<		0.1	NTU	08/27/20 14:10	08/27/20 14:10

Results: General Chemistry

Sample: 1604200826-08

Lab Number: 0H26049-05 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**33**		2	mg/L	08/27/20	08/27/20
Turbidity	**9.7**		0.1	NTU	08/27/20 14:10	08/27/20 14:10

Results: General Chemistry

Sample: 1604200826-09

Lab Number: 0H26049-06 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**39**		2	mg/L	08/27/20	08/27/20
Turbidity	**22.7**		0.1	NTU	08/27/20 14:10	08/27/20 14:10

Results: General Chemistry

Sample: 1604200826-10

Lab Number: 0H26049-07 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**37**		2	mg/L	08/27/20	08/27/20
Turbidity	**14.9**		0.1	NTU	08/27/20 14:10	08/27/20 14:10

Results: General Chemistry

Sample: 1604200826-11

Lab Number: 0H26049-08 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**25**		2	mg/L	08/27/20	08/27/20
Turbidity	**1.6**		0.1	NTU	08/27/20 14:10	08/27/20 14:10

Results: General Chemistry

Sample: 1604200826-12

Lab Number: 0H26049-09 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**23**		2	mg/L	08/27/20	08/27/20
Turbidity	**0.6**		0.1	NTU	08/27/20 14:10	08/27/20 14:10

Results: General Chemistry

Sample: 1604200826-13

Lab Number: 0H26049-10 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**25**		2	mg/L	08/27/20	08/27/20
Turbidity	**0.7**		0.1	NTU	08/27/20 14:10	08/27/20 14:10

Results: General Chemistry

Sample: 1604200826-14

Lab Number: 0H26049-11 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**35**		2	mg/L	08/27/20	08/27/20
Turbidity	**17.6**		0.1	NTU	08/27/20 14:30	08/27/20 14:30

Results: General Chemistry

Sample: 1604200826-15

Lab Number: 0H26049-12 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**35**		2	mg/L	08/27/20	08/27/20
Turbidity	**16.1**		0.1	NTU	08/27/20 14:30	08/27/20 14:30

Results: Total Metals

Sample: 1604200826-01

Lab Number: 0H26049-01 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.39**		0.05	mg/L	08/27/20	08/28/20

Results: Total Metals

Sample: 1604200826-02

Lab Number: 0H26049-02 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.37**		0.05	mg/L	08/27/20	08/28/20

Results: Total Metals

Sample: 1604200826-03

Lab Number: 0H26049-03 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**26.9**		0.05	mg/L	08/27/20	08/28/20

Results: Total Metals

Sample: 1604200826-07

Lab Number: 0H26049-04 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.07**		0.05	mg/L	08/27/20	08/28/20

Results: Total Metals

Sample: 1604200826-08

Lab Number: 0H26049-05 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.55**		0.05	mg/L	08/27/20	08/28/20

Results: Total Metals

Sample: 1604200826-09

Lab Number: 0H26049-06 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**1.36**		0.05	mg/L	08/27/20	08/28/20

Results: Total Metals

Sample: 1604200826-10

Lab Number: 0H26049-07 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.31**		0.05	mg/L	08/27/20	08/28/20

Results: Total Metals

Sample: 1604200826-11

Lab Number: 0H26049-08 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.18**		0.05	mg/L	08/27/20	08/28/20

Results: Total Metals

Sample: 1604200826-12

Lab Number: 0H26049-09 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.19**		0.05	mg/L	08/27/20	08/28/20

Results: Total Metals

Sample: 1604200826-13

Lab Number: 0H26049-10 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.18**		0.05	mg/L	08/27/20	08/28/20

Results: Total Metals

Sample: 1604200826-14

Lab Number: 0H26049-11 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.60**		0.05	mg/L	08/27/20	08/28/20

Results: Total Metals

Sample: 1604200826-15

Lab Number: 0H26049-12 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.78**		0.05	mg/L	08/27/20	08/28/20

Quality Control

General Chemistry

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: B0H1144 - Turbidity										
Blank (B0H1144-BLK1)					Prepared & Analyzed: 08/27/20					
Turbidity	ND		0.1	NTU						
Blank (B0H1144-BLK2)					Prepared & Analyzed: 08/27/20					
Turbidity	ND		0.1	NTU						
LCS (B0H1144-BS1)					Prepared & Analyzed: 08/27/20					
Turbidity	1.0		0.1	NTU	1.00		102	0-200		
LCS (B0H1144-BS2)					Prepared & Analyzed: 08/27/20					
Turbidity	1.0		0.1	NTU	1.00		104	0-200		
Duplicate (B0H1144-DUP1)		**Source: 0H26049-01**			Prepared & Analyzed: 08/27/20					
Turbidity	11.0		0.1	NTU		10.2			7.55	200
Batch: B0H1145 - Turbidity										
Blank (B0H1145-BLK1)					Prepared & Analyzed: 08/27/20					
Turbidity	ND		0.1	NTU						
Blank (B0H1145-BLK2)					Prepared & Analyzed: 08/27/20					
Turbidity	ND		0.1	NTU						
LCS (B0H1145-BS1)					Prepared & Analyzed: 08/27/20					
Turbidity	1.0		0.1	NTU	1.00		104	0-200		
LCS (B0H1145-BS2)					Prepared & Analyzed: 08/27/20					
Turbidity	1.1		0.1	NTU	1.00		107	0-200		

Quality Control

(Continued)

General Chemistry (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: B0H1145 - Turbidity (Continued)										
Duplicate (B0H1145-DUP1)		**Source: 0H26049-11**			Prepared & Analyzed: 08/27/20					
Turbidity	17.1		0.1	NTU		17.6			2.88	200
Batch: B0H1147 - Alkalinity										
Blank (B0H1147-BLK1)					Prepared & Analyzed: 08/27/20					
Alkalinity as CaCO3	ND		2	mg/L						
LCS (B0H1147-BS1)					Prepared & Analyzed: 08/27/20					
Alkalinity as CaCO3	49		2	mg/L	50.0		98.1	90-110		
Duplicate (B0H1147-DUP1)		**Source: 0H25061-01**			Prepared & Analyzed: 08/27/20					
Alkalinity as CaCO3	44		2	mg/L		46			3.92	20
Matrix Spike (B0H1147-MS1)		**Source: 0H25061-01**			Prepared & Analyzed: 08/27/20					
Alkalinity as CaCO3	89		2	mg/L	50.0	46	87.6	80-120		

Quality Control

(Continued)

Total Metals

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: B0H1111 - Metals Digestion Waters										
Blank (B0H1111-BLK1)					Prepared: 08/27/20 Analyzed: 08/28/20					
Iron	ND		0.05	mg/L						
LCS (B0H1111-BS1)					Prepared: 08/27/20 Analyzed: 08/28/20					
Iron	10.5		0.05	mg/L	10.0		105	85-115		

Notes and Definitions

Item	Definition
Wet	Sample results reported on a wet weight basis.
ND	Analyte NOT DETECTED at or above the reporting limit.

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CHAIN-OF-CUSTODY RECORD 0592

Turnaround
☐ 1 Day* ☐ 2 Days* ☐ 3 Days* ☑ Standard (____ days) ☐ Other ______ (days)
*Surcharge Applies

PROJECT NAME: SPECTACLE POND
PROJECT LOCATION: CRANSTON, RI
PROJECT NUMBER: 20170900.B10
LABORATORY: NET LAB

REPORT TO: ALLEN TEVYAW atevyaw@fando.com
INVOICE TO: ALLEN TEVYAW atevyaw@fando.com
P.O. NO.: ~~ATA~~ 160420170900.B10
Sampler's Signature: Date: 8/26/20

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Sediment A=Air
X=Other ____________

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Analysis Request: Total IRON	Turbidity	Alkalinity						Containers: Soil VOA Vial, [ ] methanol	Soil VOA Vial, [ ] water	Glass Soil Container ( ) oz [ ] Na(SO₄)₂	Glass Soil Container ( ) oz	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H₂SO₄	Plastic - As is, [ ] 250 ml [ ] 500 [X] 1000 ml	Plastic - H₂SO₄ [ ] 250 ml [ ] 500 ml	Plastic - HNO₃, 250 ml [ ] Filtered [ ] Unfiltered	Plastic - NaOH, 250 ml	Comments
1	1				1604200826-01 ..	SW	8/26/20	1200	X	X	X													X				
2	1				-02 ..	SW		1220	X	X	X													X				
3	1				-03 ..	SW		1200	X	X	X													X				
4	1				-07 ..	SW		1100	X	X	X													X				
5	1				-08 ..	SW		1120	X	X	X													X				
6	1				-09 ..	SW		1200	X	X	X													X				
7	1				-10 ..	SW		1220	X	X	X													X				
8	1				-11 ..	SW		1240	X	X	X													X				
9	1				-12 ..	SW		1310	X	X	X													X				
10	1				-13 ..	SW		1330	X	X	X													X				

Transfer Number	Relinquished By	Accepted By	Date	Time
1	ALLEN TEVYAW		8/26/20	
2			8/26/20	1024
3				
4				

Reporting and Detection Limit Requirements.

Additional Comments:

LV

PAGE 2 of

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☐ 50 Redfield Street, Suite 100, Boston, MA 02122
☐ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601

CHAIN-OF-CUSTODY RECORD 0589

Turnaround
☐ 1 Day* ☐ 2 Days* ☐ 3 Days* ☑ Standard (____ days) ☐ Other ______ (days)
*Surcharge Applies

PROJECT NAME: SPECTACLE POND
PROJECT LOCATION: CRANSTON, RI
PROJECT NUMBER: 20170900.B10
LABORATORY: NET LAB

REPORT TO: ALLEN TEVYAW atevyaw@fando.com
INVOICE TO: ALLEW TEVYAW atevyaw@fando.com
P.O. NO.: 160420170900.B10

Sampler's Signature: Date: 8/26/20

Source Codes:
MW=Monitoring Well SW=Surface Water PW=Potable Water T=Treatment Facility S=Soil B=Sediment W=Waste A=Air
X=Other ______

Analysis Request / Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	TOTAL IRON	TURBIDITY	ALKALINITY						Soil VOA Vial, [ ] methanol	Soil VOA Vial, [ ] water	Glass Soil Container ( ) oz [ ] Na(SO4)2	Glass Soil Container ( ) oz	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H2SO4	Plastic - As is, [ ] 250 ml [ ] 500 [X] 1000 ml	Plastic - H2SO4, [ ] 250 ml [ ] 500 ml	Plastic - HNO3, 250 ml [ ] Filtered [ ] Unfiltered	Plastic - NaOH, 250 ml	Comments
11	✓				1604200826-14..	SW	8/26/20	1400	X	X	X													X				
12	✓				↓ -15..	↓	↓	1430	X	X	X													X				

Transfer Number	Relinquished By	Accepted By	Date	Time
1	ALLEN TEVYAW		8/26/20	
2			8/26/20	1624
3				
4				

Reporting and Detection Limit Requirements:

Additional Comments:

LV

New England Testing Laboratory, Inc.
(401) 353-3420

REPORT OF ANALYTICAL RESULTS

NETLAB Work Order Number: 0J12013
Client Project: 20170900.B10 - Spectacle Pond, Cranston

Report Date: 19-October-2020

Prepared for:

Alan Tevyaw
Fuss & O'Neill
317 Iron Horse Way
Providence, RI 02908

Richard Warila, Laboratory Director
New England Testing Laboratory, Inc.
59 Greenhill Street
West Warwick, RI 02893
rich.warila@newenglandtesting.com

Samples Submitted :

The samples listed below were submitted to New England Testing Laboratory on 10/12/20. The group of samples appearing in this report was assigned an internal identification number (case number) for laboratory information management purposes. The client's designations for the individual samples, along with our case numbers, are used to identify the samples in this report. This report of analytical results pertains only to the sample(s) provided to us by the client which are indicated on the custody record. The case number for this sample submission is 0J12013. Custody records are included in this report.

Lab ID	Sample	Matrix	Date Sampled	Date Received
0J12013-01	1604201012-01	Water	10/12/2020	10/12/2020
0J12013-02	1604201012-02	Water	10/12/2020	10/12/2020
0J12013-03	1604201012-03	Water	10/12/2020	10/12/2020
0J12013-04	1604201012-04	Water	10/12/2020	10/12/2020
0J12013-05	1604201012-05	Water	10/12/2020	10/12/2020
0J12013-06	1604201012-06	Water	10/12/2020	10/12/2020
0J12013-07	1604201012-07	Water	10/12/2020	10/12/2020
0J12013-08	1604201012-08	Water	10/12/2020	10/12/2020
0J12013-09	1604201012-09	Water	10/12/2020	10/12/2020
0J12013-10	1604201012-10	Water	10/12/2020	10/12/2020
0J12013-11	1604201012-11	Water	10/12/2020	10/12/2020
0J12013-12	1604201012-12	Water	10/12/2020	10/12/2020
0J12013-13	1604201012-13	Water	10/12/2020	10/12/2020

Request for Analysis

At the client's request, the analyses presented in the following table were performed on the samples submitted.

1604201012-01 (Lab Number: 0J12013-01)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1604201012-02 (Lab Number: 0J12013-02)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1604201012-03 (Lab Number: 0J12013-03)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1604201012-04 (Lab Number: 0J12013-04)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1604201012-05 (Lab Number: 0J12013-05)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1604201012-06 (Lab Number: 0J12013-06)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1604201012-07 (Lab Number: 0J12013-07)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1604201012-08 (Lab Number: 0J12013-08)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

Request for Analysis (continued)

1604201012-09 (Lab Number: 0J12013-09)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1604201012-10 (Lab Number: 0J12013-10)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1604201012-11 (Lab Number: 0J12013-11)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1604201012-12 (Lab Number: 0J12013-12)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1604201012-13 (Lab Number: 0J12013-13)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

Method References

Standard Methods for the Examination of Water and Wastewater, 20th Edition, APHA/ AWWA-WPCF, 1998

Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW846, USEPA

Case Narrative

Sample Receipt:

The samples associated with this work order were received in appropriately cooled and preserved containers. The chain of custody was adequately completed and corresponded to the samples submitted.

Exceptions: None

Analysis:

All samples were prepared and analyzed within method specified holding times and according to NETLAB's documented standard operating procedures. The results for the associated calibration, method blank and laboratory control sample (LCS) were within method specified quality control requirements and allowances. Results for all soil samples, unless otherwise indicated, are reported on a dry weight basis.

Exceptions: None

Results: General Chemistry

Sample: 1604201012-01

Lab Number: 0J12013-01 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**31**		10	mg/L	10/16/20	10/16/20
Turbidity	**656**		2.0	NTU	10/13/20 17:05	10/13/20 17:05

Results: General Chemistry

Sample: 1604201012-02

Lab Number: 0J12013-02 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**47**		2	mg/L	10/16/20	10/16/20
Turbidity	**15.2**		0.1	NTU	10/13/20 17:05	10/13/20 17:05

Results: General Chemistry

Sample: 1604201012-03

Lab Number: 0J12013-03 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**56**		2	mg/L	10/16/20	10/16/20
Turbidity	**15.6**		0.1	NTU	10/13/20 17:05	10/13/20 17:05

Results: General Chemistry

Sample: 1604201012-04

Lab Number: 0J12013-04 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**40**		2	mg/L	10/16/20	10/16/20
Turbidity	**0.3**		0.1	NTU	10/13/20 17:05	10/13/20 17:05

Results: General Chemistry

Sample: 1604201012-05

Lab Number: 0J12013-05 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**64**		2	mg/L	10/16/20	10/16/20
Turbidity	**14.0**		0.1	NTU	10/13/20 17:05	10/13/20 17:05

Results: General Chemistry

Sample: 1604201012-06

Lab Number: 0J12013-06 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**54**		2	mg/L	10/16/20	10/16/20
Turbidity	**15.0**		0.1	NTU	10/13/20 17:05	10/13/20 17:05

Results: General Chemistry

Sample: 1604201012-07

Lab Number: 0J12013-07 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**37**		2	mg/L	10/16/20	10/16/20
Turbidity	**15.4**		0.1	NTU	10/13/20 17:05	10/13/20 17:05

Results: General Chemistry

Sample: 1604201012-08

Lab Number: 0J12013-08 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**49**		2	mg/L	10/16/20	10/16/20
Turbidity	**3.8**		0.1	NTU	10/13/20 17:05	10/13/20 17:05

Results: General Chemistry

Sample: 1604201012-09

Lab Number: 0J12013-09 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**48**		2	mg/L	10/16/20	10/16/20
Turbidity	**25.3**		0.1	NTU	10/13/20 17:05	10/13/20 17:05

Results: General Chemistry

Sample: 1604201012-10

Lab Number: 0J12013-10 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**23**		2	mg/L	10/16/20	10/16/20
Turbidity	**0.9**		0.1	NTU	10/13/20 17:05	10/13/20 17:05

Results: General Chemistry

Sample: 1604201012-11

Lab Number: 0J12013-11 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**53**		2	mg/L	10/16/20	10/16/20
Turbidity	**11.7**		0.1	NTU	10/13/20 16:55	10/13/20 16:55

Results: General Chemistry

Sample: 1604201012-12
Lab Number: 0J12013-12 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**53**		2	mg/L	10/16/20	10/16/20
Turbidity	**17.4**		0.1	NTU	10/13/20 16:55	10/13/20 16:55

Results: General Chemistry

Sample: 1604201012-13

Lab Number: 0J12013-13 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**57**		2	mg/L	10/16/20	10/16/20
Turbidity	**15.2**		0.1	NTU	10/13/20 16:55	10/13/20 16:55

Results: Total Metals

Sample: 1604201012-01

Lab Number: 0J12013-01 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**102**		0.05	mg/L	10/13/20	10/16/20

Results: Total Metals

Sample: 1604201012-02

Lab Number: 0J12013-02 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.99**		0.05	mg/L	10/13/20	10/16/20

Results: Total Metals

Sample: 1604201012-03

Lab Number: 0J12013-03 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.71**		0.05	mg/L	10/13/20	10/16/20

Results: Total Metals

Sample: 1604201012-04

Lab Number: 0J12013-04 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	ND		0.05	mg/L	10/13/20	10/16/20

Results: Total Metals

Sample: 1604201012-05

Lab Number: 0J12013-05 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.58**		0.05	mg/L	10/13/20	10/16/20

Results: Total Metals

Sample: 1604201012-06

Lab Number: 0J12013-06 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.65**		0.05	mg/L	10/13/20	10/16/20

Results: Total Metals

Sample: 1604201012-07

Lab Number: 0J12013-07 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.23**		0.05	mg/L	10/13/20	10/16/20

Results: Total Metals

Sample: 1604201012-08

Lab Number: 0J12013-08 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.30**		0.05	mg/L	10/13/20	10/16/20

Results: Total Metals

Sample: 1604201012-09

Lab Number: 0J12013-09 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**1.24**		0.05	mg/L	10/13/20	10/16/20

Results: Total Metals

Sample: 1604201012-10

Lab Number: 0J12013-10 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.51**		0.05	mg/L	10/13/20	10/16/20

Results: Total Metals

Sample: 1604201012-11

Lab Number: 0J12013-11 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.98**		0.05	mg/L	10/13/20	10/16/20

Results: Total Metals

Sample: 1604201012-12

Lab Number: 0J12013-12 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.69**		0.05	mg/L	10/13/20	10/16/20

Results: Total Metals

Sample: 1604201012-13

Lab Number: 0J12013-13 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.83**		0.05	mg/L	10/13/20	10/16/20

Quality Control

General Chemistry

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: B0J0544 - Turbidity										
Blank (B0J0544-BLK1)					Prepared & Analyzed: 10/13/20					
Turbidity	ND		0.1	NTU						
Blank (B0J0544-BLK2)					Prepared & Analyzed: 10/13/20					
Turbidity	ND		0.1	NTU						
LCS (B0J0544-BS1)					Prepared & Analyzed: 10/13/20					
Turbidity	0.9		0.1	NTU	1.00		92.0	0-200		
LCS (B0J0544-BS2)					Prepared & Analyzed: 10/13/20					
Turbidity	1.0		0.1	NTU	1.00		95.0	0-200		
Duplicate (B0J0544-DUP1)		**Source: 0J12013-01**			Prepared & Analyzed: 10/13/20					
Turbidity	626		2.0	NTU		656			4.68	200
Batch: B0J0545 - Turbidity										
Blank (B0J0545-BLK2)					Prepared & Analyzed: 10/13/20					
Turbidity	ND		0.1	NTU						
LCS (B0J0545-BS1)					Prepared & Analyzed: 10/13/20					
Turbidity	1.1		0.1	NTU	1.00		110	0-200		
LCS (B0J0545-BS2)					Prepared & Analyzed: 10/13/20					
Turbidity	0.9		0.1	NTU	1.00		93.0	0-200		
Duplicate (B0J0545-DUP1)		**Source: 0J12013-11**			Prepared & Analyzed: 10/13/20					
Turbidity	12.6		0.1	NTU		11.7			7.41	200

Quality Control

(Continued)

General Chemistry (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: B0J0725 - Alkalinity										
Blank (B0J0725-BLK1)					Prepared & Analyzed: 10/16/20					
Alkalinity as CaCO3	ND		2	mg/L						
LCS (B0J0725-BS1)					Prepared & Analyzed: 10/16/20					
Alkalinity as CaCO3	50		2	mg/L	50.0		101	90-110		
Duplicate (B0J0725-DUP1)		**Source: 0J09034-04**			Prepared & Analyzed: 10/16/20					
Alkalinity as CaCO3	ND		2	mg/L		ND				20
Matrix Spike (B0J0725-MS1)		**Source: 0J09034-04**			Prepared & Analyzed: 10/16/20					
Alkalinity as CaCO3	93		2	mg/L	50.0	ND	185	80-120		

Quality Control

(Continued)

Total Metals

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: B0J0512 - Metals Digestion Waters										
Blank (B0J0512-BLK1)					Prepared: 10/13/20 Analyzed: 10/16/20					
Iron	ND		0.05	mg/L						
LCS (B0J0512-BS1)					Prepared: 10/13/20 Analyzed: 10/16/20					
Iron	9.89		0.05	mg/L	10.0		98.9	85-115		

Notes and Definitions

Item	Definition
Wet	Sample results reported on a wet weight basis.
ND	Analyte NOT DETECTED at or above the reporting limit.

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☒ 317 Iron Horse Way, Suite 204, Providence, RI 02908
☐ 1550 Main Street, Suite 400, Springfield, MA 01103
☐ 108 Myrtle Street, Suite 502, Quincy, MA 02171

☐ 540 North Commercial Street, M
☐ 276 Newport Road, New Londo
☐ 205 Billings Farm Road, Suite 6B, V
☐ 5 Fletcher Street, Suite 1, Kenneb
☐ 23046 Avenida de la Carlota, Suit

0 J 1 2013%

CHAIN-OF-CUSTODY RECORD 43471

☐ 24-Hour* ☐ 72-Hour* ☐ Other ______ (days)
☐ 48-Hour* ☒ Standard (____ days) *Surcharge Applies

Project Name	Project Location	Project Number	Laboratory
Spectacle Pond	CRANSTON, RI	20170900.B10	NET LAB

Report To: ALLEN TEVYAW (atevyaw@fando.com)
Invoice To: ALLEN TEVYAW (atevyaw@fando.com)
P.O. No.: 160420170900.B10
Sampler's Signature: Date: 10/12/2020

Source Codes:
MW=Monitoring Well PW=Potable Water T=Treatment Facility S=Soil B=Sediment
SW=Surface Water ST=Stormwater W=Waste A=Air C=Concrete
X=Other ____________

Analysis Request / Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	TOTAL IRON	TURBIDITY	ALKALINITY						Soil VOA Vial, ☐ methanol	Soil VOA Vial, ☐ water	Glass Soil Container ( ) oz ☐ Na(SO₄)₂	Other:	Other:	Water VOA Vial, ☐ As is ☐ HCl	Glass Amber ( ) ml, ☐ As is ☐ H₂SO₄	Plastic - As is, ☐ 250 ml ☐ 500 ☒ 1000 ml	Plastic - H₂SO₄, ☐ 250 ml ☐ 500 ml	Plastic - HNO₃, 250 ml ☐ Filtered ☐ 0.45µ ☐ 10µ	Plastic - NaOH, 250 ml	Comments
1					1604201012-01	SW	10/12/20	1137	X	X	X													1		1		
2					-02	↓	↓	1141	X	X	X													1		1		
3					-03	↓	↓	1145	X	X	X													1		1		
4					-04	↓	↓	1218	X	X	X													1		1		
5					-05	↓	↓	1221	X	X	X													1		1		
6					-06	↓	↓	1250	X	X	X													1		1		
7					-07	↓	↓	1315	X	X	X													1		1		
8					-08	↓	↓	1320	X	X	X													1		1		
9					-09	↓	↓	1232	X	X	X													1		1		
10					-10	↓	↓	1312	X	X	X													1		1		

Transfer Number	Relinquished By	Accepted By	Date	Time
1			10/12/20	15:40
2				
3				
4				

Charge Exceptions: ☐ CT Tax Exempt ☐ QA/QC ☐ Other ____________
____ Duplicates ____ Blanks (Item Nos:)

Reporting and Detection Limit Requirements: ☐ RCP Deliverables ☐ MCP CAM Cert.

Additional Comments:

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☐ 205 Billings Farm Road, Suite 6B, White River Junction, VT 05001
☐ 5 Fletcher Street, Suite 1, Kennebunk, ME 04043
☐ 23046 Avenida de la Carlota, Suite 600, Laguna Hills, CA 92653
☐ Other ______

CHAIN-OF-CUSTODY RECORD 43472

Turnaround
☐ 24-Hour* ☐ 72-Hour* ☐ Other ______ (days)
☐ 48-Hour* ☒ Standard (____ days) *Surcharge Applies

PROJECT NAME: SPECTACLE POND
PROJECT LOCATION: CRANSTON, RI
PROJECT NUMBER: 20170900.B10
LABORATORY: NET LAB

REPORT TO: ALLEN TEVYAW (atevyaw@fando.com)
INVOICE TO: ALLEN TEVYAW (atevyaw@fando.com)
P.O. NO.: 1604 20170900.B10
Sampler's Signature: Date: 10/12/20

Source Codes:
MW=Monitoring Well PW=Potable Water T=Treatment Facility S=Soil B=Sediment
SW=Surface Water ST=Stormwater W=Waste A=Air C=Concrete
X=Other ______

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Analysis Request: TOTAL IRON	TURBIDITY	ALKALINITY						Containers: Soil VOA Vial, ☐ methanol	Soil VOA Vial, ☐ water	Glass Soil Container ( ) oz ☐ Na(SO4)2	Other:	Other:	Water VOA Vial, ☐ As is ☐ HCl	Glass Amber ( ) ml, ☐ As is ☐ H2SO4	Plastic - As is, ☐ 250 ml ☐ 500 ☒ 1000 ml	Plastic - H2SO4, ☐ 250 ml ☐ 500 ml	Plastic - HNO3, 250 ml ☐ Filtered ☐ 0.45µ ☐ 10µ	Plastic - NaOH, 250 ml	Comments
11					1604201012 - 11	SW	10/12/20	1323	X	X	X													1		1		
12					- 12	↓	↓	1345	X	X	X													1		1		
13					- 13	↓	↓	1350	X	X	X													1		1		

Transfer Number	Relinquished By	Accepted By	Date	Time
1			10/12/20	15:48
2				
3				
4				

Charge Exceptions: ☐ CT Tax Exempt ☐ QA/QC ☐ Other ______
____ Duplicates ____ Blanks (Item Nos:)

Reporting and Detection Limit Requirements: ☐ RCP Deliverables ☐ MCP CAM Cert.

Additional Comments:

New England Testing Laboratory, Inc.
(401) 353-3420

REPORT OF ANALYTICAL RESULTS

NETLAB Work Order Number: 0J29056
Client Project: 20170900.B10 - Spectacle Pond, Cranston

Report Date: 05-November-2020

Prepared for:

Alan Tevyaw
Fuss & O'Neill
317 Iron Horse Way
Providence, RI 02908

Richard Warila, Laboratory Director
New England Testing Laboratory, Inc.
59 Greenhill Street
West Warwick, RI 02893
rich.warila@newenglandtesting.com

Samples Submitted :

The samples listed below were submitted to New England Testing Laboratory on 10/29/20. The group of samples appearing in this report was assigned an internal identification number (case number) for laboratory information management purposes. The client's designations for the individual samples, along with our case numbers, are used to identify the samples in this report. This report of analytical results pertains only to the sample(s) provided to us by the client which are indicated on the custody record. The case number for this sample submission is 0J29056. Custody records are included in this report.

Lab ID	Sample	Matrix	Date Sampled	Date Received
0J29056-01	1603201029-01	Water	10/29/2020	10/29/2020
0J29056-02	1603201029-02	Water	10/29/2020	10/29/2020
0J29056-03	1603201029-03	Water	10/29/2020	10/29/2020
0J29056-04	1603201029-04	Water	10/29/2020	10/29/2020
0J29056-05	1603201029-05	Water	10/29/2020	10/29/2020
0J29056-06	1603201029-06	Water	10/29/2020	10/29/2020
0J29056-07	1603201029-07	Water	10/29/2020	10/29/2020
0J29056-08	1603201029-08	Water	10/29/2020	10/29/2020
0J29056-09	1603201029-09	Water	10/29/2020	10/29/2020
0J29056-10	1603201029-10	Water	10/29/2020	10/29/2020
0J29056-11	1603201029-11	Water	10/29/2020	10/29/2020
0J29056-12	1603201029-12	Water	10/29/2020	10/29/2020
0J29056-13	1603201029-13	Water	10/29/2020	10/29/2020

Request for Analysis

At the client's request, the analyses presented in the following table were performed on the samples submitted.

1603201029-01 (Lab Number: 0J29056-01)

Analysis	Method
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1603201029-02 (Lab Number: 0J29056-02)

Analysis	Method
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1603201029-03 (Lab Number: 0J29056-03)

Analysis	Method
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1603201029-04 (Lab Number: 0J29056-04)

Analysis	Method
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1603201029-05 (Lab Number: 0J29056-05)

Analysis	Method
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1603201029-06 (Lab Number: 0J29056-06)

Analysis	Method
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1603201029-07 (Lab Number: 0J29056-07)

Analysis	Method
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1603201029-08 (Lab Number: 0J29056-08)

Analysis	Method
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

Request for Analysis (continued)

1603201029-09 (Lab Number: 0J29056-09)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1603201029-10 (Lab Number: 0J29056-10)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1603201029-11 (Lab Number: 0J29056-11)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1603201029-12 (Lab Number: 0J29056-12)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

1603201029-13 (Lab Number: 0J29056-13)

Analysis	**Method**
Alkalinity (CaCO3)	SM2320-B (11)
Iron	EPA 6010C
Turbidity	SM2130-B (11)

Method References

Standard Methods for the Examination of Water and Wastewater, 20th Edition, APHA/ AWWA-WPCF, 1998

Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW846, USEPA

Case Narrative

Sample Receipt:

The samples associated with this work order were received in appropriately cooled and preserved containers. The chain of custody was adequately completed and corresponded to the samples submitted.

Exceptions: None

Analysis:

All samples were prepared and analyzed within method specified holding times and according to NETLAB's documented standard operating procedures. The results for the associated calibration, method blank and laboratory control sample (LCS) were within method specified quality control requirements and allowances. Results for all soil samples, unless otherwise indicated, are reported on a dry weight basis.

Exceptions: None

Results: General Chemistry

Sample: 1603201029-01

Lab Number: 0J29056-01 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**30**		2	mg/L	11/05/20	11/05/20
Turbidity	**0.5**		0.1	NTU	10/30/20 15:55	10/30/20 15:55

Results: General Chemistry

Sample: 1603201029-02

Lab Number: 0J29056-02 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**42**		2	mg/L	11/05/20	11/05/20
Turbidity	**11.8**		0.1	NTU	10/30/20 15:55	10/30/20 15:55

Results: General Chemistry

Sample: 1603201029-03

Lab Number: 0J29056-03 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**48**		2	mg/L	11/05/20	11/05/20
Turbidity	**21.1**		0.1	NTU	10/30/20 15:55	10/30/20 15:55

Results: General Chemistry

Sample: 1603201029-04

Lab Number: 0J29056-04 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**44**		2	mg/L	11/05/20	11/05/20
Turbidity	**13.8**		0.1	NTU	10/30/20 15:55	10/30/20 15:55

Results: General Chemistry

Sample: 1603201029-05

Lab Number: 0J29056-05 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**15**		2	mg/L	11/05/20	11/05/20
Turbidity	**12.5**		0.1	NTU	10/30/20 15:55	10/30/20 15:55

Results: General Chemistry

Sample: 1603201029-06

Lab Number: 0J29056-06 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**10**		2	mg/L	11/05/20	11/05/20
Turbidity	**13.1**		0.1	NTU	10/30/20 15:55	10/30/20 15:55

Results: General Chemistry

Sample: 1603201029-07

Lab Number: 0J29056-07 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**6**		2	mg/L	11/05/20	11/05/20
Turbidity	**0.7**		0.1	NTU	10/30/20 15:55	10/30/20 15:55

Results: General Chemistry

Sample: 1603201029-08

Lab Number: 0J29056-08 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**40**		2	mg/L	11/05/20	11/05/20
Turbidity	**23.7**		0.1	NTU	10/30/20 15:55	10/30/20 15:55

Results: General Chemistry

Sample: 1603201029-09

Lab Number: 0J29056-09 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**32**		2	mg/L	11/05/20	11/05/20
Turbidity	**20.7**		0.1	NTU	10/30/20 15:55	10/30/20 15:55

Results: General Chemistry

Sample: 1603201029-10

Lab Number: 0J29056-10 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**52**		2	mg/L	11/05/20	11/05/20
Turbidity	**772**		2.0	NTU	10/30/20 15:55	10/30/20 15:55

Results: General Chemistry

Sample: 1603201029-11
Lab Number: 0J29056-11 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**42**		2	mg/L	11/05/20	11/05/20
Turbidity	**14.5**		0.1	NTU	10/30/20 16:10	10/30/20 16:10

Results: General Chemistry

Sample: 1603201029-12

Lab Number: 0J29056-12 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**40**		2	mg/L	11/05/20	11/05/20
Turbidity	**11.8**		0.1	NTU	10/30/20 16:10	10/30/20 16:10

Results: General Chemistry

Sample: 1603201029-13

Lab Number: 0J29056-13 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Alkalinity as CaCO3	**38**		2	mg/L	11/05/20	11/05/20
Turbidity	**283**		1.0	NTU	10/30/20 16:10	10/30/20 16:10

Results: Total Metals

Sample: 1603201029-01

Lab Number: 0J29056-01 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	ND		0.05	mg/L	10/30/20	11/03/20

Results: Total Metals

Sample: 1603201029-02

Lab Number: 0J29056-02 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.46**		0.05	mg/L	10/30/20	11/03/20

Results: Total Metals

Sample: 1603201029-03

Lab Number: 0J29056-03 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.41**		0.05	mg/L	10/30/20	11/03/20

Results: Total Metals

Sample: 1603201029-04

Lab Number: 0J29056-04 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.41**		0.05	mg/L	10/30/20	11/03/20

Results: Total Metals

Sample: 1603201029-05

Lab Number: 0J29056-05 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.75**		0.05	mg/L	10/30/20	11/03/20

Results: Total Metals

Sample: 1603201029-06

Lab Number: 0J29056-06 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.66**		0.05	mg/L	10/30/20	11/03/20

Results: Total Metals

Sample: 1603201029-07

Lab Number: 0J29056-07 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.12**		0.05	mg/L	10/30/20	11/03/20

Results: Total Metals

Sample: 1603201029-08

Lab Number: 0J29056-08 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**1.79**		0.05	mg/L	10/30/20	11/03/20

Results: Total Metals

Sample: 1603201029-09

Lab Number: 0J29056-09 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**1.49**		0.05	mg/L	10/30/20	11/03/20

Results: Total Metals

Sample: 1603201029-10

Lab Number: 0J29056-10 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**12.7**		0.05	mg/L	10/30/20	11/03/20

Results: Total Metals

Sample: 1603201029-11

Lab Number: 0J29056-11 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.55**		0.05	mg/L	10/30/20	11/03/20

Results: Total Metals

Sample: 1603201029-12

Lab Number: 0J29056-12 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.46**		0.05	mg/L	10/30/20	11/03/20

Results: Total Metals

Sample: 1603201029-13

Lab Number: 0J29056-13 (Water)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Iron	**0.57**		0.05	mg/L	10/30/20	11/03/20

Quality Control

General Chemistry

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: B0K0066 - Turbidity										
Blank (B0K0066-BLK1)					Prepared & Analyzed: 10/30/20					
Turbidity	ND		0.1	NTU						
Blank (B0K0066-BLK2)					Prepared & Analyzed: 10/30/20					
Turbidity	ND		0.1	NTU						
LCS (B0K0066-BS1)					Prepared & Analyzed: 10/30/20					
Turbidity	1.0		0.1	NTU	1.00		99.0	0-200		
LCS (B0K0066-BS2)					Prepared & Analyzed: 10/30/20					
Turbidity	1.0		0.1	NTU	1.00		100	0-200		
Duplicate (B0K0066-DUP1)		**Source: 0J29056-01**			Prepared & Analyzed: 10/30/20					
Turbidity	0.5		0.1	NTU		0.5			1.90	200
Batch: B0K0070 - Turbidity										
Blank (B0K0070-BLK1)					Prepared & Analyzed: 10/30/20					
Turbidity	ND		0.1	NTU						
Blank (B0K0070-BLK2)					Prepared & Analyzed: 10/30/20					
Turbidity	ND		0.1	NTU						
LCS (B0K0070-BS1)					Prepared & Analyzed: 10/30/20					
Turbidity	1.0		0.1	NTU	1.00		100	0-200		
LCS (B0K0070-BS2)					Prepared & Analyzed: 10/30/20					
Turbidity	1.0		0.1	NTU	1.00		99.0	0-200		

Quality Control

(Continued)

General Chemistry (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: B0K0070 - Turbidity (Continued)										
Duplicate (B0K0070-DUP1)		**Source: 0J29056-11**			Prepared & Analyzed: 10/30/20					
Turbidity	14.1		0.1	NTU		14.5			2.80	200
Batch: B0K0225 - Alkalinity										
Blank (B0K0225-BLK1)					Prepared & Analyzed: 11/05/20					
Alkalinity as CaCO3	ND		2	mg/L						
LCS (B0K0225-BS1)					Prepared & Analyzed: 11/05/20					
Alkalinity as CaCO3	51		2	mg/L	50.0		102	90-110		
Duplicate (B0K0225-DUP1)		**Source: 0J29056-01**			Prepared & Analyzed: 11/05/20					
Alkalinity as CaCO3	35		2	mg/L		30			15.4	20
Matrix Spike (B0K0225-MS1)		**Source: 0J29056-01**			Prepared & Analyzed: 11/05/20					
Alkalinity as CaCO3	76		2	mg/L	50.0	30	91.6	80-120		

Quality Control

(Continued)

Total Metals

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: B0J1339 - Metals Digestion Waters										
Blank (B0J1339-BLK1)					Prepared: 10/30/20 Analyzed: 11/03/20					
Iron	ND		0.05	mg/L						
LCS (B0J1339-BS1)					Prepared: 10/30/20 Analyzed: 11/03/20					
Iron	10.4		0.05	mg/L	10.0		104	85-115		
Batch: B0J1340 - Metals Digestion Waters										
Blank (B0J1340-BLK1)					Prepared: 10/30/20 Analyzed: 11/03/20					
Iron	ND		0.05	mg/L						
LCS (B0J1340-BS1)					Prepared: 10/30/20 Analyzed: 11/03/20					
Iron	10.4		0.05	mg/L	10.0		104	85-115		

Notes and Definitions

Item	Definition
Wet	Sample results reported on a wet weight basis.
ND	Analyte NOT DETECTED at or above the reporting limit.

FUSS & O'NEILL
(860) 646-2469 • www.FandO.com

☐ 146 Hartford Road, Manchester, CT 06040
☐ 56 Quarry Road, Trumbull, CT 06611
☒ 317 Iron Horse Way, Suite 204, Providence, RI 02908
☐ 1550 Main Street, Suite 400, Springfield, MA 01103
☐ 108 Myrtle Street, Suite 502, Quincy, MA 02171

☐ 540 North
☐ 276 Newpo
☐ 205 Billings
☐ 5 Fletcher S
☐ 23046 Aven

0 J 2 9056

CHAIN-OF-CUSTODY RECORD 43499

☐ 24-Hour* ☐ 72-Hour* ☐ Other ______ (days)
☐ 48-Hour* ☒ Standard (____ days) *Surcharge Applies

PROJECT NAME	PROJECT LOCATION	PROJECT NUMBER	LABORATORY
Spectacle POND	CRANSTON, RI	20170900.B10	NET-LAB

REPORT TO: ALLEN TEVYAW (atevyaw@fando.com)
INVOICE TO: X
P.O. No.: 1603201709000.B10
Sampler's Signature: Date: 10/29/20

Source Codes:
MW=Monitoring Well PW=Potable Water T=Treatment Facility S=Soil B=Sediment
SW=Surface Water ST=Stormwater W=Waste A=Air C=Concrete
X=Other ______

Analysis Request

Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	TOTAL IRON	TURBIDITY	ALKALINITY						Soil VOA Vial, ☐ methanol	Soil VOA Vial, ☐ water	Glass Soil Container ( ) oz ☐ Na(SO₄)₂	Other:	Other:	Water VOA Vial, ☐ As is ☐ HCl	Glass Amber ( ) ml, ☐ As is ☐ H₂SO₄	Plastic - As is, ☒250 ml ☐ 500 ☒1000 ml	Plastic - H₂SO₄, ☐ 250 ml ☐ 500 ml	Plastic - HNO₃, 250 ml ☐ Filtered ☐ 0.45µ ☐ 10µ	Plastic - NaOH, 250 ml	Comments
1					1603261029 - 01	SW	10/29/2	0942	X	X	X	• •												1		1		
2					- 02			0950	X	X	X	• •												1		1		
3					- 03			1018	X	X	X	• •												1		1		
4					- 04			1052	X	X	X	• •												1		1		
5					- 05			1121	X	X	X	• •												1		1		
6					- 06			1132	X	X	X	• •												1		1		
7					- 07			1202	X	X	X	• •												1		1		
8					- 08			1211	X	X	X	• •												1		1		
9					- 09			1225	X	X	X	• •												1		1		
10					- 10			1233	X	X	X	• •												1		1		

NM

Transfer Number	Relinquished By	Accepted By	Date	Time
1			10/29/20	
2				
3			10-29-20	4:04
4				

Charge Exceptions: ☐ CT Tax Exempt ☐ QA/QC ☐ Other ______
____ Duplicates ____ Blanks (Item Nos:)

Reporting and Detection Limit Requirements: ☐ RCP Deliverables ☐ MCP CAM Cert.

Additional Comments:

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☐ 56 Quarry Road, Trumbull, CT 06611
☒ 317 Iron Horse Way, Suite 204, Providence, RI 02908
☐ 1550 Main Street, Suite 400, Springfield, MA 01103
☐ 108 Myrtle Street, Suite 502, Quincy, MA 02171
☐ 540 North Commercial Street, Manchester, NH 03101
☐ 276 Newport Road, New London, NH 03257
☐ 205 Billings Farm Road, Suite 6B, White River Junction, VT 05001
☐ 5 Fletcher Street, Suite 1, Kennebunk, ME 04043
☐ 23046 Avenida de la Carlota, Suite 600, Laguna Hills, CA 92653
☐ Other ______

CHAIN-OF-CUSTODY RECORD 43498

Turnaround
☐ 24-Hour* ☐ 72-Hour* ☐ Other ______ (days)
☐ 48-Hour* ☒ Standard (____ days) *Surcharge Applies

PROJECT NAME: SPECTACLE POND
PROJECT LOCATION: CRANSTON, RI
PROJECT NUMBER: 20170900.B10
LABORATORY: NET-LAB

REPORT TO: ALLEN TENYAW (atenyaw@fando.com)
INVOICE TO: 〃
P.O. NO.: 160320170900.810
Sampler's Signature: Date: 10/29/20

Source Codes:
MW=Monitoring Well PW=Potable Water T=Treatment Facility S=Soil B=Sediment
SW=Surface Water ST=Stormwater W=Waste A=Air C=Concrete
X=Other ______

Item No.	Transfer Check				Sample Number	Source Code	Date Sampled	Time Sampled	Analysis Request								Containers											Comments
	1	2	3	4					TOTAL IRON	TURBIDITY	ALKALINITY						Soil VOA Vial, ☐ methanol	Soil VOA Vial, ☐ water	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, ☐ As is ☐ HCl	Glass Amber ( ) ml, ☐ As is ☐ H₂SO₄	Plastic - As is, ☐ 250 ml ☐ 500 ☒ 1000 ml	Plastic - H₂SO₄, ☐ 250 ml ☐ 500 ml	Plastic - HNO₃, 250 ml ☐ Filtered ☐ 0.45µ ☐ 10µ	Plastic - NaOH, 250 ml	
11					1603201029 -11	SW	10/29/20	1435	X	X	X	• •												1		1		
12					-12	↓	↓	1447	X	X	X	• •												1		1		
13					-13	↓	↓	1452	X	X	X	• •												1		1		
																												NM

Transfer Number	Relinquished By	Accepted By	Date	Time
1			10/29/20	
2				
3			10-29-20	4:04
4				

Charge Exceptions: ☐ CT Tax Exempt ☐ QA/QC ☐ Other ______
____ Duplicates ____ Blanks (Item Nos:)

Reporting and Detection Limit Requirements: ☐ RCP Deliverables ☐ MCP CAM Cert.

Additional Comments:

Northeast Laboratories, Inc.

ANALYTICAL REPORT

Fuss & O'Neill
Attn: Allen Tevyaw
317 Iron Horse Way, Suite 204
Providence, RI 02908

Email: atevyaw@fando.com

Report Date:	**10/15/2020**	Date Sampled:	**8/26/2020**
Laboratory ID#:	**N2081902 (01-03)**	Date Received:	**9/08/2020**
Sample Description:	**SEDIMENT**	Date(s) Tested:	**See Below**
Sample Site:	**Spectacle Pond – Cranston, RI**		

Client ID#:	Date Collected	Time Collected	Total Phosphorous (mg/kg) ♦	Iron Bound Phosphorus (mg/kg)	Loosely Bound Phosphorus (mg/kg)	Total Solids ♦ (%)	Organic Matter (%)
1604200826-04	8/26/2020	--	5,810	376	10.1	14.6	10.29
1604200826-05	8/26/2020	--	175	44.0	4.4	66.4	60.83
1604200826-06	8/26/2020	--	3,810	78.2	3.0	13.7	6.96
			9/21/2020 ♦	10/14/2020	10/13/2020	9/18/2020 ♦	10/15/2020
		Method:	SM4500PE-11	SM4500 P	SM4500 P	SM2540B-11	

♦ = Analysis for Phosphorous and Total Solids was outsourced to & tested by Phoenix Lab#PH0618 / Rpt#: GCG80758

Comments:
Results are based on sample, as submitted to Northeast Laboratories, Inc. on: 9/08/2020

Approved by:
Laboratory Director

PHOENIX
Environmental Laboratories, Inc.

Tuesday, June 02, 2020

Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Project ID: SPECTACLE POND
SDG ID: GCG03521
Sample ID#s: CG03521 - CG03530

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory. This report is incomplete unless all pages indicated in the pagination at the bottom of the page are included.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Sincerely yours,

Phyllis Shiller

Phyllis Shiller
Laboratory Director

NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #M-CT007
ME Lab Registration #CT-007
NH Lab Registration #213693-A,B
NJ Lab Registration #CT-003
NY Lab Registration #11301
PA Lab Registration #68-03530
RI Lab Registration #63
UT Lab Registration #CT00007
VT Lab Registration #VT11301

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Sample Id Cross Reference

June 02, 2020

SDG I.D.: GCG03521

Project ID: SPECTACLE POND

Client Id	Lab Id	Matrix
16042000528-01	CG03521	SURFACE WATER
16042000528-02	CG03522	SURFACE WATER
16042000528-03	CG03523	SURFACE WATER
16042000528-04	CG03524	SURFACE WATER
16042000528-05	CG03525	SURFACE WATER
16042000528-06	CG03526	SURFACE WATER
16042000528-07	CG03527	SURFACE WATER
16042000528-08	CG03528	SURFACE WATER
16042000528-09	CG03529	SURFACE WATER
16042000528-10	CG03530	SURFACE WATER

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

June 02, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	AT	05/28/20	10:15
Location Code:	F&O-RI	Received by:	CP	05/29/20	14:36
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG03521
Phoenix ID: CG03521

Project ID: SPECTACLE POND
Client ID: 16042000528-01

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.009	0.003	mg/L	0.5	06/01/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
June 02, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

June 02, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	AT	05/28/20	10:23
Location Code:	F&O-RI	Received by:	CP	05/29/20	14:36
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG03521
Phoenix ID: CG03522

Project ID: SPECTACLE POND
Client ID: 16042000528-02

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.028	0.003	mg/L	0.5	06/01/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
June 02, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

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Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

June 02, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	AT	05/28/20	10:52
Location Code:	F&O-RI	Received by:	CP	05/29/20	14:36
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG03521
Phoenix ID: CG03523

Project ID: SPECTACLE POND
Client ID: 16042000528-03

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.033	0.003	mg/L	0.5	06/01/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
June 02, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

June 02, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	AT	05/28/20	11:16
Location Code:	F&O-RI	Received by:	CP	05/29/20	14:36
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG03521
Phoenix ID: CG03524

Project ID: SPECTACLE POND
Client ID: 16042000528-04

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.105	0.003	mg/L	0.5	06/01/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
June 02, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

June 02, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	AT	05/28/20	11:40
Location Code:	F&O-RI	Received by:	CP	05/29/20	14:36
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG03521
Phoenix ID: CG03525

Project ID: SPECTACLE POND
Client ID: 16042000528-05

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.053	0.003	mg/L	0.5	06/01/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
June 02, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

June 02, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	AT	05/28/20	12:15
Location Code:	F&O-RI	Received by:	CP	05/29/20	14:36
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG03521
Phoenix ID: CG03526

Project ID: SPECTACLE POND
Client ID: 16042000528-06

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.041	0.003	mg/L	0.5	06/01/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
June 02, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

June 02, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	AT	05/28/20	12:55
Location Code:	F&O-RI	Received by:	CP	05/29/20	14:36
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG03521
Phoenix ID: CG03527

Project ID: SPECTACLE POND
Client ID: 16042000528-07

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.125	0.003	mg/L	0.5	06/01/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
June 02, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

June 02, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	AT	05/28/20	13:12
Location Code:	F&O-RI	Received by:	CP	05/29/20	14:36
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG03521
Phoenix ID: CG03528

Project ID: SPECTACLE POND
Client ID: 16042000528-08

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.056	0.003	mg/L	0.5	06/01/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
June 02, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

June 02, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	AT	05/28/20	13:52
Location Code:	F&O-RI	Received by:	CP	05/29/20	14:36
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG03521
Phoenix ID: CG03529

Project ID: SPECTACLE POND
Client ID: 16042000528-09

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.096	0.003	mg/L	0.5	06/01/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
June 02, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

June 02, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	AT	05/28/20	13:55
Location Code:	F&O-RI	Received by:	CP	05/29/20	14:36
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG03521
Phoenix ID: CG03530

Project ID: SPECTACLE POND
Client ID: 16042000528-10

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.096	0.003	mg/L	0.5	06/01/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
June 02, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

QA/QC Report

June 02, 2020

QA/QC Data

SDG I.D.: GCG03521

Parameter	Blank	Blk RL	Sample Result	Dup Result	Dup RPD	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 531723 (mg/L), QC Sample No: CG02877 (CG03521, CG03522, CG03523, CG03524, CG03525, CG03526, CG03527, CG03528)													
Phosphorus, as P	BRL	0.01	2.76	2.77	0.40	98.8			94.1			85 - 115	20
Comment:													
Additional criteria matrix spike acceptance range is 75-125%.													
QA/QC Batch 531724 (mg/L), QC Sample No: CG03533 (CG03529, CG03530)													
Phosphorus, as P	BRL	0.01	0.039	0.037	NC	97.7			93.5			85 - 115	20
Comment:													
Additional criteria matrix spike acceptance range is 75-125%.													

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

RPD - Relative Percent Difference
LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
MS - Matrix Spike
MS Dup - Matrix Spike Duplicate
NC - No Criteria
Intf - Interference

Phyllis Shiller

Phyllis Shiller, Laboratory Director
June 02, 2020

Tuesday, June 02, 2020

Criteria: None

State: RI

Sample Criteria Exceedances Report

GCG03521 - FO-RI

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units

*** No Data to Display ***

Phoenix Laboratories does not assume responsibility for the data contained in this exceedance report. It is provided as an additional tool to identify requested criteria exceedences. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedence information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.

Analysis Comments

June 02, 2020 SDG I.D.: GCG03521

The following analysis comments are made regarding exceptions to criteria not already noted in the Analysis Report or QA/QC Report: None.

1.4

FUSS & O'NEILL ENVIROSCIENCE, LLC
Disciplines to Deliver
(860) 646-2469 • www.FandO.com

☐ 146 Hartford Road, Manchester, CT 06040
☐ 56 Quarry Road, Trumbull, CT 06611
☐ 1419 Richland Street, Columbia, SC 29201
☐ 78 Interstate Drive, West Springfield, MA 01089
☐ 50 Redfield Street, Suite 100, Boston, MA 02122
☐ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601

CHAIN-OF-CUSTODY RECORD 0579

Turnaround
☐ 1 Day* ☐ 2 Days* ☐ 3 Days* ☑ Standard (____ days) ☐ Other ______ (days)
*Surcharge Applies

PROJECT NAME	PROJECT LOCATION	PROJECT NUMBER	LABORATORY
Spectacle Pond	Cranston, RI	20170900.B10	Phoenix

REPORT TO: ALLEN TEVYAW atevyaw@fando.com
INVOICE TO: ALLEN TEVYAW atevyaw@fando.com
P.O. NO.: 1604 20170900.B10
Sampler's Signature: Date: 5/28/20

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Sediment A=Air
X=Other ______

Analysis Request: Total Phosphorus (SM 4500)

Containers: Soil VOA Vial, [ ] methanol; Soil VOA Vial, [ ] water; Glass Soil Container ( ) oz; Glass Soil Container ( ) oz [ ] Na(SO4)2; Other; Water VOA Vial, [ ] As is [ ] HCl; Glass Amber ( ) ml, [ ] As is [ ] H2SO4; Plastic - As is, [ ] 250 ml [ ] 500 [ ] 1000 ml; Plastic - H2SO4, [ ] 250 ml [ ] 500 ml 8oz; Plastic - HNO3, 250 ml [ ] Filtered [ ] Unfiltered; Plastic - NaOH, 250 ml

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Total Phosphorus (SM 4500)	Soil VOA Vial, [ ] methanol	Soil VOA Vial, [ ] water	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other	Water VOA Vial	Glass Amber	Plastic - As is	Plastic - H2SO4	Plastic - HNO3	Plastic - NaOH	Comments
1	✓	✓	✓		1604200528-01	SW	5/28/20	1015	X									X			03521
2	✓	✓	✓		1604200528-02	↓		1023	X									X			03522
3	✓	✓	✓		1604200528-03	↓		1052	X									X			03523
4	✓	✓	✓		1604200528-04	↓		1116	X									X			03524
5	✓	✓	✓		1604200528-05	↓		1140	X									X			03525
6	✓	✓	✓		1604200528-06	↓		1215	X									X			03526
7	✓	✓	✓		1604200528-07	↓		1255	X									X			03527
8	✓	✓	✓		1604200528-08	↓		1312	X									X			03528
9	✓	✓	✓		1604200528-09	↓		1352	X									X			03529
10	✓	✓	✓		1604200528-10	↓		1355	X									X			03530

Transfer Number	Relinquished By	Accepted By	Date	Time
1	ALLEN TEVYAW	FIELD FRIDGE	5/28/20	1601
2	FIELD FRIDGE	ALLEN TEV YAW	5/29/20	0700
3	ALLEN TEV YAW		5/29/20	9:30
4			5-29-20	1436

Reporting and Detection Limit Requirements: Total P: 0.008 mg/L

Additional Comments:
> If you can not meet the reporting limit, just shoot me an email & let me know

PHOENIX
Environmental Laboratories, Inc.

Thursday, July 09, 2020

Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Project ID: SPECTACLE POND
SDG ID: GCG26773
Sample ID#s: CG26773 - CG26784

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory. This report is incomplete unless all pages indicated in the pagination at the bottom of the page are included.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Sincerely yours,

Phyllis Shiller

Phyllis Shiller
Laboratory Director

NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #M-CT007
ME Lab Registration #CT-007
NH Lab Registration #213693-A,B

NJ Lab Registration #CT-003
NY Lab Registration #11301
PA Lab Registration #68-03530
RI Lab Registration #63
UT Lab Registration #CT00007
VT Lab Registration #VT11301

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Sample Id Cross Reference

July 09, 2020

SDG I.D.: GCG26773

Project ID: SPECTACLE POND

Client Id	Lab Id	Matrix
1604200626-01	CG26773	SURFACE WATER
1604200626-02	CG26774	SURFACE WATER
1604200626-03	CG26775	SURFACE WATER
1604200626-04	CG26776	SURFACE WATER
1604200626-05	CG26777	SURFACE WATER
1604200626-06	CG26778	SURFACE WATER
1604200626-07	CG26779	SURFACE WATER
1604200626-08	CG26780	SURFACE WATER
1604200626-09	CG26781	SURFACE WATER
1604200626-10	CG26782	SURFACE WATER
1604200626-11	CG26783	SURFACE WATER
1604200626-12	CG26784	SURFACE WATER

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

July 09, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	AT	06/26/20	10:54
Location Code:	F&O-RI	Received by:	CP	07/02/20	15:53
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.A10				

Laboratory Data

SDG ID: GCG26773
Phoenix ID: CG26773

Project ID: SPECTACLE POND
Client ID: 1604200626-01

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.012	0.003	mg/L	0.5	07/07/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
July 09, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
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Analysis Report

July 09, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	AT	06/26/20	13:23
Location Code:	F&O-RI	Received by:	CP	07/02/20	15:53
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.A10				

Laboratory Data

SDG ID: GCG26773
Phoenix ID: CG26774

Project ID: SPECTACLE POND
Client ID: 1604200626-02

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.044	0.003	mg/L	0.5	07/07/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
July 09, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

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Analysis Report

July 09, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	AT	06/26/20	13:28
Location Code:	F&O-RI	Received by:	CP	07/02/20	15:53
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.A10				

Laboratory Data

SDG ID: GCG26773
Phoenix ID: CG26775

Project ID: SPECTACLE POND
Client ID: 1604200626-03

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.096	0.003	mg/L	0.5	07/07/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
July 09, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

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Analysis Report

July 09, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	AT	06/26/20	13:37
Location Code:	F&O-RI	Received by:	CP	07/02/20	15:53
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.A10				

Laboratory Data

SDG ID: GCG26773
Phoenix ID: CG26776

Project ID: SPECTACLE POND
Client ID: 1604200626-04

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.046	0.003	mg/L	0.5	07/07/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
July 09, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

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Analysis Report

July 09, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	AT	06/26/20	13:48
Location Code:	F&O-RI	Received by:	CP	07/02/20	15:53
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.A10				

Laboratory Data

SDG ID: GCG26773
Phoenix ID: CG26777

Project ID: SPECTACLE POND
Client ID: 1604200626-05

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.037	0.003	mg/L	0.5	07/07/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
July 09, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

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Analysis Report

July 09, 2020

FOR:
Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	AT	06/26/20	13:55
Location Code:	F&O-RI	Received by:	CP	07/02/20	15:53
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.A10				

Laboratory Data

SDG ID: GCG26773
Phoenix ID: CG26778

Project ID: SPECTACLE POND
Client ID: 1604200626-06

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.028	0.003	mg/L	0.5	07/07/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
July 09, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
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Analysis Report

July 09, 2020

FOR:
Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	AT	06/26/20	14:05
Location Code:	F&O-RI	Received by:	CP	07/02/20	15:53
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.A10				

Laboratory Data

SDG ID: GCG26773
Phoenix ID: CG26779

Project ID: SPECTACLE POND
Client ID: 1604200626-07

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.066	0.003	mg/L	0.5	07/07/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
July 09, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Analysis Report

July 09, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	AT	06/26/20	14:10
Location Code:	F&O-RI	Received by:	CP	07/02/20	15:53
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.A10				

Laboratory Data

SDG ID: GCG26773
Phoenix ID: CG26780

Project ID: SPECTACLE POND
Client ID: 1604200626-08

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.045	0.003	mg/L	0.5	07/07/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
July 09, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
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Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

July 09, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	AT	06/26/20	14:15
Location Code:	F&O-RI	Received by:	CP	07/02/20	15:53
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.A10				

Laboratory Data

SDG ID: GCG26773
Phoenix ID: CG26781

Project ID: SPECTACLE POND
Client ID: 1604200626-09

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.043	0.003	mg/L	0.5	07/07/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
July 09, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

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Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

July 09, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	AT	06/26/20	14:20
Location Code:	F&O-RI	Received by:	CP	07/02/20	15:53
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.A10				

Laboratory Data

SDG ID: GCG26773
Phoenix ID: CG26782

Project ID: SPECTACLE POND
Client ID: 1604200626-10

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.040	0.003	mg/L	0.5	07/07/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
July 09, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
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Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

July 09, 2020

FOR:
Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	AT	06/26/20	14:36
Location Code:	F&O-RI	Received by:	CP	07/02/20	15:53
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.A10				

Laboratory Data

SDG ID: GCG26773
Phoenix ID: CG26783

Project ID: SPECTACLE POND
Client ID: 1604200626-11

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.055	0.003	mg/L	0.5	07/07/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
July 09, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

July 09, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	AT	06/26/20	15:15
Location Code:	F&O-RI	Received by:	CP	07/02/20	15:53
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.A10				

Laboratory Data

SDG ID: GCG26773
Phoenix ID: CG26784

Project ID: SPECTACLE POND
Client ID: 1604200626-12

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.063	0.003	mg/L	0.5	07/07/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
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Phyllis Shiller

Phyllis Shiller, Laboratory Director
July 09, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

QA/QC Report

July 09, 2020

QA/QC Data

SDG I.D.: GCG26773

Parameter	Blank	Blk RL	Sample Result	Dup Result	Dup RPD	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 536340 (mg/L), QC Sample No: CG25970 (CG26773, CG26774, CG26775, CG26776, CG26777)													
Phosphorus, as P	BRL	0.01	0.183	0.180	1.70	97.5			95.7			85 - 115	20
Comment:													
Additional criteria matrix spike acceptance range is 75-125%.													
QA/QC Batch 536341 (mg/L), QC Sample No: CG26872 (CG26778, CG26779, CG26780, CG26781, CG26782, CG26783, CG26784)													
Phosphorus, as P	BRL	0.01	<0.010	<0.010	NC	98.6			104			85 - 115	20
Comment:													
Additional criteria matrix spike acceptance range is 75-125%.													

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

RPD - Relative Percent Difference
LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
MS - Matrix Spike
MS Dup - Matrix Spike Duplicate
NC - No Criteria
Intf - Interference

Phyllis Shiller

Phyllis Shiller, Laboratory Director
July 09, 2020

Thursday, July 09, 2020

Criteria: None

State: RI

Sample Criteria Exceedances Report

GCG26773 - FO-RI

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units

*** No Data to Display ***

Phoenix Laboratories does not assume responsibility for the data contained in this exceedance report. It is provided as an additional tool to identify requested criteria exceedences. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedence information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.

Analysis Comments

July 09, 2020 SDG I.D.: GCG26773

The following analysis comments are made regarding exceptions to criteria not already noted in the Analysis Report or QA/QC Report: None.

WCIPK 2.7 Page 1 of 2

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☐ 146 Hartford Road, Manchester, CT 06040
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☐ 78 Interstate Drive, West Springfield, MA 01089
☐ 50 Redfield Street, Suite 100, Boston, MA 02122
☐ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601

CHAIN-OF-CUSTODY RECORD 0582

Turnaround
☐ 1 Day* ☐ 3 Days* ☐ Other ______ (days)
☐ 2 Days* ☑ Standard (____ days) *Surcharge Applies

PROJECT NAME	PROJECT LOCATION	PROJECT NUMBER	LABORATORY
SPECTACLE POND	CRANSTON, RI	20170900.A10	PHOENIX

REPORT TO: ALLEN TEVYAW atevyaw@fando.com
INVOICE TO: ALLEN TEVYAW atevyaw@fando.com
P.O. NO.: 16042017 0900.A10
Sampler's Signature: Date: 6/26/20

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Sediment A=Air
X=Other ____________

Analysis Request | Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Total Phosphorus (SM 4500)								Soil VOA Vial, [ ] methanol	Soil VOA Vial, [ ] water [ ] Na(SO₄)₂	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H₂SO₄	Plastic - As is, [ ] 250 ml [ ] 500 [ ] 1000 ml	Plastic - H₂SO₄, [·] 250 ml [ ] 500 ml 802	Plastic - HNO₃, 250 ml [ ] Filtered [ ] Unfiltered	Plastic - NaOH, 250 ml	Comments
1	/	-	-		16042006 26-01	SW	6/26/20	1054	X																X			26773
2	-	-	-		16042006 26-02	SW	↓	1323	X																X			26774
3	-	-	-		16042006 26-03	SW		1328	X																X			26775
4	-	-	-		16042006 26-04	SW		1337	X																X			26776
5	-	-	-		16042006 26-05	SW		1348	X																X			26777
6	-	-	-		16042006 26-06	SW		1355	X																X			26778
7	-	-	-		16042006 26-07	SW		1405	X																X			26779
8	-	-	-		16042006 26-08	SW		1410	X																X			26780
9	-	-	-		16042006 26-09	SW		1415	X																X			26781
10	-	-	-		16042006 26-10	SW		~~1220~~ 1420	X																X			26782

Transfer Number	Relinquished By	Accepted By	Date	Time
1	ALLEN TEVYAW	FIELD FRIDGE	6/26/20	1700
2	FIELD FRIDGE	ALLEN TEVYAW	7/2/20	0800
3	ALLEN TEVYAW		2-2-20	9:50
4		Krystal Houle	7/2/20	15:53

Reporting and Detection Limit Requirements: Total P: 0.008 mg/L

Additional Comments:

WC IQK2.7

Page 2 of 2

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☐ 50 Redfield Street, Suite 100, Boston, MA 02122
☐ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601

CHAIN-OF-CUSTODY RECORD 0583

Turnaround
☐ 1 Day* ☐ 2 Days* ☐ 3 Days* ☑ Standard (____ days) ☐ Other ______ (days)
*Surcharge Applies

PROJECT NAME: SPECTACLE POND
PROJECT LOCATION: CRANSTON, RI
PROJECT NUMBER: 20170900.A10
LABORATORY: PHOENIX

REPORT TO: ALLEN TEVYAW atevyaw@fando.com
INVOICE TO: ALLEN TEVYAW atevyaw@fando.com
P.O. NO.: 1604 20170900.A10
Sampler's Signature: Date: 6/26/20

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Sediment A=Air
X=Other ____________

Analysis Request

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Total Phosphorus								Soil VOA Vial, [ ] methanol	Soil VOA Vial, [ ] water [ ] $Na(SO_4)_2$	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H_2SO_4	Plastic - As is, [ ] 250 ml [ ] 500 [ ] 1000 ml	Plastic - H_2SO_4, [ ] 250 ml [ ] 500 ml 202	Plastic - HNO_3, 250 ml [ ] Filtered [ ] Unfiltered	Plastic - NaOH, 250 ml	Comments
11	/	-	/		1604200626-11	SW	6/26/20	1436	X																X			260783
12	'	-	'		1604200626-12	SW	6/26/20	1515	X																X			260784

Containers

Transfer Number	Relinquished By	Accepted By	Date	Time
1	ALLEN TEVYAW	FIELD FRIDGE	6/26/20	1700
2	FIELD FRIDGE	ALLEN TEVYAW	[illegible]	0800
3	ALLEN TEVYAW		7-2-20	9:50
4		Krystal Hawk	7/2/20	15:53

Reporting and Detection Limit Requirements: Total P: 0.008 mg/L

Additional Comments:

PHOENIX Environmental Laboratories, Inc.

Wednesday, August 12, 2020

Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Project ID:	SPECTACLE POND
SDG ID:	GCG48429
Sample ID#s:	CG48429 - CG48440

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory. This report is incomplete unless all pages indicated in the pagination at the bottom of the page are included.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Sincerely yours,

Phyllis Shiller

Phyllis Shiller
Laboratory Director

NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #M-CT007
ME Lab Registration #CT-007
NH Lab Registration #213693-A,B

NJ Lab Registration #CT-003
NY Lab Registration #11301
PA Lab Registration #68-03530
RI Lab Registration #63
UT Lab Registration #CT00007
VT Lab Registration #VT11301

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Sample Id Cross Reference

August 12, 2020

SDG I.D.: GCG48429

Project ID: SPECTACLE POND

Client Id	Lab Id	Matrix
1604200730-01	CG48429	SURFACE WATER
1604200730-02	CG48430	SURFACE WATER
1604200730-03	CG48431	SURFACE WATER
1604200730-04	CG48432	SURFACE WATER
1604200730-05	CG48433	SURFACE WATER
1604200730-06	CG48434	SURFACE WATER
1604200730-07	CG48435	SURFACE WATER
1604200730-08	CG48436	SURFACE WATER
1604200730-09	CG48437	SURFACE WATER
1604200730-10	CG48438	SURFACE WATER
1604200730-11	CG48439	SURFACE WATER
1604200730-12	CG48440	SURFACE WATER

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

August 12, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		07/30/20	9:25
Location Code:	F&O-RI	Received by:	CP	08/05/20	18:20
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG48429
Phoenix ID: CG48429

Project ID: SPECTACLE POND
Client ID: 1604200730-01

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.092	0.003	mg/L	0.5	08/11/20	EG	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
August 12, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Analysis Report

August 12, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		07/30/20	9:35
Location Code:	F&O-RI	Received by:	CP	08/05/20	18:20
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG48429
Phoenix ID: CG48430

Project ID: SPECTACLE POND
Client ID: 1604200730-02

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.071	0.003	mg/L	0.5	08/11/20	EG	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
August 12, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

August 12, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		07/30/20	9:45
Location Code:	F&O-RI	Received by:	CP	08/05/20	18:20
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG48429
Phoenix ID: CG48431

Project ID: SPECTACLE POND
Client ID: 1604200730-03

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.067	0.003	mg/L	0.5	08/11/20	EG	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
August 12, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

August 12, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		07/30/20	9:53
Location Code:	F&O-RI	Received by:	CP	08/05/20	18:20
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG48429
Phoenix ID: CG48432

Project ID: SPECTACLE POND
Client ID: 1604200730-04

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.047	0.003	mg/L	0.5	08/11/20	EG	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
August 12, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

August 12, 2020

FOR:
Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		07/30/20	9:58
Location Code:	F&O-RI	Received by:	CP	08/05/20	18:20
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG48429
Phoenix ID: CG48433

Project ID: SPECTACLE POND
Client ID: 1604200730-05

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.046	0.003	mg/L	0.5	08/11/20	EG	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
August 12, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

August 12, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		07/30/20	10:05
Location Code:	F&O-RI	Received by:	CP	08/05/20	18:20
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG48429
Phoenix ID: CG48434

Project ID: SPECTACLE POND
Client ID: 1604200730-06

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.043	0.003	mg/L	0.5	08/11/20	EG	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
August 12, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

August 12, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		07/30/20	10:15
Location Code:	F&O-RI	Received by:	CP	08/05/20	18:20
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG48429
Phoenix ID: CG48435

Project ID: SPECTACLE POND
Client ID: 1604200730-07

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.055	0.003	mg/L	0.5	08/11/20	EG	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
August 12, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

August 12, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		07/30/20	10:24
Location Code:	F&O-RI	Received by:	CP	08/05/20	18:20
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG48429
Phoenix ID: CG48436

Project ID: SPECTACLE POND
Client ID: 1604200730-08

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.064	0.003	mg/L	0.5	08/11/20	EG	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
August 12, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

August 12, 2020

FOR:
Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		07/30/20	10:26
Location Code:	F&O-RI	Received by:	CP	08/05/20	18:20
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG48429
Phoenix ID: CG48437

Project ID: SPECTACLE POND
Client ID: 1604200730-09

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.067	0.003	mg/L	0.5	08/11/20	EG	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller

Phyllis Shiller, Laboratory Director
August 12, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

August 12, 2020

FOR:
Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		07/30/20	10:33
Location Code:	F&O-RI	Received by:	CP	08/05/20	18:20
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG48429
Phoenix ID: CG48438

Project ID: SPECTACLE POND
Client ID: 1604200730-10

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.056	0.003	mg/L	0.5	08/11/20	EG	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller

Phyllis Shiller, Laboratory Director
August 12, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

August 12, 2020

FOR:
Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		07/30/20	11:05
Location Code:	F&O-RI	Received by:	CP	08/05/20	18:20
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG48429
Phoenix ID: CG48439

Project ID: SPECTACLE POND
Client ID: 1604200730-11

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.020	0.003	mg/L	0.5	08/11/20	EG	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
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Phyllis Shiller

Phyllis Shiller, Laboratory Director
August 12, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

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Analysis Report

August 12, 2020

FOR:
Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information

Matrix: SURFACE WATER
Location Code: F&O-RI
Rush Request: Standard
P.O.#: 20170900.B10

Custody Information

Custody Information		Date	Time
Collected by:		07/30/20	11:37
Received by:	CP	08/05/20	18:20
Analyzed by:	see "By" below		

Laboratory Data

SDG ID: GCG48429
Phoenix ID: CG48440

Project ID: SPECTACLE POND
Client ID: 1604200730-12

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.068	0.003	mg/L	0.5	08/11/20	EG	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
August 12, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

QA/QC Report

August 12, 2020

QA/QC Data

SDG I.D.: GCG48429

Parameter	Blank	Blk RL	Sample Result	Dup Result	Dup RPD	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 540853 (mg/L), QC Sample No: CG48546 (CG48432, CG48433, CG48434, CG48435, CG48436, CG48437, CG48438, CG48439, CG48440)													
Phosphorus, as P	BRL	0.01	0.022	0.025	NC	90.2			98.5			85 - 115	20
Comment:													
Additional criteria matrix spike acceptance range is 75-125%.													
QA/QC Batch 540852 (mg/L), QC Sample No: CG50607 (CG48429, CG48430, CG48431)													
Phosphorus, as P	BRL	0.01	<0.010	<0.010	NC	94.2			113			85 - 115	20
Comment:													
Additional criteria matrix spike acceptance range is 75-125%.													

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

RPD - Relative Percent Difference
LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
MS - Matrix Spike
MS Dup - Matrix Spike Duplicate
NC - No Criteria
Intf - Interference

Phyllis Shiller

Phyllis Shiller, Laboratory Director
August 12, 2020

Wednesday, August 12, 2020

Criteria: None

State: RI

Sample Criteria Exceedances Report

GCG48429 - FO-RI

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units

*** No Data to Display ***

Phoenix Laboratories does not assume responsibility for the data contained in this exceedance report. It is provided as an additional tool to identify requested criteria exceedences. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedence information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.

Analysis Comments

August 12, 2020 SDG I.D.: GCG48429

The following analysis comments are made regarding exceptions to criteria not already noted in the Analysis Report or QA/QC Report: None.

FUSS & O'NEILL
(860) 646-2469 • www.FandO.com

☐ 146 Hartford Road, Manchester, CT 06040
☐ 56 Quarry Road, Trumbull, CT 06611
☑ 317 Iron Horse Way, Suite 204, Providence, RI 02908
☐ 1550 Main Street, Suite 400, Springfield, MA 01103
☐ 108 Myrtle Street, Suite 502, Quincy, MA 02171
☐ 540 North Commercial Street, Manchester, NH 03101
☐ 276 Newport Road, New London, NH 03257
☐ 205 Billings Farm Road, Suite 6B, White River Junction, VT 05001
☐ 5 Fletcher Street, Suite 1, Kennebunk, ME 04043
☐ 23046 Avenida de la Carlota, Suite 600, Laguna Hills, CA 92653
☐ Other

WCIP 2.3 Page 1 of 2

CHAIN-OF-CUSTODY RECORD 43456

Turnaround
☐ 24-Hour* ☐ 72-Hour* ☐ Other ______ (days)
☐ 48-Hour* ☑ Standard (____ days) *Surcharge Applies

PROJECT NAME: SPECTACLE POND
PROJECT LOCATION: CRANSTON, RI
PROJECT NUMBER: 20170900.B10
LABORATORY: PHOENIX

REPORT TO: ALLEN TEVYAW atevyaw@fando.com
INVOICE TO: ALLEN TEVYAW atevyaw@fando.com
P.O. NO.: 1604 20170900.B10
Sampler's Signature: Date: 7/30/20

Source Codes:
MW=Monitoring Well PW=Potable Water T=Treatment Facility S=Soil B=Sediment
SW=Surface Water ST=Stormwater W=Waste A=Air C=Concrete
X=Other ______

Analysis Request: Total Phosphorus (SM 4500)

Containers: 8 oz

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Total Phosphorus (SM 4500)		Soil VOA Vial, ☐ methanol	Soil VOA Vial, ☐ water	Glass Soil Container ( ) oz ☐ Na(SO4)2	Other:	Other:	Water VOA Vial, ☐ As is ☐ HCl	Glass Amber ( ) ml, ☐ As is ☐ H2SO4	Plastic - As is, ☐ 250 ml ☐ 500 ☐ 1000 ml	Plastic - H2SO4, ☑ 250 ml ☐ 500 ml	Plastic - HNO3, 250 ml ☐ Filtered ☐ 0.45µ ☐ 10µ	Plastic - NaOH, 250 ml	Comments
1	/	/	/		1604200730 - 01	SW	7/30/20	0925	X	48429									X			
2	/	/	/		-02			0935	X	48430									X			
3	/	/	/		-03			0945	X	48431									X			
4	/	/	/		-04			0953	X	48432									X			
5	/	/	/		-05			0957	X	48433									X			
6	/	/	/		-06			1005	X	48434									X			
7	/	/	/		-07			1015	X	48435									X			
8	/	/	/		-08			1024	X	48436									X			
9	/	/	/		-09			1020	X	48437									X			
10	/	/	/		-10			1033	X	48438									X			

Transfer Number	Relinquished By	Accepted By	Date	Time
1	ALLEN TEVYAW	FIELD FRIDGE	7/30/20	1437
2	FIELD FRIDGE	ALLEN TEVYAW	7/31/20	0800
3	ALLEN TEVYAW		8-5-20	16:20
4			8/5	1820

Charge Exceptions: ☐ CT Tax Exempt ☐ QA/QC ☐ Other ______
____ Duplicates ____ Blanks (Item Nos:)

Reporting and Detection Limit Requirements: ☐ RCP Deliverables ☐ MCP CAM Cert.
Total P: 0.008 mg/L

Additional Comments:

FUSS & O'NEILL
(860) 646-2469 • www.FandO.com

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☐ 56 Quarry Road, Trumbull, CT 06611
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☐ 540 North Commercial Street, Manchester, NH 03101
☐ 276 Newport Road, New London, NH 03257
☐ 205 Billings Farm Road, Suite 6B, White River Junction, VT 05001
☐ 5 Fletcher Street, Suite 1, Kennebunk, ME 04043
☐ 23046 Avenida de la Carlota, Suite 600, Laguna Hills, CA 92653
☐ Other

WCIP Page 2 of 2
2.3

CHAIN-OF-CUSTODY RECORD 43457

Turnaround
☐ 24-Hour* ☐ 72-Hour* ☐ Other ______ (days)
☐ 48-Hour* ☑ Standard (____ days) *Surcharge Applies

PROJECT NAME	PROJECT LOCATION	PROJECT NUMBER	LABORATORY
SPECTACLE POND	CRANSTON, RI	2017-0900.B10	PHOENIX

REPORT TO: ALLEN TEVYAW ateryaw@fando.com
INVOICE TO: ALLEN TEVYAW ateryaw@fando.com
P.O. NO.: 16042017 0900.B10
Sampler's Signature: Date: 7/30/20

Source Codes:
MW=Monitoring Well PW=Potable Water T=Treatment Facility S=Soil B=Sediment
SW=Surface Water ST=Stormwater W=Waste A=Air C=Concrete
X=Other

Analysis Request

Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Total Phosphorus (SM 4500)								Soil VOA Vial, ☐ methanol	Soil VOA Vial, ☐ water	Glass Soil Container ( ) oz ☐ Na(SO4)2	Other:	Other:	Water VOA Vial, ☐ As is ☐ HCl	Glass Amber ( ) ml, ☐ As is ☐ H2SO4	Plastic - As is, ☐ 250 ml ☐ 500 ☐ 1000 ml	Plastic - H2SO4 ☐ 250 ml ☐ 500 ml	Plastic - HNO3, 250 ml ☐ Filtered ☐ 0.45µ ☐ 10µ	Plastic - NaOH, 250 ml	Comments
11	/	/	/		1604200730-11	SW	7/30/20	1105	X				48439												X			
12	/	/	/		1604200730-12	SW	7/30/20	1137	X				48440												X			

Transfer Number	Relinquished By	Accepted By	Date	Time
1	ALLEN TEVYAW	FIELD FRIDGE	7/30/20	1437
2	FIELD FRIDGE	ALLEN TEVYAW	7/31/20	0800
3	ALLEN TEVYAW		8-5-20	10:20
4			8/5	1820

Charge Exceptions: ☐ CT Tax Exempt ☐ QA/QC ☐ Other ____________
____ Duplicates ____ Blanks (Item Nos:)

Reporting and Detection Limit Requirements: ☐ RCP Deliverables ☐ MCP CAM Cert.
Total P: 0.008 mg/L

Additional Comments:

PHOENIX
Environmental Laboratories, Inc.

Thursday, September 03, 2020

**Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908**

**Project ID: SPECTACLE POND
SDG ID: GCG64309
Sample ID#s: CG64309 - CG64320**

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory. This report is incomplete unless all pages indicated in the pagination at the bottom of the page are included.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Sincerely yours,

Phyllis Shiller

**Phyllis Shiller
Laboratory Director**

**NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #M-CT007
ME Lab Registration #CT-007
NH Lab Registration #213693-A,B**

**NJ Lab Registration #CT-003
NY Lab Registration #11301
PA Lab Registration #68-03530
RI Lab Registration #63
UT Lab Registration #CT00007
VT Lab Registration #VT11301**

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Sample Id Cross Reference

September 03, 2020

SDG I.D.: GCG64309

Project ID: SPECTACLE POND

Client Id	Lab Id	Matrix
1604200826-01	CG64309	SURFACE WATER
1604200826-02	CG64310	SURFACE WATER
1604200826-03	CG64311	SURFACE WATER
1604200826-07	CG64312	SURFACE WATER
1604200826-08	CG64313	SURFACE WATER
1604200826-09	CG64314	SURFACE WATER
1604200826-10	CG64315	SURFACE WATER
1604200826-11	CG64316	SURFACE WATER
1604200826-12	CG64317	SURFACE WATER
1604200826-13	CG64318	SURFACE WATER
1604200826-14	CG64319	SURFACE WATER
1604200826-15	CG64320	SURFACE WATER

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Analysis Report

September 03, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		08/21/20	
Location Code:	F&O-RI	Received by:	CP	08/28/20	15:38
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG64309
Phoenix ID: CG64309

Project ID: SPECTACLE POND
Client ID: 1604200826-01

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.046	0.003	mg/L	0.5	09/02/20	MI	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
September 03, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

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Analysis Report

September 03, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		08/21/20	
Location Code:	F&O-RI	Received by:	CP	08/28/20	15:38
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG64309
Phoenix ID: CG64310

Project ID: SPECTACLE POND
Client ID: 1604200826-02

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.063	0.003	mg/L	0.5	09/02/20	MI	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
September 03, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

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Analysis Report

September 03, 2020

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Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		08/21/20	
Location Code:	F&O-RI	Received by:	CP	08/28/20	15:38
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG64309
Phoenix ID: CG64311

Project ID: SPECTACLE POND
Client ID: 1604200826-03

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.063	0.003	mg/L	0.5	09/02/20	MI	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

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Phyllis Shiller, Laboratory Director
September 03, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

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Analysis Report

September 03, 2020

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Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		08/21/20	11:00
Location Code:	F&O-RI	Received by:	CP	08/28/20	15:38
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG64309
Phoenix ID: CG64312

Project ID: SPECTACLE POND
Client ID: 1604200826-07

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.006	0.003	mg/L	0.5	09/02/20	MI	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
September 03, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

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Analysis Report

September 03, 2020

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Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		08/21/20	11:20
Location Code:	F&O-RI	Received by:	CP	08/28/20	15:38
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG64309
Phoenix ID: CG64313

Project ID: SPECTACLE POND
Client ID: 1604200826-08

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.060	0.003	mg/L	0.5	09/02/20	MI	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
September 03, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

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Analysis Report

September 03, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information	
Matrix:	SURFACE WATER
Location Code:	F&O-RI
Rush Request:	Standard
P.O.#:	20170900.B10

Custody Information		Date	Time
Collected by:		08/21/20	12:00
Received by:	CP	08/28/20	15:38
Analyzed by:	see "By" below		

Laboratory Data

SDG ID: GCG64309
Phoenix ID: CG64314

Project ID: SPECTACLE POND
Client ID: 1604200826-09

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.113	0.003	mg/L	0.5	09/02/20	MI	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

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Phyllis Shiller, Laboratory Director
September 03, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

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Analysis Report

September 03, 2020

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Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		08/21/20	12:20
Location Code:	F&O-RI	Received by:	CP	08/28/20	15:38
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG64309
Phoenix ID: CG64315

Project ID: SPECTACLE POND
Client ID: 1604200826-10

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.048	0.003	mg/L	0.5	09/02/20	MI	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

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Phyllis Shiller, Laboratory Director
September 03, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

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Analysis Report

September 03, 2020

FOR:
Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		08/21/20	12:40
Location Code:	F&O-RI	Received by:	CP	08/28/20	15:38
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG64309
Phoenix ID: CG64316

Project ID: SPECTACLE POND
Client ID: 1604200826-11

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.028	0.003	mg/L	0.5	09/02/20	MI	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
September 03, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

September 03, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		08/21/20	13:10
Location Code:	F&O-RI	Received by:	CP	08/28/20	15:38
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG64309
Phoenix ID: CG64317

Project ID: SPECTACLE POND
Client ID: 1604200826-12

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.016	0.003	mg/L	0.5	09/02/20	MI	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller

Phyllis Shiller, Laboratory Director
September 03, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

September 03, 2020

FOR:
Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		08/21/20	13:30
Location Code:	F&O-RI	Received by:	CP	08/28/20	15:38
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG64309
Phoenix ID: CG64318

Project ID: SPECTACLE POND
Client ID: 1604200826-13

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.016	0.003	mg/L	0.5	09/02/20	MI	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
September 03, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

September 03, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		08/21/20	14:00
Location Code:	F&O-RI	Received by:	CP	08/28/20	15:38
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG64309
Phoenix ID: CG64319

Project ID: SPECTACLE POND
Client ID: 1604200826-14

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.057	0.003	mg/L	0.5	09/02/20	MI	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
September 03, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

September 03, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		08/21/20	14:30
Location Code:	F&O-RI	Received by:	CP	08/28/20	15:38
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG64309
Phoenix ID: CG64320

Project ID: SPECTACLE POND
Client ID: 1604200826-15

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.066	0.003	mg/L	0.5	09/02/20	MI	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
September 03, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

QA/QC Report

September 03, 2020

QA/QC Data

SDG I.D.: GCG64309

Parameter	Blank	Blk RL	Sample Result	Dup Result	Dup RPD	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 543885 (mg/L), QC Sample No: CG64300 (CG64309, CG64310, CG64311, CG64312, CG64313, CG64314, CG64315)													
Phosphorus, as P	BRL	0.01	1.05	1.08	2.80	100			100			85 - 115	20
Comment:													
Additional criteria matrix spike acceptance range is 75-125%.													
QA/QC Batch 543886 (mg/L), QC Sample No: CG64326 (CG64316, CG64317, CG64318, CG64319, CG64320)													
Phosphorus, as P	BRL	0.01	0.079	0.079	0	99.0			98.5			85 - 115	20
Comment:													
Additional criteria matrix spike acceptance range is 75-125%.													

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

RPD - Relative Percent Difference
LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
MS - Matrix Spike
MS Dup - Matrix Spike Duplicate
NC - No Criteria
Intf - Interference

Phyllis Shiller

Phyllis Shiller, Laboratory Director
September 03, 2020

Thursday, September 03, 2020

Criteria: None

State: RI

Sample Criteria Exceedances Report

GCG64309 - FO-RI

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units

*** No Data to Display ***

Phoenix Laboratories does not assume responsibility for the data contained in this exceedance report. It is provided as an additional tool to identify requested criteria exceedences. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedence information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.

Analysis Comments

September 03, 2020 SDG I.D.: GCG64309

The following analysis comments are made regarding exceptions to criteria not already noted in the Analysis Report or QA/QC Report: None.

WCIP 2.5 PAGE 1 of 2

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☐ 78 Interstate Drive, West Springfield, MA 01089
☐ 50 Redfield Street, Suite 100, Boston, MA 02122
☐ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601

CHAIN-OF-CUSTODY RECORD 0590

Turnaround
☐ 1 Day* ☐ 2 Days* ☐ 3 Days* ☑ Standard (____ days) ☐ Other ______ (days)
*Surcharge Applies

PROJECT NAME: SPECTACLE POND
PROJECT LOCATION: CRANSTON, RI
PROJECT NUMBER: 20170900.BIO
LABORATORY: PHOENIX
REPORT TO: ALLEN TEVYAW atevyaw@fando.com
INVOICE TO: ALLEN TEVYAW atevyaw@fando.com
P.O. NO.: 1604201700900.BIO
Sampler's Signature: Date: 8/26/20

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Sediment A=Air
X=Other ______

Analysis Request

Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	TOTAL PHOSPHORUS								Soil VOA Vial, [ ] methanol	Soil VOA Vial, [ ] water [ ] Na(SO4)2	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H2SO4	Plastic - As is, [ ] 250 ml [ ] 500 [ ] 1000 ml	Plastic - H2SO4, [x] 250 ml [ ] 500 ml	Plastic - HNO3, 250 ml [ ] Filtered [ ] Unfiltered	Plastic - NaOH, 250 ml	Comments
1	/	-	/		1604200826-01	SW	8/26/20		X																X			64309
2	/	-	-		-02				X																X			64310
3	/	/	-		-03				X																X			64311
4	/	-	/		-07			1100	X																X			64312
5	-	-	-		-08			1120	X																X			64313
6	-	-	-		-09			1200	X																X			64314
7	-	-	-		-10			1220	X																X			64315
8	-	-	-		-11			1240	X																X			64316
9	/	-	-		-12			1310	X																X			64317
10	/	-	,		-13			1330	X																X			64318

Transfer Number	Relinquished By	Accepted By	Date	Time
1	ALLEN TEVYAW	FIELD FRIDGE	8/26/20	1700
2	FIELD FRIDGE	ALLEN TEVYAW	~~8/28/20~~	
3	ALLEN TEVYAW	ST	8.28.20	1037
4	ST		8/28	1538

Reporting and Detection Limit Requirements:

Additional Comments: Reporting Limit 0.008 mg/L

WCIP 25 PAGE 2 of 2

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☐ 50 Redfield Street, Suite 100, Boston, MA 02122
☐ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601

CHAIN-OF-CUSTODY RECORD 0591

Turnaround
☐ 1 Day* ☐ 2 Days* ☐ 3 Days* ☑ Standard (____ days) ☐ Other ______ (days)
*Surcharge Applies

PROJECT NAME	PROJECT LOCATION	PROJECT NUMBER	LABORATORY
SPECTACLE POND	CRANSTON, RI	20170900.B10	PHOENIX

REPORT TO: ALLEN TEVYAN atevyan@fando.com
INVOICE TO: ALLEN TEVYAN atevyan@fando.com
P.O. NO.: 160420170900.B10
Sampler's Signature: A Date: 8/26/20

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Sediment A=Air
X=Other

Analysis Request / Containers

Item No.	Transfer Check 1	Transfer Check 2	Transfer Check 3	Transfer Check 4	Sample Number	Source Code	Date Sampled	Time Sampled	TOTAL PHOSPHORUS								Soil VOA Vial, [ ] methanol	Soil VOA Vial, [ ] water [ ] Na(SO₄)₂	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H_2SO_4	Plastic - As is, [X] 250 ml [ ] 500 [ ] 1000 ml	Plastic - H_2SO_4, [ ] 250 ml [ ] 500 ml	Plastic - HNO_3, 250 ml [ ] Filtered [ ] Unfiltered	Plastic - NaOH, 250 ml	Comments
11	✓	✓	✓		1604200826 - 14	SW	8/26/20	1400	X															X				~~64309~~ 64319
12	✓	✓	✓		↓ -15	↓	✓	1430	X															X				~~64310~~ 64320
																												~~64311~~
																												~~64312~~
																												~~64313~~ DJ
																												~~64314~~
																												~~64315~~
																												~~64316~~
																												~~64317~~
																												~~64318~~

Transfer Number	Relinquished By	Accepted By	Date	Time
1	ALLEN TEVYAN	FIELD FRIDGE	8/26/20	1700
2	FIELD FRIDGE	ALLEN TEVYAN	8/28/20	
3	A	ST	8.28.20	1037
4	ST		8/28	1536

Reporting and Detection Limit Requirements:

Additional Comments: Reporting Limit - 0.008 mg/L

PHOENIX
Environmental Laboratories, Inc.

Wednesday, October 21, 2020

Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Project ID: SPECTACLE POND
SDG ID: GCG98796
Sample ID#s: CG98796 - CG98808

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory. This report is incomplete unless all pages indicated in the pagination at the bottom of the page are included.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Sincerely yours,

Phyllis Shiller

Phyllis Shiller
Laboratory Director

NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #M-CT007
ME Lab Registration #CT-007
NH Lab Registration #213693-A,B
NJ Lab Registration #CT-003
NY Lab Registration #11301
PA Lab Registration #68-03530
RI Lab Registration #63
UT Lab Registration #CT00007
VT Lab Registration #VT11301

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Sample Id Cross Reference

October 21, 2020

SDG I.D.: GCG98796

Project ID: SPECTACLE POND

Client Id	Lab Id	Matrix
1604201012-01	CG98796	SURFACE WATER
1604201012-02	CG98797	SURFACE WATER
1604201012-03	CG98798	SURFACE WATER
1604201012-04	CG98799	SURFACE WATER
1604201012-05	CG98800	SURFACE WATER
1604201012-06	CG98801	SURFACE WATER
1604201012-07	CG98802	SURFACE WATER
1604201012-08	CG98803	SURFACE WATER
1604201012-09	CG98804	SURFACE WATER
1604201012-10	CG98805	SURFACE WATER
1604201012-11	CG98806	SURFACE WATER
1604201012-12	CG98807	SURFACE WATER
1604201012-13	CG98808	SURFACE WATER

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 21, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		10/12/20	11:37
Location Code:	F&O-RI	Received by:	B	10/16/20	16:33
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG98796
Phoenix ID: CG98796

Project ID: SPECTACLE POND
Client ID: 1604201012-01

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	11.3	0.25	mg/L	50	10/20/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

Total Phosphorus: Due to sample matrix, and low reporting level could not be achieved.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
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Phyllis Shiller

Phyllis Shiller, Laboratory Director
October 21, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
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Analysis Report

October 21, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		10/12/20	11:41
Location Code:	F&O-RI	Received by:	B	10/16/20	16:33
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG98796
Phoenix ID: CG98797

Project ID: SPECTACLE POND
Client ID: 1604201012-02

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.057	0.003	mg/L	0.5	10/20/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
October 21, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 21, 2020

FOR:
Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		10/12/20	11:43
Location Code:	F&O-RI	Received by:	B	10/16/20	16:33
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG98796
Phoenix ID: CG98798

Project ID: SPECTACLE POND
Client ID: 1604201012-03

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.079	0.003	mg/L	0.5	10/20/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
October 21, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 21, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		10/12/20	12:18
Location Code:	F&O-RI	Received by:	B	10/16/20	16:33
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG98796
Phoenix ID: CG98799

Project ID: SPECTACLE POND
Client ID: 1604201012-04

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.019	0.003	mg/L	0.5	10/20/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
October 21, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 21, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		10/12/20	12:21
Location Code:	F&O-RI	Received by:	B	10/16/20	16:33
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG98796
Phoenix ID: CG98800

Project ID: SPECTACLE POND
Client ID: 1604201012-05

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.078	0.003	mg/L	0.5	10/20/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
October 21, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 21, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		10/12/20	12:50
Location Code:	F&O-RI	Received by:	B	10/16/20	16:33
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG98796
Phoenix ID: CG98801

Project ID: SPECTACLE POND
Client ID: 1604201012-06

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.072	0.003	mg/L	0.5	10/20/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
October 21, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 21, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		10/12/20	13:15
Location Code:	F&O-RI	Received by:	B	10/16/20	16:33
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG98796
Phoenix ID: CG98802

Project ID: SPECTACLE POND
Client ID: 1604201012-07

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.067	0.003	mg/L	0.5	10/20/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller

Phyllis Shiller, Laboratory Director
October 21, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 21, 2020

FOR:
Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		10/12/20	13:20
Location Code:	F&O-RI	Received by:	B	10/16/20	16:33
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG98796
Phoenix ID: CG98803

Project ID: SPECTACLE POND
Client ID: 1604201012-08

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.049	0.003	mg/L	0.5	10/20/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller

Phyllis Shiller, Laboratory Director
October 21, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Analysis Report

October 21, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		10/12/20	12:32
Location Code:	F&O-RI	Received by:	B	10/16/20	16:33
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG98796
Phoenix ID: CG98804

Project ID: SPECTACLE POND
Client ID: 1604201012-09

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.119	0.003	mg/L	0.5	10/20/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
October 21, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Analysis Report

October 21, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		10/12/20	13:12
Location Code:	F&O-RI	Received by:	B	10/16/20	16:33
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG98796
Phoenix ID: CG98805

Project ID: SPECTACLE POND
Client ID: 1604201012-10

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.095	0.003	mg/L	0.5	10/20/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
October 21, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 21, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		10/12/20	13:23
Location Code:	F&O-RI	Received by:	B	10/16/20	16:33
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG98796
Phoenix ID: CG98806

Project ID: SPECTACLE POND
Client ID: 1604201012-11

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.051	0.003	mg/L	0.5	10/20/20	MI	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
October 21, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

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Analysis Report

October 21, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		10/12/20	13:45
Location Code:	F&O-RI	Received by:	B	10/16/20	16:33
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG98796
Phoenix ID: CG98807

Project ID: SPECTACLE POND
Client ID: 1604201012-12

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.052	0.003	mg/L	0.5	10/20/20	MI	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
October 21, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
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Analysis Report

October 21, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		10/12/20	13:50
Location Code:	F&O-RI	Received by:	B	10/16/20	16:33
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG98796
Phoenix ID: CG98808

Project ID: SPECTACLE POND
Client ID: 1604201012-13

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.075	0.003	mg/L	0.5	10/20/20	MI	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
October 21, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

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Tel. (860) 645-1102 Fax (860) 645-0823

QA/QC Report

October 21, 2020

QA/QC Data

SDG I.D.: GCG98796

Parameter	Blank	Blk RL	Sample Result	Dup Result	Dup RPD	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 550036 (mg/L), QC Sample No: CG98212 (CG98796)													
Phosphorus, as P	BRL	0.01	0.103	0.100	3.00	98.4			94.4			85 - 115	20
Comment:													
Additional criteria matrix spike acceptance range is 75-125%.													
QA/QC Batch 550044 (mg/L), QC Sample No: CG98823 (CG98797, CG98798, CG98799, CG98800, CG98801, CG98802, CG98803, CG98804, CG98805)													
Phosphorus, as P	BRL	0.01	0.039	0.034	NC	98.6			112			85 - 115	20
Comment:													
Additional criteria matrix spike acceptance range is 75-125%.													
QA/QC Batch 550107 (mg/L), QC Sample No: CG99513 (CG98806, CG98807, CG98808)													
Phosphorus, as P	BRL	0.01	9.63	8.71	10.0	96.9			93.7			85 - 115	20
Comment:													
Additional criteria matrix spike acceptance range is 75-125%.													

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

RPD - Relative Percent Difference
LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
MS - Matrix Spike
MS Dup - Matrix Spike Duplicate
NC - No Criteria
Intf - Interference

Phyllis Shiller

Phyllis Shiller, Laboratory Director
October 21, 2020

Wednesday, October 21, 2020

Criteria: None

State: RI

Sample Criteria Exceedances Report

GCG98796 - FO-RI

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units

*** No Data to Display ***

Phoenix Laboratories does not assume responsibility for the data contained in this exceedance report. It is provided as an additional tool to identify requested criteria exceedences. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedence information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.

Analysis Comments

October 21, 2020 SDG I.D.: GCG98796

The following analysis comments are made regarding exceptions to criteria not already noted in the Analysis Report or QA/QC Report: None.

WCIP 1of2
2.2

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☐ 78 Interstate Drive, West Springfield, MA 01089
☐ 50 Redfield Street, Suite 100, Boston, MA 02122
☐ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601

CHAIN-OF-CUSTODY RECORD 0595

Turnaround
☐ 1 Day* ☐ 3 Days* ☐ Other ______ (days)
☐ 2 Days* ☑ Standard (____ days) *Surcharge Applies

PROJECT NAME: Spectacle Pond
PROJECT LOCATION: Cranston, RI
PROJECT NUMBER: 20170900 B10
LABORATORY: PHOENIX

REPORT TO: ALLEN TEVYAN atevyan@fando.com
INVOICE TO: ALLEN TEVYAN atevyan@fando.com
P.O. NO.: 1604 20170900 B10
Sampler's Signature: Date: 10/12/20

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Sediment A=Air
X=Other ______

Analysis Request / Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Total Phosphorus								Soil VOA Vial, [ ] methanol	Soil VOA Vial, [ ] water	Glass Soil Container ( ) oz [ ] Na(SO₄)₂	Glass Soil Container ( ) oz	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H₂SO₄	Plastic - As is, [ ] 250 ml [ ] 500 [ ] 1000 ml	Plastic - H₂SO₄, [+] 250 ml [ ] 500 ml	Plastic - HNO₃, 250 ml [ ] Filtered [ ] Unfiltered	Plastic - NaOH, 250 ml	Comments
1	-	-	-		1604201012-01	SW	10/12/20	1137	X																X			98796
2	-	-	-		↓ -02	↓	↓	1141	X																X			98797
3	-	-	-		-03			1143	X																X			98798
4	-	-	-		-04			1218	X																X			98799
5	-	-	-		-05			1221	X																X			98800
6	-	-	-		-06			1250	X																X			98801
7	-	-	-		-07			1315	X																X			98802
8	-	-	-		-08			1320	X																X			98803
9	-	-	-		-09			1232	X																X			98804
10	-	-	-		-10			1312	X																X			98805

Transfer Number	Relinquished By	Accepted By	Date	Time
1	ALLEN TEVYAN	FIELD FRIDGE	10/12/20	1600
2	FIELD FRIDGE	ALLEN TEVYAN	10/13/20	0800
3	ALLEN TEVYAN	10-16-20	~~10/13/20~~	9:50
4			10/16	1633

Reporting and Detection Limit Requirements:

Additional Comments:
Report limit - 0.008 mg/L

WCIP 2.2 2of2

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☐ 50 Redfield Street, Suite 100, Boston, MA 02122
☐ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601

CHAIN-OF-CUSTODY RECORD 0594

Turnaround
☐ 1 Day* ☐ 3 Days* ☐ Other ______ (days)
☐ 2 Days* ☐ Standard (____ days) *Surcharge Applies

PROJECT NAME: Spectacle Pond
PROJECT LOCATION: Cranston, RI
PROJECT NUMBER: 20170900.~~B~~B10
LABORATORY: PHOENIX

REPORT TO:
INVOICE TO:
P.O. NO.: 1604201709~~00~~ B10
Sampler's Signature: Date: 10/12/20

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Sediment A=Air
X=Other ______

Analysis Request / Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Total Phosphorus	Soil VOA Vial, [ ] methanol	Soil VOA Vial, [ ] water [ ] Na(SO4)2	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H2SO4	Plastic - As is, [ ] 250 ml [ ] 500 [ ] 1000 ml	Plastic - H2SO4, [ ] 250 ml [ ] 500 ml	Plastic - HNO3, 250 ml [ ] Filtered [ ] Unfiltered	Plastic - NaOH, 250 ml	Comments
11	-	-	-		1604201012-11	SW	10/12/20	1323	X								[illegible]	X			98806
12	-	-	-		↓ -12	↓	↓	1345	X								[illegible]	X			98807
13	-	-	-		↓ -13	↓		1350	X												98808

Transfer Number	Relinquished By	Accepted By	Date	Time
1	ALLEN TEVYAN	FIELD FREDGE	10/12/20	1600
2	FIELD FREDGE	ALLEN TEVYAN	10/13/20	0800
3	ALLEN TEVYAN	10-16-20	~~10/13/20~~	0958
4			10/16	1633

Reporting and Detection Limit Requirements:

Additional Comments:
Reporting limit 0.008 mg/L

PHOENIX
Environmental Laboratories, Inc.

Wednesday, October 21, 2020

Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Project ID: SPECTACLE POND
SDG ID: GCG98796
Sample ID#s: CG98796 - CG98808

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory. This report is incomplete unless all pages indicated in the pagination at the bottom of the page are included.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Sincerely yours,

Phyllis Shiller

Phyllis Shiller
Laboratory Director

NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #M-CT007
ME Lab Registration #CT-007
NH Lab Registration #213693-A,B

NJ Lab Registration #CT-003
NY Lab Registration #11301
PA Lab Registration #68-03530
RI Lab Registration #63
UT Lab Registration #CT00007
VT Lab Registration #VT11301

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Sample Id Cross Reference

October 21, 2020

SDG I.D.: GCG98796

Project ID: SPECTACLE POND

Client Id	Lab Id	Matrix
1604201012-01	CG98796	SURFACE WATER
1604201012-02	CG98797	SURFACE WATER
1604201012-03	CG98798	SURFACE WATER
1604201012-04	CG98799	SURFACE WATER
1604201012-05	CG98800	SURFACE WATER
1604201012-06	CG98801	SURFACE WATER
1604201012-07	CG98802	SURFACE WATER
1604201012-08	CG98803	SURFACE WATER
1604201012-09	CG98804	SURFACE WATER
1604201012-10	CG98805	SURFACE WATER
1604201012-11	CG98806	SURFACE WATER
1604201012-12	CG98807	SURFACE WATER
1604201012-13	CG98808	SURFACE WATER

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
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Analysis Report

October 21, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		10/12/20	11:37
Location Code:	F&O-RI	Received by:	B	10/16/20	16:33
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG98796
Phoenix ID: CG98796

Project ID: SPECTACLE POND
Client ID: 1604201012-01

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	11.3	0.25	mg/L	50	10/20/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

Total Phosphorus: Due to sample matrix, and low reporting level could not be achieved.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
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Phyllis Shiller

Phyllis Shiller, Laboratory Director
October 21, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

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Analysis Report

October 21, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		10/12/20	11:41
Location Code:	F&O-RI	Received by:	B	10/16/20	16:33
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG98796
Phoenix ID: CG98797

Project ID: SPECTACLE POND
Client ID: 1604201012-02

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.057	0.003	mg/L	0.5	10/20/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
October 21, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

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Analysis Report

October 21, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		10/12/20	11:43
Location Code:	F&O-RI	Received by:	B	10/16/20	16:33
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG98796
Phoenix ID: CG98798

Project ID: SPECTACLE POND
Client ID: 1604201012-03

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.079	0.003	mg/L	0.5	10/20/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
October 21, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

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Analysis Report

October 21, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		10/12/20	12:18
Location Code:	F&O-RI	Received by:	B	10/16/20	16:33
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG98796
Phoenix ID: CG98799

Project ID: SPECTACLE POND
Client ID: 1604201012-04

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.019	0.003	mg/L	0.5	10/20/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
October 21, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 21, 2020

FOR:
Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		10/12/20	12:21
Location Code:	F&O-RI	Received by:	B	10/16/20	16:33
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG98796
Phoenix ID: CG98800

Project ID: SPECTACLE POND
Client ID: 1604201012-05

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.078	0.003	mg/L	0.5	10/20/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
October 21, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

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587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 21, 2020

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Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		10/12/20	12:50
Location Code:	F&O-RI	Received by:	B	10/16/20	16:33
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG98796
Phoenix ID: CG98801

Project ID: SPECTACLE POND
Client ID: 1604201012-06

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.072	0.003	mg/L	0.5	10/20/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller

Phyllis Shiller, Laboratory Director
October 21, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 21, 2020

FOR:
Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		10/12/20	13:15
Location Code:	F&O-RI	Received by:	B	10/16/20	16:33
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG98796
Phoenix ID: CG98802

Project ID: SPECTACLE POND
Client ID: 1604201012-07

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.067	0.003	mg/L	0.5	10/20/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
October 21, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
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Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 21, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		10/12/20	13:20
Location Code:	F&O-RI	Received by:	B	10/16/20	16:33
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG98796
Phoenix ID: CG98803

Project ID: SPECTACLE POND
Client ID: 1604201012-08

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.049	0.003	mg/L	0.5	10/20/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
October 21, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
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Analysis Report

October 21, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		10/12/20	12:32
Location Code:	F&O-RI	Received by:	B	10/16/20	16:33
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG98796
Phoenix ID: CG98804

Project ID: SPECTACLE POND
Client ID: 1604201012-09

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.119	0.003	mg/L	0.5	10/20/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
October 21, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 21, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		10/12/20	13:12
Location Code:	F&O-RI	Received by:	B	10/16/20	16:33
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG98796
Phoenix ID: CG98805

Project ID: SPECTACLE POND
Client ID: 1604201012-10

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.095	0.003	mg/L	0.5	10/20/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
October 21, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 21, 2020

FOR:
Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		10/12/20	13:23
Location Code:	F&O-RI	Received by:	B	10/16/20	16:33
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG98796
Phoenix ID: CG98806

Project ID: SPECTACLE POND
Client ID: 1604201012-11

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.051	0.003	mg/L	0.5	10/20/20	MI	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
October 21, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

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587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 21, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		10/12/20	13:45
Location Code:	F&O-RI	Received by:	B	10/16/20	16:33
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG98796
Phoenix ID: CG98807

Project ID: SPECTACLE POND
Client ID: 1604201012-12

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.052	0.003	mg/L	0.5	10/20/20	MI	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
October 21, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 21, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		10/12/20	13:50
Location Code:	F&O-RI	Received by:	B	10/16/20	16:33
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCG98796
Phoenix ID: CG98808

Project ID: SPECTACLE POND
Client ID: 1604201012-13

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.075	0.003	mg/L	0.5	10/20/20	MI	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
October 21, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

QA/QC Report

October 21, 2020

QA/QC Data

SDG I.D.: GCG98796

Parameter	Blank	Blk RL	Sample Result	Dup Result	Dup RPD	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 550036 (mg/L), QC Sample No: CG98212 (CG98796)													
Phosphorus, as P	BRL	0.01	0.103	0.100	3.00	98.4			94.4			85 - 115	20
Comment:													
Additional criteria matrix spike acceptance range is 75-125%.													
QA/QC Batch 550044 (mg/L), QC Sample No: CG98823 (CG98797, CG98798, CG98799, CG98800, CG98801, CG98802, CG98803, CG98804, CG98805)													
Phosphorus, as P	BRL	0.01	0.039	0.034	NC	98.6			112			85 - 115	20
Comment:													
Additional criteria matrix spike acceptance range is 75-125%.													
QA/QC Batch 550107 (mg/L), QC Sample No: CG99513 (CG98806, CG98807, CG98808)													
Phosphorus, as P	BRL	0.01	9.63	8.71	10.0	96.9			93.7			85 - 115	20
Comment:													
Additional criteria matrix spike acceptance range is 75-125%.													

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

RPD - Relative Percent Difference
LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
MS - Matrix Spike
MS Dup - Matrix Spike Duplicate
NC - No Criteria
Intf - Interference

Phyllis Shiller

Phyllis Shiller, Laboratory Director
October 21, 2020

Wednesday, October 21, 2020

Criteria: None

State: RI

Sample Criteria Exceedances Report

GCG98796 - FO-RI

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units

*** No Data to Display ***

Phoenix Laboratories does not assume responsibility for the data contained in this exceedance report. It is provided as an additional tool to identify requested criteria exceedences. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedence information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.

Analysis Comments

October 21, 2020 SDG I.D.: GCG98796

The following analysis comments are made regarding exceptions to criteria not already noted in the Analysis Report or QA/QC Report: None.

WCIP 1 of 2
2.2

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☐ 56 Quarry Road, Trumbull, CT 06611
☐ 1419 Richland Street, Columbia, SC 29201
☐ 78 Interstate Drive, West Springfield, MA 01089
☐ 50 Redfield Street, Suite 100, Boston, MA 02122
☐ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601

CHAIN-OF-CUSTODY RECORD 0595

Turnaround
☐ 1 Day* ☐ 2 Days* ☐ 3 Days* ☑ Standard (____ days) ☐ Other ______ (days)
*Surcharge Applies

PROJECT NAME: Spectacle Pond
PROJECT LOCATION: Cranston, RI
PROJECT NUMBER: 20170900.B10
LABORATORY: PHOENIX

REPORT TO: ALLEN TEVYAN atevyan@fando.com
INVOICE TO: ALLEN TEVYAN atevyan@fando.com
P.O. NO.: 160420170900.B10
Sampler's Signature: Date: 10/12/20

Source Codes:
MW=Monitoring Well
SW=Surface Water
PW=Potable Water
T=Treatment Facility
S=Soil
B=Sediment
W=Waste
A=Air
X=Other ______

Analysis Request: Total Phosphorus

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	Total Phosphorus	Soil VOA Vial, [ ] methanol	Soil VOA Vial, [ ] water [ ] Na(SO$_4$)$_2$	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H$_2$SO$_4$	Plastic - As is, [ ] 250 ml [ ] 500 [ ] 1000 ml	Plastic - H$_2$SO$_4$, [✓] 250 ml [ ] 500 ml	Plastic - HNO$_3$, 250 ml [ ] Filtered [ ] Unfiltered	Plastic - NaOH, 250 ml	Comments
1	-	-	-		1604201012-01	SW	10/12/20	1137	X									X			98796
2	-	-	-		-02	↓	↓	1141	X									X			98797
3	-	-	-		-03			1143	X									X			98798
4	-	-	-		-04			1218	X									X			98799
5	-	-	-		-05			1221	X									X			98800
6	-	-	✓		-06			1250	X									X			98801
7	-	-	-		-07			1315	X									X			98802
8	-	-	-		-08			1320	X									X			98803
9	-	-	-		-09			1232	X									X			98804
10	-	-	/		-10			1312	X									X			98805

Transfer Number	Relinquished By	Accepted By	Date	Time
1	ALLEN TEVYAN	FIELD FRIDGE	10/12/20	1600
2	FIELD FRIDGE	ALLEN TEVYAN	10/13/20	0800
3	ALLEN TEVYAN	10-16-20	~~10/13/20~~	9:50
4			10/16	1633

Reporting and Detection Limit Requirements:

Additional Comments:
Report limit - 0.008 mg/L

WCIP 2.2 2 of 2

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☐ 78 Interstate Drive, West Springfield, MA 01089
☐ 50 Redfield Street, Suite 100, Boston, MA 02122
☐ 275 Promenade Street, Suite 350, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601

CHAIN-OF-CUSTODY RECORD 0594

Turnaround
☐ 1 Day* ☐ 2 Days* ☐ 3 Days* ☐ Standard (____ days) ☐ Other ______ (days)
*Surcharge Applies

PROJECT NAME: Spectacle Pond
PROJECT LOCATION: Cranston, RI
PROJECT NUMBER: 20170900.B10
LABORATORY: PHOENIX

REPORT TO:
INVOICE TO:
P.O. NO.: 1604201709002 B10
Sampler's Signature:
Date: 10/12/20

Source Codes:
MW=Monitoring Well
SW=Surface Water
PW=Potable Water
T=Treatment Facility
S=Soil
B=Sediment
W=Waste
A=Air
X=Other

Analysis Request

Containers

Item No.	Transfer Check 1	Transfer Check 2	Transfer Check 3	Transfer Check 4	Sample Number	Source Code	Date Sampled	Time Sampled	Total Phosphorus								Soil VOA Vial, [ ] methanol	Soil VOA Vial, [ ] water [ ] Na(SO4)2	Glass Soil Container ( ) oz	Glass Soil Container ( ) oz	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H2SO4	Plastic - As is, [ ] 250 ml [ ] 500 [ ] 1000 ml	Plastic - H2SO4, [~~] 250~~ ml [ ] 500 ml	Plastic - HNO3, 250 ml [ ] Filtered [ ] Unfiltered	Plastic - NaOH, 250 ml	Comments
11	-	-	-		1604201012 - 11	SW	10/12/20	1323	X															[illegible]	X			98806
12	-	-	-		↓ -12	↓	↓	1345	X															2x	X			98807
13	-	-	-		↓ -13	↓	↓	1350	X																			98808

Transfer Number	Relinquished By	Accepted By	Date	Time
1	ALLEN TEVYAN	FIELD FRIDGE	10/12/20	1600
2	FIELD FRIDGE	ALLEN TEVYAN	10/13/20	0800
3	ALLEN TEVYAN	10-16-20	FD ~~10/13/20~~	0958
4		DJ	10/16	1633

Reporting and Detection Limit Requirements:

Additional Comments:
Reporting limit 0.008 mg/L

PHOENIX
Environmental Laboratories, Inc.

Thursday, November 05, 2020

Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Project ID: SPECTACLE POND CRANSTON, RI
SDG ID: GCH07876
Sample ID#s: CH07876 - CH07888

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory. This report is incomplete unless all pages indicated in the pagination at the bottom of the page are included.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Sincerely yours,

Phyllis Shiller

Phyllis Shiller
Laboratory Director

NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #M-CT007
ME Lab Registration #CT-007
NH Lab Registration #213693-A,B
NJ Lab Registration #CT-003
NY Lab Registration #11301
PA Lab Registration #68-03530
RI Lab Registration #63
UT Lab Registration #CT00007
VT Lab Registration #VT11301

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Sample Id Cross Reference

November 05, 2020

SDG I.D.: GCH07876

Project ID: SPECTACLE POND CRANSTON, RI

Client Id	Lab Id	Matrix
1603201029-01	CH07876	SURFACE WATER
1603201029-02	CH07877	SURFACE WATER
1603201029-03	CH07878	SURFACE WATER
1603201029-04	CH07879	SURFACE WATER
1603201029-05	CH07880	SURFACE WATER
1603201029-06	CH07881	SURFACE WATER
1603201029-07	CH07882	SURFACE WATER
1603201029-08	CH07883	SURFACE WATER
1603201029-09	CH07884	SURFACE WATER
1603201029-10	CH07885	SURFACE WATER
1603201029-11	CH07886	SURFACE WATER
1603201029-12	CH07887	SURFACE WATER
1603201029-13	CH07888	SURFACE WATER

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

November 05, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	MS	10/29/20	9:42
Location Code:	F&O-RI	Received by:	LB	11/03/20	13:22
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCH07876
Phoenix ID: CH07876

Project ID: SPECTACLE POND CRANSTON, RI
Client ID: 1603201029-01

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.006	0.003	mg/L	0.5	11/03/20	MI	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
November 05, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
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Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

November 05, 2020

FOR:
Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	MS	10/29/20	9:50
Location Code:	F&O-RI	Received by:	LB	11/03/20	13:22
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCH07876
Phoenix ID: CH07877

Project ID: SPECTACLE POND CRANSTON, RI
Client ID: 1603201029-02

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.058	0.003	mg/L	0.5	11/03/20	MI	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
November 05, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX
Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

November 05, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	MS	10/29/20	10:18
Location Code:	F&O-RI	Received by:	LB	11/03/20	13:22
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCH07876
Phoenix ID: CH07878

Project ID: SPECTACLE POND CRANSTON, RI
Client ID: 1603201029-03

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.065	0.003	mg/L	0.5	11/03/20	MI	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
November 05, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

November 05, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	MS	10/29/20	10:52
Location Code:	F&O-RI	Received by:	LB	11/03/20	13:22
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCH07876
Phoenix ID: CH07879

Project ID: SPECTACLE POND CRANSTON, RI
Client ID: 1603201029-04

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.058	0.003	mg/L	0.5	11/03/20	MI	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller

Phyllis Shiller, Laboratory Director
November 05, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
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Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

November 05, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	MS	10/29/20	11:21
Location Code:	F&O-RI	Received by:	LB	11/03/20	13:22
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCH07876
Phoenix ID: CH07880

Project ID: SPECTACLE POND CRANSTON, RI
Client ID: 1603201029-05

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.143	0.003	mg/L	0.5	11/03/20	MI	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
November 05, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

November 05, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	MS	10/29/20	11:32
Location Code:	F&O-RI	Received by:	LB	11/03/20	13:22
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCH07876
Phoenix ID: CH07881

Project ID: SPECTACLE POND CRANSTON, RI
Client ID: 1603201029-06

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.122	0.003	mg/L	0.5	11/03/20	MI	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
November 05, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

November 05, 2020

FOR:
Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	MS	10/29/20	12:02
Location Code:	F&O-RI	Received by:	LB	11/03/20	13:22
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCH07876
Phoenix ID: CH07882

Project ID: SPECTACLE POND CRANSTON, RI
Client ID: 1603201029-07

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.053	0.003	mg/L	0.5	11/03/20	MI	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
November 05, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
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Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

November 05, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	MS	10/29/20	12:11
Location Code:	F&O-RI	Received by:	LB	11/03/20	13:22
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCH07876
Phoenix ID: CH07883

Project ID: SPECTACLE POND CRANSTON, RI
Client ID: 1603201029-08

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.192	0.003	mg/L	0.5	11/04/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
November 05, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

November 05, 2020

FOR:
Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	MS	10/29/20	12:15
Location Code:	F&O-RI	Received by:	LB	11/03/20	13:22
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCH07876
Phoenix ID: CH07884

Project ID: SPECTACLE POND CRANSTON, RI
Client ID: 1603201029-09

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.216	0.003	mg/L	0.5	11/04/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
November 05, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

November 05, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	MS	10/29/20	12:33
Location Code:	F&O-RI	Received by:	LB	11/03/20	13:22
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCH07876
Phoenix ID: CH07885

Project ID: SPECTACLE POND CRANSTON, RI
Client ID: 1603201029-10

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	3.41	0.063	mg/L	13	11/04/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
November 05, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

November 05, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	MS	10/29/20	14:35
Location Code:	F&O-RI	Received by:	LB	11/03/20	13:22
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCH07876
Phoenix ID: CH07886

Project ID: SPECTACLE POND CRANSTON, RI
Client ID: 1603201029-11

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.069	0.003	mg/L	0.5	11/04/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
November 05, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

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Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

November 05, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	MS	10/29/20	14:47
Location Code:	F&O-RI	Received by:	LB	11/03/20	13:22
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCH07876
Phoenix ID: CH07887

Project ID: SPECTACLE POND CRANSTON, RI
Client ID: 1603201029-12

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.095	0.003	mg/L	0.5	11/04/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
November 05, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

November 05, 2020

FOR: Attn: Allen Tevyaw
Fuss & O'Neill, Inc.
Foundry Corporate Office Center
317 Iron Horse Way, Suite 204
Providence, RI 02908

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	MS	10/29/20	14:52
Location Code:	F&O-RI	Received by:	LB	11/03/20	13:22
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	20170900.B10				

Laboratory Data

SDG ID: GCH07876
Phoenix ID: CH07888

Project ID: SPECTACLE POND CRANSTON, RI
Client ID: 1603201029-13

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Phosphorus, as P	0.066	0.003	mg/L	0.5	11/04/20	JR	SM4500PE-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller

Phyllis Shiller, Laboratory Director
November 05, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

QA/QC Report

November 05, 2020

QA/QC Data

SDG I.D.: GCH07876

Parameter	Blank	Blk RL	Sample Result	Dup Result	Dup RPD	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 551964 (mg/L), QC Sample No: CH07851 (CH07876, CH07877, CH07878, CH07879, CH07880, CH07881, CH07882)													
Phosphorus, as P	BRL	0.01	5.82	5.78	0.70	99.2			97.3			85 - 115	20
Comment:													
Additional criteria matrix spike acceptance range is 75-125%.													
QA/QC Batch 552065 (mg/L), QC Sample No: CH07994 (CH07888)													
Phosphorus, as P	BRL	0.01	4.65	4.67	0.40	101			103			85 - 115	20
Comment:													
Additional criteria matrix spike acceptance range is 75-125%.													
QA/QC Batch 552063 (mg/L), QC Sample No: CH08313 (CH07883, CH07884, CH07885, CH07886, CH07887)													
Phosphorus, as P	BRL	0.01	7.63	7.51	1.60	99.8			94.9			85 - 115	20
Comment:													
Additional criteria matrix spike acceptance range is 75-125%.													

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

RPD - Relative Percent Difference
LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
MS - Matrix Spike
MS Dup - Matrix Spike Duplicate
NC - No Criteria
Intf - Interference

Phyllis Shiller

Phyllis Shiller, Laboratory Director
November 05, 2020

Thursday, November 05, 2020

Criteria: None

State: RI

Sample Criteria Exceedances Report

GCH07876 - FO-RI

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units

*** No Data to Display ***

Phoenix Laboratories does not assume responsibility for the data contained in this exceedance report. It is provided as an additional tool to identify requested criteria exceedences. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedence information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.

Analysis Comments

November 05, 2020 SDG I.D.: GCH07876

The following analysis comments are made regarding exceptions to criteria not already noted in the Analysis Report or QA/QC Report: None.

WCIP
2.2

FUSS & O'NEILL
(860) 646-2469 • www.FandO.com

☐ 146 Hartford Road, Manchester, CT 06040
☐ 56 Quarry Road, Trumbull, CT 06611
☒ 317 Iron Horse Way, Suite 204, Providence, RI 02908
☐ 1550 Main Street, Suite 400, Springfield, MA 01103
☐ 108 Myrtle Street, Suite 502, Quincy, MA 02171

☐ 540 North Commercial Street, Manchester, NH 03101
☐ 276 Newport Road, New London, NH 03257
☐ 205 Billings Farm Road, Suite 6B, White River Junction, VT 05001
☐ 5 Fletcher Street, Suite 1, Kennebunk, ME 04043
☐ 23046 Avenida de la Carlota, Suite 600, Laguna Hills, CA 92653
☐ Other ____________

CHAIN-OF-CUSTODY RECORD

43500

Turnaround
☐ 24-Hour* ☐ 72-Hour* ☐ Other ______ (days)
☐ 48-Hour* ☒ Standard (____ days) *Surcharge Applies

PROJECT NAME	PROJECT LOCATION	PROJECT NUMBER	LABORATORY
SPECTACLE POND	CRANSTON, RI	20170900.B10	PHOENIX

REPORT TO: ALLEN TEVYAW (atevyaw@fando.com)
INVOICE TO: " "
P.O. NO.: 1603 20170900.B10
Sampler's Signature: Date: 10/29/20

Source Codes:
MW=Monitoring Well PW=Potable Water T=Treatment Facility S=Soil B=Sediment
SW=Surface Water ST=Stormwater W=Waste A=Air C=Concrete
X=Other ____________

Analysis Request

Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	TOTAL PHOSPHORUS (SM 4500)								Soil VOA Vial, ☐ methanol	Soil VOA Vial, ☐ water	Glass Soil Container ( ) oz	Other: ☐ Na(SO₄)₂	Other:	Water VOA Vial, ☐ As is ☐ HCl	Glass Amber ( ) ml, ☐ As is ☐ H₂SO₄	Plastic - As is, ☐ 250 ml ☐ 500 ☐ 1000 ml	Plastic - H₂SO₄, ☐ 250 ml ☐ 500 ☐ 500 ml	Plastic - HNO₃, 250 ml ☐ Filtered ☐ 0.45μ ☐ 10μ	Plastic - NaOH, 250 ml	Comments
1					1603201029 - 01	SW	10/29/20	0942	X																1			07876
2					- 02			0950	X																1			07877
3					- 03			1018	X																1			07878
4					- 04			1052	X																1			07879
5					-05			1121	X																1			07880
6					-06			1132	X																1			07881
7					-07			1202	X																1			07882
8					-08			1211	X																1			07883
9					-09			1215	X																1			07884
10					-10			1233	X																1			07885

Transfer Number	Relinquished By	Accepted By	Date	Time
1		FTO FRIDGE	10/29/20	1630
2			11/3	1125
3			11/3	1322
4				

Charge Exceptions: ☐ CT Tax Exempt ☐ QA/QC ☐ Other ____________
____ Duplicates ____ Blanks (Item Nos:)

Reporting and Detection Limit Requirements: ☐ RCP Deliverables ☐ MCP CAM Cert.
TOTAL PHOSPHORUS: 0.008 mg/L

Additional Comments:

WCIP
2.2

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(860) 646-2469 • www.FandO.com

☐ 146 Hartford Road, Manchester, CT 06040
☐ 56 Quarry Road, Trumbull, CT 06611
☐ 1419 Richland Street, Columbia, SC 29201
☐ 78 Interstate Drive, West Springfield, MA 01089
☒ 317 Iron Horse Way, Suite 204, Providence, RI 02908
☐ 80 Washington Street, Suite 301, Poughkeepsie, NY
☐ Other ____

CHAIN-OF-CUSTODY RECORD 37101

Turnaround
☐ 24-Hour* ☐ 72-Hour* ☐ Other ____ (days)
☐ 48-Hour* ☒ Standard (____ days) *Surcharge Applies

Project Name	Project Location	Project Number	Laboratory
SPECTACLE POND	CRANSTON, RI	20170960.B10	PHOENIX

Report To: ALLEN TEVYAW (atevyaw@fando.com)
Invoice To: "
P.O. No.: 1603201709600.B10
Sampler's Signature: Date: 10/29/20

Source Codes:
MW=Monitoring Well PW=Potable Water T=Treatment Facility S=Soil B=Sediment
SW=Surface Water ST=Stormwater W=Waste A=Air C=Concrete
X=Other ____

Analysis Request

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	TOTAL PHOSPHORUS (SM 4500)								Soil VOA Vial, ☐ methanol	Soil VOA Vial, ☐ water ☐ Na(SO4)2	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, ☐ As is ☐ HCl	Glass Amber ( ) ml, ☐ As is ☐ H2SO4	Plastic - As is, ☐ 250 ml ☐ 500 ☐ 1000 ml	Plastic - H2SO4, ☐ 250 ml ☐ 500 ml	Plastic - HNO3, 250 ml ☐ Filtered ☐ 0.45µ ☐ 10µ	Plastic - NaOH, 250 ml	Comments
11					1603201029- 11	SW	10/29/20	1435	X																1			07886
12					- 12	↓	↓	1447	X																1			07887
13					- 13	↓	↓	1452	X																1			07888

Transfer Number	Relinquished By	Accepted By	Date	Time
1		F+O FRIDGE	10/29/20	1630
2			11/3	1125
3			11/3	1322
4				

Charge Exceptions: ☐ CT Tax Exempt ☐ QA/QC ☐ Other ____
____ Duplicates ____ Blanks (Item Nos: ____)

Reporting and Detection Limit Requirements: ☐ RCP Deliverables ☐ MCP CAM Cert.

Additional Comments:

FUSS & O'NEILL

800.286.2469
www.fando.com

ENGINEERS • SCIENTISTS • PLANNERS

Appendix D

Pomham St. Stormwater Improvement Project

POMHAM STREET
STORMWATER IMPROVEMENTS

POMHAM STREET · CRANSTON · RHODE ISLAND

NOVEMBER 2023

ISSUED FOR BIDDING

PREPARED FOR

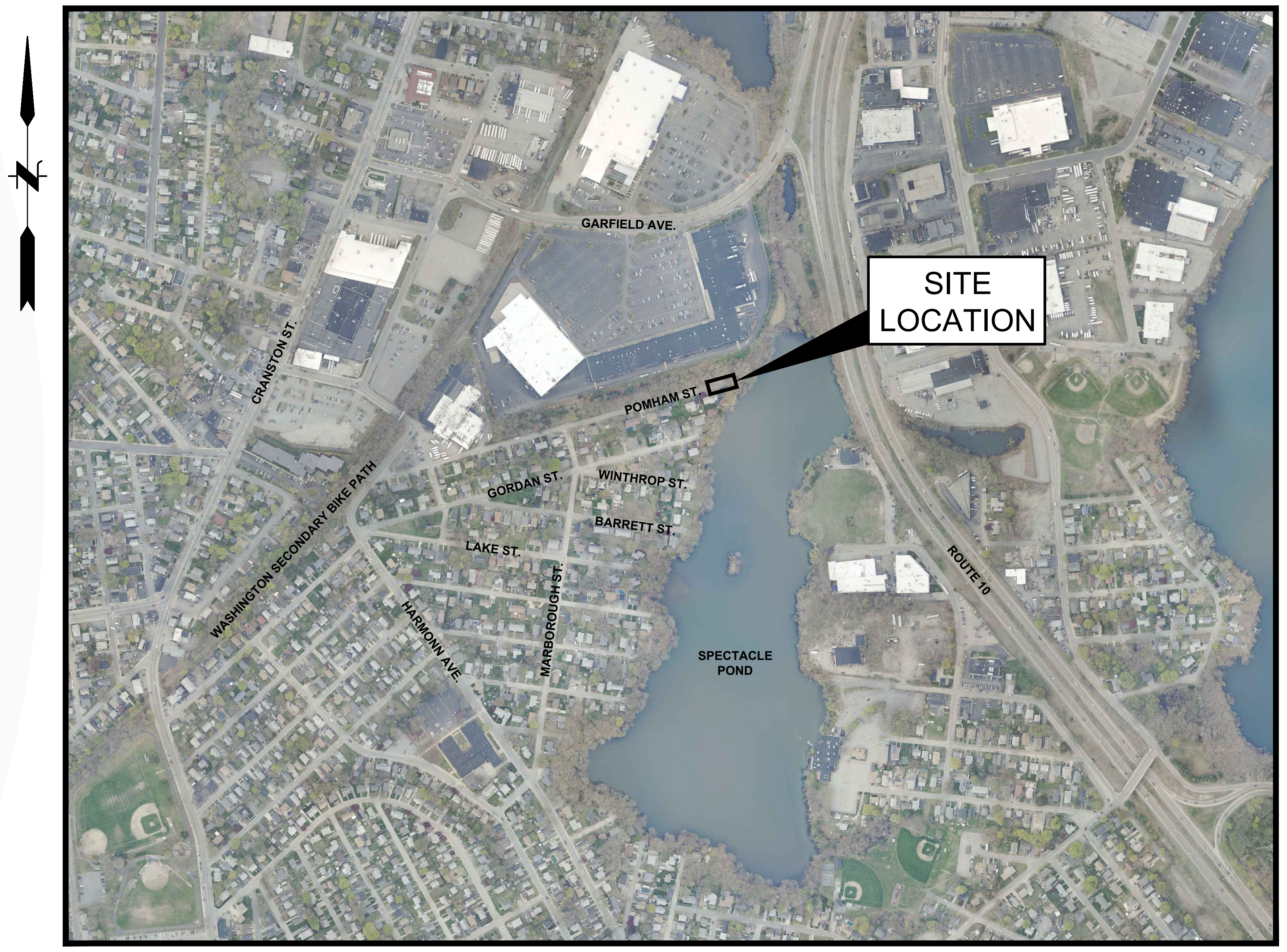
CITY OF CRANSTON
CRANSTON CITY HALL
869 PARK AVENUE
CRANSTON, RHODE ISLAND 02910

PREPARED BY

FUSS & O'NEILL
317 IRON HORSE WAY, SUITE 204
PROVIDENCE, RI 02908
401.861.3070
www.fando.com

SHEET INDEX

SHEET No.	SHEET TITLE
GI-001	COVER SHEET
CN-001	GENERAL NOTES & LEGEND
CS-100	EXISTING CONDITIONS PLAN
CP-101	SITE PREPARATION PLAN
CG-101	GRADING & DRAINAGE PLAN
CD-501 - CD-502	DETAILS



LOCATION MAP
SCALE: 1" = 500'

PROJ. No.: 20200078.A40
DATE: NOVEMBER 2023

GI-001

File Path: J:\DWG\P2020\0078\A40\Civil\Plan\20200078A40_COV01.dwg, Layout: GI-001, Plotted: Thursday, November 09, 2023, User: gernest Plotter: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 CTB File: FO.STB

LEGEND

EXIST	PROP	
— — —	━━━━	PROPERTY LINE/RIGHT-OF-WAY
	—LOD—	LIMIT OF DISTURBANCE
10+00	10+00	BASELINE
—···—	—···—	EDGE OF WATER
⩛		WETLAND SYMBOL
— — —	———	EDGE OF PAVEMENT
———	═══	BITUMINOUS CURB
—x—x—x—	—x—x—x—	CHAIN LINK FENCE
◡◡◡	◡◡	TREE LINE
✿		EXISTING TREE
═══		RETAINING WALL
2— — —	—4—	MINOR CONTOUR
10——	—20—	MAJOR CONTOUR
▨		BUILDING
○	○	BOLLARD
—o—	—o—	SIGN
+21.25	x21.25	SPOT ELEVATION
—— ——	━ ━ ━	DRAINAGE LINE
▦ CB	▦ CB	CATCH BASIN
Ⓓ DMH	Ⓓ DMH	DRAIN MANHOLE
Ⓢ SMH	Ⓢ SMH	SEWER MANHOLE
⊖	⊗	FIRE HYDRANT
☼	☼	LIGHT POST
ø	ø	UTILITY POLE
>——	>——	GUY POLE
	▭▭▭▭▭▭	COMPOST FILTER TUBE

LEGEND NOTE

SYMBOLS AND LEGENDS OF PROJECT FEATURES ARE GRAPHIC REPRESENTATIONS AND ARE NOT NECESSARILY SHOWN ON THE DRAWINGS TO SCALE OR TO THEIR ACTUAL DIMENSION OR LOCATION. COORDINATE DETAIL SHEET DIMENSIONS, MANUFACTURERS' LITERATURE, SHOP DRAWINGS, AND FIELD MEASUREMENTS OF SUPPLIED PRODUCTS FOR LAYOUT OF THE PROJECT FEATURES.

ABBREVIATIONS

GENERAL

APPROX	APPROXIMATE
BIT	BITUMINOUS PAVEMENT
BW	BOTTOM OF WALL
CC	CONCRETE CURB
CCB	CAPE CODE BERM
ELEV	ELEVATION
EXIST	EXISTING
GC	GRANITE CURB
MAX	MAXIMUM
MIN	MINIMUM
NTS	NOT TO SCALE
PCC	PRECAST CONCRETE CURB
PROP	PROPOSED
R&D	REMOVE AND DISPOSE
R&R	REMOVE AND RESET
R&S	REMOVE AND STACK
TOS	TOP OF SLOPE
TW	TOP OF WALL
TYP	TYPICAL
VGC	VERTICAL GRANITE CURB

UTILITY

CB	CATCH BASIN
CMP	CORRUGATED METAL PIPE
CPP	CORRUGATED POLYETHYLENE PIPE
DCB	DOUBLE CATCH BASIN
DI	DUCTILE IRON PIPE
F&G	FRAME AND GRATE
F&C	FRAME AND COVER
HDPE	HIGH DENSITY POLYETHYLENE
HYD	HYDRANT
INV	INVERT ELEVATION
PVC	POLYVINYL CHLORIDE PIPE
RCP	REINFORCED CONCRETE PIPE
RD	ROOF DRAIN
SMH	SEWER MANHOLE
TSV	TAPPING SLEEVE, VALVE AND BOX
UP	UTILITY POLE

GENERAL NOTES

1. REFERENCES:
   - A. THE STATE OF RHODE ISLAND STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 2018 EDITION, REVISIONS AND ALL CURRENT ADDENDA, ARE MADE A PART HEREOF, AS IF ATTACHED HERETO. ALL REFERENCES TO "STATE STANDARD SPECIFICATIONS" SHALL REFER TO THE LATEST EDITION OF THE STATE OF RHODE ISLAND STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.
   - B. THE STATE OF RHODE ISLAND STANDARD DETAILS, 2015 EDITION, AND ALL CURRENT REVISIONS, ARE MADE A PART HEREOF, AS IF ATTACHED HERETO. ALL REFERENCES TO "STATE STANDARD DETAILS" OR "R.I. STD. #.#.#" SHALL REFER TO THE LATEST EDITION OF THE STATE OF RHODE ISLANDS STANDARD DETAILS.
   - C. THE STATE OF RHODE ISLAND SOIL EROSION AND SEDIMENT CONTROL HANDBOOK, 2016 EDITION, REVISIONS AND ALL CURRENT ADDENDA, ARE MADE A PART HEREOF, AS IF ATTACHED HERETO. ALL REFERENCES TO "SOIL EROSION AND SEDIMENT CONTROL HANDBOOK" SHALL REFER TO THE LATEST EDITION OF THE STATE OF RHODE ISLAND SOIL EROSION AND SEDIMENT CONTROL HANDBOOK.
   - D. THE SITE-SPECIFIC SOIL EROSION AND SEDIMENT CONTROL PLAN (SESC PLAN) PREPARED BY FUSS & O'NEILL, INC., DATED 09/23/20221, IS MADE A PART HEREOF, AS IF ATTACHED HERETO.
2. EXISTING CONDITIONS:
   - A. PROPERTY BOUNDARIES, EXISTING AND TOPOGRAPHICAL INFORMATION WERE OBTAINED FROM A PLAN BY PRINCIPE COMPANY, INC, DATED 04/13/2022.
   - B. EXISTING AND TOPOGRAPHICAL FEATURES OUTSIDE OF THE RIGHT-OF-WAY WERE OBTAINED FROM RHODE ISLAND GEOGRAPHIC INFORMATION SYSTEM (RIGIS) DATA AND AERIAL IMAGERY.
   - C. WETLAND FLAGS SHOWN WERE FLAGGED BY NATURAL RESOURCE SERVICES, INC. (NRS) ON MARCH 8, 2022 AND WERE FIELD LOCATED BY PRINCIPE COMPANY.
3. DATUM REFERENCE:
   ALL TOPOGRAPHIC INFORMATION INCLUDED HEREON IS IN REFERENCE TO NAVD83.
4. FLOOD ZONE:
   DISTURBANCE PROPOSED FOR THIS PROJECT IS NOT LOCATED IN SPECTACLE POND'S ASSOCIATED FLOOD PLAIN AS DEPICTED IN FEMA FLOOD MAP NUMBER 44007C0312H (DATED OCTOBER 2, 2015).
5. MATERIALS:
   - A. BITUMINOUS CONCRETE PAVEMENT:
     BITUMINOUS PAVEMENTS SHALL MEET REQUIREMENTS OF PART 400 OF THE STATE STANDARD SPECIFICATIONS.
   - B. LANDSCAPE AREAS:
     ALL SURFACED AREAS OR DISTURBED AREAS NOT SPECIFIED ON THE PLANS SHALL RECEIVE 4 INCHES OF TOPSOIL, SEED, MULCH, AND BE WATERED UNTIL A HEALTHY STAND OF GRASS IS OBTAINED.
   - A. SATISFACTORY SOILS:
     SOIL CLASSIFICATION GROUPS GW, GP, GM, SW, SP, AND SM ACCORDING TO ASTM D 2487, OR A COMBINATION OF THESE GROUPS; FREE OF ROCK, GRAVEL LARGER THAN 3 INCHES IN ANY DIMENSION, DEBRIS, WASTE, FROZEN MATERIALS, VEGETATION, AND OTHER DELETERIOUS MATTER.
   - B. GRAVEL BORROW:
     GRAVEL BORROW SHALL CONFORM TO SECTION M.01.09, TABLE 1, COLUMN 1 OF THE STANDARD SPECIFICATIONS.
   - C. COMMON BORROW:
     SHALL MEET THE REQUIREMENT OF SATISFACTORY SOILS AND SHALL CONFORM TO SUBSECTION M.01.01 OF THE STANDARD SPECIFICATIONS.
6. UTILITIES:
   - A. STORM DRAINAGES:
     STORM DRAIN PIPING SHALL BE SMOOTH LINED BE DOUBLE-WALL HIGH DENSITY POLYETHYLENE PIPE, (n=0.012) WITH WATER TIGHT JOINTS. THE SIZES OF ALL PIPES ARE NOTED ON THE PLANS.

     ALL CATCH BASINS SHALL BE PRECAST CONCRETE, AS SPECIFIED ON THE DETAIL SHEETS, WITH BICYCLE SAFE GRATES, R.I. STANDARD 6.3.2, OR APPROVED EQUAL.

GENERAL CONSTRUCTION REQUIREMENTS

1. SITE DISCHARGES FROM CONSTRUCTION SITES ARE REGULATED BY THE RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT RHODE ISLAND POLLUTANT DISCHARGE SYSTEM ELIMINATION (RIPDES) PROGRAM. THE PROJECT SHALL COMPLY WITH THE CONDITIONS OF THE RIPDES GENERAL PERMIT FOR STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION SITE RUNOFF.
2. VERIFY THE PROPOSED LAYOUT WITH ITS RELATIONSHIP TO THE EXISTING SITE SURVEY AND CONFIRM ALL DIMENSIONS, SITE CONDITIONS, AND MATERIAL SPECIFICATIONS ARE CONSISTENT. NOTIFY THE OWNER AND ENGINEER OF ANY ERRORS, OMISSIONS OR DISCREPANCIES BEFORE COMMENCING OR PROCEEDING WITH WORK.
3. OBTAIN ALL NECESSARY PERMITS, INSPECTIONS, BONDS, ETC. AND OTHER APPROVAL RELATED ITEMS WITH THE LOCAL AND STATE MUNICIPALITIES. APPLICATION FEES SHALL BE PAID BY OWNER. NO CONSTRUCTION SHALL COMMENCE UNTIL SUCH PERMITS HAVE BEEN SECURED AND THE CONTRACTOR HAS SUPPLIED THE REQUIRED NOTICES.
4. METHODS AND MATERIALS USED IN THE CONSTRUCTION OF IMPROVEMENTS FOR THIS PROJECT SHALL CONFORM TO THE CURRENT CONSTRUCTION STANDARDS AND SPECIFICATIONS OF THE LOCAL MUNICIPALITY AND THE RHODE ISLAND DEPARTMENT OF TRANSPORTATION.
5. DEVIATIONS OR CHANGES FROM THESE PLANS WILL NOT BE ALLOWED UNLESS APPROVED BY THE ENGINEER/OWNER.
6. CONTACT 'DIG SAFE' AT 1-888-344-7233, 72 HOURS PRIOR, EXCLUDING WEEKENDS AND HOLIDAYS, TO ANY EXCAVATION PERFORMED ON SITE.
7. THE EXISTENCE AND/OR LOCATION OF UTILITIES SHOWN ON THESE PLANS MAY BE ONLY APPROXIMATELY CORRECT. MAKE EXPLORATORY EXCAVATIONS AND LOCATE ANY EXISTING UTILITIES AND NOTIFY OWNER/ENGINEER OF ANY DISCREPANCIES FROM CONTRACT DOCUMENTS. THE OWNER SHALL BE NOTIFIED AS TO THE RELOCATIONS REQUIRED PRIOR TO THE START OF CONSTRUCTION. CONTRACTOR IS REQUIRED TO TAKE PRECAUTIONARY MEASURES TO PROTECT THE UTILITIES SHOWN HEREON AND ANY OTHER EXISTING UTILITIES NOT OF RECORD OR NOT SHOWN ON THESE PLANS. THE CONTRACTOR IS RESPONSIBLE FOR REPAIRING, AT HIS/HER EXPENSE, ANY EXISTING UTILITIES DAMAGED DURING CONSTRUCTION.
8. AN APPROVED SET OF PLANS, SIGNED SOIL EROSION AND SEDIMENT CONTROL PLAN, AND ALL APPLICABLE PERMITS SHALL BE AVAILABLE AT THE CONSTRUCTION SITE AT ALL TIMES.
9. THE CONTRACTOR IS RESPONSIBLE FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.
10. IDENTIFY TREES TO BE REMOVED PRIOR TO CONSTRUCTION AND MARK THEM WITH CONSTRUCTION TAPE FOR REVIEW BY THE OWNER/ENGINEER. TREES AND OTHER EXISTING VEGETATION SHALL BE RETAINED WHEREVER FEASIBLE. DO NOT REMOVE TREES UNTIL REVIEWED AND APPROVED BY THE OWNER/ENGINEER.
11. PROVIDE PROPER TRANSITIONS BETWEEN EXISTING AND PROPOSED SITE IMPROVEMENTS.
12. RESTORE HARDSCAPE IMPROVEMENTS WITH MATCHING MATERIALS (I.E. ANY PAVEMENT, WALKS, CURBS, ETC.) THAT MUST BE CUT OR THAT ARE DAMAGED DURING CONSTRUCTION.
13. RESTORE DISTURBED LANDSCAPE AREAS TO ORIGINAL CONDITION (I.E. SEEDED, SODDED, PLANTED) UNLESS OTHERWISE DIRECTED WITHIN CONTRACT DOCUMENTS.
14. ADJUST UTILITY COVERS, GRATES, AND HAND HOLES TO FINISH GRADE.
15. ALL EXCESS EXCAVATED MATERIALS, EXCESS FILL, EXCESS CONSTRUCTION MATERIALS, DEBRIS, AND WASTE SHALL BE REMOVED FROM THE SITE AND SHALL BE DISPOSED OF IN ACCORDANCE WITH APPLICABLE LAWS.
16. IN BACKFILLED AREAS, RECOMPACT TOP 12 INCHES OF EXISTING SUBGRADE AND EACH LAYER OF BACKFILL OR FILL MATERIAL IN ACCORDANCE WITH ASTM D1557 TO 95 PERCENT OF THE MAXIMUM DRY DENSITY.
17. DO NOT CLOSE OR OBSTRUCT ROADWAYS, SIDEWALKS, FIRE HYDRANTS, AND UTILITIES WITHOUT APPROPRIATE PERMITS.
18. WORK IS RESTRICTED TO THE HOURS OF 7 AM TO 5 PM ON MONDAY THROUGH FRIDAY, EXCLUDING HOLIDAYS, UNLESS OTHERWISE APPROVED BY THE OWNER.

CONTROL OF WATER

1. TEMPORARY STORMWATER BYPASS CONVEYANCE SYSTEMS TO CONTROL STORMWATER THROUGH THE SITE AND AROUND PROPOSED WORK DURING CONSTRUCTION SHALL BE INSTALLED, OPERATED AND MAINTAINED TO SAFELY PROTECT THE WORK AND EXISTING FEATURES FROM DAMAGE AT ALL TIMES UNTIL FINAL ACCEPTANCE BY THE OWNER.
2. DO NOT ALLOW WATER TO ACCUMULATE IN EXCAVATIONS. REMOVE WATER TO PREVENT SOFTENING OF FOUNDATION BOTTOMS, UNDERCUTTING OF FOOTINGS AND SOIL CHANGES DETRIMENTAL TO STABILITY OF SUBGRADES, FOUNDATIONS AND STRUCTURES.
3. PUMPED WATER SHALL BE DISCHARGED THROUGH AN APPROVED SEDIMENT CONTROL DEVICE (E.G. SILT BAG) TO PROPERLY FILTER TURBID WATER PRIOR TO ITS RETURN TO THE WATERCOURSE. THE DISCHARGE OF PUMPED WATER SHALL BE ONTO AN APPROVED ARMORED OR HARD SURFACE (E.G., RIPRAP APRON) TO PREVENT EROSION, SCOUR AND SUSPENSION OF SOIL AT THE DISCHARGE. WATER SHALL NOT BE DISCHARGED ONTO FILL OR BACKFILL AREAS OR FOUNDATIONS.
4. PROTECT CONSTRUCTED WORK ON THE SITE DURING STORM AND FLOOD CONDITIONS.
5. A WATER CONTROL PLAN SHALL BE SUBMITTED FOR REVIEW AND APPROVAL BY THE ENGINEER PRIOR TO CONSTRUCTION. IF REQUIRED, THE PLAN SHALL BE PREPARED BY A PROFESSIONAL ENGINEER. APPROVAL OF THE PLAN SHALL NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH THE PERFORMANCE STANDARDS.

CONSTRUCTION SEQUENCE

CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS PROJECT ARE EXPECTED TO COMMENCE IN SPRING 2023 AND WILL BE COMPLETED BY AUTUMN 2023. SOME OF THE CONSTRUCTION ACTIVITIES MAY OCCUR CONCURRENTLY WITH OTHER CONSTRUCTION ACTIVITIES. THE GENERAL SEQUENCE FOR EACH PHASE OF CONSTRUCTION IS AS FOLLOWS:

1. INSTALL PERIMETER SEDIMENT CONTROL BARRIERS AND OTHER SEDIMENT EROSION CONTROL MEASURES. SEDIMENT EROSION CONTROL MEASURES WILL BE MAINTAINED OR REPLACED AS REQUIRED THROUGHOUT CONSTRUCTION PERIOD. ANY TEMPORARY SOIL STOCKPILE AREAS DURING CONSTRUCTION WILL ALSO BE ENCOMPASSED BY PERIMETER CONTROLS.
2. CONFIRM EXISTING SITE CONDITIONS AND IDENTIFY TREES AND OTHER EXISTING FEATURES (STRUCTURES, UTILITIES, ETC.) THAT ARE NOT DESIGNATED FOR REMOVAL. NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION.
3. COMPLETE DEMOLITION ACTIVITIES.
4. INSTALL SUBSURFACE INFILTRATION SYSTEM AND ASSOCIATED DRAINAGE COMPONENTS. MAINTAIN EXISTING DRAINAGE OVERFLOW UNTIL ALL PROPOSED DRAINAGE COMPONENTS ARE IN-PLACE AND READY TO INSTALL CATCH BASIN INLET PROTECTION IMMEDIATELY AFTER CATCH BASIN IS INSTALLED.
5. PAVE DISTURBED ROADWAY(S) AND INSTALL BITUMINOUS CONCRETE BERM.
6. PERFORM FINAL GRADING AND RESTORATION OF DISTURBED NON-PAVED AREAS.
7. REMOVE TEMPORARY EROSION CONTROLS MEASURES ONCE PERMANENT VEGETATION COVER HAS BEEN ESTABLISHED AND THE SITE IS STABILIZED, INSPECTED, AND APPROVED BY PERMITTING AUTHORITY AND THE ENGINEER.
8. PERFORM ANY FINAL GRADING AND RESTORATION OF DISTURBED NON-PAVED AREAS.

SOIL EROSION AND SEDIMENT CONTROL INSTALLATION

1. FOLLOW THE SITE-SPECIFIC SESC PLAN, SITE PREPARATION PLAN, EROSION AND SEDIMENT CONTROL SPECIFICATION, AS WELL AS RHODE ISLAND SOIL EROSION AND SEDIMENT CONTROL HANDBOOK IN CONSTRUCTING THE EROSION AND SEDIMENT CONTROLS INDICATED ON THE PLANS. ALL EROSION AND SEDIMENT CONTROL MEASURES OR WORKS AND REHABILITATION MEASURES MUST CONFORM TO OR EXCEED THESE REQUIREMENTS.
2. THE TIMELY INSTALLATION, INSPECTION, AND MAINTENANCE/REPLACEMENT OF SEDIMENT AND EROSION CONTROL DEVICES TO ENSURE PROPER OPERATION AND PERMIT COMPLIANCE IS THE RESPONSIBILITY OF THE CONTRACTOR UNTIL CONSTRUCTION OF THE PROJECT IS COMPLETE AND ACCEPTED BY THE OWNER. THE OWNER IS RESPONSIBLE THEREAFTER. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL CONTINUE TO BE MAINTAINED IN EFFECTIVE CONDITION UNTIL SITE STABILIZATION.
3. PRIOR TO THE COMMENCEMENT OF CONSTRUCTION ACTIVITIES, INSTALL ALL EROSION AND SEDIMENT CONTROL DEVICES AS SHOWN ON THE PLAN, OR AS DIRECTED BY THE RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT AND LOCAL MUNICIPALITY, OR AS MAY BE REQUIRED TO PREVENT SEDIMENT FLOW TO STORM DRAINS OR SURFACE WATERS.

SOIL EROSION AND SEDIMENT CONTROL INSPECTION

1. SITE DISCHARGES FROM CONSTRUCTION SITES ARE REGULATED BY THE RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT (RIDEM) RHODE ISLAND POLLUTANT DISCHARGE SYSTEM ELIMINATION (RIPDES) PROGRAM. A SITE-SPECIFIC SOIL EROSION AND SEDIMENT CONTROL PLAN (SESC PLAN) HAS BEEN PREPARED. THE SESC PLAN MUST BE REVIEWED AND SIGNED BY THE OWNER, OPERATOR (I.E CONTRACTOR), AND CONTRACTOR'S DESIGNATED SESC INSPECTOR. A HARD-COPY OF THE SIGNED SESC PLAN, INCLUDING ALL INSPECTION REPORTS, CORRECTIVE ACTION LOGS, AND ADDENDA, MUST BE KEPT ON SITE AT ALL TIMES THROUGHOUT CONSTRUCTION.
2. AN INSPECTION OF STORMWATER CONTROL MEASURES MUST BE CONDUCTED BY THE CONTRACTOR AT LEAST ONCE EVERY SEVEN (7) CALENDAR DAYS, AND WITHIN TWENTY-FOUR (24) HOURS AFTER ANY STORM EVENT WHICH GENERATES AT LEAST 0.25 INCHES OF RAINFALL PER TWENTY-FOUR (24) HOUR PERIOD.
3. PREPARE AN INSPECTION REPORT SUMMARIZING THE SCOPE OF THE INSPECTION, NAME(S) AND TITLES OF PERSONNEL MAKING THE INSPECTION, THE DATE(S) OF THE INSPECTION, MAJOR OBSERVATIONS RELATING TO THE IMPLEMENTATION OF THE SESC PLAN, AND CORRECTIVE ACTIONS WHICH MUST BE MADE. SUCH REPORTS MUST IDENTIFY ANY INCIDENTS OF NONCOMPLIANCE. WHERE AN INSPECTION DOES NOT IDENTIFY ANY INCIDENTS OF NONCOMPLIANCE, A INSPECTION REPORT MUST STILL BE PREPARED TO CERTIFY THAT THE SITE IS IN COMPLIANCE WITH THE SESC PLAN AND RIPDES PERMIT. THE INSPECTION REPORT MUST BE SIGNED BY THE INSPECTOR AND OPERATOR AND KEPT WITH THE ON-SITE SESC PLAN.
4. FOLLOWING AN INSPECTION, ALL CORRECTIVE ACTIONS MUST BE COMPLETED WITHIN SEVEN (7) CALENDAR DAYS. A CORRECTIVE ACTION LOG MUST BE SIGNED BY THE OPERATOR AND KEPT WITH THE ON-SITE SESC PLAN.
5. BASED ON THE RESULTS OF THE INSPECTIONS, THE SESC PLAN MUST BE REVISED AS APPROPRIATE, BUT IN NO CASE LATER THAN SEVEN (7) CALENDAR DAYS FOLLOWING THE INSPECTION. SUCH MODIFICATIONS MUST PROVIDE FOR IMPLEMENTATION OF ANY CHANGES TO THE SESC PLAN WITHIN SEVEN (7) CALENDAR DAYS FOLLOWING THE INSPECTION.
6. IF AN INSPECTION REVEALS A DISCHARGE OF SEDIMENTS TO THE WATERS OF THE STATE OR A SEPARATE STORM SEWER SYSTEM, THE PERMITTEE MUST NOTIFY THIS OFFICE OF THE NATURE OF THE DISCHARGE, THE MEASURES TAKEN TO CLEAN UP THE DISCHARGE, AND THE MEASURES TAKEN TO PREVENT FUTURE RELEASES.
7. A HARD COPY OF THE COMPLETE SESC PLAN, INCLUDING ALL INSPECTION REPORTS, CORRECTIVE ACTION LOGS, AND ADDENDA, MUST BE RETAINED BY THE OWNER FOR AT LEAST FIVE (5) YEARS FROM THE DATE THAT THE SITE HAS UNDERGONE FINAL STABILIZATION.

STORMWATER MAINTENANCE PROGRAM

1. OPERATION AND MAINTENANCE OF STORMWATER MANAGEMENT SYSTEM SHALL BE CONDUCTED IN ACCORDANCE WITH SITE-SPECIFIC LONG-TERM OPERATION & MAINTENANCE PLAN.
2. THE CONTRACTOR IS RESPONSIBLE FOR OPERATION AND MAINTENANCE OF STORMWATER MANAGEMENT SYSTEM UNTIL COMPLETION OF CONSTRUCTION AND OWNER ACCEPTANCE. THE OWNER SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF THE STORMWATER MANAGEMENT SYSTEM ONCE CONSTRUCTION IS COMPLETE.

SPILL PREVENTION AND RESPONSE PROCEDURE

1. ANY INADVERTENT OR DELIBERATE DISCHARGE OF WASTE OIL OR ANY OTHER POLLUTANT TO THE STORMWATER DISPOSAL SYSTEM REQUIRES IMMEDIATE NOTIFICATION TO THE RIDEM OIL POLLUTION CONTROL PROGRAM AT (401) 277-2284, AS PER THE OIL POLLUTION CONTROL REGULATIONS. DURING NON-WORKING HOURS, NOTIFICATION OF SPILLS CAN BE MADE TO THE RIDEM DIVISION OF ENFORCEMENT AT (401) 222-3070 (THE 24-HOUR EMERGENCY RESPONSE PHONE NUMBER).
2. ANY INCIDENT OF GROUNDWATER CONTAMINATION RESULTING FROM THE IMPROPER DISCHARGE OF POLLUTANTS TO THE STORMWATER DISPOSAL SYSTEM SHALL BE THE RESPONSIBILITY OF THE PROPERTY OWNER AS WELL AS ANY OTHER PARTIES THAT THE RIDEM DETERMINES TO BE RESPONSIBLE FOR THE CONTAMINATION. PURSUANT TO STATE LAWS AND REGULATIONS, THE RIDEM MAY REQUIRE THE PROPERTY OWNER AND OTHER RESPONSIBLE PARTIES TO REMEDIATE ANY INCIDENTS THAT MAY ADVERSELY IMPACT GROUNDWATER QUALITY.
3. UPON TRANSFER OF THE PROPERTY, THE NEW OWNER SHALL BE INFORMED AS TO THE LEGAL RESPONSIBILITIES ASSOCIATED WITH DISPOSAL SYSTEM, AS INDICATED ABOVE.
4. THE OWNER WILL CREATE A MAINTENANCE LOG, SHOWING THE DATE, TIME, NAME OF INSPECTOR, INSPECTION COMMENTS, AND ANY ACTIONS TAKEN BASED ON THE ABOVE REFERENCE SCHEDULE.
5. THE PROPERTY OWNER SHALL BE RESPONSIBLE TO REMEDIATE INCIDENTS THAT ADVERSELY IMPACT GROUNDWATER QUALITY.

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VERT.:
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GRAPHIC SCALE

FUSS & O'NEILL
317 IRON HORSE WAY, SUITE 204
PROVIDENCE, RI 02908
401.861.3070
www.fando.com

CITY OF CRANSTON
GENERAL NOTES & LEGEND
POMHAM STREET STORMWATER IMPROVEMENTS
CRANSTON RHODE ISLAND

PROJ. No.: 20200078.A40
DATE:NOVEMBER 2023

CN-001

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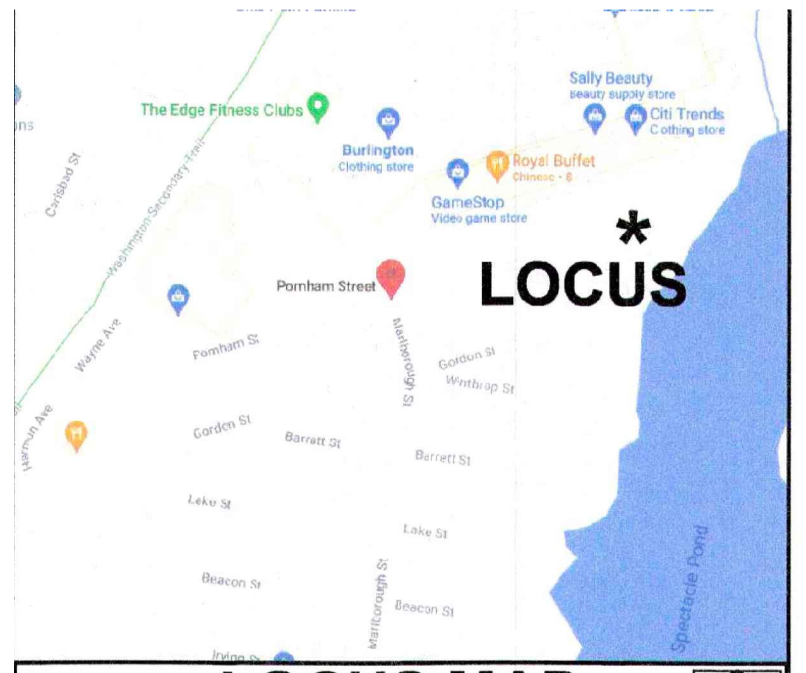


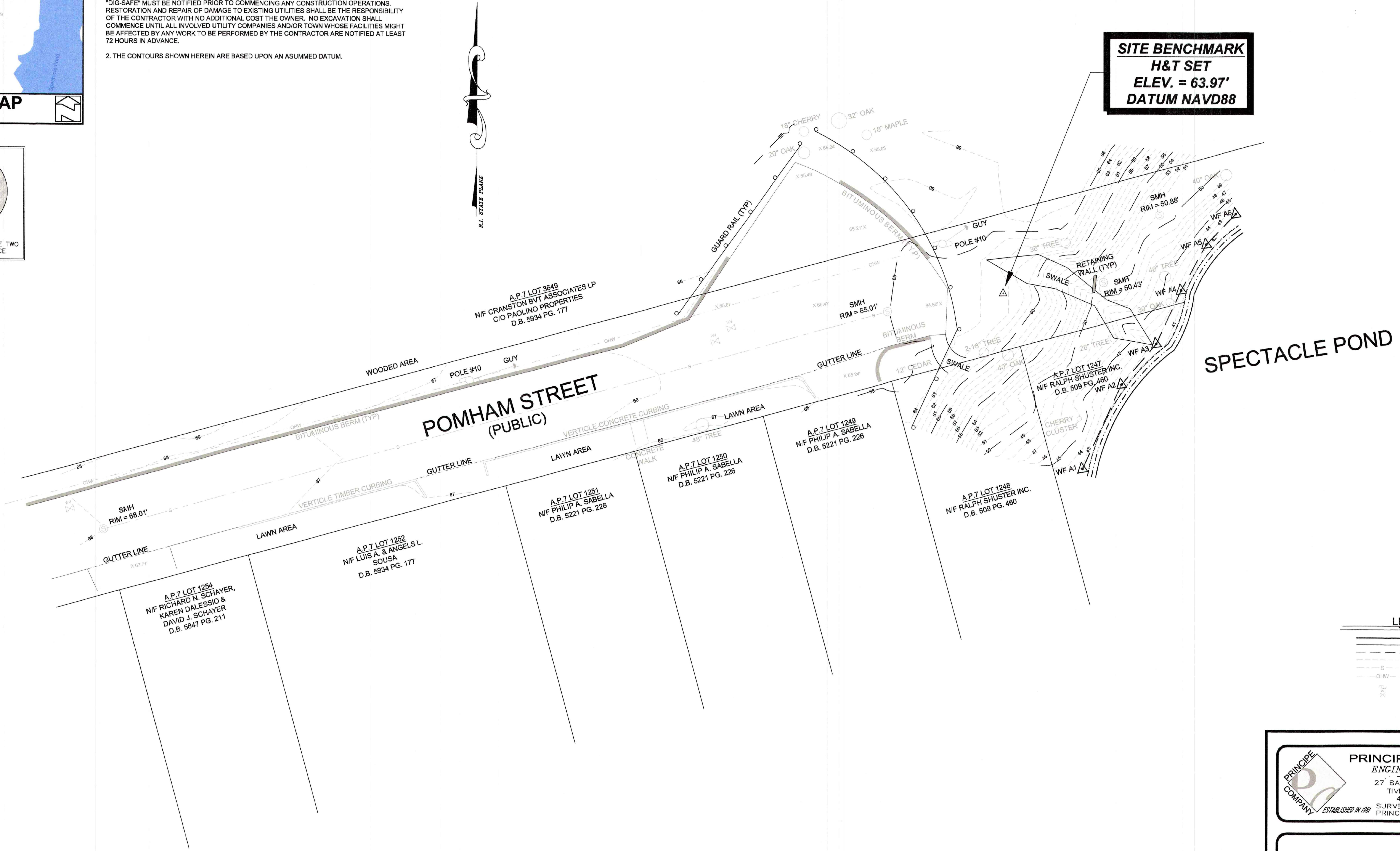
LOCUS MAP
NOT TO SCALE

GENERAL NOTES:

1. THE LOCATION AND DEPTH OF EXISTING UTILITIES ARE APPROXIMATE AND HAVE BEEN PLOTTED FROM THE LATEST AVAILABLE INFORMATION. THE UTILITY LOCATIONS ARE APPROXIMATE AND MAY NOT BE ALL INCLUSIVE. THE CONTRACTOR SHALL CHECK AND VERIFY THE LOCATIONS OF ALL EXISTING UTILITIES, BOTH OVERHEAD AND UNDERGROUND, AND "DIG-SAFE" MUST BE NOTIFIED PRIOR TO COMMENCING ANY CONSTRUCTION OPERATIONS. RESTORATION AND REPAIR OF DAMAGE TO EXISTING UTILITIES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR WITH NO ADDITIONAL COST THE OWNER. NO EXCAVATION SHALL COMMENCE UNTIL ALL INVOLVED UTILITY COMPANIES AND/OR TOWN WHOSE FACILITIES MIGHT BE AFFECTED BY ANY WORK TO BE PERFORMED BY THE CONTRACTOR ARE NOTIFIED AT LEAST 72 HOURS IN ADVANCE.

2. THE CONTOURS SHOWN HEREIN ARE BASED UPON AN ASUMMED DATUM.

CALL TOLL FREE
1-888-DIG-SAFE
PROTECT YOURSELF, GIVE TWO WORKING DAYS NOTICE



LEGEND
NOT TO SCALE

▬▬▬	BOUNDARY
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— — —	MAJOR CONTOUR
- - - -	MINOR CONTOUR
— S —	SEWER LINE
— OHW —	ELECTRIC LINE
	UTILITY POLE
WV ⋈	WATER VALVE

PRINCIPE COMPANY, INC.
ENGINEERING DIVISION
27 SAKONNET RIDGE DRIVE
TIVERTON, RI 02878
401.816.5385
SURVEY@PRINCIPEENGINEERING.COM
PRINCIPEENGINEERING.COM
ESTABLISHED IN 1981

EXISTING CONDITIONS PLAN
for
PONHAM STREET
in
CRANSTON, RHODE ISLAND

SCALE: 1"=15'	SHEET NO: 1 OF 1
DRAWN BY: JML	DESIGN BY:
CHECKED BY: NAT	
DATE: 4-13-2022	PROJECT NO.: SVY-2022-24

NORBERT A. THERIEN
No. 1739
PROFESSIONAL LAND SURVEYOR
4-19-2022

THIS SURVEY HAS BEEN CONDUCTED AND THE PLAN HAS BEEN PREPARED PURSUANT TO SECTION 9 OF THE RULES AND REGULATIONS ADOPTED BY THE RHODE ISLAND STATE BOARD OF REGISTRATIONS FOR PROFESSIONAL LAND SURVEYORS NOVEMBER 25, 2015 AS FOLLOWS:

TYPE OF SURVEY: EXISTING CONDITIONS
MEASUREMENT SPECIFICATION: CLASS 3 STANDARD

PURPOSE OF SURVEY: TOPOGRAPHICAL SURVEY

BY: Norbert A. Therien DATE: 4-19-2022
NORBERT A. THERIEN, PLS NO. 1739

GRAPHIC SCALE
15 0 7.5 15 30 60
(IN FEET)
1 inch = 15 ft.

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

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317 IRON HORSE WAY, SUITE 204
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CITY OF CRANSTON

EXISTING CONDITIONS PLAN

POMHAM STREET STORMWATER IMPROVEMENTS

CRANSTON RHODE ISLAND

PROJ. No.: 20200078.A40
DATE:NOVEMBER 2023

CS-100

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GRAPHIC SCALE

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CITY OF CRANSTON

SITE PREPARATION PLAN

POMHAM STREET STORMWATER IMPROVEMENTS

CRANSTON RHODE ISLAND

PROJ. No.: 20200078.A40
DATE: NOVEMBER 2023

CP-101

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CITY OF CRANSTON

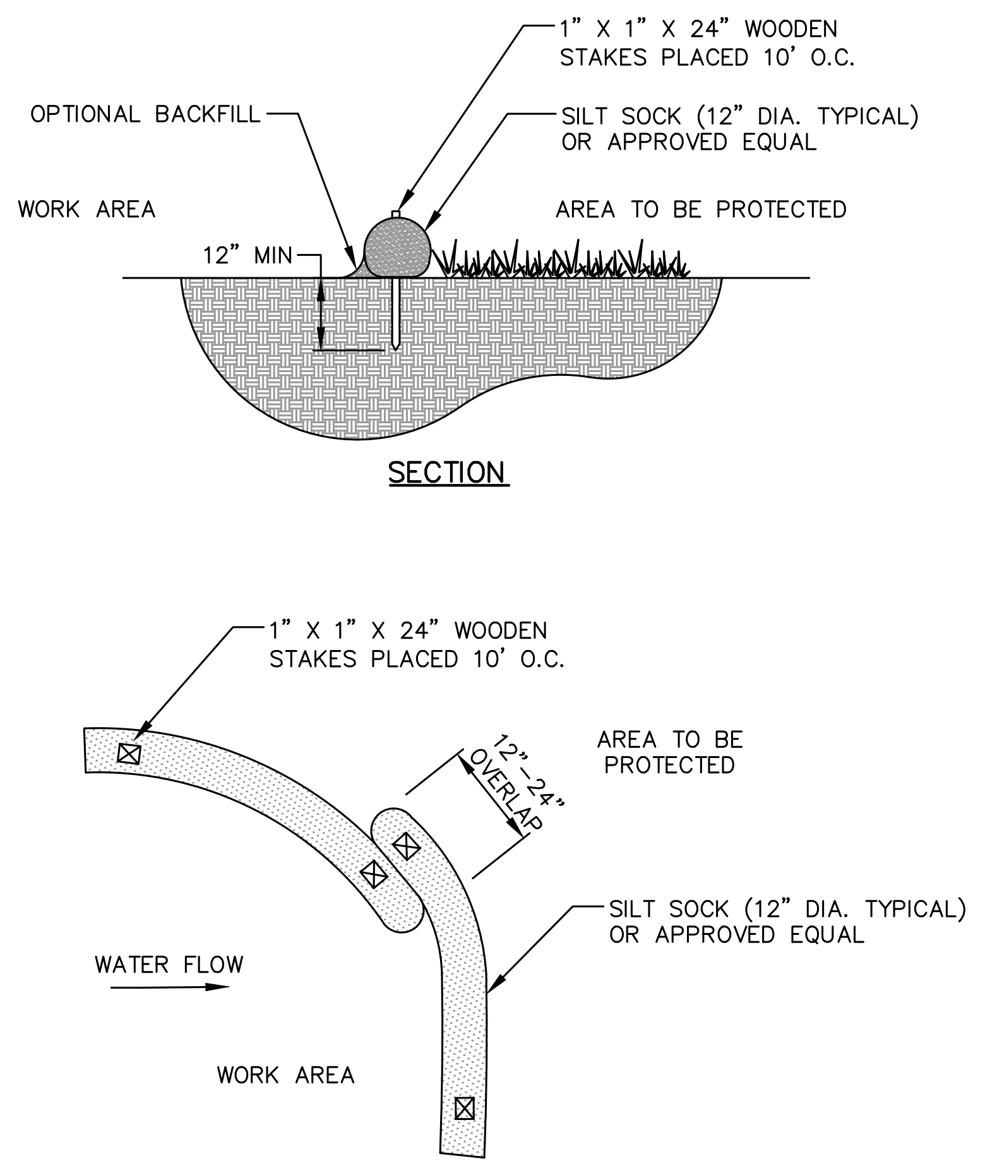
GRADING & DRAINAGE PLAN

POMHAM STREET STORMWATER IMPROVEMENTS

CRANSTON RHODE ISLAND

PROJ. No.: 20200078.A40
DATE:NOVEMBER 2023

CG-101

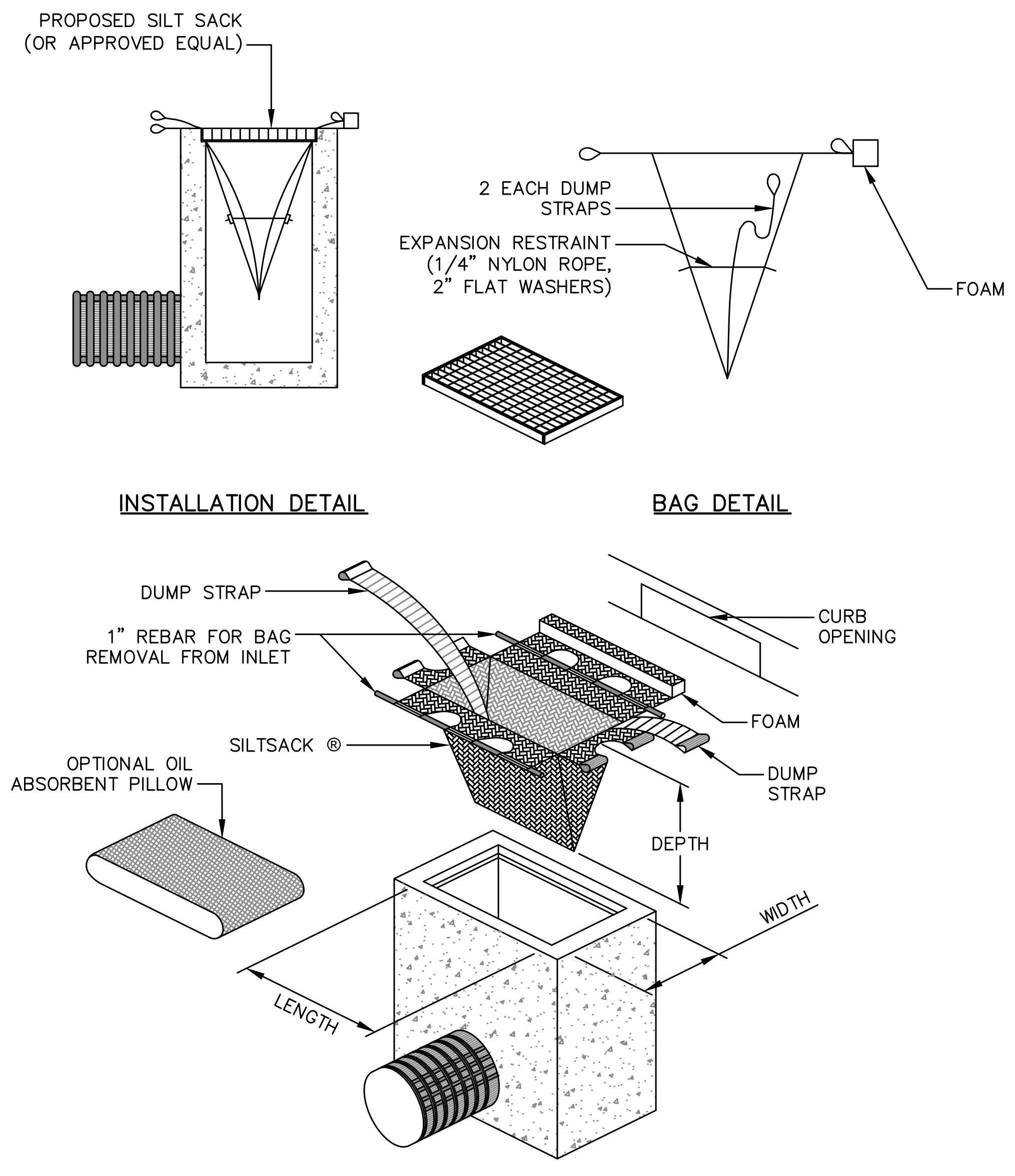


NOTES:

1. ALL MATERIAL TO MEET MANUFACTURER'S SPECIFICATIONS.
2. FILTER MEDIA™ FILL TO MEET APPLICATION REQUIREMENTS.
3. COMPOST MATERIAL TO BE DISPERSED ON SITE, AS DETERMINED BY ENGINEER.

COMPOST FILTER SOCK

NOT TO SCALE



CATCH BASIN INLET PROTECTION

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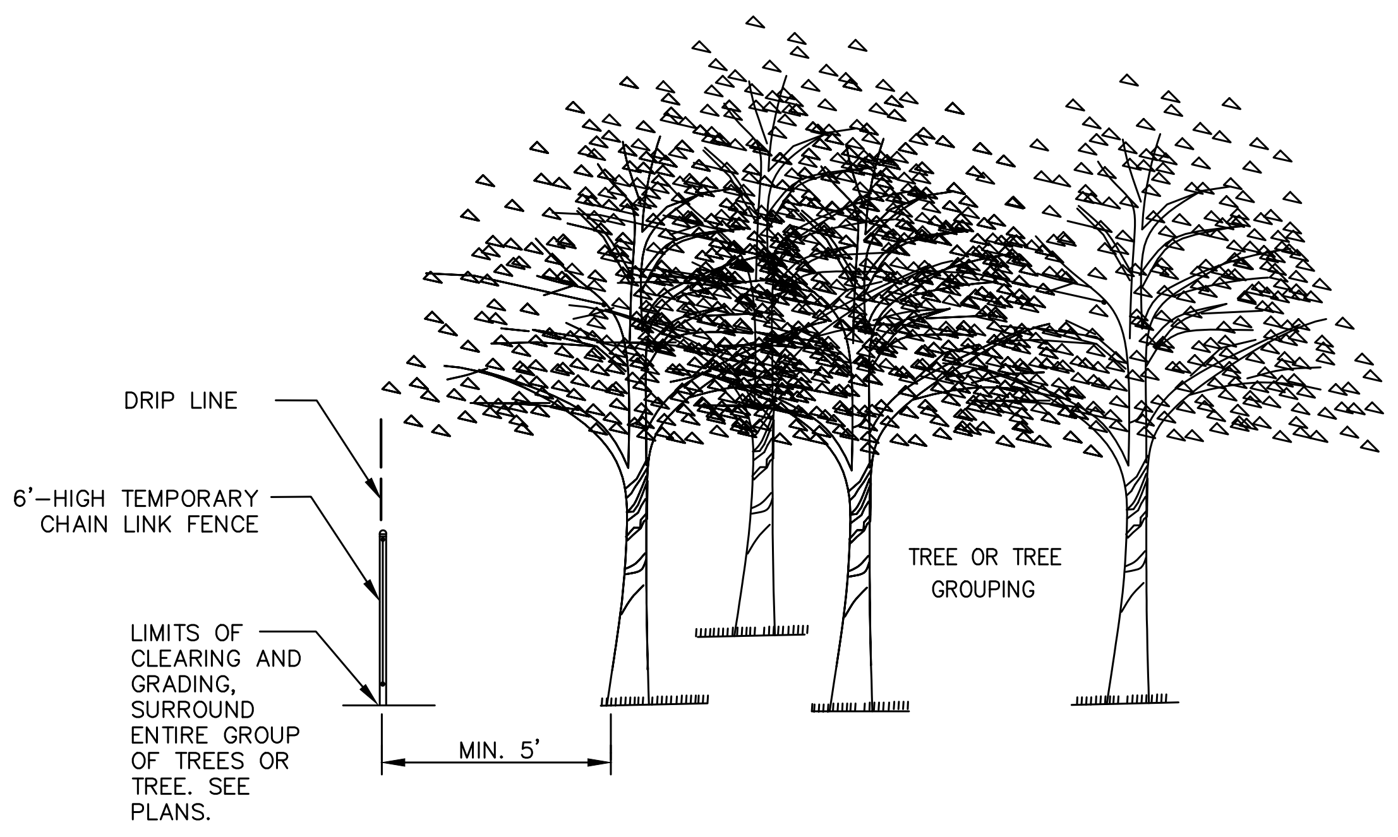

TREE PROTECTION

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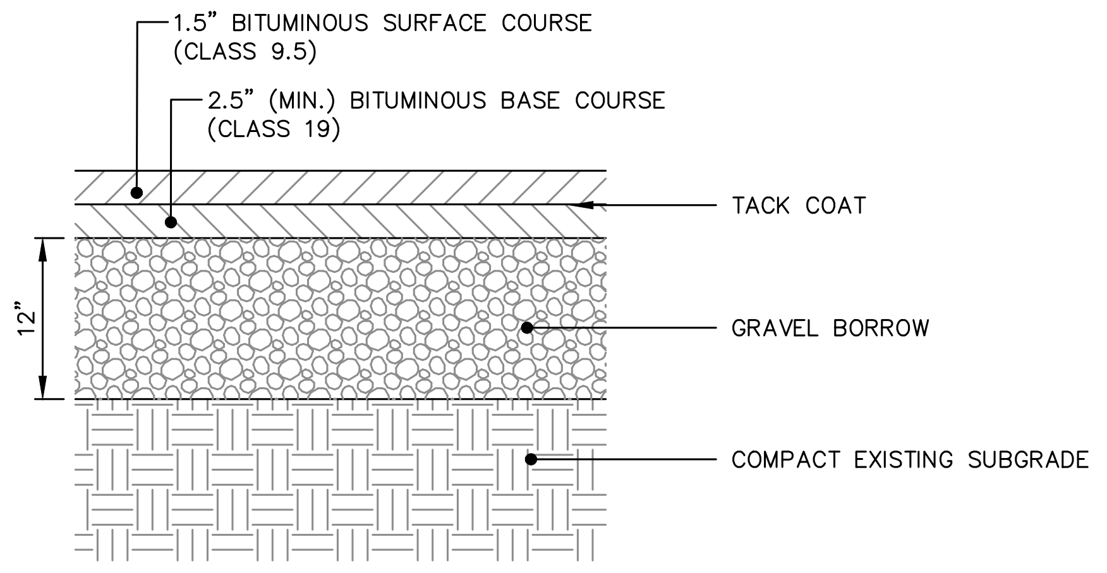
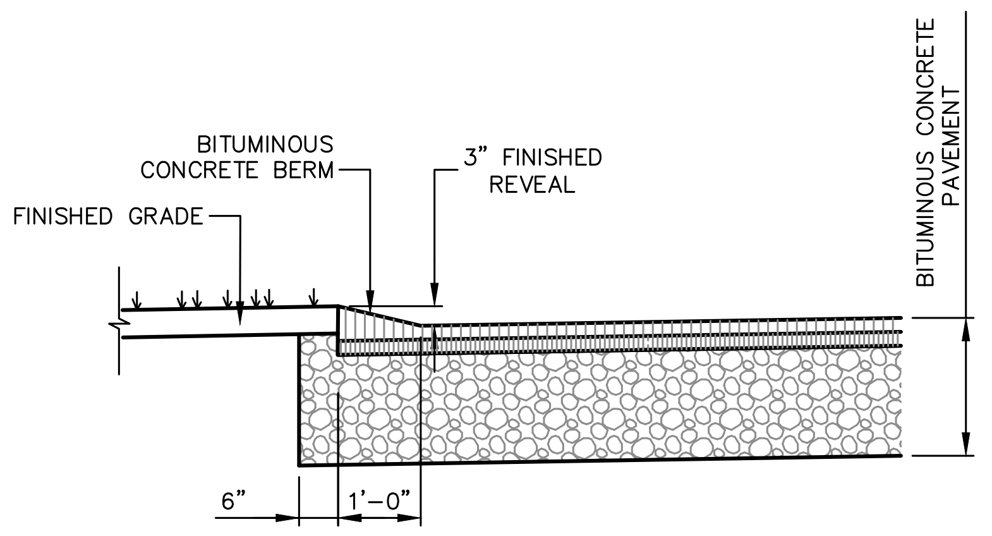


NOTE:

UNSUITABLE MATERIAL WITHIN SUBGRADE SHALL BE REMOVED AND REPLACED WITH GRAVEL BORROW.

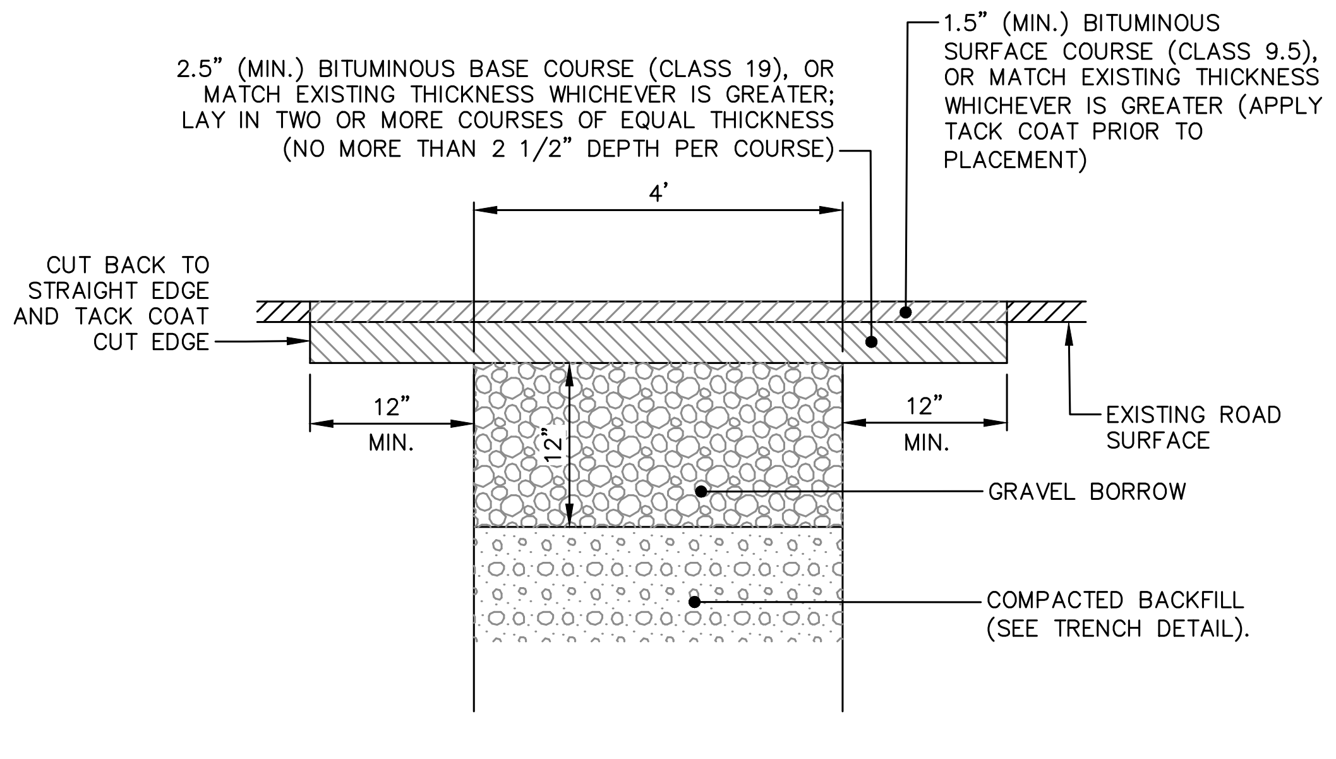
BITUMINOUS CONCRETE PAVEMENT

NOT TO SCALE



BITUMINOUS CONCRETE BERM

NOT TO SCALE



NOTE:

UNSUITABLE MATERIAL WITHIN SUBGRADE SHALL BE REMOVED AND REPLACED WITH GRAVEL BORROW.

ROADWAY PAVEMENT REPAIR

NOT TO SCALE

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FUSS & O'NEILL
317 IRON HORSE WAY, SUITE 204
PROVIDENCE, RI 02908
401.861.3070
www.fando.com

CITY OF CRANSTON

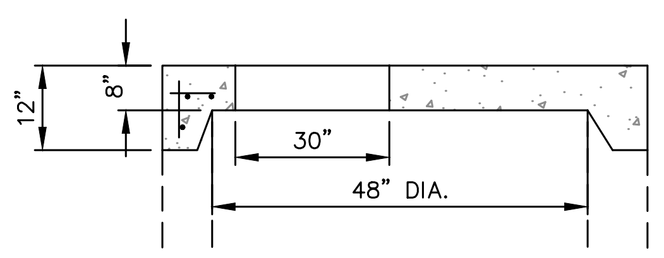
DETAILS

POMHAM STREET STORMWATER IMPROVEMENTS

CRANSTON RHODE ISLAND

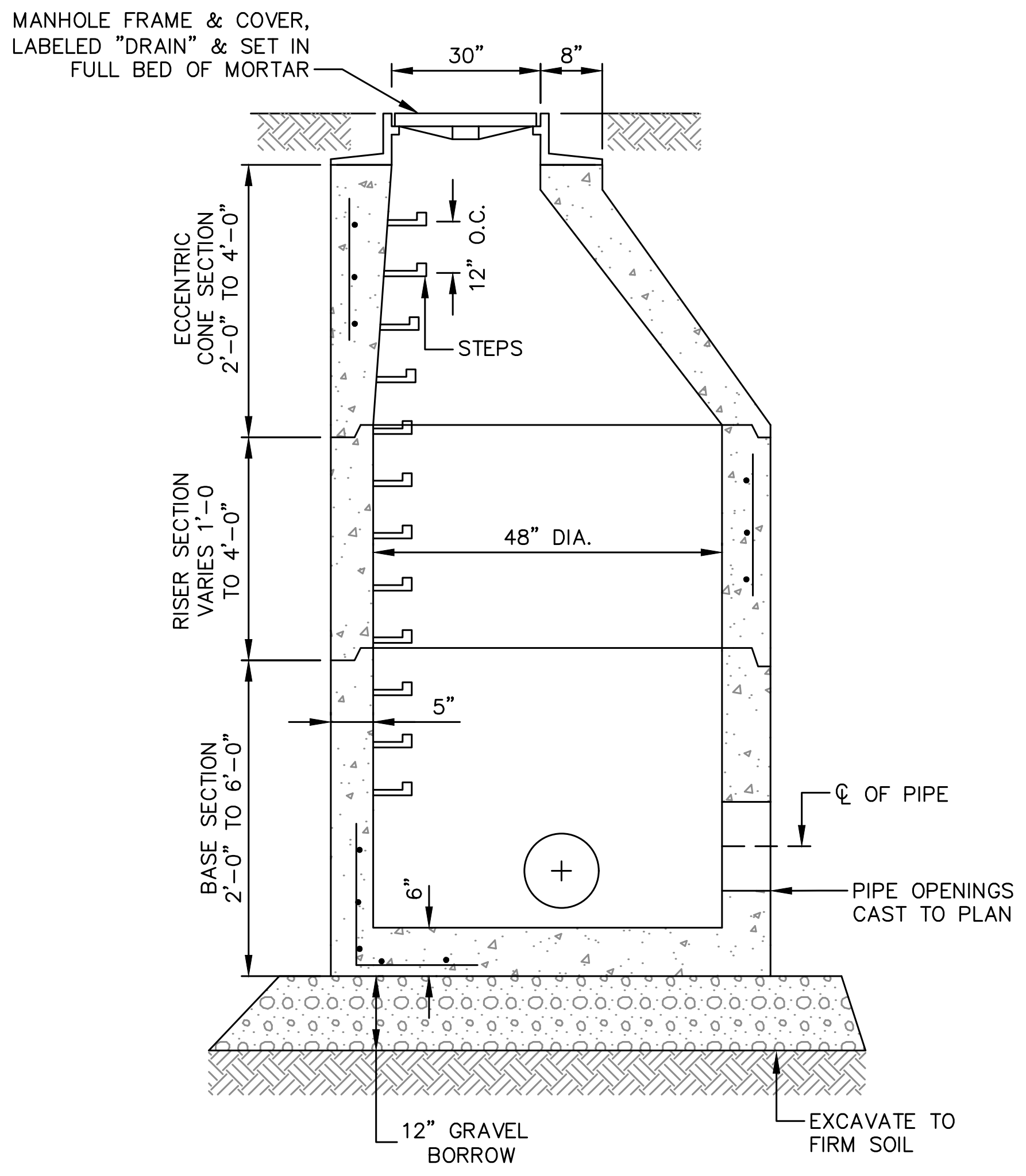
PROJ. No.: 20200078.A40
DATE:NOVEMBER 2023

CD-501



ALTERNATE TOP SLAB

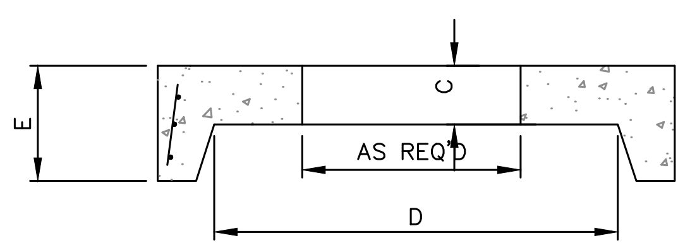
(STEEL REINFORCED FOR HS-25 LOADING)



1. FRAME AND COVER TO BE R.I. STD. 6.2.1 OR APPROVED EQUAL. LETTERING: "DRAIN"
2. FRAMES SHALL BE SET IN FULL BED OF MORTAR. ADJUST TO GRADE WITH RED CLAY BRICKS AND MORTAR.
3. REINFORCING STEEL SHALL CONFORM TO ASTM A-185:
   - 0.12 SQ. IN./LIN. FT. CIRCUMFERENTIAL
   - 0.18 SQ. IN./FT. (BOTH WAYS) BASE BOTTOM
4. CONCRETE SHALL BE COMPRESSIVE STRENGTH 4,000 PSI TYPE II CEMENT.
5. ONE POUR MONOLITHIC BASE SECTION.
6. PROVIDE "V" KNOCKOUTS FOR PIPES WITH 2" MAX. CLEARANCE TO OUTSIDE OF PIPE. MORTAR ALL PIPE CONNECTIONS.
7. JOINT SEALANT SHALL BE PREFORMED BUTYL RUBBER MASTIC TYPE SEAL THAT COMPLIES WITH AASHTO M198 OR SYNTHETIC RUBBER GASKET THAT COMPLIES WITH ASTM C-443 OR C-361.
8. MANHOLE DESIGN SHALL CONFORM TO ASTM C-478 FOR "PRECAST REINFORCED CONCRETE MANHOLE SECTIONS."
9. MANHOLE STEPS SHALL BE ASTM A 615/A615M, DEFORMED, 1/2-INCH STEEL REINFORCED RODS ENCASED IN ASTM D 4101, POLYPROPYLENE PLASTIC. THE CENTERLINE OF OPENING MUST BE WITHIN 2'-0" FROM STEPS.
10. ANY NECESSARY ADJUSTMENTS DURING CONSTRUCTION WILL BE DONE BY SAW-CUTTING AND/OR CORING ONLY. NO JACKHAMMERS, HAMMERS AND CHISELS OR PNEUMATIC TOOLS WILL BE ALLOWED.
11. INVERT CONSTRUCTED OF BRICK OR CEMENT CONCRETE, CLASS D.

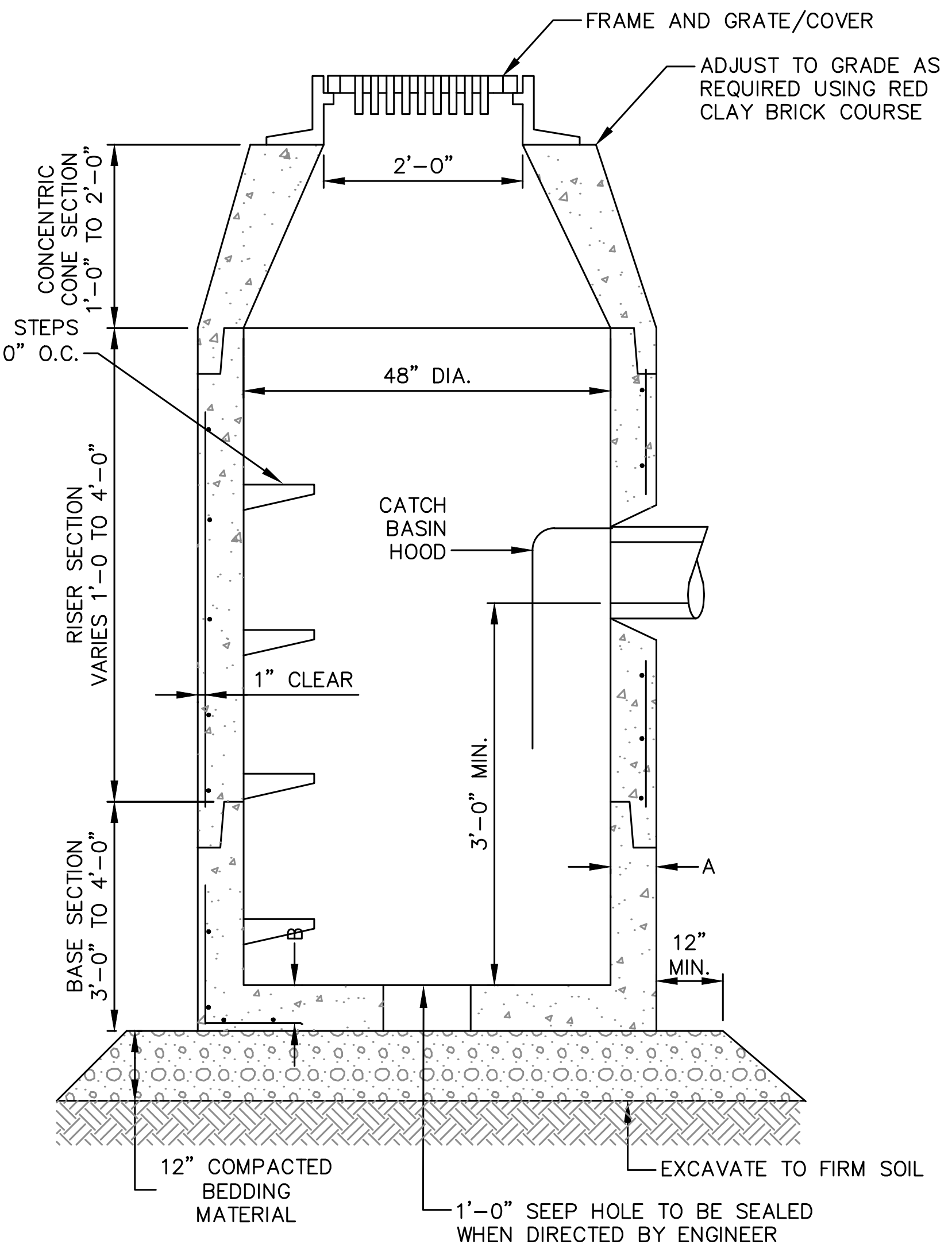
DRAIN MANHOLE

NOT TO SCALE



ALTERNATE TOP SLAB

(STEEL REINFORCED FOR HS-25 LOADING)



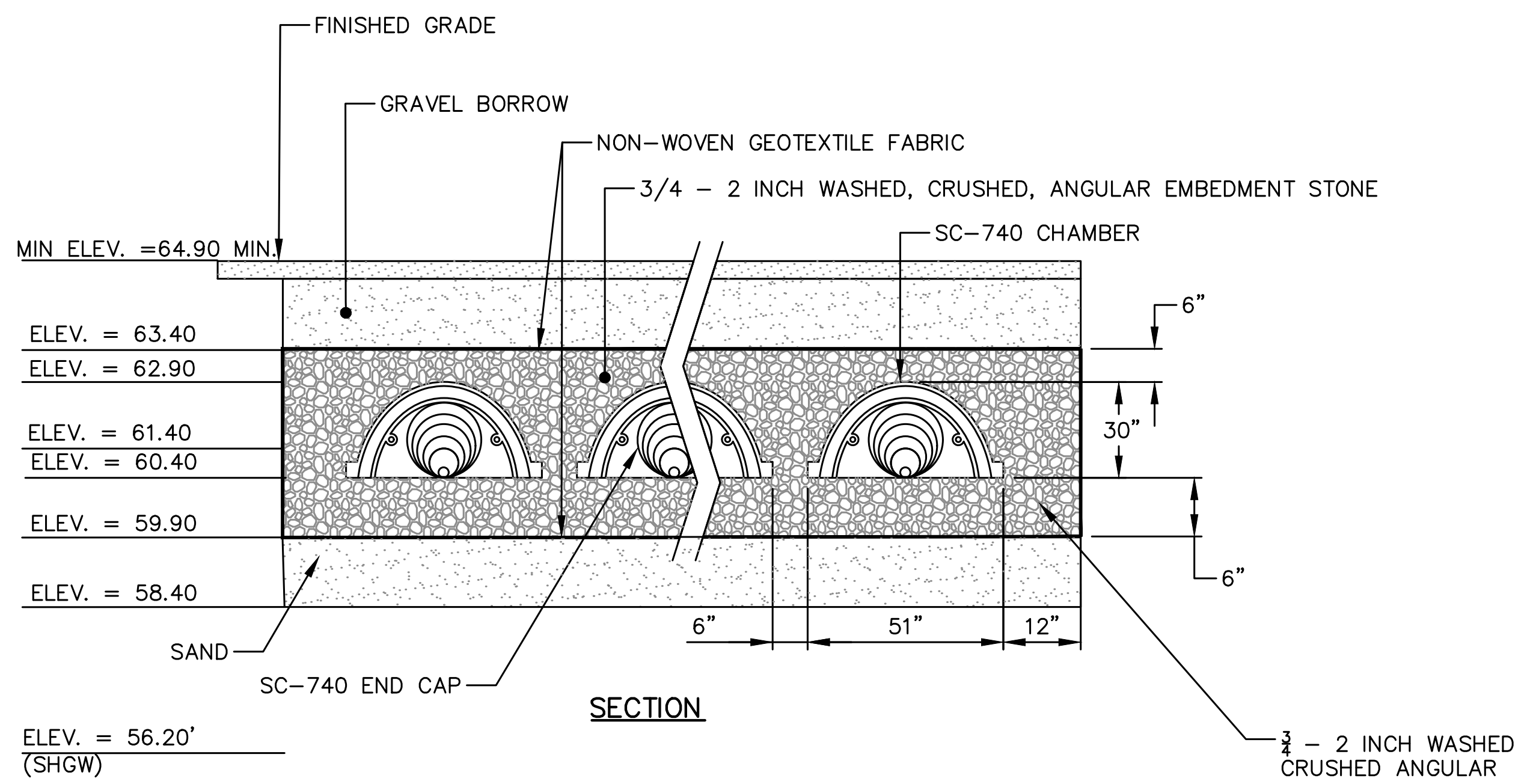
SECTION

NOTES:

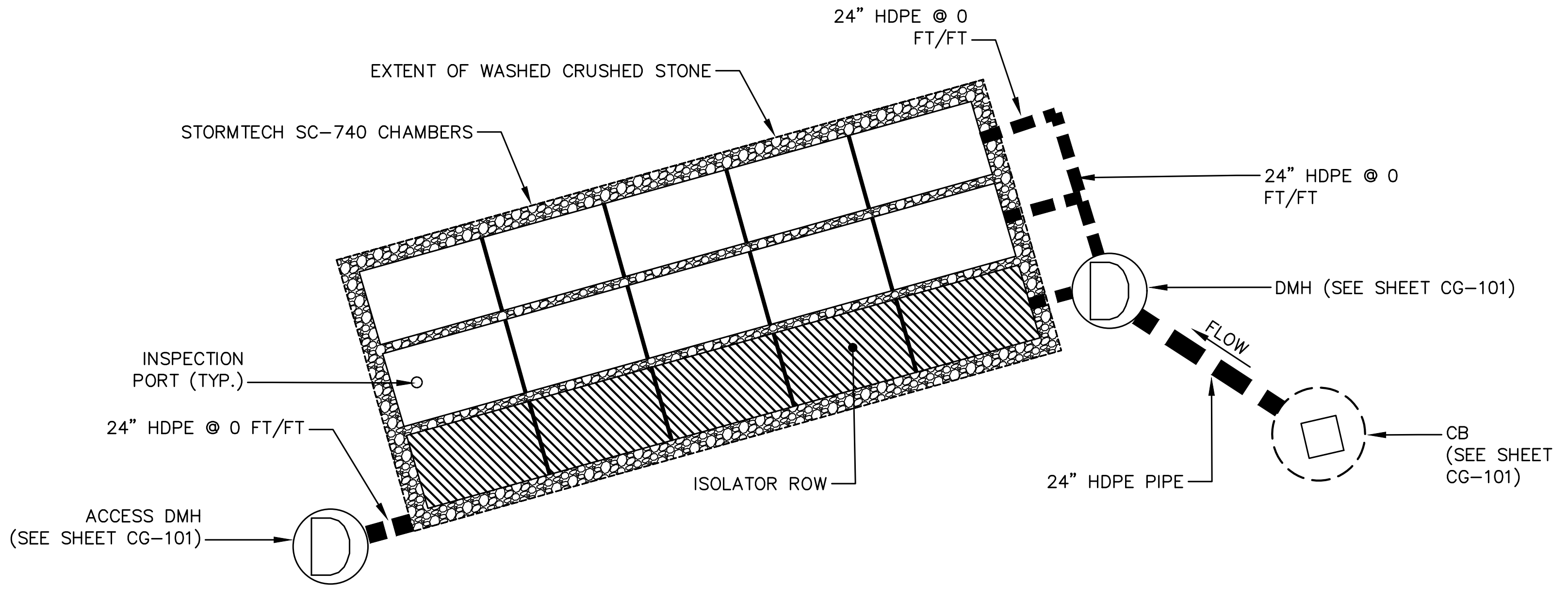
1. FRAME AND GRATE SHALL BE R.I. STD. 6.3.0 OR APPROVED EQUAL.
2. INLET CATCH BASIN SHALL INCLUDE GRANITE APRON STONE PER PROVIDENCE STANDARD 7.3.7P, AND BE INSTALLED IN ACCORDANCE WITH INLET/APRON STONE REVEAL PER PROVIDENCE STANDARD 60.4.0P.
3. INLET CATCH BASIN SHALL HAVE 4' SUMP.
4. FRAMES SHALL BE SET IN FULL BED OF MORTAR. ADJUST TO GRADE WITH RED CLAY BRICKS AND MORTAR.
5. REINFORCING STEEL SHALL CONFORM TO ASTM A-185:
   - 0.12 SQ. IN./LIN. FT. CIRCUMFERENTIAL
   - 0.18 SQ. IN./FT. (BOTH WAYS) BASE BOTTOM
6. CONCRETE SHALL BE COMPRESSIVE STRENGTH 4,000 PSI TYPE II CEMENT.
7. ONE POUR MONOLITHIC BASE SECTION.
8. PROVIDE "V" KNOCKOUTS FOR PIPES WITH 2" MAX. CLEARANCE TO OUTSIDE OF PIPE. MORTAR ALL PIPE CONNECTIONS.
9. JOINT SEALANT SHALL BE PREFORMED BUTYL RUBBER MASTIC TYPE SEAL THAT COMPLIES WITH AASHTO M198 OR SYNTHETIC RUBBER GASKET THAT COMPLIES WITH ASTM C-443 OR C-361.
10. CATCH BASIN DESIGN SHALL CONFORM TO ASTM C-478 FOR "PRECAST REINFORCED CONCRETE MANHOLE SECTION.
11. CATCH BASIN STEPS SHALL BE ASTM A 615/A615M, DEFORMED, 1/2-INCH STEEL REINFORCED RODS ENCASED IN ASTM D 4101, POLYPROPYLENE PLASTIC. THE CENTERLINE OF OPENING MUST BE WITHIN 2'-0" FROM STEPS.
12. ANY NECESSARY ADJUSTMENTS DURING CONSTRUCTION WILL BE DONE BY SAW-CUTTING AND/OR CORING ONLY. NO JACKHAMMERS, HAMMERS AND CHISELS OR PNEUMATIC TOOLS WILL BE ALLOWED.

CATCH BASIN

NOT TO SCALE



SECTION



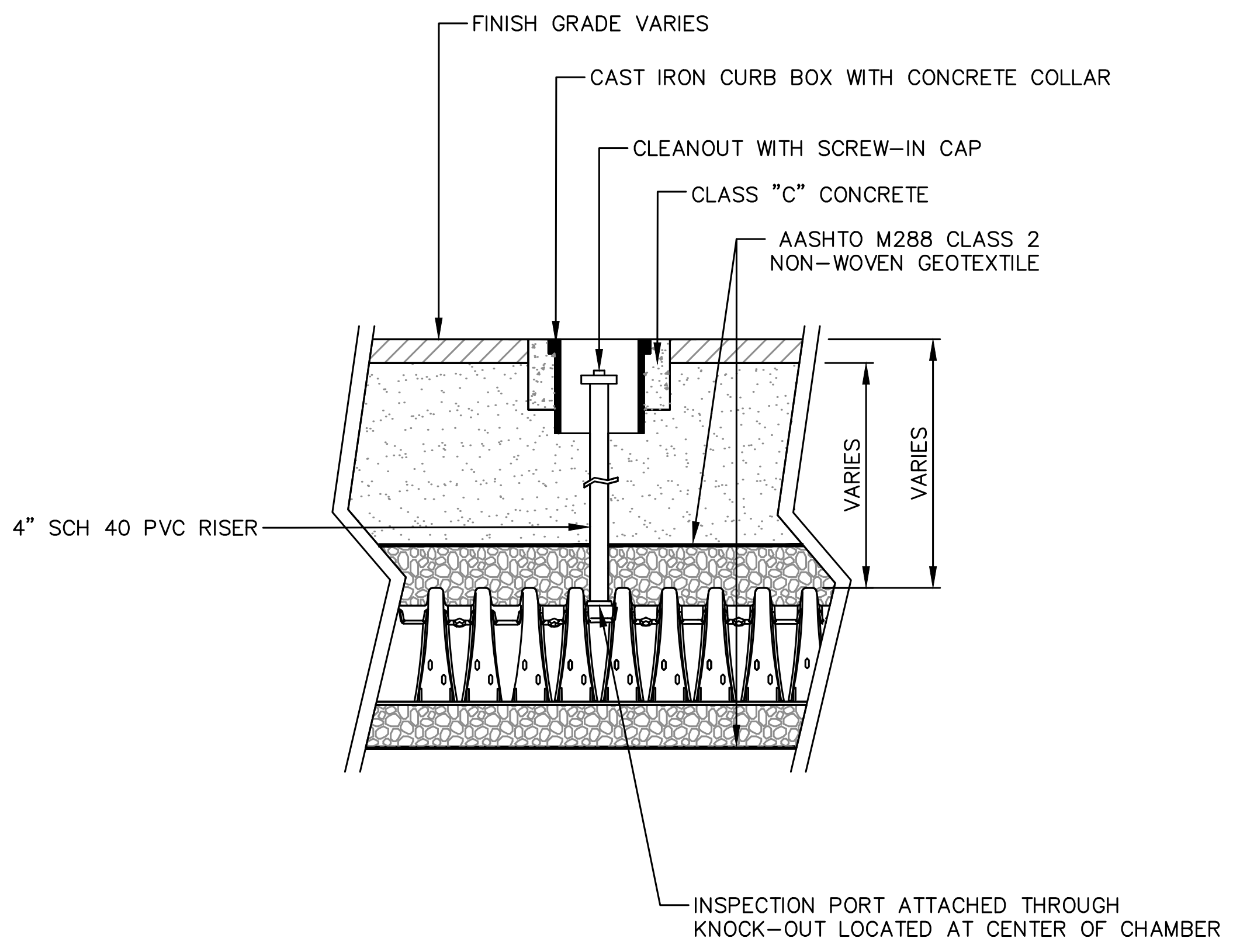
PLAN

NOTES:

1. GEOTEXTILE FABRICS SHALL MEET MANUFACTURER'S SPECIFICATIONS.
2. WASHED CRUSHED STONE BELOW CHAMBERS SHALL BE COMPACTED TO 95% STANDARD PROCTOR DENSITY.
3. COMPACT FOUNDATION STONE WITH VIBRATARY COMPACTOR.
4. NO COMPACTION IS REQUIRED FOR EMBEDMENT STONE SURROUNDING CHAMBERS.
5. BEGIN COMPACTION AFTER 12" OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL MATERIAL IN 6" LIFTS TO 95% STANDARD PROCTOR DENSITY.
6. INSTALL PER MANUFACTURER'S INSTRUCTIONS.
7. SAND SHALL MEET THE REQUIREMENTS OF AASHTO-M-6 OR ASTM-C-33. ON-SITE MATERIAL MAY BE USED IF IT CONFORMS TO THE SPECIFICATIONS.
8. EMBEDMENT STONE AND FOUNDATION STONE SHALL CONFORM TO MANUFACTURER'S SPECIFICATIONS.

SUBSURFACE INFILTRATION SYSTEM

NOT TO SCALE



INSPECTION PORT

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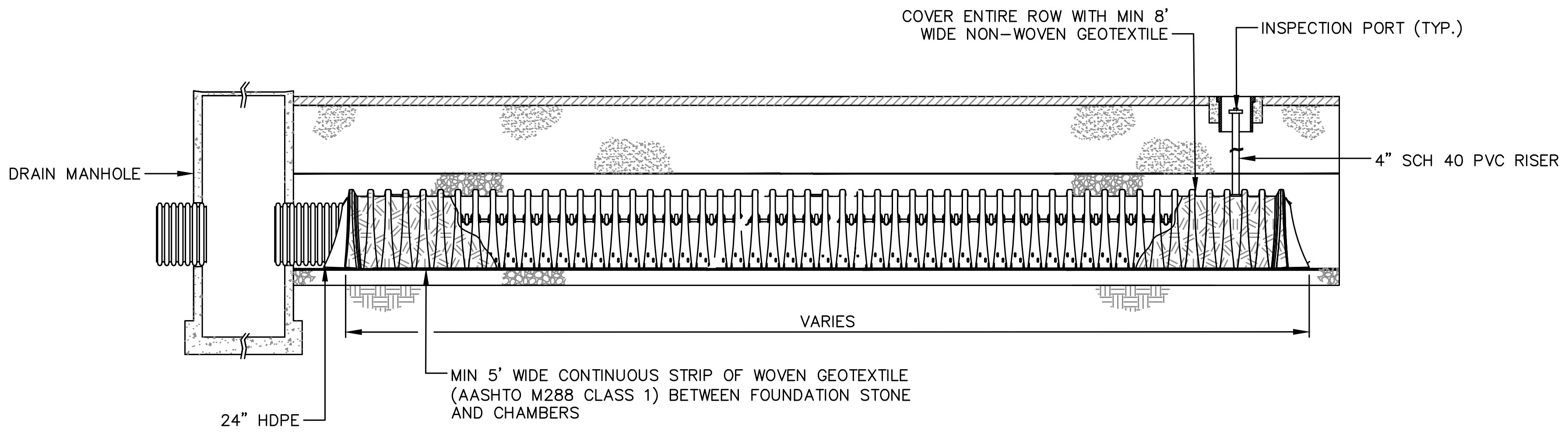


NOTES:

1 INSTALL PER MANUFACTURER'S INSTRUCTIONS.

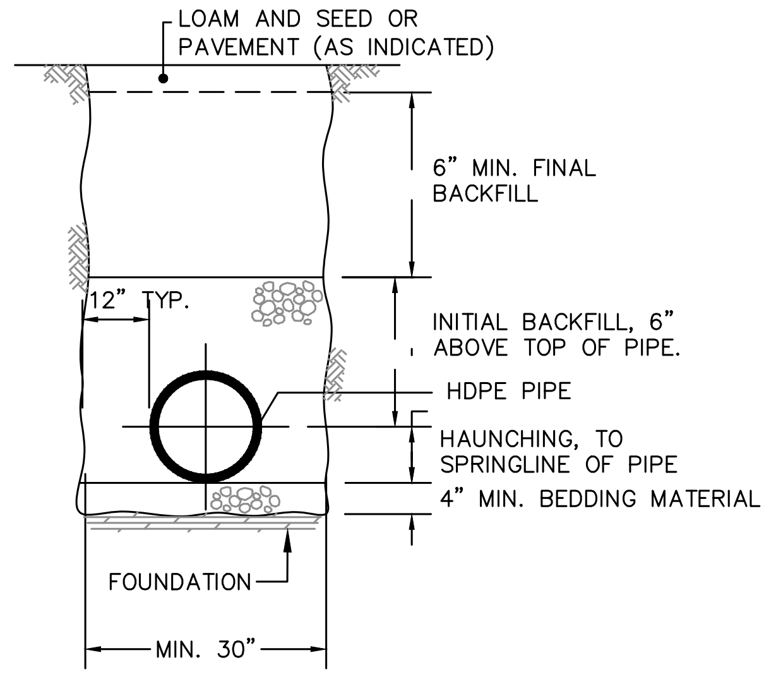
2. GEOTEXTILE FABRICS SHALL MEET MANUFACTURER'S SPECIFICATIONS.

ISOLATOR ROW

NOT TO SCALE

NOTE:

1. FOUNDATION: WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH A FOUNDATION OF CLASS I OR II MATERIAL AS DEFINED IN ASTM D2321, "STANDARD PRACTICE FOR INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY-FLOW APPLICATIONS," LATEST EDITION; AS AN ALTERNATIVE AND AT THE DISCRETION OF THE ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING A WOVEN GEOTEXTILE FABRIC.
2. BEDDING: SUITABLE MATERIAL SHALL BE CLASS II AND INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION.
3. HAUNCHING AND INITIAL BACKFILL: SUITABLE MATERIAL SHALL BE CLASS II AND INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION.
4. THE MINIMUM TRENCH WIDTH FOR 12" HDPE PIPING SHALL BE 31".
5. BEDDING MATERIAL AND INITIAL BACKFILL: ALL BEDDING MATERIAL AND INITIAL BACKFILL SHALL BE CLEAN, FREE OF DEBRIS AND RUBBLE, AND FREE OF MATERIALS WHICH MAY CAUSE POLLUTION OF SURFACE WATERS AND GROUNDWATER.



STORM DRAIN TRENCH FOR HDPE PIPE

NOT TO SCALE

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CITY OF CRANSTON

DETAILS

POMHAM STREET STORMWATER IMPROVEMENTS

CRANSTON RHODE ISLAND

PROJ. No.: 20200078.A40
DATE:NOVEMBER 2023

CD-502

Appendix E

Barrett St. Green Infrastructure Outreach Flyer

Come learn what the City of Cranston is doing to improve water quality in Spectacle Pond!

Wednesday, October 26, 2022
5:00 to 6:00pm

End of Barrett Street
Cranston, RI

Hear from experts in the field!

Learn more about the Barrett Street water quality improvement project. Including the proposed construction of a subsurface infiltration system.

To Register, please email: *etally@cranstonri.gov*

Presented by the City of Cranston and Fuss & O'Neill, as part of Southeast New England Program (SNEP).

FUSS & O'NEILL
ENGINEERS • SCIENTISTS • PLANNERS

1754 - 1910

SNEP

Appendix F

2023 Stormwater Training

CITY OF CRANSTON
Appendix F

2023 Stormwater Training and Outreach

Date	Title	Hosting Organization	Location	Length (hrs)	Topic	Attendees
2/13/2024	Emerging Stormwater Technologies in RI	New England Environmental Finance Center	Webinar	1.5	Green Infrastructure Technologies	Ed Tally
3/15/2023	Funding Water Quality Restoration and Climate Resilience Projects in RI	SNEP Network	Webinar	2	Grant Funding Workshop	Ed Tally
4/26/2023	SIC Stormwater Maintenance Training	Stormwater Innovation Center	Roger Williams Park Botantical Center	2.5	Stormwater Maintenance	Rob Maio
5/25/2023	SIC North Kingstown Stormwater Maintenance Training	Stormwater Innovation Center	North Kingstown Town Hall	3	Stormwater Maintenance	Rob Maio, Ed Tally
10/18/2023	Stormwater Innovation Expo	RI Green Infrastructure Coalition	Roger Williams Park	7	Green Infrastructure	Rob Maio, Ed Tally

Ed Tally - Environmental Program Manager
Robert Maio - Surveyor
Maria Giarusso - GIS Manager
Paul Murray - Plumbing Inspector
Justin Mateus - Chief Engineer

Appendix G

Public Notice of Annual Report

WW

Cranston H

THURSDAY, FEBRUARY 29, 2024

2 SECT

Fo

their claims in the office of the probate clerk within the time required by law beginning February 29, 2024

CHAN SEMCO, SUSAN ESTATE
Suwin Chan has qualified as Executrix; creditors must file their claims in the office of the probate

the logon information provided below as posted on the City's website at www.cranstonri.gov and Secretary of State's website at www.sos.ri.gov.

Please click the link below to join the webinar:
https://zoom.us/j/97210372996?pwd=aS92ZW

City of Cranston
Notice of Plan Availability

As required by RIPDES Phase II Storm Water Permit #RIR040012, the City of Cranston announces the availability of the 2023 RIPDES Small MS4 Annual Report to be submitted to RIDEM.

Cranston must submit the report to DEM by March 10, 2024.

A copy of the draft report is available for public review prior to submission at the Department of Public Works, City Hall, Room 109 from 8:30 am to 4:30 pm Monday through Friday

Kenneth J. Hopkins
Mayor

Justin Mateus, P.E.
Acting Director, Public Works

tion, amendment or repeal of the zoning ordinance or zoning map(s), as well as any proposal for amendment to the comprehensive plan of the city. Immediately upon receipt of the proposal, the city clerk shall refer the proposal to the city council and to the planning commission for study and recommendation. The planning commission shall, in turn, notify and seek the advice of the city planning department and shall report to the city council within forty-five (45) days after receipt of the proposal, giving its findings and recommendations as prescribed in Rhode Island General Laws Section 45-24-52. Where a proposal for adoption, amendment or repeal of a zoning ordinance or zoning map or any proposal for amendment to the comprehensive plan of the city is made by the city planning commission, the requirements for study by the commission may be waived, provided that the proposal by the planning commission includes its findings and recommendations pursuant to Rhode Island General Laws Section 45-24-52. The city council shall hold a public hearing within sixty-five (65) days of receipt of a proposal, giving proper notice as prescribed in Section 17.120.040. The city council shall render a decision on any proposal within forty-five (45) days after the date of completion of the public hearing. The provisions of this section pertaining to deadlines shall not be construed to apply to any extension consented to by an applicant.

Each proposal for adoption,

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ON THE BOARD: Cranstonians from all over the city came to the on the updated comprehensive plan. *(Photos by Kevin Fitzpatrick)*

have the opport

ACLU investigates training attended by Cranston poli

Appendix H

City Council Resolution & OWMP

CITY OF CRANSTON

RESOLUTION OF THE CITY COUNCIL

TO PARTICIPATE IN THE RI INFRASTRUCTURE BANK'S COMMUNITY SEPTIC SYSTEM LOAN PROGRAM

No. 2023-23

Passed:
June 26, 2023

Jessica M. Marino, Council President

Resolved, that

WHEREAS, the City of Cranston wishes to participate in the RI Infrastructure Bank's Community Septic System Loan Program (CSSLP) in order to assist property owners in Cranston who are required to repair or replace failing septic systems and cesspools; and

WHEREAS, such approval is a prerequisite for participation in the CSSLP

NOW, THEREFORE, BE IT RESOLVED THAT, the Honorable Cranston City Council authorizes Administration and the Finance Director to execute any and all documents necessary to participate in the Rhode Island Infrastructure Bank's Community Septic System Loan Program including the request for a non-restoring line of credit in the amount of $500,000 to be allocated.

The following criteria shall be applied to all CSSLP loans in the City of Cranston administered by Rhode Island Housing:

1. The maximum amount of each loan shall be $30,000
2. The loans shall be interest free, however borrowers shall pay a one-time origination fee of $300 and a 1% annual servicing charge on the outstanding balance.
3. The term shall be up to a maximum of ten (10) years.
4. Residential properties with up to 4 units shall be eligible.
5. There shall be no income limits for program participants.
6. A property owner must first acquire an approved RIDEM Onsite Wastewater Treatment System Permit to be eligible for funding.
7. Funding is released to the homeowner when RI Housing receives RIDEM Certificate of Conformance after the work is complete.

Sponsored by: Jessica M. Marino, Council President
Referred to Finance Committee June 5, 2023

U/Resolutions/Community Septic System Loan Program

Cranston, Rhode Island

Onsite Wastewater Management Plan

Prepared by

Weston & Sampson

CITY APPROVAL: June 26, 2023

TABLE OF CONTENTS

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EXECUTIVE SUMMARY

If we assume, like Rhode Island as a whole, that one-third of Cranston's approximately 6,150 onsite wastewater treatment systems (e.g., septic systems and cesspools) are substandard, then we could estimate that approximately 1,045 or other substandard onsite wastewater systems likely exist in the City and are probably at least 50 years old, since 1968 was the last year that a cesspool could be legally installed. Systems of this age are past their life expectancy and are, therefore, prone to failure. A failed onsite wastewater treatment system presents health and environmental risk not to mention an inconvenience and unexpected expense.

The primary purpose of the Cranston Onsite Wastewater Management Plan is to enable the City to qualify for a line of credit under Rhode Island's Community Septic System Loan Program (CSSLP), which will allow homeowners with failed and substandard onsite wastewater treatment systems to use their homes as collateral to access low-interest loans and upgrade their systems. The CSSLP has been in existence for over 20 years and over 20 Rhode Island communities currently participate in it.

The Cranston Onsite Wastewater Management Plan also describes the basics of onsite wastewater treatment and disposal, how the standards apply to existing conditions in the City, regulatory and management issues, and plan implementation.

1.0 INTRODUCTION

The City of Cranston, Rhode Island (the City) has gathered information about both current and future environmental and public health issues related to onsite wastewater treatment and disposal. Encompassing approximately 30 square miles, the City is located in the east-central portion of Rhode Island. As of the 2020 decennial census, Cranston has a population of 82,935 (population density of approximately 2,925/square mile). From 2010 to 2020 the City's population growth was approximately 3.2%. 2020 census data indicates that there are a total of 34,482 housing units within the City. Interstate 295 bisects the City, with the majority of residents living in Eastern Cranston.

The eastern portion of the City is generally served by public sewer; however, there are isolated parcels where properties are served by septic systems. The western portion of the City is primarily served by septic systems. The Assessor's records show there are over 32,000 parcels in Cranston with 5,503 parcels without buildings and 26,497 parcels with buildings. Of those 26,497 developed parcels, 22,241 records are on the "Sewer Roll," meaning that 4,256 parcels with buildings are not connected to sewers.[1]

The Cranston Onsite Wastewater Management Plan (Cranston OWMP) provides information about how onsite systems work, how to improve system performance in sensitive environments, why maintenance of the systems is important, and what options a community or group of communities has for managing onsite systems. Western Cranston (see Figure 1) is considered the management area for this OWMP. The City Council resolution provided in Appendix A demonstrates the City of Cranston has formally decided to participate in development and submittal of this plan.

1.1 The Case for Onsite System Management

In their 1997 Response to Congress, the United States Environmental Protection Agency (US EPA) concluded that "adequately managed decentralized wastewater systems are a cost-effective and long-term option for meeting public health and water quality goals, particularly in less densely populated areas." To support onsite system management programs at the local and state levels, the US EPA released guidelines that are structured to reflect an increasing need for more comprehensive management as the sensitivity of the environment or the degree of technological complexity increases (US EPA, 2003). Local or state regulators can use these voluntary guidelines as a basis for their onsite system management programs to reduce the public health and water quality concerns associated with these systems.

Domestic sewage contains high concentrations of total suspended solids (TSS), 5-Day biochemical oxygen demand (BOD_5), pathogens, ammonium nitrogen, total nitrogen, and total phosphorus, as well as varying amounts of heavy metals, organic compounds, pharmaceuticals, and other potentially hazardous materials. A properly installed and operated onsite system can treat many of the constituents present in residential wastewater. Standard and properly installed onsite systems that protect public health may not, however, protect drinking water supplies, recreational waters, or aquatic habitats from the nutrient loading those onsite systems can add to local waters.

Improperly designed or constructed systems—for example, where the disposal field is too close to groundwater—can adversely affect groundwater through the release of pathogens, nutrients, and other contaminants. Cesspools are no longer allowed in Rhode Island for new construction because they do not provide adequate treatment. Notwithstanding, some cesspools still exist, particularly on

---

[1] The number of parcels with buildings not on the sewer (i.e. with individual septic), is from the 2010 Comprehensive Plan.

older lots. Cesspools lack treatment design and are generally undersized for modern wastewater needs. Even when onsite systems are properly designed, located, and operated, they can have public health and ecological effects on groundwater and surface waters. Where very coarse soils exist, pathogens and nitrate can more easily wash through the soils into groundwater.

Cranston is primarily within the watersheds of the Pawtuxet River, Providence River, and Seekonk River. A small area of the northwestern corner of Cranston is in the Scituate Reservoir Watershed and, therefore, contributes runoff to the Providence Water supply.

With the exception of a few private wells, Cranston is predominantly served by Providence Water. Drilled wells are usually sealed into solid bedrock and tap into groundwater reservoirs far below the surface. Thus, drilled bedrock wells are often somewhat protected from the potential effects of onsite systems. Shallow wells and springs use shallower groundwater sources and may not be adequately protected from sources of surface contamination, including pollutants from substandard or failing onsite systems.

Presently, approximately 6,150 developed properties within Cranston rely on onsite systems for wastewater disposal.[2] Since 1982, 670 of these onsite systems were repaired or upgraded due to system failure. Localized clusters of system failures, particularly in areas with small lots or older development may have the potential to affect local groundwater or surface water quality, although data documenting these effects generally do not exist.

In addition to the effects of onsite systems on local drinking water supplies, an overabundance of nutrients from human sources getting into surface waters can lead to the excessive growth of algae and other nuisance aquatic plants—a process known as cultural eutrophication. Freshwater lakes and ponds can be particularly affected by phosphorus from onsite system effluent. Coastal embayments with shellfisheries can also be negatively affected by high nutrient loads and can be closed to production because of high pathogen counts in the waters. Since Cranston’s surface waters all eventually discharge to the Narragansett Bay (the Bay), improperly functioning onsite systems in the City can contribute to the cumulative effect of high nutrient and pathogen loadings in the Bay.

To ensure the safe disposal of wastewater from onsite systems, the Rhode Island Department of Environmental Management (RIDEM) enacted regulations governing the installation and repair of septic systems; however, under normal circumstances, these rules cannot be applied to systems that were installed before the regulations, and the rules do not provide for the maintenance of onsite systems after they are constructed. Thus, using only the State rules to govern onsite wastewater disposal, communities are not able to ensure that onsite systems remain a viable infrastructure for protecting drinking water and surface water quality.

Local governments can implement onsite wastewater management programs (OWM programs) to address existing problems resulting from onsite wastewater disposal, or as proactive measures to protect drinking water and other sensitive resources where problems are not yet documented. Several Rhode Island towns, including Charlestown, Narragansett, South Kingstown, Block Island, North Kingstown, and Tiverton, established protective septic system siting requirements beyond those required by State regulations and implemented OWM programs to protect water quality and other natural resources in their communities. RIDEM and the RI Coastal Resources Management Council (CRMC) revised the freshwater wetlands rules to implement amendments to state law that were aimed

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[2] The number of OWTS cited here (6,150) is based on the number of parcels with buildings not served by sewer plus the additional parcel potential in western Cranston (2002 OSWMP; 2010 Comprehensive Plan).

at strengthening wetlands protection, providing clarity and predictability, and streamlining the permitting process for development and other activities conducted in proximity to freshwater wetlands. These rule changes address the siting of OWTS and were implemented in 2018.

1.2 Plan Overview

The purpose of this plan is to:

- Provide the City and the public with a summary of onsite wastewater issues.
- Provide a substantive means of dealing with the City's onsite wastewater issues in an environmentally responsible way.
- Enable the City to qualify for a line of credit under CSSLP.

The following sections describe the basics of onsite wastewater treatment and disposal, how the standards apply to existing conditions in the City, regulatory and management issues, and plan implementation.

2.0 THE BASICS OF ONSITE WASTEWATER TREATMENT AND DISPOSAL

Decentralized water supply and wastewater treatment and disposal technology choices can have a significant effect on protecting water supplies and surface waters, meeting development density goals, and preserving traditional New England-village land use patterns. Onsite and clustered systems can be protective of public health, drinking water supplies, and the quality of water resources if they are properly planned, installed, operated, and maintained. When they are managed properly, these systems can also protect property values, preserve tax bases, result in lifecycle cost savings, and further Rhode Island's ultimate goals for thoughtful development and land use. Current state regulations, recent technology improvements (including management system technologies for smaller systems), and new management models give communities more options for meeting public health, environmental, and land use planning goals. The following sections explain how septic systems function, what land characteristics and soil conditions are needed for proper treatment performance, and what types of effects systems can have on the environment.

2.1 Typical Components in an Onsite Wastewater Treatment System

A typical OWTS includes two major components—a septic tank and a disposal field. The septic tank is a watertight structure that allows solids to settle to the bottom. Scum, grease, and oils rise to the top of the tank, and are kept from leaving the tank by baffles. Relatively clear effluent leaves the septic tank. Newer tanks include access risers to the ground surface for easy access and maintenance and an effluent filter at the tank outlet that keeps solids from leaving the tank and clogging the disposal field. The septic tank provides primary treatment of the sewage and is a vitally important part of the entire system. Older tanks may leak and may eventually collapse. The baffles in older tanks may also deteriorate, allowing scum, oils, or solids to escape into the disposal field.

The disposal field is designed to maintain unsaturated soil conditions below the disposal field and provides both physical and biochemical treatment of wastewater effluent. As the effluent moves through the soil, solids and microbes are physically filtered out of the wastewater. Treatment processes that occur in the unsaturated soils between the disposal field and groundwater, impervious soils, and bedrock significantly reduce pathogen levels, provide some adsorption, and may transform forms of nitrogen compounds.

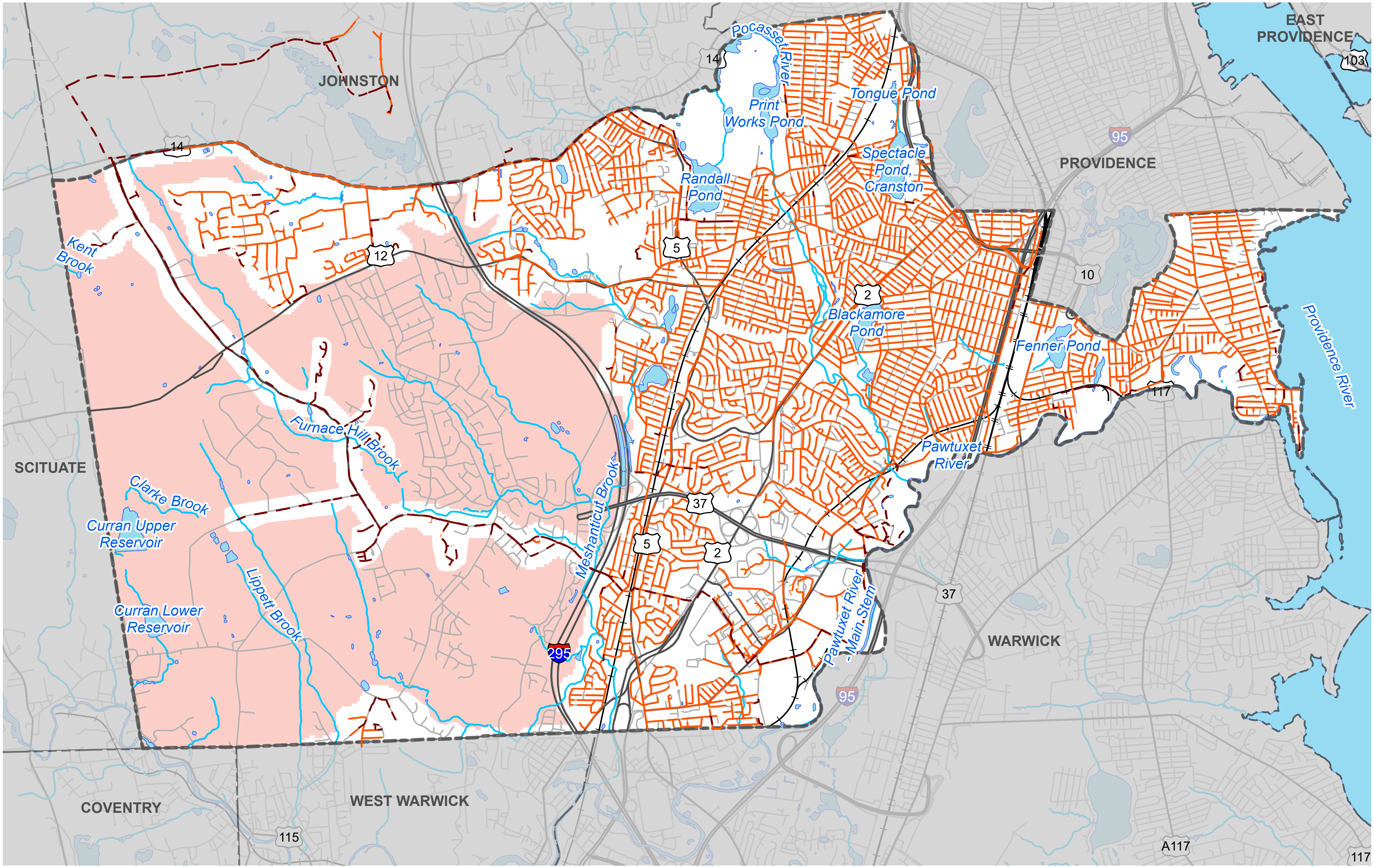
2.2 Onsite System Treatment Performance

Much of the treatment in the disposal field occurs at the interface between the media (typically stone) and the undisturbed soil, where a chemical and biological layer known as a biomat forms. A biomat is often less permeable than the surrounding soils, and system design standards take into account the long-term acceptance rate of the biomat.

Soil can provide treatment of effluent through a series of physical, chemical, and biological processes. However, some of the nutrients (such as nitrate) are capable of moving through the soil into the groundwater (and surface waters). Nitrogen can undergo several transformations in and below the disposal field. Nitrification, the conversion of ammonium nitrogen to nitrite and then nitrate by bacteria is the predominant transformation. However, if there is inadequate separation to seasonal groundwater, this conversion may not occur.

Although traditional onsite septic systems can treat many of the constituents present in residential wastewater, OWTSs can still have public health effects and ecological effects. Other wastewater constituents that can cause problems in drinking water and surface waters include the following:

- Toxic organic compounds in household chemicals can be persistent in groundwater and cause damage to surface water ecosystems and human health.



- Sewer Gravity Mains
- Sewer Pressurized Mains
- Roads
- Major Roads
- Railroad
- Town Boundary
- Mangement Area
- Water Bodies
- Rivers and Streams

FIGURE 1
CITY OF CRANSTON, RI
WASTEWATER MANAGEMENT PLAN

ONSITE WASTEWATER MANAGEMENT AREA

5,000 0 5,000

Scale In Feet

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- Dissolved inorganic compounds like chloride and sulfide can cause taste and odor problems in drinking water.
- Pharmaceuticals can be persistent in groundwater and recent studies are evaluating their potential effect on drinking water and surface waters.

2.3 Failing and Substandard Systems

Failing or substandard septic systems that pollute water resources are considered a category of nonpoint source (NPS) pollution. This type of wastewater pollution is considered to be a significant contributor to water quality contamination both regionally and nationally.

Cesspools and Other Substandard Systems

Systems installed prior to the advent of permitting (circa 1968), were built without the benefit of today's regulatory requirements. These older systems may still "function" in the sense that sewage is not backing up into the plumbing or surfacing in the yard, but they do not always function properly in terms of treating the wastewater before it reaches groundwater or surface water. Many of these older systems are cesspools.

Cesspools are disposal systems without septic tanks, where raw sewage enters a single perforated or bottomless tank and leaches out through holes in the sides and bottom. Cesspools typically do not provide enough interface with the soil to properly treat wastewater. This type of system does not provide adequate treatment and is not allowed in Rhode Island for new construction, although cesspools may still serve some older residences.

There are likely about 1,000 cesspools and other substandard systems in Cranston. This estimate is based on using median value of two different approaches to determining the number of substandard systems.

- According to the Rhode Island Cesspool Act of 2007 (RIGL 23-19.15-2; see Section 4.2), as of 2013 there are approximately 25,000 cesspools in Rhode Island meaning that approximately 17% of Rhode Island's roughly 150,000 OWTS are cesspools. If we extrapolate this estimate to Cranston and assume that 17% of Cranston's approximately 6,150 OWTS are substandard systems, then we could estimate that approximately 1,045 cesspools likely exist in the City.
- When we use City assessor records of building data and OWTS permit data collected by RIDEM,[3] we estimate that approximately 980 substandard systems likely exist in the City.[4, 5]

Failing Systems

Modern septic systems, even those that are sited and installed properly, can still fail if they are not maintained. Conditions that can cause the soil to provide poor treatment primarily involve hydraulic or organic overloading of the disposal field. This overloading is most commonly caused by failure to maintain the septic tank.

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[3] The state of Rhode Island has run the OWTS permitting program since 1968. Records were collected originally in hard copy, until an electronic data system was installed. Current, records are available in the electronic database from 1992 to present. The searchable records are used as a representative sample.

[4] The number of repaired OWTS (640) is based on RIDEM permit records from 1992-2021 classified RPR.

[5] Town assessor data on residences built since 1970 was searched to find residences on streets outside of sewered areas shown within the 2017 Comprehensive Plan. This search resulted in 1,457 records, 224 of which are partially sewered streets. Another 365 are known to have permitted OWTS (according to the Town Wastewater Facilities Plan Amendment in 2010). Assuming 50% of residences on partially sewered streets (1/2 of 224) have OWTS, this estimate is 980 (1,457 minus 112 minus 365).

Section 3.7 of this plan discusses City specific data pertaining to failing systems from 1992 to the present.

2.4 Patterns of Development and Implications for the Environment

Preserving compact village development patterns while also protecting public health and water quality by improving OWTSs is a delicate balance. Both in villages and in more rural areas, the use of OWTSs for wastewater disposal creates important concerns regarding nutrient and bacterial loadings, particularly near or over important water resources, aquifers, and recreational waters. The most common environmental and public health effects attributed to OWTSs are effects from the pathogens and nutrients that can be present in wastewater effluent.

Potential effects on surface waters that are used for swimming and other forms of recreation are typically monitored, and swimming areas can be closed if indicator pathogens, such as *Enterococcus* or *E. coli*, are reported in high numbers; however, it is widely recognized that these bacteria indicate only the potential presence of other water-borne pathogens; thus, the presence of indicator bacteria does not exclude other sources of pathogens or necessarily mean that nearby OWTSs are performing improperly. In recent years, new methods for monitoring pathogens near recreation areas have been developed. Microbial source typing, for instance, attempts to identify the type of animal that was the source for a certain bacterium.

As previously identified, an overabundance of nutrients from human sources in surface waters can lead to cultural eutrophication. Freshwater lakes and ponds can be affected by phosphorus from septic system effluent. Coastal embayments with shellfisheries can also be negatively affected by high nutrient loads and can be closed to production because of pathogens in the waters. Since Cranston's surface waters all eventually discharge to Narragansett Bay, they can contribute to the cumulative effect of high nutrient and pathogen amounts.

Table 2-1 (below) adapted from USEPA's 2002 Onsite Wastewater Treatment Systems Manual, lists the types of land and soil characteristics (along with other design factors) used in evaluating existing and future OWTS locations.

Table 2-1. Typical Use of OWTSs

Design Issue	Common Use or Application	Applications to Avoid
Type of wastewater service	Domestic and commercial (residential, mobile home parks, schools, restaurants, etc.,)	Facilities with non-sanitary and/or industrial wastewaters. Local codes may contain additional restrictions.
Daily flow	<20 population equivalents unless a management entity exists	>20 population equivalents without a management program. Local codes may contain specific or special conditions (e.g., USEPA or state Underground Injection Control Program Class V rule)
Minimum pretreatment	Septic tank	Discharge of raw wastewater to disposal field, cesspool, etc.
Lot orientation	Loading along contour(s) must not exceed the allowable loading rate	Any site where hydraulic loads from the system will exceed allowable contour loading rates

Table 2-1. Typical Use of OWTSs

Design Issue	Common Use or Application	Applications to Avoid
Landscape position	Ridge lines, hilltops, shoulder/side slopes	Depressions, foot slopes, concave slopes, floodplains
Topography	Planar, mildly undulating slopes of ≤20% grade	Complex Slopes of >30%
Soil texture	Sands to clay loams	Very fine sands, heavy clays, expandable clays
Soil structure	Granular, blocky	Platy, prismatic, or massive
Drainage	Moderately drained or well-drained	Extremely well-drained, somewhat poor or very poorly drained
Depth to groundwater	>5 feet	<2 feet. Check local codes for specific requirements

Note:

Source: Table 4-2 “Characteristics of Typical SWIS Applications,” https://www.epa.gov/sites/production/files/2015-06/documents/2004_07_07_septics_septic_2002_osdm_all.pdf.

3.0 EXISTING CONDITIONS

An essential part of building an OWMP is an understanding of the local environment (e.g., soils and hydrogeology); sensitive resources (e.g., public and private drinking water supplies), regulatory conditions (e.g., municipal planning and zoning regulations); and current wastewater management infrastructure. The following sections of this plan describe the key characteristics in the City that influence the locations and performance of septic systems.

3.1 Land Use, Zoning, and Demographics

The City of Cranston encompasses a total area of 28.6 square miles, with boundaries formed by the town of Johnston to the north, the City of Providence to the north and east, the municipalities of Warwick and West Warwick to the south, and Scituate and Coventry to the west. Providence River also forms part of the eastern border of Cranston.

As of the 2020 decennial census, Cranston has a population of 82,935 (population density of approximately 2,925/square mile). From 2010 to 2020 the City's population growth was approximately 3.2%. Census data from 2020 indicates that there are a total of 34,482 housing units within the City.

3.2 Soils and Geology

Soils vary based on parent geologic materials, slope, hydrology, human disturbance, and other factors. For this assessment, we are primarily concerned with soil properties that determine suitability for siting of OWTSs. These properties include depth to seasonal high groundwater, depth to bedrock, soil texture and structure, and slope. State regulations require four feet from the ground surface to seasonal high groundwater table, or a vertical separation of three feet from the bottom of the system. A five-foot separation is required from the bottom of the system to impervious soils or bedrock.

Based on the data from Rhode Island GIS (RIGIS), 24% percent of the land in Cranston is categorized as having severe constraints for development. Soils considered as having moderate constraints to development account for 27% of the City, while 21% of the City has slight constraints. Approximately 28% of the City has soils considered to have unknown constraints to development, and need further site investigations to determine the level of development constraints. Figure 2 shows the location of restrictive soils across the management area.

Table 3-2. Soil Development Classifications for Cranston

Development Constraint	Percentage of Land
Soils have severe constraints	24%
Soils have moderate constraints	27%
Soils have slight constraints	21%
Unknown	28%

Source: Rhode Island GIS

3.3 Surface Water and Water Quality

The City of Cranston has several prominent fresh and estuarine surface waterbodies. Named waters include:

- Blackamore Pond
- Clarke Brook

- Dyer Pond
- Fenner Pond
- Furnace Hill Brook and Tributaries
- J.L. Curran Reservoir (Fiskeville Reservoir)
- Lippet Brook and Tributaries
- Meshanticut Brook and Tributaries
- Meshanticut Pond
- Pawtuxet River Main Stem
- Pawtuxet River North Branch
- Pocasset River and Tributaries
- Print Works Pond
- Providence River
- Randall Pond
- Spectacle Pond
- Stone Pond
- Tongue Pond

In addition to these major waterbodies, the City has abundant small ponds, brooks and streams that form a network that extends beyond the boundaries of the City.

There are several waterbodies in City that either already have a TMDL or are required to have one in the future. Table 3-1, below, provides a list of waterbodies in Cranston that are included in RIDEMs Impaired Waters List 2018 - 2020.

Table 3-1. List of Impaired Waterbodies 2018-2020[a]

Waterbody	Impairment	TMDL Status and Schedule
Blackamore Pond	Phosphorus (Total)	TMDL (2024)
Fenner Pond	Phosphorous (Total)	TMDL (2024)
Meshanticut Brook and Tributaries	Enterococcus	TMDL Approved
Pawtuxet River North Branch	Mercury in Fish Tissue	TMDL (2026)
Pawtuxet River Main Stem	Phosphorous (Total)	TMDL (2023)
	Mercury in fish tissue	TMDL (2028)
	Enterococcus	TMDL (2020)
	Nonnative Plants	No TMDL Required
Pocasset River and Tributaries	Benthic-Macroinvertebrate Bioassessments	TMDL (2026)
	Chloride	TMDL (2026)
	Copper	TMDL (2026)
	Nonnative Plants	No TMDL Required
	Enterococcus	TMDL (2020)
Print Works Pond	Total Suspended Solids	TMDL (2026)
	Chloride	TMDL (2026)
	Lead	TMDL (2026)
	Fecal Coliform	TMDL (2024)
Providence River	Dissolved Oxygen	TMDL (2023)
	Nitrogen (Total)	TMDL (2023)
	Fecal Coliform	TMDL (2025)

Table 3-1. List of Impaired Waterbodies 2018-2020[a]

Waterbody	Impairment	TMDL Status and Schedule
Spectacle Pond	Chlorophyl-a	TMDL Approved
	Dissolved Oxygen	TMDL Approved
	Phosphorus (Total)	TMDL Approved

Notes:

a. Source: State of Rhode Island 2021 Impaired Waters Report
b. Listed as scheduled for 2020 although the scheduled timeframe has passed.

3.4 Groundwater and Drinking Water Supplies

Groundwater is found in fractured rock and saturated soil formations, where water is stored in spaces within the rock or soil. Aquifers occur where these formations can yield substantial amounts of water. Unconfined aquifers occur where unsaturated porous materials overlie the saturated formations. These aquifers can be extremely complex, and their yields can vary greatly. Unconfined aquifers are also susceptible to pollution from septic systems and other sources since contaminants can move relatively quickly in saturated materials.

Even when properly designed, located and operated, septic systems can affect groundwater through the discharge of nitrate, phosphorus and pathogens. Where very coarse soils exist, pathogens and nitrate can more easily wash through the soils into groundwater. Substandard systems, where the disposal field is below or too close to the seasonal high groundwater table, can affect groundwater through incomplete soil-based treatment that allows pathogens, nitrate, and other contaminants to enter the groundwater. Maintaining minimum setbacks and construction requirements typically provides protection from contamination. Higher levels of wastewater treatment can be required as additional protection from nutrients or pathogens.

Cranston is mainly within the Pawtuxet River watershed which includes the Pawtuxet River, the North Branch of the Pawtuxet River, the Pocassett River, and the Scituate Reservoir. A small corner in the northeast part of the City is located in the Woonasquatucket River and Moshassuck River watersheds. Cranston's principal waterbodies are primarily rivers which are tidally influenced near the coast, and inland ponds. These are all vulnerable to impacts associated with sea level rise and coastal storm surge, nonpoint source pollution, eutrophication, sedimentation, and invasive species. Cranston's drinking water is managed by Providence Water. The main source of water is from the Scituate Reservoir which is the terminal reservoir in a network of six interconnected reservoirs: the Scituate Reservoir, Regulating Reservoir, Barden Reservoir, Ponaganset Reservoir, Westconnaug Reservoir, and Moswansicut Reservoir.

3.5 Current Wastewater Infrastructure

This section discusses the extent of sewer system infrastructure and the extent of OWTSs in Cranston.

Use of Onsite Wastewater Treatment Systems

Septic system records compiled by the RIDEM, Office of Water Resources were reviewed for this project to identify the number of known disposal systems and failures over roughly the past 10 - 30 years. An electronic search was conducted for repair applications submitted to the RIDEM for the

City from 1992 through 2021.[6] Repair applications were chosen for review because they typically represent septic system failures and upgrade of cesspools. Cesspool upgrades commonly occur due to their failure. Failures may occur for a variety of reasons that include unfavorable soil conditions, high groundwater, ledge close to surface, improper maintenance, faulty construction, improper sizing, and increase in use above design capacity. System repair records help to establish the frequency of failures within a particular area and give an indication of the frequency of problems. The approximate locations of OWTS failures are shown in Figure 3. Figure 4 then shows these locations relative to environmentally sensitive areas and areas with environmental constraints. OWTS failure rate in Cranston is summarized in Table 3-2.

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[6] Permit and repair records are available in the RIDEM electronic database from 1992 to present. The searchable records are used here as a representative sample.

Table 3-2. Summary of OWTS Repairs and Enforcement Actions from 1992 to April 2021

Total OWTS	OWTS Repairs and Unresolved Enforcement Actions	Percent of OWTS Repaired or with Unresolved Enforcement Actions
6,150[1]	670[2]	11

Notes:

1. Total OWTS of 6,150 is estimated based on the 4,256 built parcels without sewer plus 1,894 potential additional parcels in Western Cranston (Cranston 2010 CCP)
2. This is the total number of repairs including upgrades to innovative and alternative systems, conventional systems, and upgrade of substandard system replacements.

Several factors were reviewed in order to map areas of apparent failure risk to onsite systems in the City. Some of these issues were discussed in previous sections, and thus will be briefly summarized in the following sections:

1. Septic system failure/repair rates
2. Soil suitability for onsite disposal systems
3. Surface and groundwater quality
4. Density of housing (lot sizes)
5. Depth of groundwater
6. Age of septic systems

According to RIDEM septic system records unresolved enforcement actions and repair applications total 670 between 1992 and April 2021. This represents about 11% of the total number of OWTSs in the City (assuming 6,150 developed parcels without sewer each have one OWTS). This equates to a failure rate of approximately 23 systems (or 0.37 percent)[7] per year.

An additional number of OWTSs must be upgraded by regulation when the property is sold. At the rate of 85 homes sold per year,[8] and with 11% of homes in Cranston having substandard systems, that will likely result in approximately 9 additional systems needing upgrade each year. Thus, the total number of OWTS needing replacement each year may be estimated at 32.

OWTS failures occur throughout Cranston, however, there are some areas in the City where clusters of known OWTS repairs and enforcement issues are present. These areas are reflected in Figure 4 and could pose wastewater disposal problems in the future.

Sewer System Extent and Expansion

The City of Cranston owns a municipal wastewater system that is operated by Veolia Water. It treats an average of 10.0 million gallons of wastewater per day, serving approximately 73,200 customers in Cranston. The WWTF shares the site with an incinerator capable of processing 66 dry tons of sludge per day.

Much of the service area of the wastewater system is located in the eastern section of the City. The developed parcels in the City that do not have sewer service discharge their wastewater to OWTS. Figure 5 provides a map of currently sewered areas in City as well as proposed areas for expansion.

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[7] Based on 670 failures over 352 months (i.e., from January 1992 to April 2021) and 6,150 total OWTSs.

[8] Redfin.com Cranston, RI Housing Market Trends.

According to the Cranston Facilities Plan, the only existing sewer infrastructure in place that makes sewer expansion growth in western Cranston feasible at this time would be via connection to the Rhode Island State Energy (RISE) return line.

The City's comprehensive plan update states that future development in western Cranston will require individual OWTS unless development projects can connect to the pressurized sewer line (RISE). The current City policy is generally not to extend sewer service to western Cranston; therefore, it is assumed that the western Cranston population that is sewered will likely not increase significantly while this policy is in place. That said, since the RISE line is a variable pressure force main the City policy is dependent on an ongoing sewer model, which is maintained by the City. There are certain locations on the RISE line where the pressures preclude sewer connections; however, the City is currently allowing most requested connections to the system with a small area near Wilbur Avenue being excluded. Essentially, capacity and pressure drives decision making.

4.0 STATE POLICY

To ensure the safe disposal of wastewater, RIDEM enacted regulations governing the installation and repair of septic systems. Several towns in Rhode Island have also enacted standards that go beyond rules promulgated by the State to protect groundwater and other natural resources. This section summarizes Rhode Island's state regulations for septic systems and provides information about local wastewater management programs already established in some other Rhode Island towns. We have also provided it as a description of the *Rhode Island Cesspool Act of 2007*.

4.1 RIDEM Regulations

In 2018, the RIDEM published the latest set of regulations (*Rules Establishing Minimum Standards Relating to Location, Design, Construction and Maintenance of Onsite Wastewater Treatment Systems*), referred to below as the 2018 RIDEM OWTS Regulations, concerning the use of septic systems. The regulations state that "No person shall install, construct, alter, or repair or cause to be installed, constructed, altered, or repaired any OWTS without first obtaining the Director's written approval of the plans and specifications for such work and without adhering to each and every term of the approval." The Rules were amended in July 2022 to be consistent with the recently adopted "Rules and Regulations Governing the Administration and Enforcement of the Freshwater Wetlands Act" (Freshwater Wetlands Rules) (250-RICR-150-15-3), which went into effect July 1, 2022.

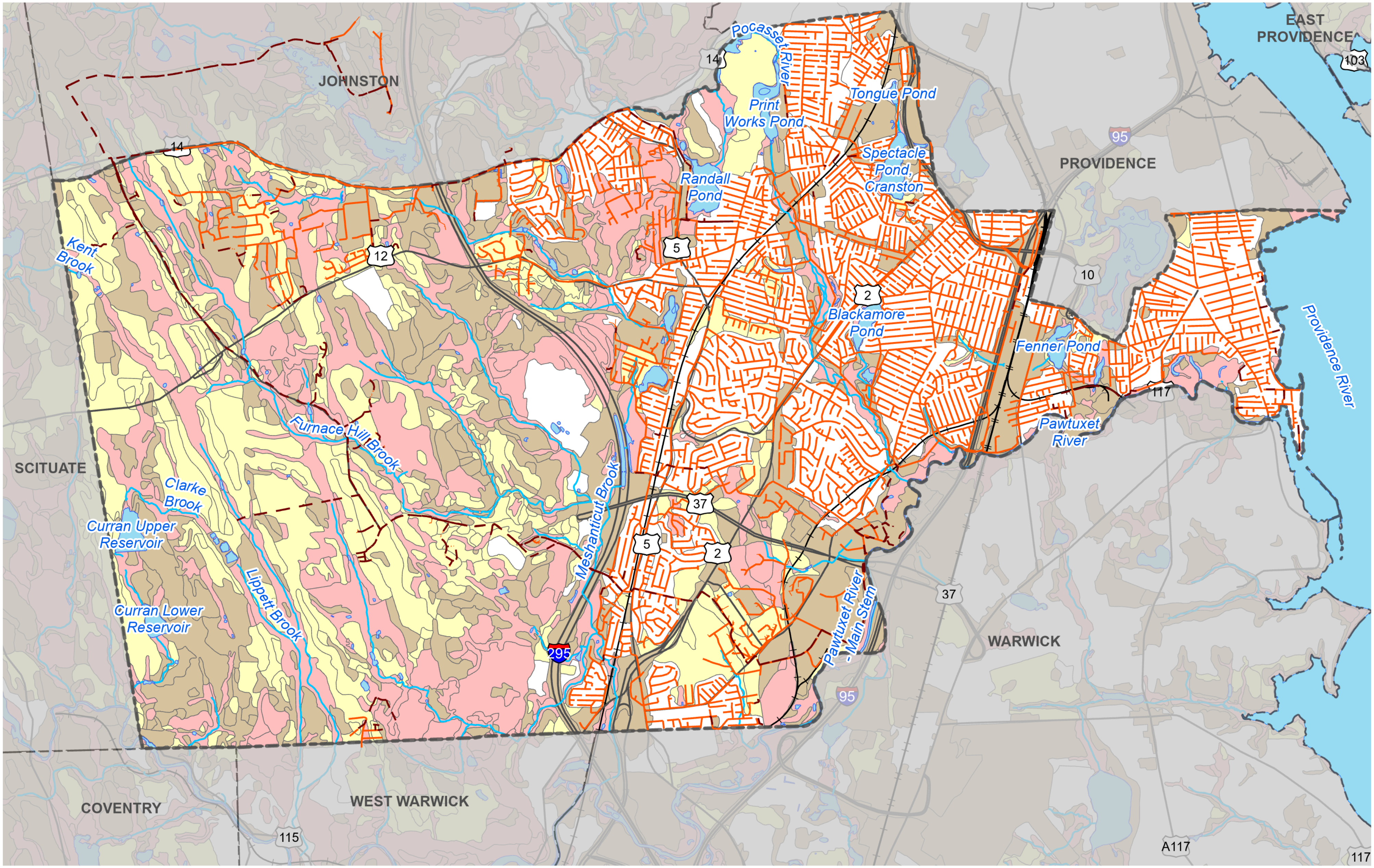
The horizontal and vertical distances between the leaching field of the septic system and important physical and environmental features, as specified in the regulations, are summarized in Table 4-1. Additional distances are provided in the 2018 RIDEM OWTS Regulations, amended in 2022. The amendment does not impact the minimum setbacks included below.

Table 4-1. 2018 RIDEM OWTS Regulations Minimum Setbacks for Leachfields to Physical and Environmental Features

Physical or Environmental Feature	Minimum Horizontal Setbacks (ft) for Leachfields
Seasonally High Groundwater	3 (vertical)
Private Drinking Water Wells	150[1]
Public Drinking Water Wells	200[2]
Property Lines	10
Water Supply Lines	25
Foundations	25[3]
Flowing Water and Open Bodies of Water	75[4]

Notes:

1. This distance assumes an OWTS design flow of 1,000- <2,000 gallons per day.
2. Assumes an OWTS design flow of 1,000-<2,000 galls per day and also assumes the well is drilled or driven.
3. May be varied under certain conditions.
4. Assumes an OWTS design flow of <5,000 gallons per day.



- ▭ Town Boundary
- 🟦 Water Bodies
- ― Rivers and Streams
- ― Major Roads
- ┼ Railroad
- ― Sewer Gravity Mains
- – Sewer Pressurized Mains
- 🟨 Slightly Restrictive Soils
- 🟫 Moderately Restrictive Soils
- 🟥 Severely Restrictive Soils
- ☐ No Characterization

FIGURE 2
CITY OF CRANSTON, RI
WASTEWATER MANAGEMENT PLAN

SOIL CHARACTERIZATION

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Scale In Feet

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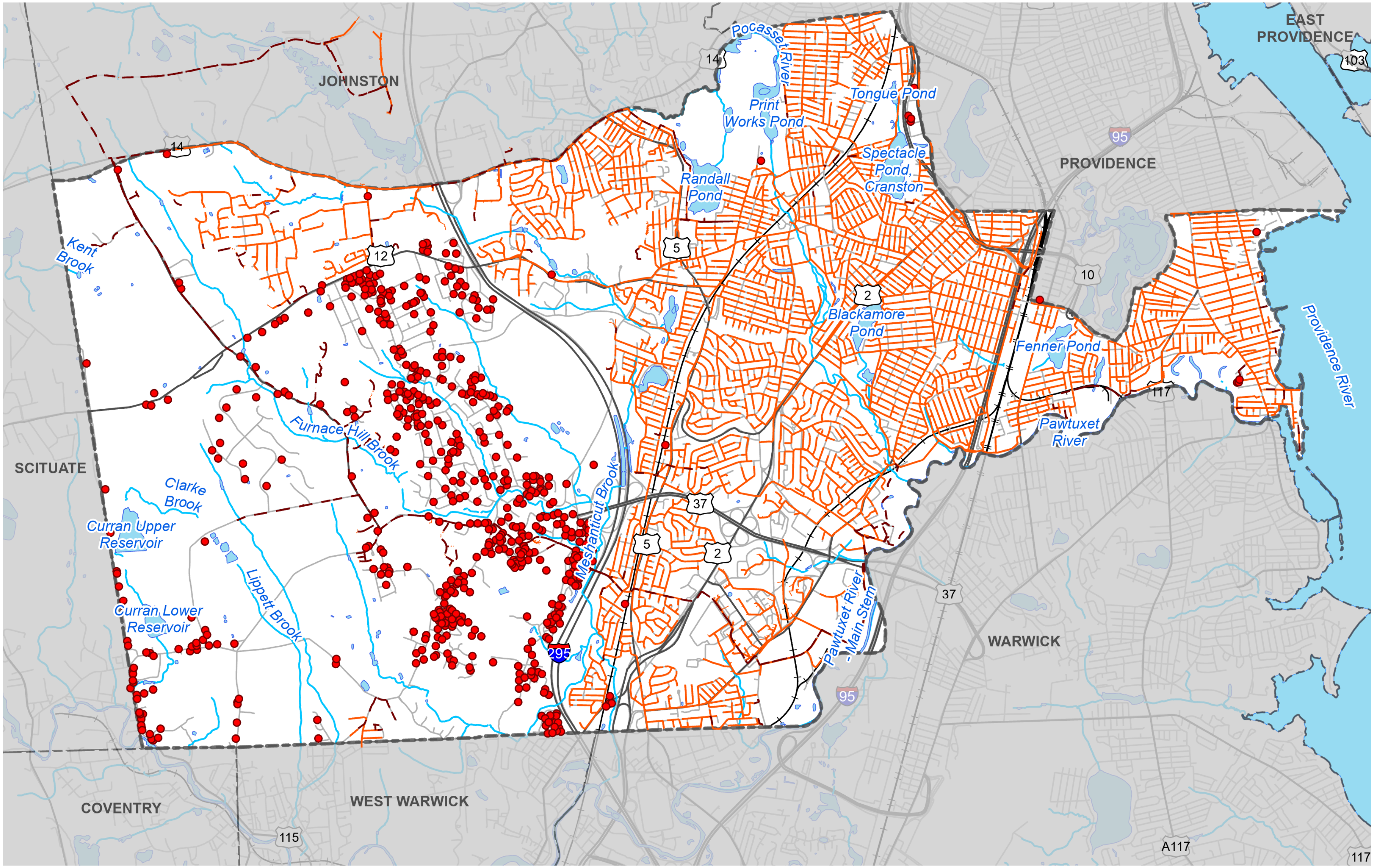

- ● Failure Locations
- ⬚ Town Boundary
- ▭ Water Bodies
- — Rivers and Streams
- — Roads
- — Major Roads
- ┼ Railroad
- — Sewer Gravity Mains
- - - Sewer Pressurized Mains

FIGURE 3
CITY OF CRANSTON, RI
WASTEWATER MANAGEMENT PLAN

OWTS FAILURE LOCATIONS

5,000 0 5,000

Scale In Feet

N

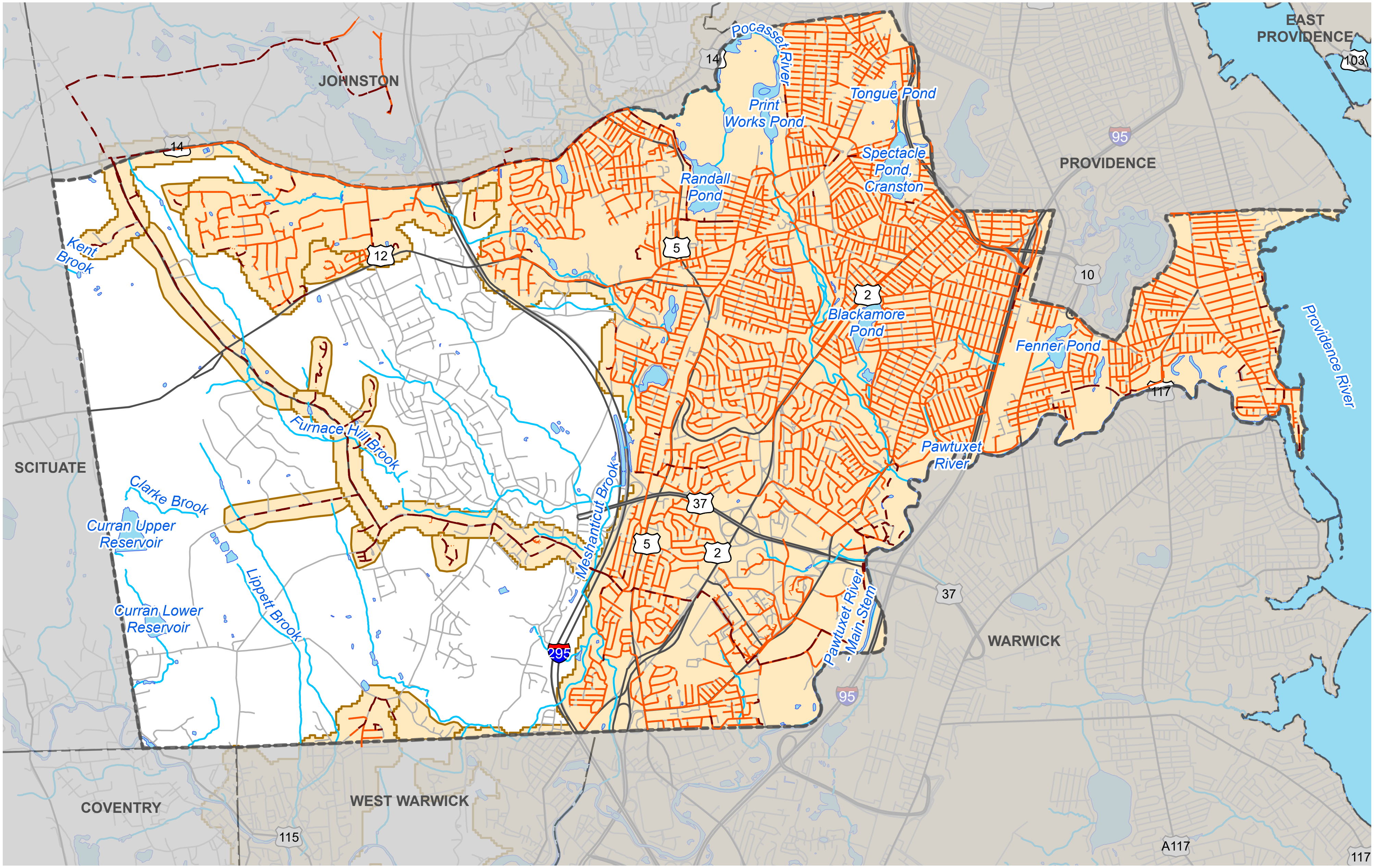

FIGURE 5
CITY OF CRANSTON, RI
WASTEWATER MANAGEMENT PLAN

EXISTING SEWERED AREAS

▭ Town Boundary	— Major Roads
🟦 Water Bodies	— Sewer Gravity Mains
— Rivers and Streams	- - Sewer Pressurized Mains
— Roads	▭ Sewered Areas

5,000 0 5,000

Scale In Feet

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Variances to these minimum setbacks are allowed under specific conditions. Alternative distances and specific conditions under which variances apply are provided in the 2018 RIDEM OWTS Regulations.

Licensing Requirements for OWTS Design and Construction

A state license, issued by RIDEM, is required for professionals who design new systems or repairs or alterations for existing systems. A Class I designer's license authorizes the design of repair of a residential septic system or component with flows less than or equal to 900 gallons per day. A Class II license authorizes the design of repairs and alterations of residential systems with flows less than 2,000 gallons per day and commercial systems with flows less than 900 gallons per day. A Class II license also authorizes the design of new systems provided there are no variances to the requirements for depth to groundwater, depth to an impervious layer, or setbacks established for critical resource areas. Class III licenses authorize the design of any septic system. Class I licenses can be either a registered Professional Land Surveyor or hold an OWTS Installers license while Class II licenses require registration as a Professional Land Surveyor or a Professional Engineer. Class III licenses can only be obtained by a Professional Engineer licensed by the State of Rhode Island.

A suitably licensed contractor must install septic systems. However, a licensed designer is responsible for witnessing and inspecting the installation and is responsible for issuing a Certificate of Construction. The Certificate of Construction certifies that the installation was completed in accordance with the approved application, plans, and specifications, and must be submitted to RIDEM.

Upgrading Dwellings with OWTSs

Because sewage flows can change significantly when building renovations are proposed or when there is a change in use, a determination of existing disposal system suitability must be rendered by RIDEM. RIDEM approval must be obtained before a City building permit is issued. A building renovation includes any addition, replacement, demolition and reconstruction, or modification of a structure on a subject property, which meets one or more of the following:

- Results in any increase in wastewater flow into the OWTS, which for residential structures is equivalent to the addition of one (1) or more bedrooms.
- Involves demolition or replastering or replacement of interior wallboard, interior walls, ceilings, flooring, windows, plumbing fixtures, electrical wiring or kitchen cabinetry, which in total affects over 50% or more of the living area of the existing structure.
- Involves adding an additional floor level or portion of floor level of living space to the structure.
- Increases the footprint of the living space of the structure.

4.2 Rhode Island Cesspool Act of 2007

In 2007, the State passed the *Rhode Island Cesspool Act of 2007* (see Appendix B), amended in 2015. Under this legislation, any cesspool in Rhode Island located within 200 feet of tidal coastline, 200 feet of public wells, and within 200 feet of drinking water reservoirs must be inspected and replaced with an OWTS meeting regulatory standards.

As described on RIDEM's webpage titled "OWTS Cesspool Phaseout"[9] there are a number of scenarios and timelines under which a cesspool must be replaced outside of the aforementioned 200-foot zones:

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[9] http://www.dem.ri.gov/programs/water/owts/regulations-reports/cess-phaseout.php

1. If a property is subject to sale or transfer, the cesspool must be removed from service within one year of the closing date.
2. If a cesspool is failed, the cesspool must be replaced within one year of the failure, or less if an imminent threat to public health is identified.
3. If a cesspool serves as non-residential facility servicing more than 20 people per day, or any multifamily dwelling, the cesspool must be replaced as required under current DEM and EPA regulations.
4. If a cesspool is located within one of three areas described below, the cesspool must be replaced immediately:

   - Within 200 feet of the inland edge of all shoreline features bordering tidal water areas.
   - Within 200 feet of any public wells.
   - Within 200 feet of a water body with an intake for drinking water supply.

   Within the three 200-foot zones identified above:

   - All cesspools will have to be inspected within a four-year period, completed by January 1, 2012.
   - All cesspools found to be failed will need to be replaced within 1 year.
   - All cesspools found in already-sewered areas will need to be hooked-up to the sewer within one year of the sale of the associated property.

The deadline for replacing cesspools located within these 200-foot zones was January 1, 2014 and all remaining cesspools in these areas are in violation of the Cesspool Act.

As discussed in RIDEM's "Frequently Asked Questions – Cesspool and the Rhode Island Cesspool Act of 2007" (hereinafter Cesspool Phaseout FAQ), there are several topics addressed in detail to provide a more thorough review of the requirements:

> A failed cesspool is one that meets any of the criteria below. Note that a cesspool can appear to function in a manner that disposes of the waste and still be considered a "failed cesspool" under the criteria below. In other words, a backup of sewage or leakage onto the ground surface are not the only criterion for failure.
>
> - Cesspool fails to accept sewage, as evidenced by sewage backing up onto the ground surface or into the building it serves.
> - The liquid level in the cesspool is less than six inches from the bottom of the pipe (i.e., building sewer) that drains into it.
> - The cesspool has to be pumped more than two times per year.
> - The cesspool has been shown to have contaminated a drinking water well, stream or wetland.
> - The bottom of the cesspool is below the groundwater table at any time of year, resulting in direct connection between the waste in the cesspool and the groundwater.

5.0 OWTS WASTEWATER MANAGEMENT APPROACHES

Several management approaches are available to communities that wish to develop onsite wastewater management plans. These are briefly described below.

5.1 System Inventory/Tracking and Public Education and Outreach

Under this approach, the City develops an active educational program to inform homeowners about proper septic system care, inspections, and maintenance. The program may publicize and provide details of the CSSLP through a combination of local newspaper advertisements, local radio announcements, community cable television channels, and posted public notices. Pamphlets describing septic systems, operation and maintenance techniques, and adverse effects related to failing systems should be made available to all septic system owners/users. This effort should encourage property owners to be more proactive as they address concerns related to substandard or failing systems.

Data collection efforts under this approach include developing and maintaining a database. This database can be used for inventorying specific permit and system component information, following up on permit conditions, tracking maintenance contracts on advanced systems, collecting and tracking septic tank pumpout information, and tracking septic system failures. If system inspections or pumpouts are encouraged or required, the database can be used to generate notices for inspections and to track follow-up maintenance activities.

The City may also encourage residents to perform voluntary inspections of their septic systems (e.g., at a recommended rate of once every three to five years).

5.2 Special Design Standards

Historically, cities and towns have had the ability to adopt special design standards in their zoning regulations or code of ordinances such as cesspool elimination, increased treatment performance standards, or increased setbacks from surface waters. These design standards could include nutrient reduction in systems near sensitive environments, particularly where dense development may contribute to eutrophication or contamination of drinking water supplies.

5.3 Wastewater Management Districts

Many problems associated with septic systems are the result of substandard designs, construction, or poor maintenance practices. To overcome these problems, a regulatory framework can be developed at the local level to oversee septic system approvals, installations, and maintenance practices. Enabling legislation that was passed in the 1987 Rhode Island General Assembly Session allows municipalities to establish their own Wastewater Management Districts (WWMDs).

The purpose of WWMDs is to mitigate or prevent contamination of state waters from malfunctioning septic systems through the implementation of local inspection and maintenance programs. Among other things, WWMDs allow a municipality to:

- Access private property, when necessary, for the periodic inspection and/or maintenance of onsite systems.
- Raise funds for the administration, operation, and services of the WWMD by assessing property owners for taxes or annual fees and issuing bonds.

- Establish the necessary administrative, financial, technical, enforcement, and legal structure to implement and conduct wastewater management programs and hire the necessary personnel to support the structure.
- Receive grants or loans and establish a revolving fund to make grants and low interest loans available to property owners for the improvement, rehabilitation, or replacement of failed septic systems.
- Levy fines for noncompliance. Such fines shall be no greater than $500 per violation. Each day of continuing noncompliance shall constitute a separate and distinct violation.

Community Required Maintenance Inspections

Under this approach, the management entity requires homeowners to provide periodic inspection and maintenance if needed on their septic systems but does not provide the service directly. One-way municipalities encourage compliance is to have a notice sent to system owners every three to five years to remind them to have their systems inspected or pumped out. A return receipt attached to the notice can be sent back to the City by the inspector or pumping contractor once the inspection is complete. This approach requires establishment of local legislation requiring periodic maintenance by property owners. The management entity should also have the authority to randomly inspect systems to ensure their proper operation.

Setting an Inspection Schedule

In 2000, RIDEM published *Septic System Checkup: The Rhode Island Handbook for Inspection* (Riordan, 2000) (see *Appendix C*). This handbook provides a state-approved method for inspection of conventional septic systems. For conventional systems, inspections are recommended on a three-to-five-year basis, depending on system use, and can generally be completed by a service provider in few minutes. Inspections are recommended as the basis for determining pumpout need, which helps avoid the unnecessary expense of overkill maintenance. Inspection-based programs also provide protection from system failure as they ensure that the system is functioning properly and that minor repair needs do not become aggravated.

An inspection-based program is essential for innovative and alternative (I&A) systems, which generally include mechanical and electrical parts that are more likely to experience malfunction. I&A systems should be inspected annually. The University of Rhode Island's New England Onsite Wastewater Training URI-OWT Center has developed training and certification programs for service providers. These training programs include both conventional and I&A systems. A number of Rhode Island municipalities maintain lists of approved service providers and use satisfactory completion of the URI-OWT programs as the basis for service-provider registration.

Community Operated Maintenance Program

This approach may be financed through user fees assessed to individual property owners, and the management entity assumes responsibility for pumping systems on a regular schedule and providing periodic inspections. The management entity provides services either directly or through contracted private firms. Local legislation would be necessary to require participation in the program. Bonds can be issued to cover capital expenditures, should the City decide to provide pumpout or inspection services directly. Since the management entity assumes responsibility for OWTS pumping schedules and periodic OWTS inspection under this alternative, proper system maintenance and operation is relatively certain. This has environmental and public health benefits, as groundwater and surface water resources are more likely to be protected from contamination associated with OWTS failures. This type of program would serve to eliminate the “flush and forget” attitude that is sometimes taken by the public toward system maintenance.

However, this alternative also has several negative aspects. Operating costs, in the form of additional personnel required to implement and administer the program, are high and the management entity assumes significant amounts of liability. Difficult local legislation requiring owner participation may also be necessary.

Community Owned OWTSs

Under this approach, the City takes ownership of all septic systems within the management district and is responsible for their installation and operation. To finance this program, a user charge is assessed to each property owner included within the management district. A substantial amount of new local legislation would be required to allow the management entity to purchase equipment, assess fees on system owners, and to receive federal or state grants and loans. This alternative also requires significant capital expenditures for vehicles, computers, office equipment, and field equipment. Additional personnel, ranging from administrators to inspectors, would be needed to staff the program. The tremendous liabilities, the negative economic effects on private firms that design and install septic systems, and the high costs associated with this alternative do not support its feasibility.

5.4 Financial Assistance

Financial Assistance for Repair and Replacement

The costs to install, alter, or repair an OWTS to meet RIDEM standards can be substantial. A complete conventional system replacement for a three-bedroom home can cost between $10,000 and more than $18,000 depending on site constraints, while the cost of an innovative system can range from $20,000 to more than $32,000.[10]

These costs present a significant expense for most homeowners and may form the basis for objections to community based OWTS inspection and maintenance programs. Homeowners are often wary that inspection requirements create a gateway to potentially unaffordable upgrade requirements. Financial assistance can help to defray upgrade costs and may help to soften concerns.

Recently, the range of projects eligible for funding through the State Revolving Fund (SRF) has been expanded to incorporate nonpoint source pollution projects, including the repair and replacement of failing residential septic systems. The Rhode Island Infrastructure Bank (RIIB) Agency has formulated a loan program known as the CSSLP. Under this program, every community in the State will be able to use the SRF—not just those served by municipal wastewater facilities. Funding for up to one million dollars annually will be provided through this program. A copy of the regulations for the CSSLP is included in Appendix D.

By law, the RIIB or SRF cannot make loans to private individuals; therefore, the loan program allows loans to be provided to septic system owners through Cities and Towns. Rhode Island Housing (RIHousing) services the loan. RIHousing accepts homeowner loan applications, examines their ability to repay; issues payments to vendors for the work done; and collects

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[10] Approximated in 2020 dollars based on empirical data.

repayments over the life of the loans. The community acts as the primary borrower, and a loan agreement will be in place for the principal portion of outstanding homeowner loans. The community must provide a pledge for repayment of the total amount of the community's line of credit through a dedicated source of revenue or a general obligation pledge.

Specifics of the CSSLP include:

Community Involvement

- The community must prepare an OWMP describing the specifics of the community's septic system management program. The plan identifies areas that the City wishes to be covered by the septic system management program and estimates a dollar cost for the remediation of septic systems. The RIIB caps its CSSLP loans to communities at $300,000. However, communities may borrow additional $300,000 increments once the original loan is depleted below $50,000.
- RIDEM will approve the OWMP and issue a Certificate of Approval, thus making the septic system management program eligible for financing.

Homeowner Involvement

- Owners of one to four family properties will be eligible for participation in the loan program. Communities are free to decide whether the property must be the owner occupied in order to be eligible for assistance. There is a maximum loan amount of $30,000[11] that can be obtained and there are no income restrictions for eligibility.
- Recently, RIIB has begun to require that borrowers retain a designer and obtain an OWTS permit prior to obligating loan monies. This encourages immediate use of loans and reduces the potential for underutilized loans to tie up the City's borrowing line (e.g., while permits are obtained). To further encourage the immediate use of loans, the City will establish a one-year limit on the homeowner's borrowing line following loan approval. However, the cost of design and permitting can be rolled into the loan upon its approval.
- Loan financing is interest free, with borrowers subject to a $300 loan origination fee and a 1% annual servicing fee on the outstanding loan balance.

RIHousing Involvement

- RIHousing will collect repayments from homeowners and make the debt service payment to the SRF on behalf of the community.

5.5 Management Approaches Used by Other Rhode Island Municipalities

Rhode Island municipalities enjoy significant state support for development of onsite wastewater management programs. In addition to CSSLP funding, the state has also offered grant funding for the development of municipal wastewater management programs as well as technical assistance in the form of several guidance documents. Two of these documents were developed to describe the onsite wastewater management implementation efforts of Rhode Island municipalities. They are:

- Rhode Island Municipal Septic System Standards and Programs (Riordan, 2001).
- Summary of Rhode Island Municipal Onsite Wastewater Programs (RIDEM, 2014).

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[11] Towns may waive or adjust the maximum loan amount at their discretion.

Both documents are included in Appendix E of this report. A tabular summary of management approaches used by each municipality, adapted from the two aforementioned reports has been provided in Table 5-1 below.

Table 5-1. Summary of Rhode Island Municipal Onsite Wastewater Standards and Programs

Municipality	Management (Inspection/Maintenance) Requirements	Required Use of Innovative and Alternative Technologies	Repair Replacement Programs
Bristol	Yes	No	Yes (CSSLP)
Burrillville	No	No	No
Charlestown	Yes	Yes	Yes (CSSLP)
Coventry	Yes	No	Yes (CDBG & CSSLP)
Cranston	No	No	No
Cumberland	No	No	No
East Greenwich	No	No	No
Exeter	Yes	No	No
Foster	Yes	Yes	No
Glocester	Yes	Yes	Yes (CSSLP)
Hopkinton	Yes	Yes	Yes (CSSLP)
Jamestown	Yes	Yes	Yes (CSSLP)
Johnston	Yes	No	Yes (CSSLP)
Little Compton	No	No	No
Middletown	No	No	No
Narragansett	Yes	Based on staff recommendation	Yes (CSSLP)
New Shoreham	Yes	Yes	Yes (CSSLP)
North Kingstown	Yes	Yes	Yes (CSSLP)
North Smithfield	No	No	No

Table 5-1. Summary of Rhode Island Municipal Onsite Wastewater Standards and Programs

Municipality	Management (Inspection/Maintenance) Requirements	Required Use of Innovative and Alternative Technologies	Repair Replacement Programs
Portsmouth	Yes	Yes	Yes (CDBG &CSSLP)
Richmond	Yes	No	Yes (CSSLP)
Scituate	Yes	No	Yes (CSSLP)
Smithfield	Yes	Yes	Yes (CSSLP)
South Kingstown	Yes	May be required through negotiation	Yes (CSSLP)
Tiverton	Yes	No	Yes (CSSLP)
Warren	Yes	No	Yes (CSSLP)
Warwick	No	No	No
West Greenwich	No	No	No
Westerly	Yes	No	Yes (CSSLP)

Notes:

1. CDBG means Community Development Block Grant funds have been programmed for septic system repair/replacement.
2. WRIHRP refers to the Western Rhode Island Home Repair Program.

Several communities in Rhode Island, including Charlestown, Narragansett, South Kingstown, and Jamestown have established more restrictive septic system siting requirements than those required by RIDEM and have implemented OWM programs. As they provide good local examples of OWM programs, we have provided summaries of them below. It should be noted that as previously mentioned, current RIDEM regulatory requirements may be amended, which would limit the ability of cities and towns to adopt regulatory requirements in excess of those established by RIDEM in the future.

Charlestown

Charlestown's subdivision regulations and zoning and ordinance establish standards for septic system siting and installation that include policies for protection of sensitive resources. The subdivision regulations require an evaluation of sewage disposal factors such as soils, slopes, and proximity to water bodies and wetlands. The zoning ordinance establishes setbacks for septic systems from water bodies and wetlands of:

- 100 feet from a coastal wetland
- 200 feet from a 10-foot-wide flowing body of water
- 100 feet from flowing bodies of water less than 10-feet wide
- 100 feet from intermittent streams

- 100 feet from floodplains

Charlestown also has a wastewater management ordinance that mandates regular septic system pump-outs based on inspections. The Town sends a mailing to 1/3 of its residents each year requiring that the septic system be inspected. Residents that respond favorably have their systems inspected by one of three qualified firms whose services are retained by the Town. The property owner pays for the inspection. Significant points of the program are listed below.

- Septic system inspections occur at a minimum frequency of once every three years, or more frequently as determined by the WWMD.
- Pump-outs are based on inspection results but occur no less than once every six years.
- All OWTS owners are sent written notifications of regularly scheduled inspections.
- The WWMD maintains a record of each septic system inspected.
- If system requires pumping, the owner has 30 days to show proof that it was done.

If system is failed, owner has 60 days to submit a repair/replacement application.

Narragansett

In its zoning ordinance, Narragansett requires special use permits for septic systems located within 200 feet of all coastal features. Under the Town's utility code, owners must pump their septic systems at least every four years and septic tanks must be accessible at all times. In the coastal overlay district, the town may require the use of innovative/alternative septic systems for systems sited within 200 feet of a coastal feature. Requirements for nitrogen reduction are based on staff recommendations.

South Kingstown

Special use permits are required in South Kingstown for septic systems located:

- Within 200 feet of flowing bodies of water 10 feet or more in width
- Within 100 feet of flowing bodies of water less than 10 feet in width
- Within 150 feet of floodplains
- Within 50 feet of a bog, marsh, swamp, or pond
- Within 150 feet of other freshwater wetlands.

The Town's zoning ordinance also establishes setbacks, performance standards, and requirements for enhanced treatment. Portions of South Kingstown are served by a municipal sewer system. A Wastewater Management District that includes all unsewered areas has been established. The key points of the management program are:

- A Program Administrator supervises activities, serves as enforcement officer, and has authority to levy fines and orders maintenance of septic systems based on inspection results.
- Implementation will occur over a seven-year period starting with the Green Hill Pond watershed, then other coastal ponds, then the groundwater protection overlay

district, and finally the remainder of town.

- The program will create a town-wide inventory based on inspection results.
- The septic system owner is responsible for hiring septage haulers or maintenance contractors.
- If inspections reveal an immediate need to pump, a pumpout must be performed within five days.

Jamestown

Jamestown, like South Kingstown, is partially sewered. However, in Jamestown's program, the wastewater management area covers the entire Town. Highlights of Jamestown's wastewater management program include:

- Administered through the Department of Public Works (DPW).
- Powers include:
    - Contract with septage haulers, installers, and inspectors as needed
    - Order maintenance of systems based on inspection results
    - Allow entry onto private property for inspection, pumping, and repair.
- Maintenance requirements are based on inspection results
- Inspection results are being used to complete a town wide inventory
- DPW maintains a list of approved inspectors
- DPW sends a notice to system owners telling them that an inspection is required, and inspections must be scheduled within 45 days of notice.
- If inspection reveals an immediate need to pump, owners have five days to present evidence that it was done.
- Inspections are mandatory.
- Stringent design standards were established for high groundwater areas.

6.0 RECOMMENDATIONS AND NEXT STEPS

Cranston recognizes the importance of enhanced wastewater management in high-risk areas such as areas with high groundwater, shallow bedrock, and small lots served by private wells. Based on the information collected to date and presented in this plan, it is recommended that the City implement a voluntary education and outreach effort as part of a CSSLP loan program.

6.1 Education and Outreach

The education and outreach goals are to provide information to property owners on the basic components of septic systems, how septic systems can affect water resources, and about system usage and maintenance requirements and the CSSLP program. The City plans to do the following:

- City and other web sites—Cranston currently maintains a robust website, which currently provides extensive data and resources. The City will add relevant information regarding its OWMP to the website under the Department of Public Works page. This will include planning documents, fact sheets, program descriptions, applications, pertinent web links, and other materials. The City may also consider a web-based computer tracking system for maintenance activities contingent on the availability of funding. At a minimum, the web site will provide information regarding eligibility criteria and how to apply for CSSLP.
- Public meetings—City will hold a public meeting to discuss the development of its OWMP.
- Fact sheets and advertisements—The City will prepare a community-specific fact sheet for distribution to residents. An example fact sheet is provided in Appendix F.

6.2 CSSLP

The City is interested in applying for and receiving funding for a residential loan program through the CSSLP. This program is described in Section 5.4 of this OWMP. Following is additional information on establishing the loan criteria.

General Eligibility

The City intends that any residential failed or substandard OWTS in the City that meets the CSSLP eligibility criteria for the state would qualify for the loan funds. For determination of eligibility, this plan relies upon RIDEM's definition of "failed" and "substandard."

Currently, RIDEM defines a "failed" system as:

Any sewage disposal system that does not adequately treat and disperse wastewater so as to create a public or private nuisance or threat to public health or environmental quality, as evidenced by, but not limited to, one or more of the following conditions:

1. Failure to accept wastewater into the building sewer.
2. Discharge of wastewater to a basement. subsurface drain. stormwater collection, conveyance, or treatment device. or watercourse unless expressly permitted by the Department.
3. Wastewater rising to the surface of the ground over or near any part of OWTS or seeping from the absorption area at any change in grade, bank or road cut.
4. The invert of the inlet or the invert of the outlet for a septic tank, distribution box, or pump tank is submerged.
5. The liquid depth in a cesspool is less than six (6) inches from the inlet pipe invert.

6. Pumping of the cesspool or septic tank is required more than two (2) times per year.
7. OWTS is shown to have contaminated a drinking water well or watercourse.
8. If a septic tank, pump tank, distribution box, or cesspool is pumped and groundwater seeps into it.
9. Any deterioration, damage, or malfunction relating to any OWTS that would preclude adequate treatment and dispersal of wastewater.
10. Excessive solids are evident in the distribution box or distribution lines.

"Substandard" refers to any OWTS that does not meet the current RIDEM standards for design and installation. This includes, but is not necessarily limited, to standards for design flow, vertical and horizontal setbacks, and treatment components.

Additional Eligibility Issues and Features

The property owner loan program is based on a projected number of failures and includes a process for establishing criteria for approving loans. These criteria can include prioritizing areas of environmental concern, prioritizing areas where older systems including cesspools are known, and other criteria developed by the community. Suggested eligibility criteria include:

1. Loans are for all single-family and multi-family homes up to four dwelling units in size. No institutions, condominiums, or commercial businesses are to be covered. All state and local approvals and procedures must be in place prior to any acceptance of applications. No loans will be granted for properties with a sewer tie-in requirement.
2. If a system is failed, but the repair also calls for an increase in the number of bedrooms, the loan amount shall be limited to that required to repair or replace a system suitable for the original number of bedrooms.
3. Replacing a septic tank, even when no drain field repairs are necessary, is considered a legitimate expense of CSSLP funds.
4. I & A systems may be required in areas where site conditions warrant, such as a wetland buffer, high water table soils, small lots, and lots with inadequate separation distance from a well, etc. Upgrading to I&A technology is eligible for loan funds.
5. In order to qualify for the loan fund, the owner must submit three bids. The construction portion of the loan shall be limited to the low bid plus 10 percent. Engineering and permitting costs are also legitimate loan expenses.
6. The maximum loan amount is to be $30,000.
7. When the available pool of money is $50,000 or less, hardship situations and emergency repairs will be given priority.

Expected Activity of the Cranston Loan Program

We determined the expected activity of the loan program is based on a projected number of failures. For the City's total of 6,150 onsite systems, an average failure and replacement rate of 32 per year yields 320 systems over roughly 10 years.

Table 6-1 on the following page summarizes anticipated costs of repair per OWTS failure.

Table 6-1. Estimated Cost of Repair per OWTS Failure	
Type of Repair	**Estimated Cost**
Replace Leach Field	$6,700
Replace Septic Tank	$5,600
Full System Replacement	$12,350

Notes: 1. Costs estimated from RIDOT Standard Unit Prices and Local Contractor Price Quotes from 2020.

Assuming an inflation rate of 2.5% per year, it is anticipated that over a 10-year period, the duration of the CSSLP loan, the City would need approximately $4,538,000 for system repairs. Table 6-2 below shows the cost of expected repair activity on an annual basis.

Table 6-2. Cost of Expected Repair Activity per Year for the Duration of the CSSLP Loan			
Year	**Cost per System[1]**	**Total Cost**	**Cumulative Total Cost**
Year 1	$12,659	$405,088	$405,088
Year 2	$12,975	$415,215	$820,303
Year 3	$13,300	$425,596	$1,245,899
Year 4	$13,632	$436,235	$1,682,134
Year 5	$13,973	$447,141	$2,129,276
Year 6	$14,322	$458,320	$2,587,595
Year 7	$14,681	$469,778	$3,057,373
Year 8	$15,048	$481,522	$3,538,896
Year 9	$15,424	$493,560	$4,032,456
Year 10	$15,809	$505,899	$4,538,356

Notes: 1. Cost per system includes an inflation rate of 2.5% per year and assumes that Year 1 begins in 2023 and, in order to be conservative on total cost, that each system will require full replacement.

The expected level of activity does not account for substandard system replacement (i.e., cases where homeowners chose to replace antiquated systems that have not failed hydraulically). Based on conversations with RIIB, we found that Towns and Cities that actively pursue wastewater management through mandatory inspection (e.g., Charlestown, North Kingstown, South Kingstown) experience high levels of borrowing activity (e.g., $300,000/year or more). Towns and Cities that institute voluntary programs (e.g., Tiverton, Johnston) experience relatively low levels of borrowing activity (e.g., $300,000/5 years). Therefore, Cranston plans to borrow $300,000 as a starting point, which is anticipated to cover most of the first year of repair activity.

Application Procedure

The following list outlines the general procedure frhoor loan making to CSSLP applicants:

1. A system owner wishing to access the funds must obtain three bids for review by the Environmental Program Manager.
2. The system owner hires the appropriate professional to design the system repair and then submits the application to RIDEM for design approval.
3. Once RIDEM permit approval has been received, the system owner applies for a CSSLP loan through RIHousing.

4. Following loan approval, RIHousing issues a two-party check to the contractor and system owner.
5. The system owner begins repayment of the loan within one month after the check is received.
6. Loan funds must be expended by the homeowner within one year of loan approval.

6.3 Methods of Advertising

Cranston anticipates using the following methods to advertise financial assistance for OWTS upgrades and repairs:

- City and other web sites—Cranston currently maintains a website where municipal documents, programs, and items of interest are discussed. As the City continues to develop a wastewater management program, it will post information to its website. This may include planning documents, fact sheets, program descriptions, applications, pertinent web links, and other materials. At a minimum, the web site will provide information regarding eligibility criteria and how to apply for CSSLP.
- Public meetings—Cranston has planned one public meeting to discuss its OWMP at a date to be determined.
- Fact sheets and advertisements-The City will prepare a fact sheet for distribution to residents.

7.0 PROGRAM RESPONSIBILITIES AND ADMINISTRATION

The City's Environmental Program Manager will be responsible for overall implementation of the program. The finance department will be the responsible party to facilitate the loan agreements with RIIB as well as alternative financing etc. Cranston anticipates day-to-day loan administration activities with RIHousing through the Finance Director.

8.0 METHOD OF SEPTAGE DISPOSAL

Sewage collection service areas remain largely within the developed portions of the City. Service areas include the entire City east of I-295 and a small portion west of I-295 between Plainfield Pike on the north and Scituate Avenue on the south. Sewage is not collected in the public system in most of western Cranston, where onsite wastewater treatment systems (OWTS) are used instead. Sewage flows largely by gravity to the sewage treatment plant. The plant discharges into the Pawtuxet River, as do two other treatment plants located in other municipalities. The City has a contract with Veolia Water to maintain and operate the sewage treatment plant. The plant has excess capacity of approximately 4 million gallons a day (MGD). While actual flow is approximately 10 MGD, some components of the plant reportedly could support a capacity of 20 MGD.

Reports from Cranston WPCF indicate that they are able to receive 250,000 gallons a day of septage and are not expecting any issues with reaching maximum capacity of septage they can receive. The City has approximately 6,150 systems with a typical septic-tank and pumpout volume of 1,000 gallons per pumpout. Assuming an average pumpout rate of one pumpout per system every four years, the total volume of septage transported to the WPCF is approximately 4,212 gallons per calendar day.[12] Therefore, the City has a per-day unused septage receiving capacity of approximately 245,000 gallons.

Septic haulers conducting work in Cranston generally transport septage to the Cranston WPCF. If we assume 32 new or updated systems per year and that all system replacements add 1,000 gallons to the pumpout demand every four years, we estimate an increase demand of approximately 10,000 gallons of septage pumping per year in the first year or approximately 22 gallons per day.[13] Increased demand over 10 years will, therefore, be approximately 220 gallons per day, which is well within the available daily volume.

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[12] Determined by the following calculation: (6,150 systems * 1,000 gallons)/(365 days * 4 years) = ~ 4,212 gallons/day

[13] Determined by the following calculation: (32 systems * 1,000 gallons)/(365 days * 4 years) = ~ 22 gallons/day

9.0 IMPLEMENTATION

The following steps are to be taken to implement this onsite management plan:

1. Obtain SRF loan and establish Cranston in the CSSLP.
2. Advertise acceptance into the CSSLP program to City residents via items outlined in Section 6.3
3. Add information to the City's website that specifically addresses OWTSs.
4. Consider tracking OWTS systems and maintenance and pumping in GIS.
5. Mail OWTS brochures to residents of the City with the tax bill.
6. Consider establishing wastewater management districts through the necessary regulations and ordinances.
7. Revisit the OWMP and consider updating the plan.

9.1 Anticipated Project Costs

Table 9.1 provides a suggested order-of-magnitude budget for onsite wastewater management program development.

Table 9.1 Onsite Wastewater Management Program Development Cost

Program Item	Order-of-Magnitude Costs
Obtain SRF loan and establish Cranston in the CSSLP	$5,000
Advertise acceptance into the CSSLP program to City residents	Costs covered in other steps of implementation
Add information to the City's website that specifically addresses OWTSs	$5,000
Make guidance brochures available to the public at the Public Library and City offices	$3,000 - $5,000
Consider tracking OWTS systems and maintenance and pumping in GIS	$2,000 - $10,000
Mail OWTS brochures to residents of the City with the tax bill	$2,000 - $4,000
Total	$17,000 - $29,000

9.2 Implementation Schedule

Table 9.2 provides a suggested schedule of next steps.

Table 9.2 Onsite Wastewater Management Program Development Schedule

Program Item	Number Month/Year
Obtain SRF loan and establish Cranston in the CSSLP	Month 6

Advertise acceptance into the CSSLP program to City residents	Month 8
Add information to the City's website that specifically addresses OWTSs	Month 8
Make guidance brochures available to the public at the Public Library and City offices	Month 8
Consider tracking OWTS systems and maintenance and pumping in GIS	Year 3
Mail OWTS brochures to residents of the City with the tax bill	Year 1

APPENDIX A

City Council Resolution

CITY OF CRANSTON

RESOLUTION OF THE CITY COUNCIL

TO PARTICIPATE IN THE RI INFRASTRUCTURE BANK'S COMMUNITY SEPTIC SYSTEM LOAN PROGRAM

No. 2023-23

Passed:
June 26, 2023

Jessica M. Marino, Council President

Resolved, that

WHEREAS, the City of Cranston wishes to participate in the RI Infrastructure Bank's Community Septic System Loan Program (CSSLP) in order to assist property owners in Cranston who are required to repair or replace failing septic systems and cesspools; and

WHEREAS, such approval is a prerequisite for participation in the CSSLP

NOW, THEREFORE, BE IT RESOLVED THAT, the Honorable Cranston City Council authorizes Administration and the Finance Director to execute any and all documents necessary to participate in the Rhode Island Infrastructure Bank's Community Septic System Loan Program including the request for a non-restoring line of credit in the amount of $500,000 to be allocated.

The following criteria shall be applied to all CSSLP loans in the City of Cranston administered by Rhode Island Housing:

1. The maximum amount of each loan shall be $30,000
2. The loans shall be interest free, however borrowers shall pay a one-time origination fee of $300 and a 1% annual servicing charge on the outstanding balance.
3. The term shall be up to a maximum of ten (10) years.
4. Residential properties with up to 4 units shall be eligible.
5. There shall be no income limits for program participants.
6. A property owner must first acquire an approved RIDEM Onsite Wastewater Treatment System Permit to be eligible for funding.
7. Funding is released to the homeowner when RI Housing receives RIDEM Certificate of Conformance after the work is complete.

Sponsored by: Jessica M. Marino, Council President
Referred to Finance Committee June 5, 2023

U/Resolutions/Community Septic System Loan Program

APPENDIX B

Rhode Island Cesspool Act of 2007

CHAPTER 23-19.15
The Rhode Island Cesspool Act of 2007

Index Of Sections

TITLE 23
Health and Safety

CHAPTER 23-19.15
The Rhode Island Cesspool Act of 2007
SECTION 23-19.15-1

§ 23-19.15-1. Short title.

This chapter shall be known and may be cited as the "Rhode Island Cesspool Act of 2007."

History of Section.
(P.L. 2007, ch. 136, § 1; P.L. 2007, ch. 233, § 1.)

§ 23-19.15-2. Legislative findings.

The general assembly hereby recognizes and declares that:

(1) There exists a need to abate pollution and threats to public health caused by cesspools.

(2) It is estimated that there are more than twenty-five thousand (25,000) cesspools within the state as of 2013.

(3) Cesspools are a substandard and inadequate means of sewage disposal.

(4) Cesspools contribute directly to groundwater and surface water contamination and environmental impacts will be exacerbated by increased precipitation, storm frequency, and sea level rise.

(5) Wastewater disposed from cesspools contains bacteria, viruses, ammonium, and other pollutants, and may also include phosphates, chlorides, grease, and chemicals used to clean cesspools.

(6) Wastewater disposed from cesspools violates drinking water health standards for certain contaminants.

(7) Wastewater disposed from cesspools can pose significant health threats to people who come into contact with, or consume, contaminated surface waters or groundwaters.

(8) Appropriate treatment of sewage disposed into the ground is essential to the protection of public health and the environment, particularly in relation to Narragansett Bay and the rest of the state's coastal region, and public drinking water resources.

(9) Replacement of cesspools with onsite wastewater treatment systems (OWTS) technology reduces risks to public health and the environment.

(10) In sewered areas, sewer tie-ins offer a readily available, environmentally preferable means of mitigating problems and threats caused by cesspools.

(11) A fund exists to assist homeowners with the costs of removing cesspools and inadequate septic systems and replacing them with an approved OWTS if the community in which the homeowner resides has created a wastewater management district in accordance with chapter 24.5 of title 45.

History of Section.
(P.L. 2007, ch. 136, § 1; P.L. 2007, ch. 233, § 1; P.L. 2015, ch. 163, § 1; P.L. 2015, ch. 185, § 1.)

§ 23-19.15-3. Declaration of purpose.

The purpose of this chapter is to phase out use of cesspools beginning with those located in close proximity to tidal water areas and public drinking water supplies. Additionally, this chapter provides for the connection of properties served by cesspools to available sewer lines and requires the identification and replacement of cesspools on all properties throughout the state that are subject to sale or transfer.

History of Section.
(P.L. 2007, ch. 136, § 1; P.L. 2007, ch. 233, § 1; P.L. 2015, ch. 163, § 1; P.L. 2015, ch. 185, § 1.)

§ 23-19.15-4. Definitions.

For the purposes of this chapter the following terms shall mean:

(1) "Cesspool" means any buried chamber other than an onsite wastewater treatment system (OWTS), including, but not limited to, any metal tank, perforated concrete vault, or covered hollow or excavation, that receives discharges of sanitary sewage from a building for the purpose of collecting solids and discharging liquids to the surrounding soil.

(2) "Department" means the department of environmental management as established in chapter 17.1 of title 42.

(3) "Director" means the director of the department of environmental management or his or her designee.

(4) "Failed cesspool" means a cesspool where one or more of the following conditions exist: (i) The cesspool fails to accept or dispose of sewage, as evidenced by sewage at the ground surface above or adjacent to the cesspool, or in the building served; (ii) The liquid depth in a cesspool is less than six (6) inches from the inlet pipe invert; (iii) Pumping is required more than two (2) times a year; (iv) The cesspool is shown to have contaminated a drinking water well or watercourse; or (v) There is shown to be direct contact between the bottom of the cesspool and the groundwater table.

(5) "Onsite wastewater treatment system" or "OWTS" means any system of piping, tanks, disposal areas, alternative toilets, or other facilities designed to function as a unit to convey, store, treat, and/or dispose of sanitary sewage, by means other than discharge into a public sewer system. A cesspool is not an OWTS.

(6) "System inspector" means a person who is registered as an inspector and capable of properly assessing the condition of an OWTS.

(7) "Transfer" means a transfer of real property except between the following relationships:

(i) Between current spouses;

(ii) Between parents and their children;

(iii) Between full siblings; or

(iv) Where the grantor transfers the real property to be held in a revocable or irrevocable trust, where at least one of the designated beneficiaries is of the first degree of relationship to the grantor.

(8) "Wastewater" means human or animal excremental liquid or substance, putrescible animal or vegetable garbage or filth, including, but not limited to, waste discharged from toilets, bath tubs, showers, laundry tubs, washing machines, sinks, and dishwashers.

History of Section.
(P.L. 2007, ch. 136, § 1; P.L. 2007, ch. 233, § 1; P.L. 2015, ch. 163, § 1; P.L. 2015, ch. 185, § 1.)

§ 23-19.15-5. Inspection requirements for cesspools located in close proximity to tidal waters and public drinking supplies.

(a) Unless exempted under § 23-19.15-8(a), the owner of property served by a cesspool in the following areas shall cause an inspection to be performed on said cesspool by a system inspector in accordance with a schedule established by the department, but no later than January 1, 2012:

(1) Which cesspool is within two hundred feet (200') of the inland edge of a shoreline feature bordering a tidal water area [corresponding to the jurisdiction of the RI coastal resources management council];

(2) Which cesspool is within two hundred feet (200') of a public drinking water well; and

(3) Which cesspool is within two hundred feet (200') of a surface drinking water supply, specifically the impoundment from which water is drawn via the intake.

The inspection shall be conducted by a system inspector as defined herein and reported in accordance with procedures required by the department, and the results shall be recorded on forms prescribed by the department.

(b) Pursuant to § 5-20.8-13, every contract for the purchase and sale of real estate that is, or may be, served by a private cesspool shall provide that potential purchasers be permitted a ten-day (10) period, unless the parties mutually agree upon a different period of time, to conduct an inspection of the property's on-site sewage system in accordance with procedures required by the department in subsection (a) of this section before becoming obligated under the contract to purchase.

History of Section.
(P.L. 2007, ch. 136, § 1; P.L. 2007, ch. 233, § 1; P.L. 2008, ch. 475, § 61; P.L. 2015, ch. 163, § 1; P.L. 2015, ch. 185, § 1.)

§ 23-19.15-6. Cesspool removal and replacement.

(a) Any cesspool located in close proximity to tidal water areas and public drinking water supplies and required to be abandoned pursuant to this chapter shall be replaced with an approved OWTS, or the building served by the cesspool shall be connected to a public sewer, prior to the applicable deadlines contained in subsection (b) of this section.

(b) Cesspools found to be located within the areas identified in § 23-19.15-5(a) shall cease to be used for sewage disposal and shall be properly abandoned in accordance with the following schedule:

(1) *Tier 1.* Any cesspool deemed by the department or a system inspector to be failed in accordance with this chapter shall be properly abandoned within one year of discovery unless an immediate public health hazard is identified, in which case the director may require a shorter period of time.

(2) *Tier 2.* Any cesspool located on a property that has a sewer stub enabling connection to a public sewer shall be properly abandoned, and the building served by the cesspool shall be connected into the sewer system of such premises with such sewer and fill up and destroy any cesspool, privy vault, drain, or other arrangement on such land for the reception of sewage, excluding any Rhode Island department of environmental management OWTS-approved system, prior to January 1, 2014.

(3) *Tier 3.* Any cesspool within two hundred feet (200') of a public drinking water well, or within two hundred feet (200') of the inland edge of a shoreline feature bordering a tidal water area [corresponding to the jurisdiction of the RI Coastal Resources Management Council], or within two hundred feet (200) of a surface drinking water supply [specifically, the impoundment from which water is drawn via the intake], shall be properly abandoned by January 1, 2014.

History of Section.
(P.L. 2007, ch. 136, § 1; P.L. 2007, ch. 233, § 1; P.L. 2011, ch. 285, § 1; P.L. 2011, ch. 380, § 1; P.L. 2015, ch. 163, § 1; P.L. 2015, ch. 185, § 1.)

§ 23-19.15-7. Waiver.

The director may grant a waiver, to the extent necessary, from applicable provisions listed in § 23-19.15-6(b) provided the homeowner demonstrates undue hardship, defined as having an annual income of less than or equal to eighty percent (80%) of the appropriate household size area median income determined by the federal Housing and Urban Development standards for the community within which the cesspool is located, and the cesspool is not a failed system as defined herein. No waiver shall exceed five (5) years from the dates specified in § 23-19.15-6(b). Any waiver granted shall expire upon transfer or sale of the land or easement upon which the cesspool is located.

History of Section.
(P.L. 2007, ch. 136, § 1; P.L. 2007, ch. 233, § 1; P.L. 2011, ch. 285, § 1; P.L. 2011, ch. 380, § 1; P.L. 2015, ch. 163, § 1; P.L. 2015, ch. 185, § 1.)

§ 23-19.15-8. Exemption.

(a) The provisions of §§ 23-19.15-5, 23-19.15-6(a) and 23-19.15-12(a) shall not apply to any cesspool located in an area of a community covered by municipal, on-site wastewater management ordinance that requires the risk-based phase out of cesspools on an alternative schedule that meets the purposes of this act.

(b) The provisions of §§ 23-19.15-6(b)(2) and 23-19.15-12 shall not apply to any cesspool located on a property that is properly designated to be sewered no later than six (6) years after the applicable deadlines provided in § 23-19.15-6(b)(3) provided: (1) The sewering project is identified in the city, town, or sewer district's wastewater facilities plan as approved by DEM prior to January 1, 2013; (2) The municipality, acting through its city or town council, states in writing to the director of the department of environmental management by January 1, 2013, that the municipality will complete construction of the sewering project on or before January 1, 2020; and (3) The property owner certifies, in writing, that the dwelling/building will be connected to the sewer system within six (6) months of receipt of the notification to connect to the sewer system and that no increase in the design sewage flow or number of bedrooms in the building will occur until the connection is made.

(c) In addition to subdivision (b)(2) of this section, the municipality must demonstrate by December 31, 2014, that it has bond authorization or some other dedicated financial surety for expansion of sewers to the area of the building served by the cesspool. If the municipality fails to demonstrate such surety, this exemption shall terminate and the cesspool shall be replaced by June 30, 2015.

History of Section.
(P.L. 2007, ch. 136, § 1; P.L. 2007, ch. 233, § 1; P.L. 2008, ch. 475, § 61; P.L. 2011, ch. 285, § 1; P.L. 2011, ch. 380, § 1; P.L. 2015, ch. 163, § 1; P.L. 2015, ch. 185, § 1.)

§ 23-19.15-9. Notice to remove and replace cesspools.

(a) The owner of any cesspool who or that has not complied with the requirements pursuant to this chapter shall be in violation of this chapter and subject to enforcement action by the department in accordance with chapters 17.1 and 17.6 of title 42.

(b) Notwithstanding the above provisions, the director may require the abandonment and replacement of any cesspool with an approved OWTS prior to the dates specified in § 23-19.15-6(b) if the cesspool is a large capacity cesspool as defined pursuant to applicable federal regulations governing underground injection control (UIC) facilities.

History of Section.
(P.L. 2007, ch. 136, § 1; P.L. 2007, ch. 233, § 1; P.L. 2008, ch. 475, § 61; P.L. 2015, ch. 163, § 1; P.L. 2015, ch. 185, § 1.)

§ 23-19.15-10. Regulations.

The department shall promulgate rules and regulations as may be necessary to implement and carry out the provisions of this chapter.

History of Section.
(P.L. 2007, ch. 136, § 1; P.L. 2007, ch. 233, § 1.)

§ 23-19.15-11. Severability and construction.

The provisions of this chapter shall be severable, and if any court declares any phrase, clause, sentence, or provision of this chapter to be invalid, or its applicability to any government, agency, person, or circumstance is declared invalid, the remainder of the chapter and its relevant applicability shall not be affected. The provisions of this chapter shall be liberally construed to give effect to the purposes thereof.

History of Section.
(P.L. 2007, ch. 136, § 1; P.L. 2007, ch. 233, § 1.)

§ 23-19.15-12. Cesspool removal and replacement requirements at property transfer.

(a) Any cesspool found to be serving a building or use subject to sale or transfer shall be removed and replaced with an OWTS or the building served by the cesspool shall be connected to a public sewer system within twelve (12) months of the date of sale or transfer.

(b) Should the manner of wastewater disposal be unknown, an inspection shall be conducted to determine if a cesspool is present on the property. This inspection shall be done by a system inspector prior to the time of sale or transfer.

(c) Pursuant to § 5-20.8-13, every contract for the purchase and sale of real estate that is or may be served by a private cesspool shall provide that potential purchasers be permitted a ten-day (10) period, unless the parties mutually agree upon a different period of time, to conduct an inspection of the property's onsite sewage system in accordance with procedures required by the department in § 23-19.15-5(a), before becoming obligated under the contract to purchase.

History of Section.
(P.L. 2015, ch. 163, § 2; P.L. 2015, ch. 185, § 2.)

APPENDIX C

Septic System Checkup: The Rhode Island Handbook for Inspection

Septic System Checkup:
The Rhode Island Handbook
for Inspection

By

M. James Riordan

Layout design and drawings by
Anne Sherman Jett

Funded by DEM using a grant from
the U.S. Environmental Protection Agency
Clean Water Act, section 319

“You can observe a lot by watching.”

Yogi Berra, 1968

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PREFACE

How should septic systems[1] be maintained? How can one determine if a given septic system is working when purchasing a home? *Septic System Checkup* answers these questions by providing state-recommended standards for evaluating and maintaining septic systems that serve residences in Rhode Island. The handbook includes complete instructions for gathering septic system records, locating components, diagnosing minor in-home plumbing problems, conducting flow trials, dye tracing, and maintenance scheduling. It describes two types of inspections: (1) a maintenance inspection to determine the need for pumping and minor repairs; and (2) a functional inspection for use during property transfer.

Septic System Checkup is for everyone with an interest in ensuring septic system function. Home inspectors should use it to determine if a system is adequate to serve the needs of a prospective buyer. Homebuyers will find it useful in learning how septic systems should be evaluated. Maintenance professionals should use *Septic System Checkup* to determine the need for routine maintenance as well as repair. Community officials will find the handbook helpful in developing septic system maintenance programs. And do-it-yourselfers can use the handbook for instruction on how to conduct their own routine inspections.

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1. This handbook applies to conventional septic system components and cesspools. Those readers interested in inspection and maintenance of innovative and alternative components should refer to the specific system's permit stipulations and manufacturer instructions.

ACKNOWLEDGEMENTS

Septic System Checkup: The Rhode Island Handbook for Inspection and *Inspection Report Forms* were authored by M. James Riordan, Principal Environmental Scientist of the Office of Water Resources, Department of Environmental Management. Mr. Riordan also oversaw all aspects of their development.

During development, Mr. Riordan was supervised--and generously mentored--by Russ Chateauneuf, Division Chief of the Office of Water Resources, Sue Kiernan, Deputy Division Chief of the Office of Water Resources and Scott Millar, Supervising Environmental Scientist of the Office of Strategic Planning and Policy (who originated the concept of a septic system inspection handbook for Rhode Island).

Layout, design and graphic artwork for the handbook and report forms were all done by Anne Jett. Ms. Jett also devoted countless hours as one of the *Septic System Checkup's* primary reviewers and editors. Without her assistance, *Septic System Checkup* would have remained unmanifest.

Development of *Septic System Checkup* occurred in cooperation with Rhode Island's Septic System Maintenance Policy Forum. The policy forum is a roundtable group that comprises approximately 100 representatives from federal, state and local government, as well as private associations, businesses and general public. The policy forum operates on a consensus-based approach. The meetings are open to all interested parties. It has met seventeen times since its inception in 1995. The cooperative spirit of the policy forum and dedication of all its participants has been no less than critical to successful development of *Septic System Checkup*. A list of the attendants of the policy forum can be found in “Septic System Maintenance Policy Forum and Subcommittees” at the rear of the handbook.

Several individuals provided particularly significant time and effort towards the development of the procedures of *Septic System Checkup* as well as the science behind septic system inspections in general. They include Bob Schmidt and Peter O'Rourke of the Rhode Island Department of Environmental Management; George Loomis and David Dow of the University of Rhode Island; and Joe Frisella of Frisella Engineering, Dave Burnham of the Rhode Island Independent Contractors and Paul Brunetti of Griggs and Browne. *Septic System Checkup* would not have been possible without the benefit of their knowledge and generosity of time.

Many others have also contributed to *Septic System Checkup* by reviewing the document, discussing issues with the author and providing emotional support (here especially, Jody-Kay Riordan, the author's wife). To all of you--both named and unnamed--thank you for broadening the author's field of view.

"If I have seen farther than others, it is because I was standing on the shoulders of giants." (Albert Einstein)

CHAPTER 1

Inspecting Operating Septic Systems: An Overview

Approximately 150,000 Rhode Island households, or one third of the state's population, use some form of septic system for sewage disposal. Rhode Island's septic systems discharge some seven billion gallons of wastewater into the ground each year.

When used properly, septic systems function very well. If mismanaged, however, these systems will fail, creating conditions that may threaten human health and the environment. Untreated effluent from malfunctioning septic systems may reveal itself by sight and smell, when a system backs up, or it may quietly percolate through the soil into the groundwater and adjacent waterbodies.

Failed systems have been associated with many serious problems. Outbreaks of diseases, such as hepatitis, dysentery, and gastroenteritis, may result from unmitigated wastewater pathogens. Untreated effluent can accelerate the eutrophication process of nearby waterbodies, lowering oxygen levels and suffocating aquatic life. From an economic point of view, septic system repair bills can be staggering. Yet, many of us live with and use septic systems, giving little or no thought for their existence…until they fail.

Inspection and maintenance is the key to ensuring that septic systems function properly. Nevertheless, few systems receive routine inspection and maintenance and those that do may receive inadequate care as inspectors have historically been without standardized procedures.

This handbook is about septic system inspections. It provides guidelines for performing inspections. It also provides answers to a number of important questions regarding the operation and maintenance of septic systems. For example, what is the most convenient and least expensive maintenance method for ensuring that a septic system functions properly? How can prospective homebuyers make certain that a home purchase will include an adequate system? What is the minimum inspection regime necessary to determine if a septic system is working?

1.1 Types of Inspections

This handbook addresses the two types of inspections that are typically performed by properly trained wastewater professionals: maintenance inspections and functional inspections. The maintenance inspection is used to determine the need for pumping and to ensure proper function; the functional inspection is used primarily during property transfers and builds on the maintenance inspection.

1.1.1 Maintenance inspections

The maintenance inspection is used to determine the need for pumping and to identify minor problems before they become serious health and environmental hazards or cost prohibitive to repair. There are two maintenance inspection subtypes: a first maintenance inspection and a routine maintenance inspection. The first maintenance inspection consists of procedures that are designed to help an inspector locate the system components; the routine maintenance inspection assumes that the components have already been located. The following is an outline of first maintenance and routine inspection procedures (see also Tables 1.1 and 1.2).

First maintenance inspection

Gather Records and Data (chapter 2):

1. Interview user/homeowner (section 2.3).
2. Obtain most recent system drawings (section 2.1.3).

Locate the System Components (chapter 4):

1. Locate and gain access to the septic tank/cesspool (section 4.1).
2. Locate the soil absorption system (section 4.2).

3. Identify any potential retrofits (section 4.4).

Evaluate and Maintain the System Components (chapter 5):

1. Inspect and maintain the septic tank/cesspool (section 5.1).
2. Inspect the distribution box, if handhole is present (section 5.2).
3. Observe overall site conditions (section 5.4).

Establish an Inspection Schedule (chapter 6)

Report findings to the homeowner and, where required by municipal ordinance, a local official (*Septic System Checkup: Inspection Report Forms*)

Routine maintenance inspection

Locate the System Components (chapter 4):

1. Locate and gain access to the septic tank/cesspool (section 4.1).
2. Locate the soil absorption system (section 4.2).
3. Identify any potential retrofits (section 4.4).

Evaluate and Maintain the System Components (chapter 5):

1. Inspect and maintain the septic tank/cesspool (section 5.1).
2. Inspect the distribution box, if handhole is present (section 5.2).
3. Observe overall site conditions (section 5.4).

Establish an Inspection Schedule (chapter 6)

Report findings to the homeowner and, where required by municipal ordinance, a local official (*Septic System Checkup: Inspection Report Forms*)

In some instances, a maintenance service provider may perform an in-home plumbing evaluation, flow trial and dye tracing. However, these procedures should only be performed when a system problem is suspected and should not be done as a routine part of maintenance inspections.

1.1.2 Functional inspections

The functional inspection is used to determine whether a system is adequate to serve the wastewater disposal needs of the household. The functional inspection is especially intended for use during a property transfer as a means to protect the consumer and identify systems in need of upgrade or repair. It may involve, as appropriate, any of the procedures described in this handbook. The following is an outline of functional inspection procedures (see also Tables 1.1 and 1.2).

Gather Records and Data[2] (chapter 2):

1. Determine system conformance (section 2.1.1).
2. Determine the history of the system (section 2.1.2).
3. Acquire the most recent system drawings (section 2.1.3).
4. Acquire information about the system from community officials (as necessary) (section 2.2).
5. Interview the system user/owner (section 2.3).

Evaluate the In-Home Plumbing (chapter 3):

1. Estimate water use (section 3.2).
2. Conduct a leak diagnostics and repair evaluation (section 3.3).
3. Retrofit household fixtures with water conservation devices (section 3.4).

Locate the System Components (chapter 4):

1. Locate and access the septic tank/cesspool (section 4.1).
2. Locate the soil absorption system (section 4.2).
3. Identify any potential retrofits (section 4.4).

Evaluate and Maintain the System Components (chapter 5):

1. Inspect and maintain the septic tank/cesspool (section 5.1).
2. Inspect the distribution box, if handhole is present (section 5.2).
3. Observe overall site conditions (section 5.4).
4. Conduct a flow trial (section 5.5).
5. Conduct dye tracing (section 5.6).

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[2] Septic system permit records for functional inspections are typically obtained by homeowners and provided to home inspectors. Some home inspectors may provide record research services for a fee (see chapter 2).

Establish an Inspection Schedule (chapter 6)

Report findings to the homeowner, the potential homebuyer, where required by municipal ordinance, a local official, using maintenance and functional inspection reports (*Septic System Checkup: Inspection Report Forms*)

Many of the inspection procedures, described herein, require special equipment, information, and reference materials: Table 1.1, "Inspection Procedures and Necessary Information, Materials and Equipment," lists the equipment and materials necessary for each procedure. Table 1.2, "Types of Inspection and Necessary Information, Materials and Equipment," lists the items required to perform first maintenance, routine maintenance and functional inspections.

Table 1.1 Inspection Procedures and Necessary Information, Materials and Equipment

Procedure Type	Procedure	Items Required
Record and data gathering	Acquiring records from DEM and acquiring information from community officials	•Name of owner •Address of system •Plat and lot of property
	Interviewing homeowners	•System records •Interview information sheet
In-home plumbing evaluation	Estimating water use	•Recent water bills (see section 2.1) •Flashlight •Calculator (optional)
	Leak diagnosis and repair	•Calculator (optional) •Chalk, crayon or tape •Watch or stopwatch •Plumbing replacement parts and tools •Large and small metered collection cups •Clean cloth for wiping fixtures •Water conservation devices and tools as necessary •Pressure and flow meters
Accessing system components	Septic tanks and cesspools	•System drawings (see section 2.1) •Shovel or spade •Metal prod •Electrician's snake •Wrench to open building sewer •Metal detector or other pipe locator (optional)
	Distribution box	•Access to septic tank and associated tools
Evaluation and maintenance procedures	Septic tank (once accessed)	•Sludge measuring device •Scum measuring device •Latex gloves •Rag for cleaning sludge and scum off measuring devices •Bleach and water solution

Procedure Type	Procedure	Items Required
Evaluation and maintenance procedures (continued)	Septic tank (once accessed)	•Pumptruck and pumping equipment •Flashlight for viewing interior •Mirror on pole •Eye protection •Septage spoon
	Cesspool (once accessed)	•Pumpout equipment •Electrician's snake •Flashlight for viewing interior •Angled mirror on pole
	Observation of site conditions	•System drawings
	Flow trial (once the tank is located and inspected)	•Calculator •Garden hose or other water source •Flow meter or other flow measuring equipment
	Dye tracing (once tank is located and inspected)	•Dye tracing solution · dye · protective clothing · latex gloves · 1½ gallon pitcher · measuring spoons · stir stick · funnel · storage bottles · carrying cases · paper towels •Checking for bypasses · municipal permission to access basins · 6 traffic cones · manhole cover hook · rope · flashlight · broom · crow bar •Investigating bypasses · garden hose · watch
Scheduling inspections		•System records (see section 2.1) •Calculator •Most recent inspection report
Reporting findings		•Appropriate report form •Educational materials

Table 1.2 Types of Inspection and Necessary Information, Materials and Equipment

Routine Maintenance	First Maintenance	Functional Inspection
	All items from “Routine Maintenance“ and...	*All items from “Routine Maintenance” and “First Maintenance” and...*
•Most recent inspection report	•Name of owner	•Interview information sheet
•Shovel or spade	•Address of system	•Recent water bill (see section 2.1 “Acquiring Records from DEM”)
•Metal probe	•System drawings (see section 2.1 “Acquiring records from DEM”)	•Food coloring for identifying toilet leaks
•Electrician's snake	•Calculator (optional)	•Chalk, crayon or tape
•Wrench to open building sewer		•Watch or stopwatch
•Metal detector or other pipe locator (optional)		•Plumbing replacement parts and tools
•Sludge and scum measuring device		•Clean, dry cloth for wiping fixtures
•Pumping equipment		•Large and small metered collection cups
•Flashlight		•Water conservation devices and tools as necessary
•Mirror on pole		•Pressure and flow meters
•Appropriate report form		•Garden hose or other water source
•Educational materials		•Dye tracing solution
•Latex gloves		•Municipal permission to access basins
•Rag for cleaning sludge and scum measuring device		•Rope
•Bleach and water solution		•6 traffic cones
		•Broom
		•Manhole cover hook
		•Crow bar
		•Metered (measuring) cup

1.2 Types of Septic Systems and Their Workings

Septic systems come in many forms and state-of-the-art technology is constantly evolving. The vast majority of systems in Rhode Island, however, fall into one of two basic categories: cesspools and conventional systems.

1.2.1 Cesspools

What exactly is a cesspool? Typically, a cesspool is a rock-walled, covered hole that receives wastewater from a home and allows it to drain into the surrounding soil. More sophisticated designs incorporate open-bottom concrete vaults with grated sidewalls and may discharge to a seepage pit or drainfield (refer to Figure 1.1). DEM's *Rules and Regulations Establishing Minimum Standards Relating to Location, Design, Construction and Maintenance of Individual Sewage Disposal Systems* (hereafter referred to as the ISDS Regulations) define "cesspool" as follows:

> The term "cesspool" shall be held to mean any buried chamber, including but not limited to, any metal tank, perforated concrete vault or covered hollow or excavation, which receives discharges of sanitary sewage from building sewer for the purpose of collecting solids and discharging liquids to the surrounding soil. Cesspools are not an approved method of sewage disposal under these Regulations and all existing cesspools are considered to be substandard. (SD 1.00)

Approximately 70,000 Rhode Island homes use cesspools for wastewater disposal. Irrespective of their wide distribution, cesspools provide inadequate wastewater disposal service for many users. Because of this inadequacy, households that rely on cesspools and employ modern appliances, such as garbage grinders, dishwashers and washing machines, tend to have system overflows or backups.

Cesspools also compromise public health and environmental quality. Cesspools allow wastewater to flow to ground- and surface-water resources without providing adequate treatment. This means that disease-causing bacteria and viruses, which are commonly found in raw wastewater, go unchecked. When wastewater pathogens pass freely into the natural environment, they threaten fishing grounds, bathing beaches and drinking water supplies.

DEM strongly encourages owners of cesspools to upgrade their systems; however, the department also recognizes that not every owner has the immediate financial means to replace a septic system. Therefore, this handbook recommends procedures for cesspool maintenance that should be used when cesspools are not obviously failing or causing nuisance. Inspectors and owners should be aware, however, that even cesspools maintained according to handbook procedures provide, at best, marginal treatment and should be considered for upgrade as soon as practicable. Additionally, a failed cesspool is not considered repairable and should be replaced with a conventional septic system in accordance with regulatory standards.

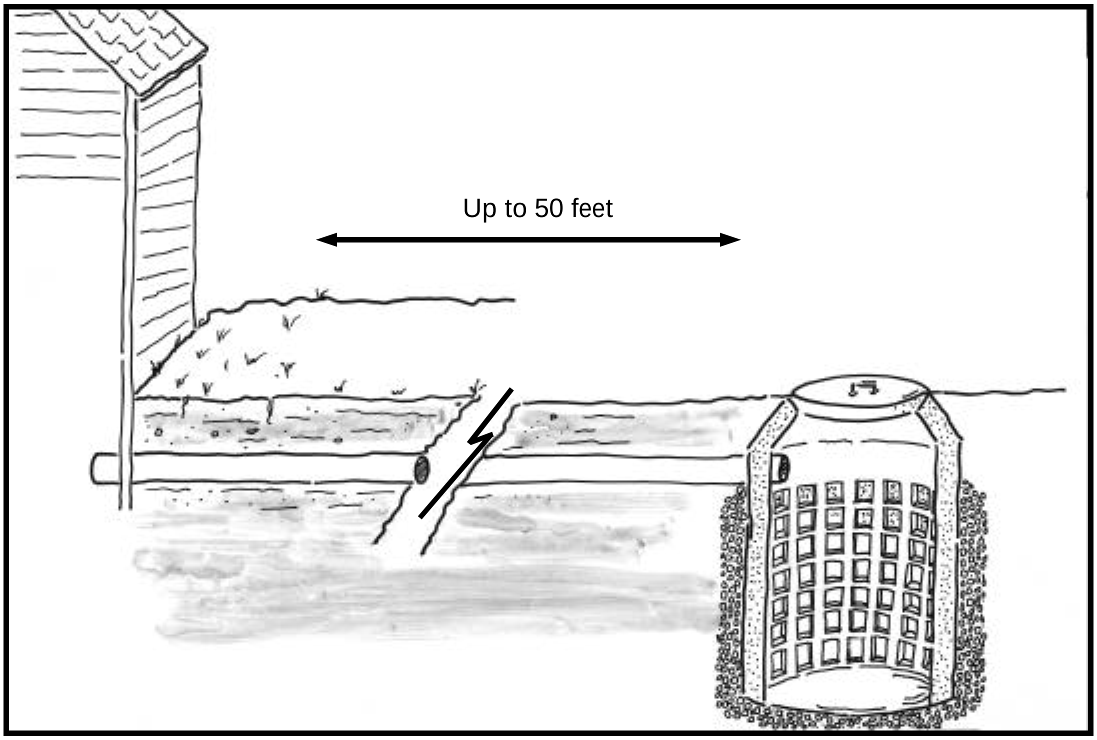

Figure 1.1 Cut away of a typical cesspool with a concrete vault. Wastewater flows by gravity from the building sewer to the cesspool, which may be located up to 50 feet from the foundation.

1.2.2 Conventional septic systems

A well-designed and maintained septic system provides an excellent means for sewage disposal. Once considered only a short-term option, experts now recognize that the conventional septic system can be long-lived and cost effective. In fact, in many suburban and rural areas, conventional septic systems are preferred over sewers.

In Rhode Island, a conventional septic system includes three basic components: building sewer, septic tank, and soil absorption system. The following sections describe the general workings of each.

Building sewer

Houses with conventional plumbing discharge all wastewater through a single pipe, called the building sewer or soil pipe, which delivers wastewater by gravity to some part of a sewage disposal system, typically the septic tank.

Septic tank

Modern septic tanks are generally rectangular boxes that are constructed of either concrete or fiberglass (refer to Figure 1.3a). Older tanks may be round (i.e., cylindrical) and built of substandard material, such as steel, which may corrode over time. Modern tank sizes typically range from 1000 - 1500 gallons, depending on the number of bedrooms served. Some older tanks may be as small as 500 gallons.

A septic tank is used to hold wastewater while the wastewater's solid and liquid constituents separate. The heavier material in the wastewater, called sludge, sinks to the bottom of the tank where it slowly decomposes. The floatable material (e.g., grease and oil), which is refered to as scum, rises to the surface and becomes trapped between devices at the tank's inlet and outlet, either baffles or sanitary tees. When wastewater enters the tank, it pushes relatively clean septage out of the tank from the "clear zone," which is the settling area between the scum and sludge layers, out of the tank .

Typically, solids accumulate in septic tanks faster than they decompose. This accumulation of solids reduces the clear zone of the tank. If the clear zone becomes too small, the incoming wastewater will displace the wastewater before solids and liquids have properly separated. Wastewater with unsettled solids will clog a soil absorption system. Thus, tanks need to be pumped to maintain an appropriate clear zone. Failure to pump in a timely manner will cause the soil absorption system to fail.

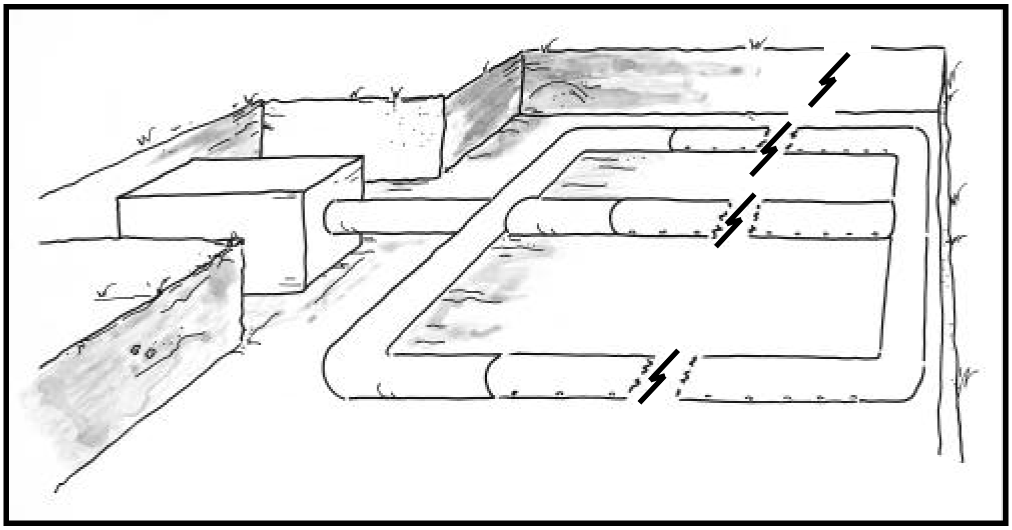

Figure 1.2a Soil absorption bed system

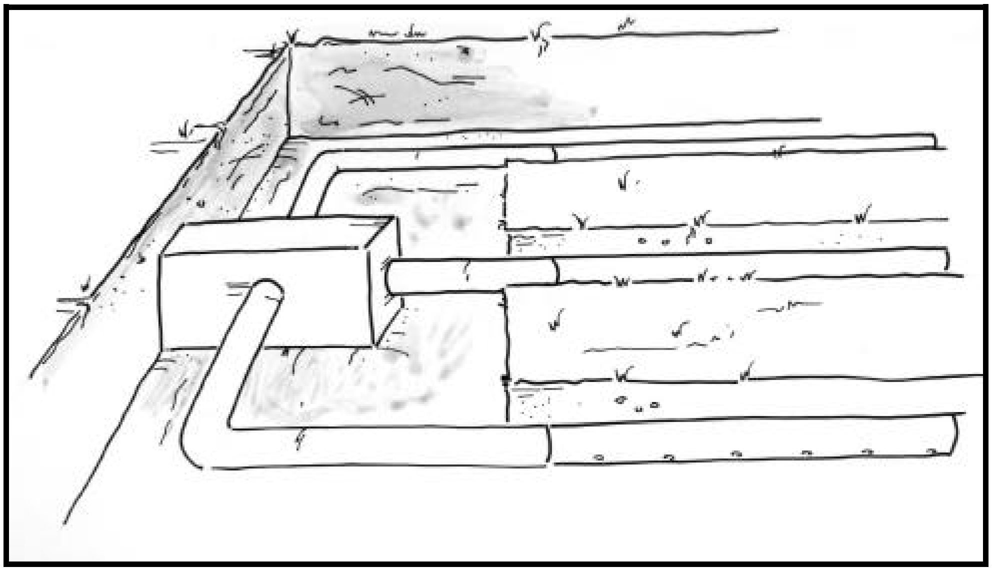

Figure 1.2b Soil absorption trench system

Soil absorption system

When effluent leaves the septic tank, it flows to the soil absorption system. If the septic tank of a conventional system is maintained in accordance with the procedures of this handbook, the soil absorption system should function properly for many, many years, perhaps in perpetuity. Three basic types of soil absorption systems are commonly used in Rhode Island: seepage pits, disposal beds and disposal trenches.

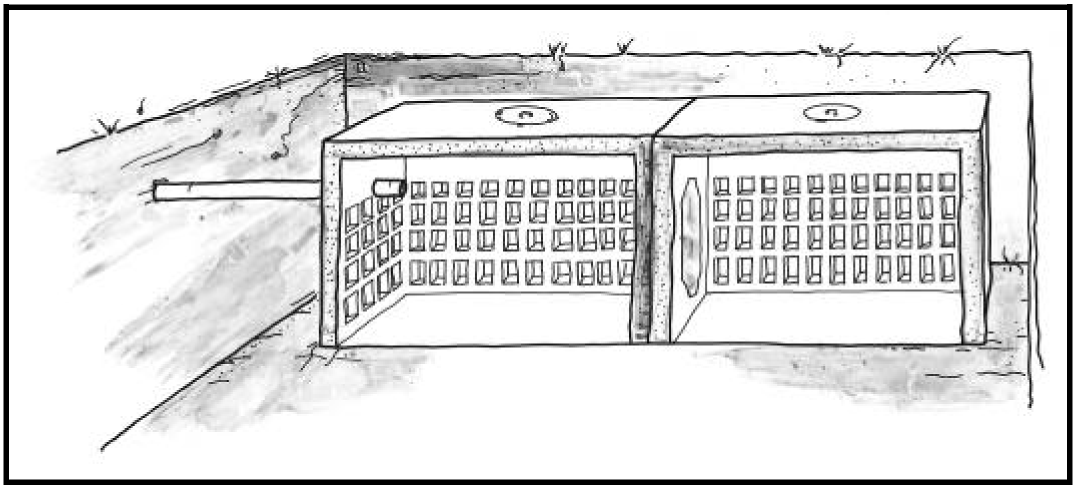

Figure 1.2c Cut-away view of soil absorption two galley-style seepage pits in series

Seepage pits (see Figure 1.2c)—sometimes referred to as flow diffusers or galleys—employ bottomless concrete structures with grated sides. The design of a seepage pit is similar to that of a cesspool; however, a seepage pit, by regulatory definition, is always downline from a septic tank.[3]

Disposal beds and disposal trenches are generically referred to as drainfields, but are in fact different. A disposal bed system is a shallow rectangular excavation that is partially backfilled with stone, lined with a network of perforated distribution pipe, and then filled to grade with earth. A disposal trench system consists of two or more parallel ditches that are partially filled with stone, each lined with singular perforated pipe, covered with a porous liner and then filled to grade with earth. Both system types typically utilize a distribution box (i.e., D-box, see Figure 1.3b). The D-box follows the septic tank, splitting the flow into approximately equal amounts, which it channels to the drainfield lines.

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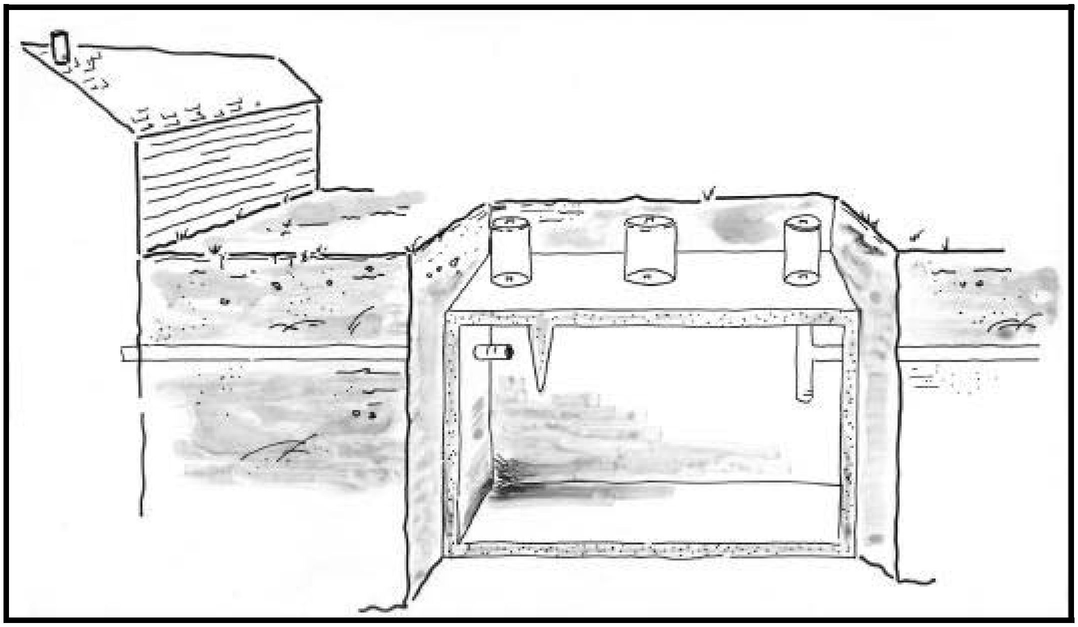
[3] When a cesspool system has two chambers, the second is usually referred to as a seepage pit.



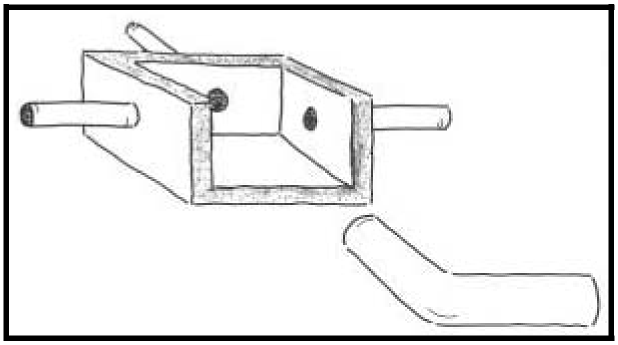


Figure 1.3a Cut-away view of a conventional 1000-gallon septic tank. Wastewater flows by gravity from the building sewer to the septic tank, followed by the distribution box and then to the soil absorption system.

Figure 1.3b Exploded diagram of a conventional distribution box.

CHAPTER 2
Gathering Records and Data for Inspections

Determining the adequacy of a septic system requires knowledge about its design, use and maintenance. Such information may be obtained by reviewing its application, use and maintenance records and by talking with the system's users.

Inspectors should make certain to have written records available at the time of inspection. Table 2.1, "Obtaining Septic System Application, Use and Maintenance Records," lists types of records and where they can be obtained. These records are necessary to ensure system conformance. The records will also provide valuable time savings when attempting to locate buried components . Usually, records are gathered by the homeowner and provided to an inspector; however, this does not preclude inspectors from gathering records as a service to homeowners.

Table 2.1 Obtaining Septic System Application, Use and Maintenance Records

Type of information	Name of record	Availability
Application[a]	Applications for new system, alteration & repair Certification of conformance Certification of construction	DEM Homeowner Building official System designer
Use[a]	Septage pumping records Water bill	Homeowner or tenant Inspector/pumper (pumping records only)
Maintenance	Maintenance inspection report	Homeowner Wastewater management official

Note: a. Some information regarding application and use may have been recorded in functional inspection and first maintenance inspection reports. However, such information should be checked against the original source, whenever possible, to avoid repeating any data-gathering errors.

The following sections describe how inspectors and homeowners may obtain information from DEM and community officials. It also discusses how inspectors should interview homeowners and other system users, such as renters.

2.1 Acquiring Records from DEM

Application records demonstrate that a system is properly permitted. Most systems installed after April 6, 1968 will have application records. Homeowners and inspectors may obtain copies of these records from DEM, which generally has the most comprehensive and up-to-date records.

Whenever possible, an inspector should review records with the homeowner to make sure they are complete. If a homeowner notes any discrepancy, the inspector should request documentation. Homeowners should follow up with local officials and DEM regarding any discrepancies that are found.

DEM keeps records at 235 Promenade Street, Providence in the Office of Water Resources. DEM's Office of Technical and Customer Assistance is available to help the general public in obtaining permits. DEM's telephone number is in the Blue Pages of the telephone directory. To obtain optimum assistance, customers may wish to call DEM before visiting the office in person. With respect to DEM records, a functional inspection should include a review of the following:

1. System conformance and construction certificates, and optionally, a functional inspection may include records of system history such as violations or applications for repair or alteration.
2. Most recent as-built plans.

2.1.1 System conformance and construction

A functional inspection should include a determination of whether a system is conformed and constructed in accordance with regulations. All conformed systems are recorded in a reference set, entitled *Conformed ISDS Applications*. Conformance records show that a system was constructed and installed in accordance with the regulations that were in force at the time of the application approval. *Conformed ISDS Applications* lists eight fields of information for each system:

1. Year of application.[4]
2. City/Town of system location.
3. Application number.
4. Microfilm number.
5. Street of system location.
6. Plat number.
7. Lot number.
8. Applicant name.

The reference indexes septic systems by town of location, and either street of location or application number.

In January 1992, DEM computerized its septic system records. Reference numbers since then have two parts that are separated by a hyphen. The first four digits include a two digit number for the year (e.g., "92" for applications in 1992) and two digits representing town number in an alphabetized listing (e.g. "30" for Scituate). The second part is a number of 1-4 digits representing order of receipt (e.g., "99" for the ninety-ninth ISDS application received by DEM in a given year). Thus, the application number for the system just described would be: 9230-99. Applications prior to 1992 were assigned reference numbers using other systems.

2.1.2 Determining system history (optional)

Though determining system history is not necessary for either functional or maintenance inspections, homeowners and potential homebuyers may wish to find out whether a system has a good history of regulatory compliance. The records of new construction, alteration or repair are bound in logbooks cataloged by year, town and application number. These records are available through DEM's Office of Technical and Customer Assistance.

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[4] An application, with proper renewals and transfers, may be valid for years after it has been approved. Thus a system may be built in one year, but have an application for another year.

DEM also keeps records of violations in a log entitled *EE. RIDEM ISDS Status Report*. The report is indexed by year, town, and street address. It dates back to 1982. Records of violations are available by request at the DEM Office of Technical and Customer Assistance, 235 Promenade Street, Providence.

2.1.3 Acquiring the most recent system drawings

To access system components, inspectors will need to know where system components are located. System drawings generally give reliable information. Using the techniques described in "Determining system history" (section 2.1.2), find the most recent permit application number for the system. Find the microfilm number in *Conformed ISDS Applications*. To obtain a hard copy of the application, contact DEM's Office of Technical and Customer Assistance.

2.2 Acquiring Information from Community Officials

Local officials may keep permit or maintenance records. Generally, building officials or wastewater officials provide appropriate points of contact.

Building officials keep records of all building permits. Before a town issues a certificate of occupancy, state law requires the town to confirm the existence of an up-to-date certificate of conformance for the septic system.

Towns with wastewater management programs may keep records of inspection and maintenance. To acquire such information, call the appropriate official as listed in the Blue Pages of the telephone directory. For questions about who to contact, call the town hall. DEM's Office of Water Resources is currently developing a reference text that also provides this information.

2.3 Interviewing System Owners

The functioning of a septic system is dynamic and complex. Sometimes observations during an inspection have more than one possible interpretation. Interviewing a system's owner and users may help to interpret inspection results. Figure 2.1 lists important information an inspector may wish to obtain from the homeowner or system users.

HOMEOWNER/OCCUPANT RECORDS & DATA, as available

Information collected pursuant to this section is to be provided voluntarily and at the discretion of the property owner. The property owner is solely responsible for record and data accuracy and completeness. The inspector assumes no responsibility for the accuracy of information provided by the property.

Indicate whether the following information was made available during the inspection. Attach copies of available records. If the property owner states that any of the following services were not provided—or in the case of application records that the system was installed prior to regulations (April 1968) — indicate not applicable (N/A). If the property owner states that partial records were provided, indicate "partial."

Source of Records & Data

Records and data were given to the inspector by:

_______ Property owner _______ Realtor ________ Other ____________________________

Application Records

Yes	No	N/A	
☐	☐	☐	Applications for septic system (inclusive of new systems, alteration, repairs). Indicate the number of each: ______ New system ______ Alteration ______ Repairs
☐	☐	☐	Certificate of Construction
☐	☐	☐	Certificate of Conformance

Use Records

Yes	No	N/A	Partial	
☐	☐	☐	☐	Last two septage pumping bills
☐	☐	☐	☐	Water bills for the last 12-24 months

Maintenance Records

Yes	No	N/A	Partial	
☐	☐	☐	☐	Maintenance inspection reports

Resident Data

During the last 12 months, the inspected residence housed _____ year-round occupants

Plat Number ______ Lot Number ______

Figure 2.1 Important homeowner records and information as required for the functional inspection, see *Septic System Checkup: Inspection Report Form.*

Begin the interview by carefully reviewing all pertinent written information. Some written records may be out of date or contain inaccuracies. An interview may help to verify data on written reports.

Interviews are best done in person. When interviewing be sure to maintain a courteous and professional demeanor. Make the person being interviewed feel comfortable. This will help to optimize the quality of the interview. Interviews also provide an excellent opportunity to educate the user about how to care for their septic system. Inspectors may wish to leave educational materials with system users. Educational materials are available from DEM, the University of Rhode Island's Onsite Wastewater Training Center, and from some municipalities.

CHAPTER 3
In-Home Plumbing Evaluation

Faulty or outdated plumbing may add significantly to the wastewater load on a septic system. Overloaded systems tend to fail and as a result may generate expensive repair bills. Also, faulty plumbing adds to overall water use and may result in expensive water bills.

Inspectors performing functional inspections should carefully check all plumbing, water fixtures and water-using devices for malfunctions.[5] Maintenance inspections, however, will not usually include in-home plumbing evaluation.

3.1 Wastewater Routing

For the purposes of this handbook, wastewater routing refers to the manner in which gray and black water outlets exit from a building. Unless otherwise allowed by a DEM-approved permit, all wastewater should route through the building sewer to the septic system. Inspectors should visually check to make certain that *only one* wastewater pipe exits the basement and, in particular, that the washing machine outflow goes to the septic tank. Homeowners may illegally route these out a window or to a storm drain.

If a gray water discharge to a dry well is approved by the department and it has not been altered since its permit approval, then it is usually an acceptable discharge.[6] Nevertheless, having a permit approval does not ensure that a dry well functions properly. Homeowners should keep in mind that most inspectors *do not* assume responsibility for dry wells and therefore do not include them as part of a functional

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[5] While checking for faulty plumbing, an inspector may also wish to take the opportunity to locate the building sewer to help find the septic tank.

[6] Black water discharges to dry wells are prohibited by regulation.

inspection. Currently, there is no procedure to ensure the proper functioning of a dry well.

Sump pumps and foundation drains should not be routed to the septic system. Water volumes generated by these devices will quickly overload a system and cause backups or other hydraulic failures. Instead, these devices should outlet to the ground surface or a dry well.

3.2 Estimating Water Use

Inspectors should analyze water use as part of the functional inspection. High water use contributes to septic system failure in two major ways: (a) high water flows tend to stress the absorptive capacity of soils; and (b) overly large flows are likely to carry over solids from the septic tank and thereby clog the soil absorption system. Inspectors should use the following method to diagnose water-use problems when a water meter is present.

3.2.1 Estimating water use with a water meter

1. Obtain water bills from the last 12-24 months including records of previous meter readings. Inspectors should obtain water bills from the homeowner (refer to section 2.3).
2. Locate the water meter by following any water line back to the main water supply line inlet. The meter may be in the basement or outside the house. Water meters generally have protective flap covers that lift open.
3. Read the meter. Water meters come in three types as shown in Figure 3.1. Use the Equation 3.1 to approximate water use per capita per day. Inspectors should also ask residents about their outdoor water-use habits (refer to section 2.3 for information on conducting interviews). Typical outdoor water use (e.g., lawn and garden) adds approximately 25 percent to water consumption. Inspectors should subtract outdoor water use from total water use before making the calculation in Step 3. Table 3.1 shows some general ranges for

Equation 3.1 Water Use Per Capita Per Day

$$W=(R_2-R_1)/D\cdot O$$

Where:

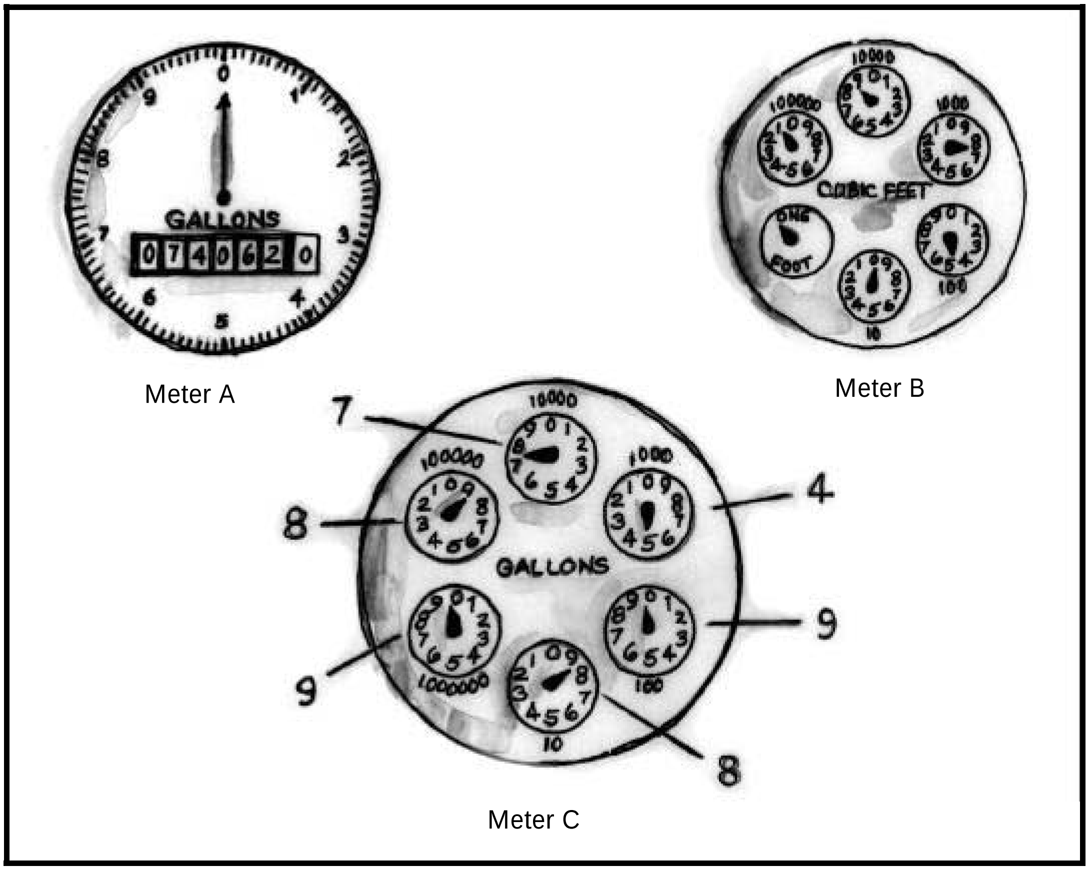
W = water use per capita per day

R_2 = most recent water meter reading

R_1 = oldest water meter reading

D = number of days elapsed between the water meter readings

O = average occupancy of the residence between readings (R_1, R_2)



Meter A

Meter B

Meter C

Figure 3.1 Water meters — Meter A reads 74,062.0 gallons, Meter B reads 187,499 cubic feet and Meter C reads 9,875,890 gallons.

Table 3.1 Typical Residential Outdoor Water Use

Type of use	Percentage of outdoor water use	Percentage of total water use
Lawn and garden	75-100	25-30
Swimming pool	0-12.5	0-5
Car washing	0-12.5	0-5

Note: Adapted from *Evaluating Urban Water Conservation Programs* (Planning and Management Consultants, 1993).

outdoor water use as a percentage of total usage.

4. Check the meter for units of measure.[7] It should read in either gallons or cubic feet--sometimes hundreds of gallons or cubic feet. Usage, as calculated in Step 3 for a home that is occupied throughout the day, should not exceed 75 gallons or 10 cubic feet per person per day. Water use in homes where occupants are absent for long periods during the day should be less--no more than 50 gallons per person per day.

Water consumption above these levels suggests leakage and may compromise system function. If excessive water use is found, inspectors should follow up with leak diagnosis as described in section 3.3.

3.2.2 Estimating water use in unmetered homes

Many homes on private wells do not have water meters. When a water meter is unavailable, water use cannot be measured directly. Inspectors may rely on home occupancy to identify potential overloads. Septic system permits are granted for use by up to two year-round occupants per bedroom. Occupancy in excess of two occupants per bedroom may damage the system. To calculate occupancy per bedroom, refer to Equation 3.2. Inspectors should note excess occupancy.

[7] Cubic foot = 7.48 gallons

Equation 3.2 Household Occupancy Per Bedroom

$$O_B = O_T/B$$

Where:

O_B = Occupancy per bedroom
O_T = Year-round occupancy, averaged over 12 months
B = Number of rooms in a house, which are of at least 100 square feet in floor area and which have at least one window and closeable passageway (i.e., doorway (see also Rule SD 1.00 of the ISDS Regulations)

Because excess water use may be generated by faulty plumbing, all fixtures and appliances in an unmetered home should be inspected carefully. Refer to section 3.3, "Leak Diagnosis and Repair."

In homes where there are water-use problems and no water meters, owners may wish to consider installing sewer-water meters. These meters apprise both the homeowner and septic system inspector of exactly how much water flows to the septic system over a period of time. Meters can help to find out if plumbing leaks or improperly routed water-using devices are adding to the hydraulic load in the septic system, and whether the home occupants are using more water than the system can handle.

3.2.3 Reducing excessive water use

In most cases where water use is above the acceptable range (approximately 50 to 75 gallons per person per day--see section 3.2., "Estimating Water Use"), it is because of leaky or out-of-date (i.e., high volume) water fixtures. Water-use problems can often be fixed by retrofitting a fixture with a water conservation device or by troubleshooting and repairing leaks. Sometimes, however, water-use problems may be best fixed by replacing a faulty fixture. Table 3.2, entitled "Intervention for Excess Water Use," lists typical remedies for residential water-use problems.

Table 3.2 Intervention for Excess Water Use

Fixture	Intervention	Repair person	Comment
Toilet	Retrofit	Homeowner Plumber	Retrofit devices are inexpensive, but work well only if carefully selected, installed and adjusted. Refer to section 3.4, "Retrofitting Household Fixtures with Water Conservation Devices."
	Leak repair	Homeowner Plumber	A leaky toilet can waste well over 100 gallons of water per day (see section 3.3.2, "Toilets").
	Replacement	Plumber	Toilets with a 1.6 gallon flush are required for replacement by code.
Faucets	Retrofit	Homeowner Plumber	Not recommended for faucets with intentionally high flows. Refer to section 3.4, "Retrofitting Household Fixtures with Water Conservation Devices."
	Leak repair	Homeowner Plumber	Due to the many types of fixtures, leak repair may require a plumber's service.
Showerheads	Retrofit	Homeowner Plumber	Retrofit devices are inexpensive, but work well only if properly selected, installed and adjusted. Refer to section 3.4, "Retrofitting Household Fixtures with Water Conservation Devices."
	Leak repair	Homeowner Plumber	Depending on the location of the leak, this may require the services of a plumber.
Water treatment appliance	Leak repair	Homeowner Plumber	A leaky water treatment appliance can waste hundreds of gallons of water per day. Refer to section 3.3.4, "Water treatment Appliances."

3.3 Leak Diagnosis and Repair

The following sections discuss step-by-step procedures for identifying and repairing leaky plumbing fixtures.

3.3.1 Measuring flow rate

Flow rates may be determined by measuring volume of flow over a period of time and substituting the measurements for variables in the flow rate equation. Inspectors should use Equation 3.3 when calculating the rate of flow from leaks.

Equation 3.3 Flow Rate

$$R = V/T$$

Where:

R = Flow rate
V = Volume of water accumulated
T = Time elapsed during accumulation of flow

3.3.2 Toilets

A leaky toilet may easily contribute a hundred gallons of water per day to the wastewater flow (see Table 3.3, "Flows from a Leaky Toilet"). Leaky toilets have also been found to cause septic system failure.

The following procedures may be used to determine if a toilet is leaking:

1. Sometimes leaks can be heard. Flush the toilet, wait for it to complete its refill cycle and then listen for flowing water. If no sound is detected, use either Procedure 2 or 3 to identify silent leaks.
2. Add a small amount of food coloring (as it will not stain) to the toilet cistern (i.e., tank or reservoir). Wait fifteen minutes. If the toilet is leaking, dye will appear in the toilet bowl.
3. Shut off the in-flow to the cistern and mark the level of water in it with crayon, chalk or tape. Wait a period of time--thirty minutes or so--and recheck the water level. If it has dropped, then the toilet is leaking. For a seeping (i.e., slight) leak, water level in a 3-5 gallon cistern may drop about an inch in 30

Table 3.3 Flows from a Leaky Toilet[a]

Leak type	Approximate water loss (gallons per day)
Seeping	30+
Open (stuck valve)[b]	6000

Notes:
a. Adapted from *How Much is Enough* (Judd, 1993).
b. Assumes 4 GPM flow (i.e., as from an open valve).

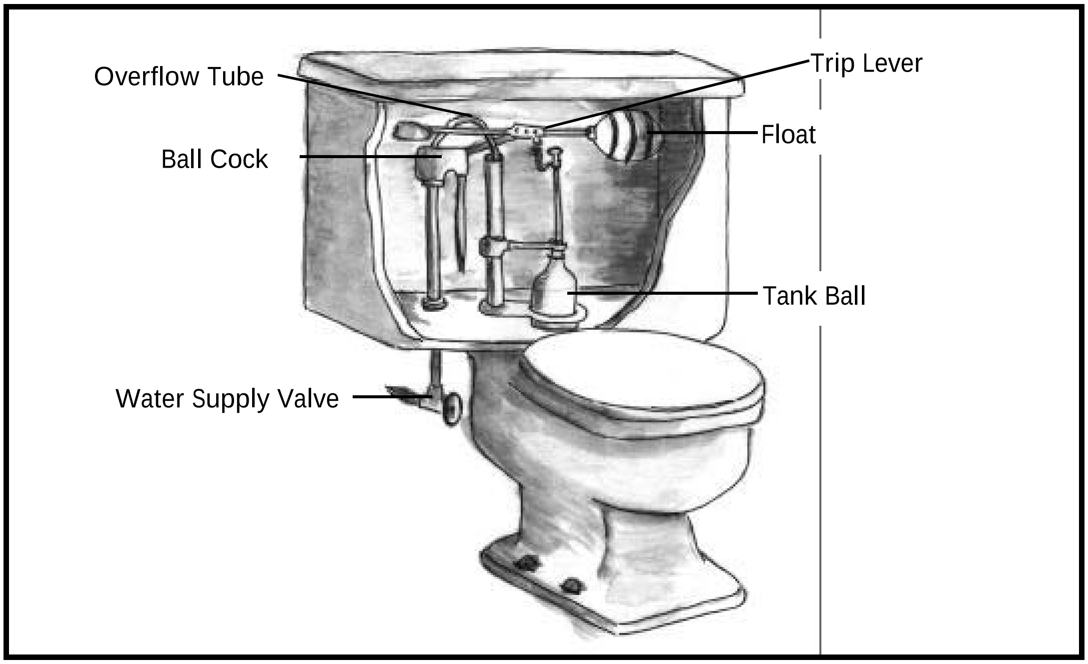


Figure 3.2 Diagram of a toilet

minutes. This represents a loss of approximately a half gallon or 24 gallons per day (see Table 3.3).

Toilet leaks are generally easy to fix. The following steps for fixing toilet leaks have been adapted from the text *Onsite Wastewater Disposal* (Perkins, 1989).

1. Check the water level in the cistern to make sure that water is not continuously running down the overflow tube. If it is, turn the adjustment screw to lower the float. If there is no adjustment screw, carefully bend the float arm.
2. If water flows in the cistern when the float is fully elevated, replace the shut off valve.
3. Inspect the overflow pipe below the water level. Replace it if there are any pitholes.
4. Check the plunger (tank ball) at the bottom of the cistern to see if it seals

properly. Remove any debris and replace any worn parts.

5. If the plunger does not drop exactly into the opening in the cistern bottom, adjust the vertical rod and/or the loops through which it passes to allow it to drop freely.
6. Make sure that the chain on the plunger rod is not twisted or caught.

3.3.3 Faucets

A water faucet that drips just a couple drops per second may add many gallons to the daily wastewater load (see Table 3.4). Often a leak can be fixed by changing a washer. If a faucet is leaking, the washer should be changed.

Sometimes leaks are not apparent. To check a fixture that is suspected of leaking, use the following procedure:

1. Open the fixture and allow water to flow for approximately 2-3 seconds.
2. Firmly close the fixture, but do not over tighten. The fixture should be closed as it would be after normal use.
3. Dry the fixture completely with a clean cloth, especially around the spout, control valves, and any plumbing joints. Watch carefully for 10 seconds to see if droplets form in the dried areas. If droplets form, recheck to be sure the control valves are firmly closed and dry the fixture again. Watch for another 10 seconds. If droplets continue to form on any part of the faucet or spout, this indicates a leak. Inspectors can use Procedures 4 and 5 to measure the rate of leakage; however, these are optional.

Table 3.4 Comparison of Leaks and Flows from a Typical Faucet [a]

Flow	Water loss (gallons per day)
Slow drip (approximately 1 drop per second)	36
Heavy leak	180
Fully open valve [b]	3600

Notes: a. Adapted from *How Much is Enough* (Judd, 1993).
b. Water loss rates assume a flow of 2.5 gallons per minute when a faucet is fully open.

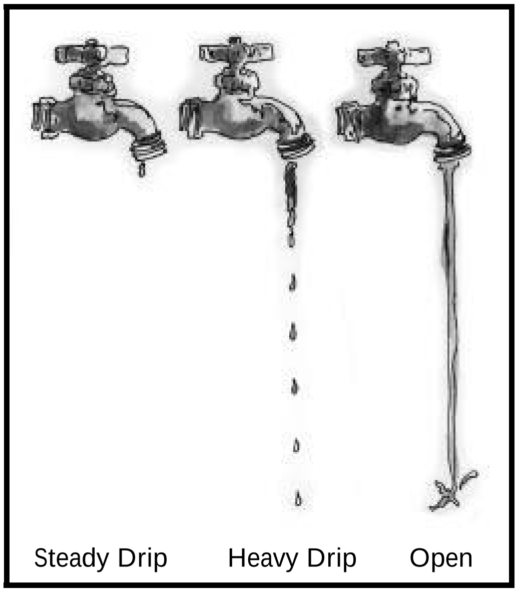


Figure 3.3 A slow steady leak (i.e., one drop per second) from a faucet may create a water loss of 36 gallons per day. A heavy leak may lose 180 gallons per day. A fully open faucet flowing at 2.5 gallons per minute will pour out 3600 gallons per day.

4. Place a dry metered cup or other collection device under the tap. Note the time and allow it to collect for at least fifteen minutes.

5. After fifteen minutes or so, recheck the collection cup. The flow rate of the leak can be calculated using the equation described in section 3.3.1, "Measuring flow rate."

3.3.4 Water treatment appliances

Water treatment appliances include softeners and purification systems. Water softeners remove minerals from domestic water. Water purifiers use filters to remove pathogens and low-level toxins from domestic water.

Most water treatment appliances backflush routinely. The backflush leaves the system via a small-diameter hose. The hose typically directs flow to one of three outlets: (a) the septic system via the washing machine outlet; (b) a sump pump outlet; or (c) an auxiliary soil absorption system (i.e., dry well) that is separate from the septic system.

Water treatment appliances backflush at a very high flow rate. Sometimes the backflush valve of a softener or purifier may stick open or leak. Such a leak may waste several hundred gallons of water per day. If a leaky softener or purifier is routed to the septic system, the system may become overloaded and back up. When softeners and purifiers are present, the following procedures should be used to locate the backflush outlet and check for leakage.

Finding water treatment backflush outlets:

1. Ask the residents. If the residents are unable to assist, proceed to Steps 2-4.
2. Some water treatment appliances are installed under the kitchen sink. Check there first.
3. Often, softeners and purifiers are designed to treat all the water coming into the house and thus intercept the main water supply line. If not found under the sink, locate a softener or purifier by following any water supply line (e.g., a cold water line from a sink) back to the incoming main.
4. Softeners and purifiers usually have four lines: (a) an incoming line--the main supply line coming into the house; (b) an outgoing line--the continuation of the supply main that delivers water to the house after it is treated by the appliance; (c) a bypass line--a line with a valve that will allow water to bypass the treatment appliance; and (d) a backflush line--usually a small, clear or black rubber hose that is approximately 10 feet long, though sometimes more, which directs backflush out of the appliance.
5. Follow the backflush line to its outlet. If the backflush line terminates in the building sewer or in another line that feeds to the septic system, it should be checked carefully for leaks. See the next procedure, "Identifying water treatment appliance leaks."

Identifying water treatment appliance leaks:

1. Locate the backflush line. See the previous procedure, "Finding water treatment backflush outlets." A backflush line will generally make a loose, unfastened connection to its outlet. Open the outlet and--being careful to avoid spillage--move the line from the outlet to a metered container (approximately 1 gallon). Observe the water treatment appliance and confirm that it is not performing a routine backflush. Generally, water treatment appliances use a timer to control backflushes. Backflushes typically occur late at night, so as not to conflict with normal water usage.
2. Backflush from a stuck valve usually flows out of a water treatment appliance under pressure and may squirt from the line. If water flows lightly and does not clearly indicate a leak, place the line in the container for 5 minutes and observe whether water flows continually. A very small amount of water may

be residual from a previous flush cycle.

3. In some cases, inspectors may desire to calculate the flow rate. Refer to section 3.3.1, "Measuring flow rate."

3.4 Retrofitting Household Fixtures with Water Conservation Devices

Excessive household water use may result from old, high-flow fixtures. Installing conservation devices is typically quick, inexpensive, and will reduce the wastewater load on a septic system. Retrofitting should, however, be undertaken thoughtfully, to avoid inappropriate remedies. Anyone who installs a conservation device should make sure of the following:

1. The new device fits the use of the fixture. Most homeowners will remove devices that are too restrictive and may damage the associated fixture in the process.
2. Water savings justify the cost of the device.
3. The new device complies with code (refer to Rhode Island State Building Code, Plumbing Code Regulation SBC-3, Article 15, Water Supply and Distribution, as amended).
4. The homeowner and/or potential homeowner are happy with the look and operation of the new device.
5. The simplest installation possible is used. Inspectors should be mindful of their skill limitations. Some installations may require a licensed plumber.
6. The retrofits are recommended after measuring flows and water pressure. Water pressure below 60 pounds per square inch requires specially designed devices. Use an in-line pressure meter to determine pressure.

   Installing conservation devices in a toilet may seem simple, but can be tricky. Inspectors should be certain to use only properly designed and manufactured devices. Makeshift retrofits can damage toilets. Never use a brick or piece of concrete as a water displacement device. Both of these materials disintegrate and may gum up plumbing mechanisms over time.

CHAPTER 4
Techniques for Accessing Septic System Components

When a system receives its first maintenance or functional inspection, the location of system components may be unknown. The following techniques are simple methods to help an inspector find the exact location of the septic tank or cesspool and to approximate the location of the distribution box and soil absorption system. Refer to chapter 5, "Evaluation and Maintenance Procedures for Septic System Components," for information on how to inspect and maintain these components.

4.1 Locating Septic Tanks and Cesspools

Several procedures may be used to locate a septic tank or cesspool. They are presented here with the least invasive procedures listed first. In general, a septic tank will be located 5-15 feet from the foundation of the house and a cesspool will be located up to 50 feet from the foundation. Keep in mind, locating a septic tank or cesspool is as much an art as it is a science. Refer to section 4.3 for instructions on how to open septic system components.

1. Check for a past maintenance inspection or functional inspection report. The homeowner and the inspector who wrote the report should have a copy. Municipalities with septic system maintenance programs may also keep reports.
2. If no written records exist, ask the homeowner. The homeowner may know approximately or even exactly where the septic tank or cesspool is located.
3. Look for inspection ports at ground level. Tanks installed after 1990 should

have ports to grade. Also, many cesspools have manholes to grade. Tanks installed prior to 1990 should have accesses that are no more than 1 foot below grade.

4. Acquire a copy of the as-built design plans. The plans should accurately show the location of all system components. DEM keeps plans and other septic system permit information for most systems built after April 1968 (refer to section 2.1.3, "Acquiring the most recent system drawings"). Homeowners or local building inspectors may also have copies.

5. Look for indirect evidence of the building sewer pipe location. The sewer pipe usually exits the basement directly below the sewer vent pipe. Also, most building sewer lines will exit the basement from the area beneath the bathroom. If no access to the house is permitted, look for a bathroom window, which is typically a small window, to help determine the approximate vicinity of the pipe.

   After determining the general location of the sewer line, precisely locate the tank using a steel probe. Most tanks are made of steel-reinforced concrete, so a metal detector may also be used. Attempt to locate buried cesspools in the same manner; however, as many cesspools have no metal parts, probing with a rod may be necessary. Be careful; probes may puncture orangeberg pipes.

6. If other procedures do not work, and if the inspector is given access to the basement, the building sewer can be used to help locate the tank.

   Open the building sewer cleanout closest to where it exits the basement and insert a snake. (An electrician’s snake works best.) The inlet baffle, tee or the furthest wall of the tank or cesspool should stop the snake as it is inserted. The length of snake inserted approximates the distance to the tank or cesspool from the building sewer access. A building sewer typically runs in a straight line to the cesspool or septic tank. Inspectors should note, however, that some building sewers bend or corner, offsetting the location of the tank or cesspool from the outlet in the basement.

   Alternatively, a float with a remote sensing device may be used to locate a septic tank. Refer to the manufacturer's instructions for proper use.

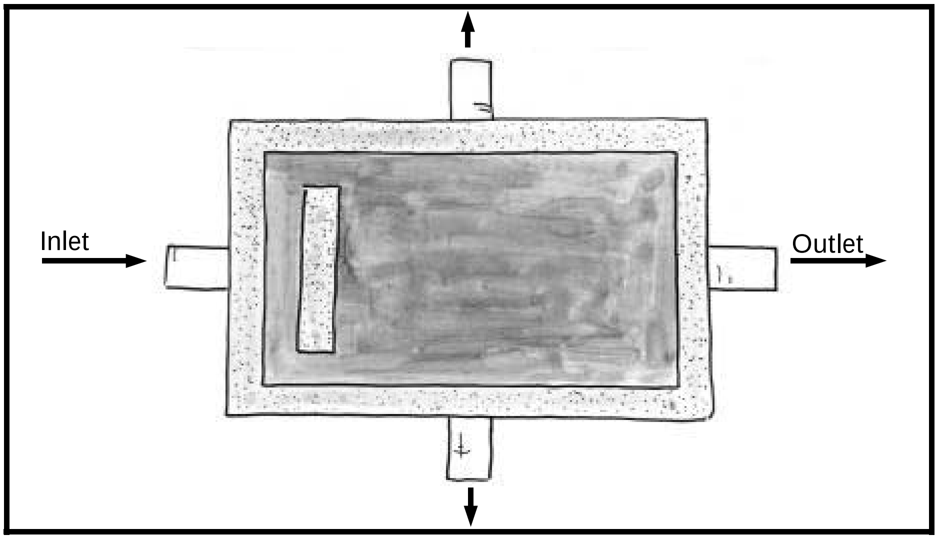


Figure 4.1 Top view of a distribution box

4.2 Locating Distribution Boxes and Soil Absorption Systems

The following techniques may be used to approximate locations for both the distribution box and soil absorption system.

1. Refer to past inspection reports. Ask the homeowner for copies. If there is a wastewater management program in town, inspection reports may also be available through the program. Refer to section 2.2 for procedures on acquiring information from community officials.
2. System components of conventional systems are constructed in accordance with as-built plans. Obtain the plans prior to the site visit and use the plans as a tool for locating components. See section 2.1.3, "Acquiring the most recent system drawings."
3. If system drawings and past inspection reports are unavailable, observe the direction of the outlet pipe of the septic tank to determine the general location of the distribution box and soil absorption system. Occasionally, the distribution box will have an inspection port (i.e., handhole) at the ground

level, providing direct access and evidence of location. Refer to section 4.3 for instructions on how to open septic system components.

4.3 Opening and Closing Component Accesses

In some cases, a component will have an access at grade. In others, the access is buried. A system component, once located, still needs to be opened. After the inspection is completed, it will also need to be closed. It is important to complete these procedures carefully and with minimal disturbance to any landscaping.

4.3.1 Accesses at grade

Sometimes, a septic system component is accessible via a riser. See Figure 4.2a, "Top view of septic tank risers at grade level." Risers are vertical tubes with tight-fitting fiberglass or concrete covers at, slightly above, or just below the ground surface. Open a fiberglass cover by unfastening the lid and lifting it off. If the lid is locked, ask the homeowner to open it. Concrete covers do not usually lock or latch.

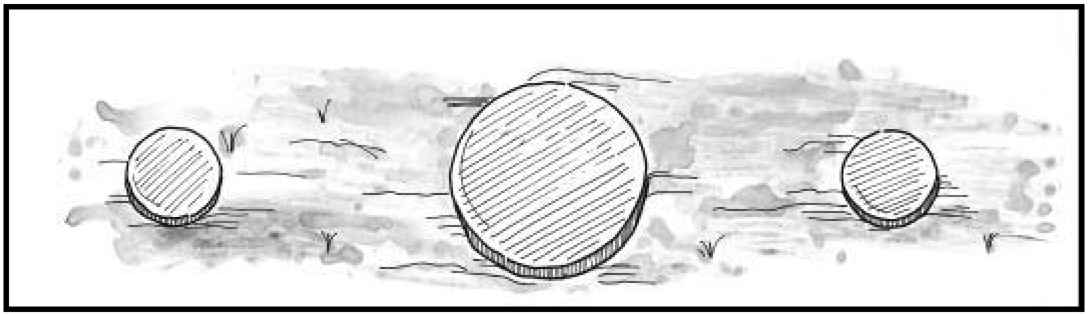


Figure 4.2a Top view of septic tank risers at grade level.

Close the access in the reverse manner to which it was opened. Be certain to replace any locks.

4.3.2 Buried accesses

Use the following procedures to open a buried access:

1. Locate the system component (refer to sections 4.1 and 4.2).
2. Approximate the location of the inspection ports or central manhole based on the anticipated component size. See Figure 4.1, "Top view of a distribution box" and Figure 4.2b, "Top view of a typical unearthed septic tank."
3. Use a spade to carefully cut and remove sections of sod. After removing the ground cover, dig as necessary to uncover the tank inspection ports. Pre-1990 code did not require that septic tanks have an access at grade. Post-1990 code requires accesses at grade.

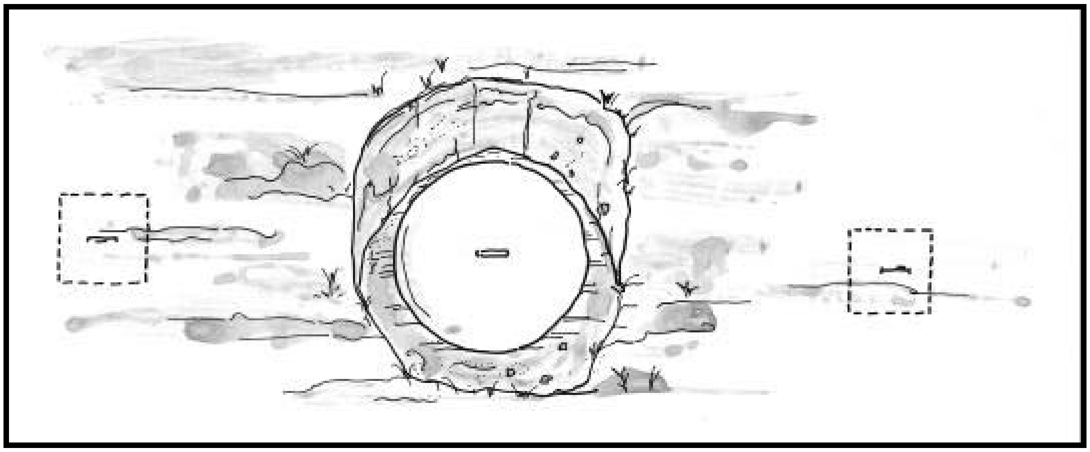


Figure 4.2b Top view of a typical unearthed septic tank main access (manhole). (Current regulations require a manhole and two inspection ports. DEM is revising the regulations to require two 20-inch manholes at the influent and effluent ends of the tank and no center manhole.)

Use the following procedures to close a buried access:

1. Be sure all port and manhole locations are correctly indicated on the current inspection report and the reports for first maintenance inspection, functional inspection and certificate of construction, as available. All component accesses should be located using swing-tie measurements. The term swing-tie

refers to two or more measurements made from the corners of a building foundation that intersect only at the point to be located. The length of each swing-tie from the intersection to the foundation corner is recorded to make finding the septic system easy.

2. Be sure port and manhole gaskets and seals are properly in place and intact before closing.
3. Rebury the access. Carefully replace the sod and tamp it down to ground level.

4.4 Suggested Retrofits for Conventional Septic Systems

The following retrofits are recommended to make inspections easier and to improve the longevity of the system. Inspectors should recommend these retrofits to system owners at the time of inspection.

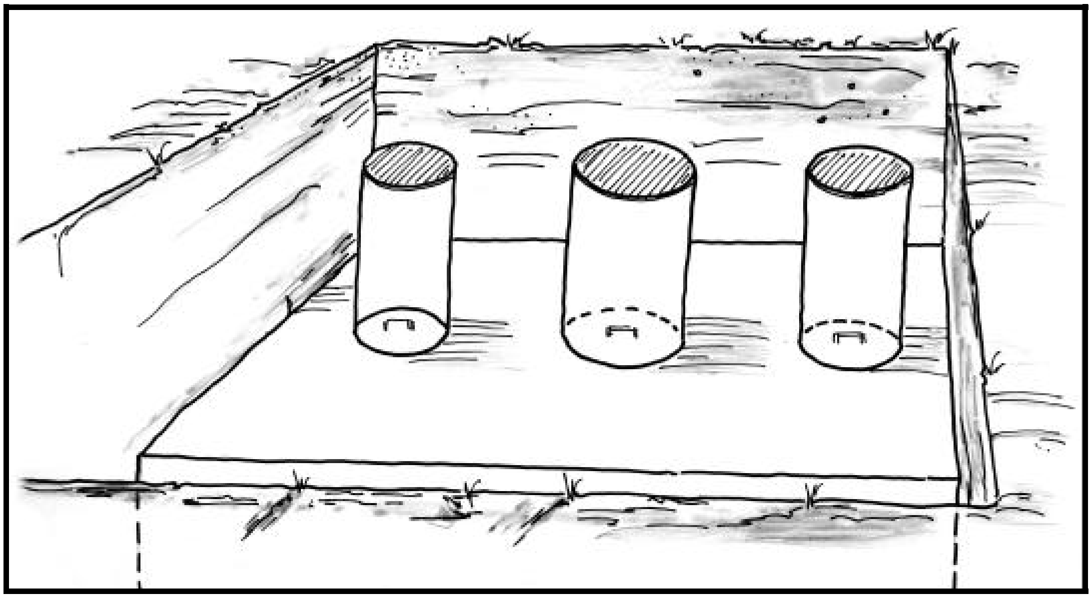


Figure 4.3a Proper installation of fiberglass risers.

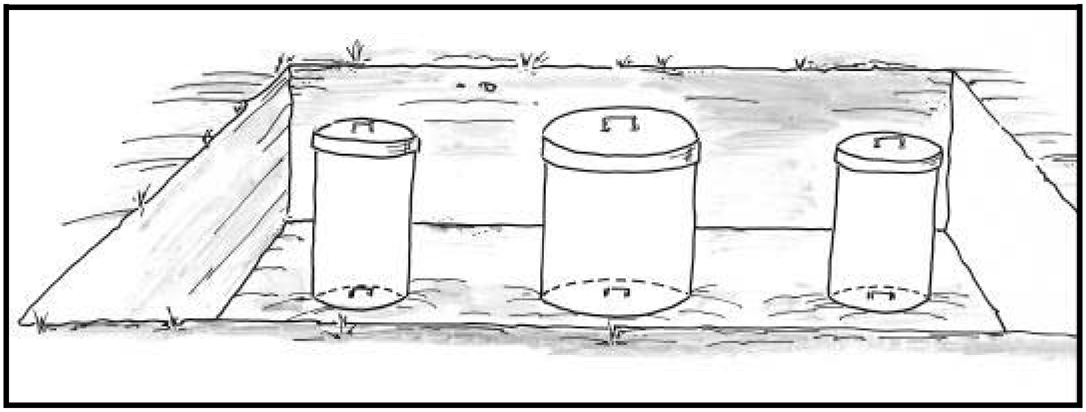


Figure 4.3b Proper installation of concrete well ring risers on the main access (manhole). Main access (manhole) cover remains on the tank; well rings are capped with a concrete cover that overlaps the outside of the rings to prevent leakage.

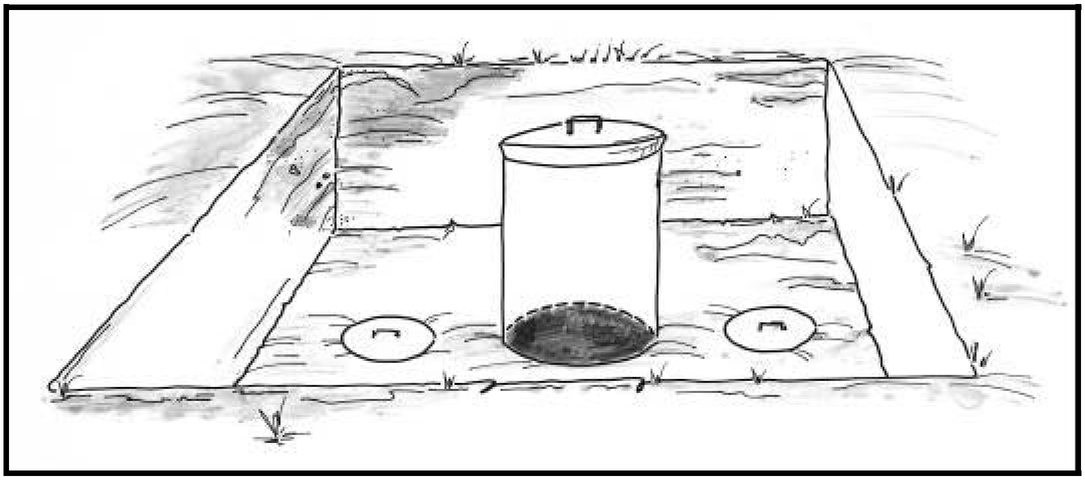


Figure 4.3c Improper installation of well ring risers with the septic tank main access (manhole) cover moved to the top of the well ring. This provides a poor fit, which may result in leakage as well as chipping of the concrete.

4.4.1 Risers to grade

Septic tank risers allow easy access to the septic tank, inspection port and manhole. Without risers, a tank must be unearthed during every inspection and pumpout. With risers, little or no digging is necessary.

System owners may also wish to install distribution box (D-box) risers. D-box risers allow inspectors to see if any solids are being carried over into the D-box. Solids carryover contributes to leachfield failure. D-box risers also allow easy access to the laterals of the soil absorption system, which may clog occasionally and require cleaning.

Risers come in two varieties: fiberglass risers and concrete well rings. Installers should make certain to use a riser with an interior dimension that is larger than access hole or manhole cover. Never use a tank's access cover as the lid for a riser. See Figures 4.3a, 4.3b and 4.3c. A tank cover will not seal a riser properly. Over time, an improper cover will damage a riser and allow stormwater to leak into the septic tank.

4.4.2 Effluent filters and gas baffles

Effluent filters attach at the outlet of a septic tank. Filters provide an easy and inexpensive means of capturing particulates to prevent them from carrying over to and clogging the soil absorption system. Properly sized filters only need cleaning at routine maintenance intervals (i.e., every 5 years or so). Refer to section 5.1.7, "Procedures for cleaning effluent filters," for more information. Gas baffles (refer to Figure 4.4) attach to the effluent sanitary tee of the septic tank and deflect gas bubbles, which may otherwise carry solids through the effluent outlet. Effluent filters and gas baffles are simple and inexpensive ways to protect and extend the life of soil absorption systems.

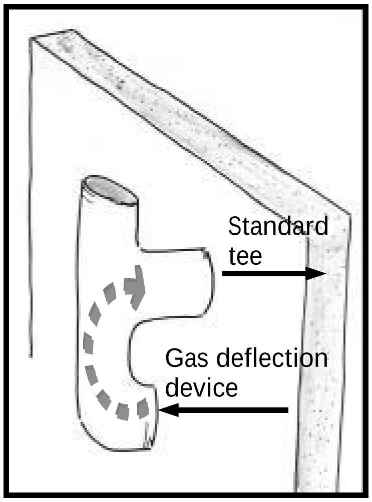


Figure 4.4 A gas baffle typically employs a standard sanitary tee fitted with a gas deflection device.

CHAPTER 5
Evaluation and Maintenance Procedures for Septic System Components

5.1 Inspecting and Maintaining Septic Tanks

This part of the inspection requires, at a minimum, access to one inspection port of the septic tank, preferably the effluent port (i.e., port at the outflowing side of the septic tank). If a pumpout is needed, the septic tank manhole must also be accessible. Locate and access the septic tank as described in sections 4.1 and 4.3. Inspectors should be aware that some septic tanks are built with two large access ports, instead of two small inspection ports with a large manhole or center hole. Two-port tanks should be inspected from the effluent port and may be pumped from either port.

5.1.1 Examining the external condition of septic tanks

Look for cracks or other signs of leakage on top of the tank and especially around the manhole and inspection ports. Leaks in the septic tank prevent proper wastewater treatment. Septic tank failures may contribute to soil absorption system failures. Any damage to the manhole or port should be repaired, but usually does not require a permit.

5.1.2 Determining when conventional tanks need pumping

Septic tanks must be pumped regularly to ensure proper functioning. If the septic system is not pumped in a timely manner, solids will bypass the effluent tee or baffle and clog the soil absorption system. Unabated, this will eventually result in hydraulic failure (e.g., plumbing backup and wastewater breakout).

Septic tanks are usually sized to allow a little more than half their volume for accumulation of solids. The remaining volume of a tank , which is called the "clear zone," provides a quiescent area for holding wastewater while the solids settle out from liquids. Standard septic tanks have a flow depth of 48 inches. A standard septic tank, which is inspected routinely, in accordance with chapter 6 of this handbook, can store 16 inches of solids (i.e., scum and sludge combined) before pumping should be considered. Pumping should also be considered when sludge depth in a tank exceeds 13 inches or the scum depth exceeds 5 inches.

A combined solids accumulation of 16-34 inches, during a routine maintenance inspection, indicates a need to pump the tank. If accumulation is over 26 inches, evaluate the inspection schedule. Combined solids accumulation greater than 34 inches indicates a high potential for solids carryover and the need for more in-depth analysis by a licensed designer. Such an analysis should include a flow trial and recommendations to improve system operation. Refer to Table 5.1a for more information.

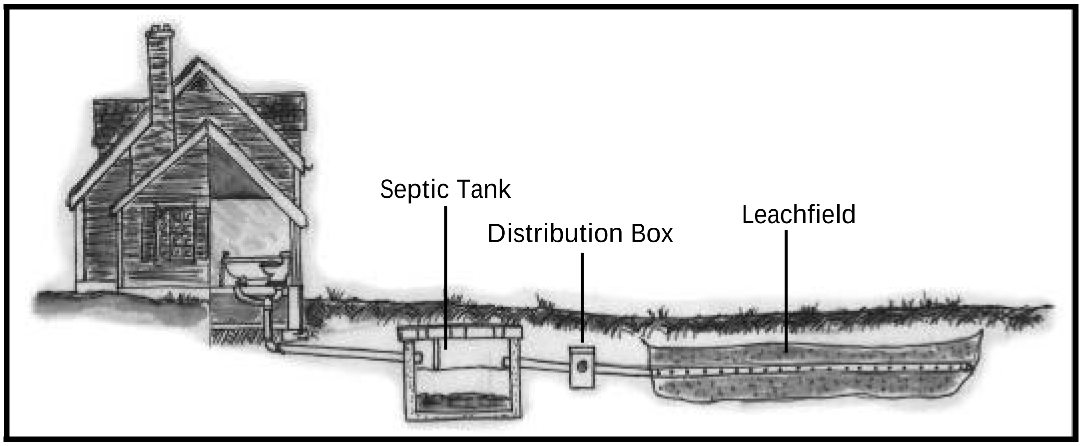


Figure 5.1 Diagram of a conventional septic system

Generally speaking, sludge accumulates at 3-4 times the rate of scum. However, relative accumulation rates may vary over a wide range, depending on such factors as the presence of a garbage disposal (see section 6.1.3 for more information on the

Table 5.1a Pumpout Guidelines for Conventional Septic Systems Serving Residential Properties

Solids 48 inch depth tank		Recommended Action
Depth Criteria	**Nonstandard depth tank**	
Combined solids < 16 inches	Combined solids < 1/3 flow depth	Pump at owner's discretion. Consider setting a new Maintenance Inspection Schedule (see section 6.5 "Evaluation of Inspection Schedules."
Combined solids = 16 - 34 inches[b]	Combined solids = 1/3 - 3/4 flow depth[b]	Pump the tank and re-inspect as per section 6.5 "Evaluation of Inspection Schedules."
Either: Combined solids > 34 inches, Sludge > 26 inches, or Scum > 11 inches	Either: Combined solids > 3/4 flow depth, Sludge > 1/2 flow depth, or Scum 1/5 flow depth	Pump the tank and consider a system analysis by a licensed designer. A new inspection schedule, which accounts for system capacity and use, should be set by the licensed designer.

Note: a. Based on T. Bounds (1987) anticipated accumulation rates.
b. Refer to Table 5.1b to determine if relative accumulation rates of scum and sludge are within acceptable ranges. Accumulation of more than 26 inches (1/2 flow depth) of combined solids indicates a need for more frequent maintenance.

Table 5.1b Combined Solids Depths and Range of Sludge Depths at Pumpout for Maximum Septic Tank Efficiency

Combined Solids (inches)	Acceptable Range of Sludge Depth (inches)[a]	Combined Solids (inches)	Acceptable Range of Sludge Depth (inches)[a]
16	11-13	26	18-20
17	11-13	27	18-21
18	12-14	28	19-22
19	13-15	29	20-24
20	14-16	30	20-24
21	14-16	31	21-24
22	14-17	32	22-25
23	16-18	33	22-26
24	16-19	34	23-26
25	16-20		

Note: a. Acceptable sludge-depth range equals approximately 66-80% of combined solids. Ranges have been rounded conservatively to whole inch numbers (i.e., top-end ranges are rounded down; bottom-end ranges are rounded up).

impact of garbage grinders), cooking habits and clothes-washing habits. For a septic tank of any flow depth to operate efficiently, scum depth should make up about 20-33% of solids depth, while sludge depth should make up 66-80% of solids depth. Table 5.1b, “Combined Solids Depths and Range of Sludge Depths at Pumpout for Maximum Septic Tank Efficiency,” lists relative depths of sludge for combined solids measurements to ensure proper and efficient operation of conventional septic systems.

The following procedures should be used to measure solids depths and determine if a tank needs to be pumped:

1. Locate and open the septic tank inspection port. If two ports are accessible, open the port on the effluent side. Refer to sections 4.1 and 4.3 for more information.
2. Put on latex gloves and measure the depth of the scum and sludge layers with appropriate scum and sludge measuring device(s) and record the results. There are several devices that may be used to make scum and sludge layer measurements. Refer to manufacturer instructions for information on proper use. URI’s On-Site Wastewater Training Center can be contacted for information on manufacturers and vendors of such equipment.
3. Consider Tables 5.1a and 5.1b to determine the need for pumping and other appropriate actions.

5.1.3 Cleaning sludge and scum measuring devices

The following procedures should be used for cleaning sludge and scum measuring devices:

With a garden hose

If a garden hose is available, hose down each measuring device into the septic tank and wipe each device clean with a rag that has been thoroughly wetted with a bleach and water solution. (Use 1 tablespoon of bleach to a gallon of water. Because chlorine is volatile, a batch of bleach solution is good for approximately two days.) Let the sun dry the devices as the weather allows and store for transport in a sheath, case or other container.

Without a garden hose

If no garden hose is available, wipe each measuring device down with the rag and bleach solution as directed for cleaning "With a garden hose." Let the sun dry the devices and store for transport as above.

5.1.4 Pumping need for metal tanks

Some older septic systems may use metal septic tanks. Metal septic tanks tend to rust, causing a loss of structural integrity. Occasionally, this may result in a collapse or cave-in. Internal rusting may cause baffles and sanitary tees to break apart or drop off. Because they are prone to failure, metal septic tanks should be pumped out as part of every inspection and then inspected carefully for structural problems. Metal tanks should be replaced with tanks that are up to code as soon as possible

5.1.5 Pumping septic systems automatically as part of the first maintenance inspection

In many cases, the first maintenance inspection will mark the first time that a system receives thorough and proper maintenance. For this reason, it is a good idea to have tanks pumped initially, regardless of solids levels, in order to fully inspect the tank.

5.1.6 Procedures for multicompartment tanks or septic tanks in series

Some septic systems may have multicompartment tanks (Figure 5.2) or two septic tanks in series. Septic tanks in series are not always visually apparent. To determine if more than one tank is in use, refer to the application information (see Table 2.1), which should include a drawing of the complete system. Multicompartment tanks may also be identified by referring to the application information, but are usually evident at inspection.

Maintenance for multicompartment tanks and tanks in series is similar to that for single-compartment and single-tank systems. Simply replicate the inspection procedures on all tanks and compartments and pump out as needed per Table 5.1a.

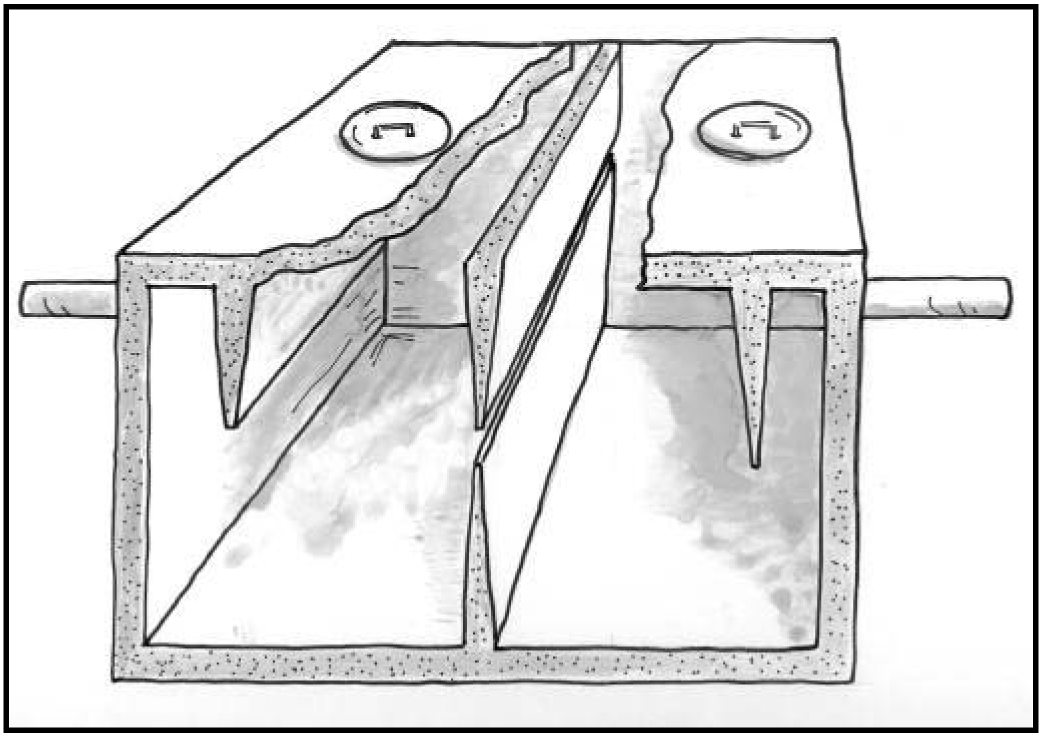


Figure 5.2 Cut-away view of a multicompartment septic tank

5.1.7 Procedures for cleaning effluent filters

Effluent filters protect soil absorption systems from clogging by removing particulates from the waste stream. Properly designed effluent filters will self-clean between routine maintenance inspections. Particles in the waste stream get caught in the filter during high-flow conditions. Most then drop to the bottom of the tank as flows subside. Septic tank bacteria eat away and dislodge the remaining particles, keeping the filter clear enough to pass wastewater.

Effluent filters should be inspected and cleaned as part of each maintenance inspection (i.e., at 3-5 year intervals). To clean a filter, put on latex gloves and remove the filter cartridge from its housing. Tap the filter against the inside of the inspection port or hose it off into the tank. The filter does not need to be cleaned spotlessly. In fact, the bio-mass that accumulates naturally on the filter helps to prevent solids carryover. After cleaning, replace the filter and continue with the inspection.

5.1.8 Pumping procedures for septic tanks

Septic tanks need pumping only when the solids buildup in the tank begins to exceed storage capacity or when a complete internal inspection is to be done. To determine if maintenance pumping is needed, refer to section 5.1.2, "Determining when conventional tanks need pumping." If the tank requires pumping, do so using the following procedures:

1. Before pumping, note the liquid level of the tank in relation to the tank's outlet pipes. Consider Table 5.2 for troubleshooting flow-level problems in the septic tank and record the tank’s condition on the inspection report.
2. If not already accessed, open the appropriate access port--usually the large central access on the septic tank--using the procedure described in section 4.3, "Opening and Closing Component Accesses." Only pump out the tank from the manhole. Pumping from inspection ports may damage tees and baffles. Also, the inspection ports do not allow pumping access to all areas of the tank.[8]
3. As the tank is pumped, watch for backflow from the tank outlet. Backflow indicates a soil absorption system backup. Notify the owner and record the occurrence on the inspection report.
4. Pump the tank completely. Use a septage spoon to loosen the sludge in the corners of the tank. There is no need to seed the tank by leaving septage in it. Conversely, there is no need to scrub or powerwash the tank's walls.
5. Once the tank is pumped, look at it to visually check the integrity of the

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[8] Some tanks are designed with large (20 inch) access ports and no center hole (e.g., Connecticut-style tanks). These tanks can accommodate pumpout from either port.

Table 5.2 **Troubleshooting for Flow Problems Based on Liquid Level in a Septic Tank**

Observation	Condition and Cause
Liquid level is approximately 2 inches below the inlet and even with the outlet bottom. There is no apparent wastewater flow in the tank.	Tank is installed properly and at rest with no indication of backup based on liquid level.
Liquid level is below the inlet and elevated less than 2 inches above the bottom of the outlet. Free flow of wastewater from inlet to outlet is apparent.	Tank is installed properly and is currently in use with no indication of backup based on liquid level.
Regardless of observed wastewater flowage in septic tank, liquid level is at or above inlet bottom or elevated by 2 inches or more above the outlet bottom.	Tank is probably installed properly, but elevated wastewater levels indicate probable backup in the system down-flow of the the tank. The inspector should perform a flow trial.
Regardless of observed wastewater flowage in the septic tank, the liquid level is at or below the outlet and the inlet is submerged.	Tank is installed up gradient or installed backwards (i.e., with the inlet in the outlet's position). Up-gradient tanks may appear to slope up towards the outlet end. Tanks installed backwards may have tees and baffles in reverse positions. Either condition should be corrected by a licensed installer.
Regardless of observed flowage in tank, liquid level is more than 2 inches below the inlet and the outlet appears and no more than 2 inches above the outlet bottom.	Tank is sloped down gradient. Depending on the severity of the slope, the tank may actually appear to slope downward toward the outlet. If the slope is minimal, no repair is necessary. Consider evaluation by a licensed installer.
Regardless of observed flowage in tank, liquid level is below inlet and outlet.	Tank may be leaking and may have structural problems. Pump the system and have a licensed installer make repairs as necessary.

sanitary tees, baffles and overall structure. Under current regulations, tanks should have an inlet tee or baffle and an outlet tee. Use a mirror on a pole and flashlight, as necessary, to look around corners and see in darkened areas. Inspection of baffles and tees can visually be done without a mirror from the inspection ports. Look for groundwater seepage through cracks or holes in the tank. Listen for trickling sounds that may indicate either backflow from the soil absorption system or groundwater seepage through a crack in the tank. Most tank in Rhode Island have a lateral midseam that may be susceptible to leakage. Tanks manufactured using a monolithic poring have a seam around the top and are susceptible to leakage there. Leakage may also occur at inlets and outlets. If there appears to be any damage, notify the owner and record the observation on the inspection report. Carefully inspect the influent side of the inlet baffle. Sometimes, baffles may trap a plug of scum or floatables that could create a plumbing backup.

5.1.9 Determining septic tank volume (optional)

Occasionally, inspectors may wish to determine the volume of a septic tank. The following procedures may be used to approximately measure volumes of rectangular and round (i.e., cylindrical) tanks.

1. Use a tape measure to determine the outer top-side dimensions of the septic tank in inches. Measure the diameter, if the tank is round. Measure the length and width if the tank is rectangular.
2. Use a sludge-measuring device to determine the flow depth of the tank in inches (i.e., the distance from the internal bottom or floor of the tank to the bottom of the tank's outlet pipe).
3. The following tables may be used to determine the volume of most tanks.

Table 5.3a **Typical Rectangular Tank Volumes, Styles and Approximate Dimensions**

Volume	Style	Dimensions outside length × outside width × flow depth in inches
1,000	Single compartment	102 × 58 × 48
1,000	Lowboy	126 × 68 × 40
1,250	Single compartment	126 × 60 × 48
1,500	Single compartment	126 × 68 × 48

Table 5.3b **Approximate Flow Depths and Diameters for Typical Round-Tank Volumes**

Diameter (inches)	Volume (gallons) and Flow Depth (inches)			
	500	600	750	900
60	41	49	61	74
72		34	43	51
84			31	38

If the tank's dimensions are atypical and the volume cannot be determined with the previous tables, use Equation 5.1 or 5.2 to approximate volumes.

Equation 5.1 Volume of Rectangular Tanks

$$V = D \times L \times W \times 0.00439 \text{ gallons/cubic inch}$$

Where:

V = Volume
D = Flow Depth
L = Length
W = Width
0.00439 gallons/cubic inch = Conversion factor (cubic inches to gallons)

Equation 5.2 Volume of Round Tanks

$$V = D \times Pi \times r^2 \times 0.00439 \text{ gallons/cubic inch}$$

Where:

V = Volume
D = Flow Depth
r = Radius ($r = d/2$)
d = Diameter
Pi = 3.14
0.00439 gallons/cubic inch = Conversion factor (cubic inches to gallons)

5.1.10 Septic system additives

A number of companies market products (e.g., enzymes and baking soda) under the claim that routine addition to the toilet or septic tank will improve septic system function and restore flow to "slow plumbing." Most experts consider these product claims to be unsubstantiated. Consumers should be aware that wastewater flow problems, which originate in a septic system, are symptomatic of major system failure. Without the proper attention of a wastewater professional, such problems will usually get worse and more expensive to repair. Relying on additives to fix septic system problems is ill-advised at best.

Some septic system service companies offer acid and organic chemical treatments as a remedy for septic system backups or even as preventative maintenance. Use of such solvents is extremely dangerous. They are caustic, typically poisonous and may contaminate nearby water supplies (e.g., private wells). Use of such solvents is also a violation of Rhode Island's ISDS Regulations. The only exception is hydrogen peroxide, which may sometimes be used in conjunction with a system enlargement to rehabilitate a failing system.

Septic system owners should note that backups are often the result of wastewater overload. Beyond danger and regulatory infraction, a solvent cannot increase the long-term capacity of a septic system. Septic systems that are undersized will need to be enlarged in order to function properly.

5.2 Procedures for Maintaining Distribution Boxes if an Inspection Port is Present

Occasionally, a distribution box may have a handhole at grade. If present, open the port and check the distribution box. There should be no solid material or standing water above the outlets in the box. If standing water is present, it may indicate a backup in the soil absorption system. If solids are present, it indicates solids carryover and the likelihood of an impending failure. If either condition is present, notify the owner and record it on the inspection report.

5.3 Maintenance Inspection for Cesspools

It is estimated that 20-30 percent of existing cesspools in Rhode Island are hydraulically failed (i.e., backing up into the building sewer or onto the surface of the ground). Cesspools need more frequent maintenance than conventional septic systems as they are typically of smaller design capacity, more prone to failure and therefore, less protective of public health and the environment. At first sign of failure, cesspools, like other substandard systems, should be upgraded.

If a cesspool has not failed and is not being immediately upgraded, then it should be maintained using the procedures that follow. Nevertheless, system owners should be reminded of the potential pitfalls of these substandard systems.

5.3.1 Inspection prior to pumping

1. As with a septic tank, inspect the cesspool for cracked covers. Cracked covers should be replaced as soon as possible.
2. Inspect for backup into or above the inlet pipe. If septage is found above the inlet, the system has reached the end of its useful life and should be upgraded to regulatory standard as soon as possible.

5.3.2 Pump the cesspool regardless of solids depth

1. As with a septic tank, pump a cesspool completely. No additional maintenance is necessary.
2. After the system is pumped, observe the inside. If water is rising from the bottom or seeping through the sidewalls, so as to create standing water, the cesspool is likely to be installed in the groundwater and should be upgraded. If the system has apparent structural problems, the system is failed and should be upgraded as soon as possible.

5.3.3 Cesspools with overflow pipes and other outlets

Some cesspools may have one or more overflow pipes or other outlets.[9] Outlets may outfall into a secondary soil absorption system (e.g., seepage pits, leaching trenches, etc.), waterbody, catch basin, or onto the surface of the ground.

Because an outlet may direct wastewater to the ground surface, an inspector should attempt to locate the outlet’s terminus using the procedures of section 5.6.1, "Identifying suspected treatment bypasses." If a suspected treatment bypass is

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[9] Cesspool overflows and outlets are generally illegal unless they direct flow to a secondary soil absorption system.

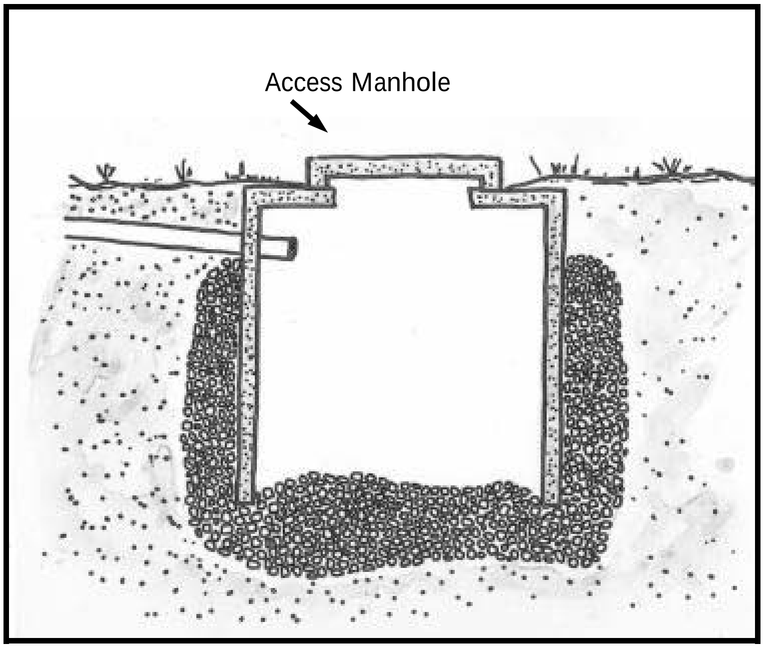

Figure 5.3 Diagram of a cesspool

identified, the inspector should notify the system owner and indicate the bypass on the inspection report.

If no bypass is observed, the inspector should assume that the overflow pipe leads to a secondary soil absorption system. Attempt to locate the absorption system, applying the principles used for locating the cesspool (see section 4.1).

If a secondary soil absorption system, which could need maintenance, is found, access, inspect and clean it as per sections 5.3.1-2.

5.4 Observation of Site Conditions

This portion of the inspection requires general knowledge of the location of certain components. These are the cesspool or septic tank and soil absorption system. Location of components can be determined by referring to the results of a first maintenance inspection, functional inspection or conformed system drawings.

Location may also be determined at the site by the inspector (refer to chapter 4, "Techniques for Accessing Septic System Components"). Once components are located, inspectors should do the following:

1. Look for any trees, large shrubs or other plants with extensive root systems growing over or within 10 feet of any system components. If any such plants are present, the owner may wish to have them removed. Owners may wish to leave ornamental and other such plants in place. However, inspectors should inform owners that large roots may crack, offset or otherwise intrude and damage components (Figure 5.4).
2. Look for any indication (e.g., tire tracks and other imprints) that heavy machinery or heavy objects (e.g., cars, above-ground pools, etc.) are or have been over any system components. If any heavy objects or indication of heavy objects are present, the owner should remove objects and discontinue the placement of such objects over the system components. Heavy objects may crush or offset system components.
3. Look for any indication that stormwater (e.g., roof runoff or outflow from foundation drains such as sump pumps) is flowing into or over any septic system components. If this condition is present, the owner should take steps to redirect the flows. Runoff that is diverted to the area of the soil absorption system may flood it and interfere with proper wastewater treatment or cause backup. Runoff diverted over other system components adds to wear and tear. Runoff may also infiltrate components,

Figure 5.4 Root systems of large plants may intrude into a septic system when proper setbacks (i.e., 10 feet) are not observed.

eventually flooding the soil absorption system.

4. Look for physical evidence of system malfunction, such as cave-in or exposed components. If present, the owner should be instructed to have the malfunction fixed by a repair professional.
5. Look for impermeable surfaces, such as driveways or patios, within 10 feet of components. Impermeable surfaces block the natural movement of air and moisture in soil, inhibiting biological activity and hindering wastewater treatment. The owner should have any such surfaces removed.
6. Look for any observable signs of system malfunctioning, such as septic odors, ponding, or other signs of wastewater outbreak, patches of lush green grass (in conjunction with other signs of failure and giving consideration to seasonal growth patterns), burnt-out grass or ground staining. Symptoms, such as the aforementioned, indicate a major system failure and should receive the immediate attention of a repair professional.

5.5 Flow Trial for Identifying Gross Loss of Hydraulic Capacity

Hydraulic capacity--the potential for a soil absorption system to accept wastewater--varies as a result of changes in effective absorption area, wastewater flow, waste strength and biological activity in the soil. When overly stressed by excessive flows or waste strengths, a system may lose hydraulic capacity. In the most severe cases, this may result in a complete failure (i.e., a wastewater backup into the house or onto the ground surface). The functioning of a soil absorption system may also be impaired as a result of cave-ins, crushed pipes or objects stuck in lines. The flow trial is a means for identifying blockages or significant reduction of hydraulic capacity.

5.5.1 Limitations of the flow trial

The flow trial is one of a suite of techniques that may be used to assess a septic system during a functional inspection. It is not a be-all-and-end-all test, nor is it accurate under all conditions. The results of a flow trial should always be interpreted within the context of the entire inspection. If a system is showing signs of failure, certain flow-trial procedures may actually aggravate the problem (see "Situations when a flow trial performed at the septic tank outlet is recommended …," which follows). Under such circumstances, if a flow trial cannot be done at the outlet, do not perform a flow trial. If there is an obvious cave-in over the soil absorption system, the system clearly needs a major repair and no flow trial is necessary.

Situations when a flow trial may give unreliable results

1. During the last 12 months, the home was unoccupied for a continuous period of one month or more.
2. The system has had a recent hydrogen peroxide treatment (usually evidenced by chemical scouring or a bleached-out appearance on concrete components). Inspectors should be mindful that use of hydrogen peroxide generally indicates an attempt to fix a major system failure, which will be likely to recur.

Situations when a flow trial performed at the septic tank outlet is recommended as other methods may contribute to a failure (refer to section 5.5.3, "Flow trial procedures," for more information on various methods to load a system with the flow trial volume)

1. Overaccumulation of solids: (a) depth of combined solids is greater than 34 inches; (b) depth of scum is greater than 11 inches; or (c) depth of sludge is greater than 26 inches.
2. Evidence of structural damage to the system: (a) broken tee or baffle; (b) cracked tank; (c) evidence of a heavy object placed over the soil absorption system; or (d) one component or more has been exposed as a result of soil erosion.
3. Inspector has not measured the depth of solids and the system has not been pumped in over 3 years. An adequately sized, conventional system, which has been pumped in the last 3 years, is unlikely to have an overaccumulation of solids; however, inspectors may wish to measure solids for added certainty.

5.5.2 Calculating the flow trial volume

Normal wastewater flows vary over the course of a day, peaking during the morning and evening hours when people are most likely to use the kitchen, bathroom and laundry facilities. The greatest flow that may enter a system during an hour of time is called the peak one-hour flow. As it is typically the most stressful condition experienced by a system, the peak one-hour flow is also the condition that the flow trial is designed to approximate (i.e., peak one-hour flow = flow trial volume).

An examination of the literature indicates that peak one-hour flow can be estimated as 12 times the average hourly flow or half the daily flow. Systems in Rhode Island are designed based on the daily flow (i.e., design flow = daily flow), which can be calculated as 150 gallons per bedroom per day.[10] Therefore, flow trial volumes can be calculated as half the design flow or as the number of bedrooms times 75 gallons. Table 5.4 indicates flow trial volumes for homes relative to number of bedrooms and design-flow volumes.

Table 5.4 Minimum Flow Trial Volumes Relative to Number of Bedrooms and Design Flow

Number of Bedrooms	Design Flow (Gallons/Day)	Flow Trial Volume (Gallons)
2	300	150
3	450	225
4	600	300
5	750	375
6	900	450

5.5.3 Flow trial procedures

The following are procedures for a flow trial. Inspectors should keep in mind that a flow trial requires a large volume of water, which creates a good condition for dye tracing. If both a dye tracing and flow trial are to be done, an inspector should perform them together to avoid waste (to determine if dye tracing is necessary refer to section 5.6, "Dye Tracing for Confirming Treatment Bypasses").

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10. The design flow should also be indicated on the certificate of construction.

1. Ask occupants to refrain from using any plumbing fixtures (e.g., sinks, toilets, spigots, etc.) during the flow trial.

2. Consider the condition of the septic tank (refer to section 5.1.1, "Examining the external condition of septic tanks" and to section 5.5.1, “Limitations of the flow trial”). If there is evidence of backflow from the soil absorption system, evidence of solids carryover or other situations of concern, do not flow trial the system at the inlet or by using in-home water fixtures. Instead, consider doing a flow trial by running water through a garden hose that has been inserted into the tank outlet. If the inspector opts not to do the flow trial at the outlet, then the tank should be pumped and the inspector should refer the system owner to a repair professional.

   In general, if a system has been pumped in the last three years, then it can be assumed that there will be no solids carryover during a flow trial. If no pumpout record is available, the inspector should measure the depth of both the scum and sludge layers. (Refer also to Item 1 of “Situations when a flow trial performed at the septic tank outlet is recommended...”). If the system appears to be in working order, the flow trial volume may be added via either the inlet or the outlet of the septic tank.

3. The flow trial volume (refer to section 5.5.2, "Calculating the flow trial volume") may be added at a rate of between 5 and 10 gallons per minute. This may be done by placing a garden hose at the inlet inspection port of the tank or by opening water taps in the house.

   If the house has a water meter, then the meter may be used to measure flow (refer to section 3.2, "Estimating Water Use"). (Be sure to note the volume unit of flow on the meter--a cubic foot is approximately 7.48 gallons.) If a household water meter is not present, an in-line flow meter may be used on a garden hose to measure flow rate. If no metering device is available, flow rate from a garden hose may be estimated by opening the tap fully and timing the fill up of a 5 gallon bucket (refer to section 3.3.1, "Measuring flow rate," for more details).

   If dye tracing is being performed on the system, dye should be added to the outlet of the septic tank during this step (refer to section 5.6, "Dye Tracing for Confirming Treatment Bypasses").

4. Measure and record the time it takes to add the flow-trial volume as determined in Step 2. If water begins to back up (i.e., rises more than two inches above the outlet bottom), record the time it took for this to occur. Inspectors should note that when first adding flow to the soil absorption system, a small rise in water level (1 or 2 inches) will occur in the septic tank. This is not a backup.
5. Calculate the volume of flow accepted by the soil absorption system (refer to section 3.3.1, "Measuring flow rate," for more details). Record the results on the inspection report form. If the system did not accept the full flow-trial volume, refer the owner to a repair professional.

5.6 Dye Tracing for Confirming Treatment Bypasses[11]

Soil absorption systems use the soil to treat wastewater and remove pathogens, (i.e., disease-causing organisms and viruses) from wastewater. When wastewater bypasses soil treatment, wastes and pathogens are not adequately removed and remain in unhealthful concentrations. For example, treatment may be bypassed by an overflow pipe that routes flow out of a septic system component, preventing it from reaching the soil absorption system. Bypasses are illegal under Rhode Island law and should be eliminated when they are confirmed.

Bypasses may take complex and broken paths, making them difficult to trace visually or even by use of a snake. Dye tracing overcomes this problem, as dye will resurface and flow wherever wastewater does (i.e., up to the ground surface, into a waterbody or stormwater system). Inspectors should use the following procedures when dye tracing.

5.6.1 Identifying suspected treatment bypasses

Most bypasses are installed to drain undersized or failed cesspools or drain gray-water appliances (e.g., washing machines). Bypasses in conventional septic systems

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[11] Procedures are based on *Identification of Sewage Contamination Sources: A Field Handbook* (RIDEM, in draft).

are rare, but not entirely unheard of. Therefore, check all systems thoroughly.

The following procedures may be used to find potential bypasses, but require a large volume of water to be effective. Therefore, the dye tracing and flow trials should be performed together. If a flow trial is not being performed because of solids-carryover concerns, do not perform dye tracing either (refer to section 5.5).

1. Ask the residents if they know of any wastewater bypasses or overflow pipes.
2. Walk the property boundary and note any catch basins within view, pipes emerging from the ground or retaining walls as well as waterbodies that border the property. Also, walk throughout the whole property and note any waterbodies and groundwater upwellings. Inspectors should note both visible outlets and wet areas where outlets are likely to discharge.

   Check the interiors of cesspools and septic tanks using a mirror and flashlight if necessary. A bypass is most likely installed at or just above the flow line, therefore, pumping the tank is not required for inspection purposes.
3. If any potential bypasses are observed, note their locations and any signs of flowage (i.e., actual flow or evidence of flow, such as laundry lint, algal growth, or erosion patterns on the ground). If any catch basins are found, they should be checked for bypass lines (refer to section 5.6.2, "Checking catch basins for bypasses").
4. If no potential bypasses are visible and the residents report no bypasses, dye tracing is not necessary. Proceed with the remainder of the inspection. If a suspected bypass is identified, proceed to section 5.6.3, "Investigating suspected bypasses."

5.6.2 Checking catch basins for bypasses

Safety precautions for observing and opening catch basins

1. Opening and working near catch basins must be undertaken carefully in order to avoid risk to both the inspector and unwary onlookers. Removal of a catch basin grate or manhole cover is heavy work and somewhat dangerous.

Removing a catch basin cover should only be done by a trained drainlayer or municipal employee.

2. Never enter a catch basin without following appropriate Occupational Safety and Health Administration precautions (refer to OSHA 1910.146 Permit Required Confined Space Rule). Never leave an open catch basin unattended (i.e. out of view) as water in the basin may present a drowning hazard.
3. Catch basins are usually owned by a municipality. Notify and obtain permission from local officials--both at the police and public works departments--prior to accessing a catch basin.

   Ask for assistance in following safety procedures as these may change from one municipality to another.
4. Oncoming traffic can be dangerous. Do not attempt to open or look inside catch basins where posted speeds exceed 25 miles per hour.
5. Do not attempt to open or look inside covers, located more than five feet laterally from the curb edge to the furthest point on the cover.

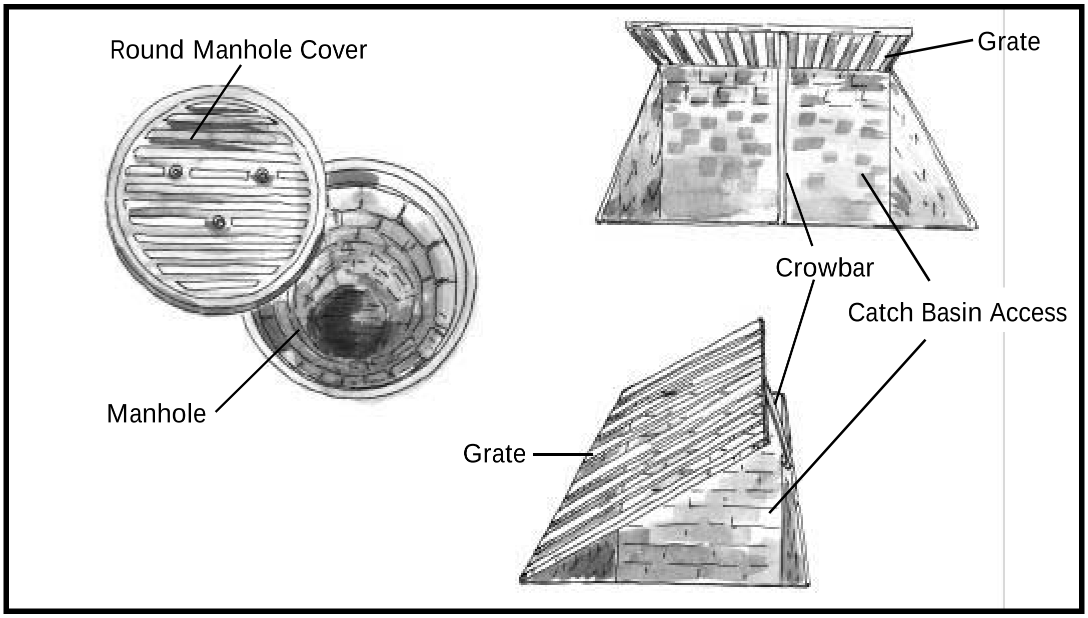

Figure 5.5 Opened storm drain grates.

6. Catch basins should not be opened or observed during inclement weather or when driving conditions are otherwise poor.
7. To limit traffic hazards, park a vehicle, with the hazard lights flashing, approximately 10 feet up-traffic of the catch basin being accessed. Place three traffic cones up-traffic of the parked vehicle. Place three additional cones at five-foot intervals around the cover in a triangular formation.

Determining the need to open catch basins (refer to "Safety precautions for observing and opening catch basins," listed above)

If the cover is a grate, dye may be observable without opening the grate. Attempt to look inside the access hole using a flashlight. If a suspected bypass, bottom of the basin or water in the basin can be viewed clearly, then the tracing dye will also be visible and opening the basin is not necessary.

Opening and closing catch basins (refer to "Safety precautions for observing and opening catch basins," listed above)

1. Sweep debris and sand from the general area of the catch basin to prevent it from falling into the cover seating when the basin is opened. This makes resetting the cover easier.
2. If pivoted diagonally, a rectangular grate may fall into its access hole. Before attempting to open a rectangular grate, secure a rope to it and then to something that can support its weight if it falls (e.g., your vehicle bumper, if it is sturdy enough). Circular covers cannot fall into their access holes and do not need to be secured.
3. Wedge a crowbar into any notch around the edge of the cover and pry the cover with the crowbar until it is raised an inch or so above its seating. Insert a manhole cover hook and use it to grab the cover. Circular covers may be swung along side the catch basin access hole. Rectangular covers should propped up on one side of their seating using the crowbar as a prop (see Figure 5.5).
4. Check the inside of the catch basin for bypass lines. A bypass line is typically a 2-inch diameter pipe. However, the minimum standard pipe size for a

stormwater drain is 12 inches; therefore, an inspector should be suspicious of any pipes less than 12 inches in diameter. If no suspected bypass is found, close the catch basin (refer to Step 6) and proceed with the inspection as appropriate.

5. If a suspected bypass is identified, proceed with dye tracing (refer to section 5.6.3, "Investigating suspected bypasses"). Be certain to replace any removed catch basin covers at the end of the dye-tracing procedure.
6. Before closing a catch basin, sweep its cover seating to remove sand or other obstructions. Replace the cover, being certain that the cover resets tightly.

5.6.3 Investigating suspected bypasses

Use the following procedures to determine if a suspected bypass is actually diverting flows and interrupting septic system treatment. Only use this procedure after suspected bypasses have been identified (refer to section 5.6.1, "Identifying suspected treatment bypasses").

1. After following the steps of "Identifying suspected treatment bypasses," add one quart of dye solution (refer to section 5.6.4, “Preparation of dye-tracing solution").
2. Dye testing is typically done in conjunction with a flow trial. Proceed with a flow trial (refer to section 5.5, "Flow Trial for Identifying Gross Loss of Hydraulic Capacity"). Look through the outlet inspection port to make certain that dye is moving into the outlet pipe. If the dye appears to be pooling or if the flow trial is being done at the septic tank outlet, use a garden hose to wash it through.
3. Once the flow trial is in process and water is being added to the septic system, begin observation of the suspected bypasses by checking them every 10 minutes for dyed water. If no dye is apparent by the end of the flow test, a bypass is not present. If dye is present, it indicates a bypass. Record the occurrence in the inspector’s report, noting the location and general description of the bypass and recommend that the owner seeks the advice of a repair professional.

5.6.4 Preparation of dye-tracing solution

Fluorescein dye, which is used for the dye-tracing procedures, may be purchased in powder or liquid concentrates. Liquid concentrates are generally easier to work with than powder. The dye powder can be messy to handle. It may permanently stain clothing, carpets and other textiles. Dye powder may be blown about by very light air movement.

If powder is being used, an inspector should prepare dye solution before visiting the inspection site. The following is a procedure for making a dye tracing solution from powdered dye, which was adapted from *Identification of Sewage Contamination Sources: A Field Handbook* (RIDEM, in draft).

Equipment

1. Utility sink with a nearby counter or other clear work surface.
2. Lab smock or other covering to protect clothing from dye stains.
3. Latex gloves to prevent staining of hands.
4. A 1½ gallon pitcher for mixing and pouring the solution.
5. Measuring spoons: teaspoon and tablespoon.
6. Stir stick or long-handled mixing spoon.
7. Funnel.
8. 4 clearly labeled,[12] quart-sized, plastic bottles with screw-on tops (to prevent poisoning do not use drink containers) for storing and dispensing the dye solution.
9. Waterproof carrying case (such as a smaller cooler) to transport the bottles of dye solution.
10. Paper towels for cleanup.

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[12] Inspectors should clearly label bottles as follows: **"Caution - flourescien dye solution, not for human consumption"** to ensure that it is not confused with a beverage.

Materials per 1 gallon batch

1. 2 teaspoons of fluorescein yellow dye powder. Yellow dye is recommended as it is easy to see in the field.
2. 1 gallon and 1 tablespoon of water (tap water is acceptable).

Preparation steps

1. Put on the smock and gloves and arrange all materials and equipment at the utility sink. In the sink, place the mixing pitcher and 4 storage bottles. On the nearby work surface, spread out 1 or 2 paper towels with the opened dye powder container and measuring spoon on top. Place the carrying case, funnel, and stir stick nearby so it will be ready for use.
2. Holding the dye powder container over the sink, measure 2 teaspoons of dye powder carefully into the mixing pitcher. Put the dye powder back on the paper towel and re-cover it.
3. Add 1 tablespoon of water--in a few driblets--to the dye in the mixing pitcher. Mix the powder and water with the stir stick so that the powder becomes wetted and pasty. If the powder is not completely wetted, it will not mix in when the larger volume of water is added, but instead will float like unsweetened cocoa powder in cold milk. Add the gallon of water and mix thoroughly.
4. Place the funnel into the neck of a storage container. With one hand, grasp the neck of the bottle and funnel together, giving them support. Use the other hand to pour off dye solution from the pitcher and fill the storage bottle. Fill each of the remaining bottles in the same manner.
5. Cap the storage bottles tightly and wipe off any dye residue with paper towels. Discard the used towels and place the bottles in the carrying case. Carefully fold up and discard the paper towels on the counter. Use additional paper towels to wipe up any spilled dye from the sink and counter area.

CHAPTER 6

Scheduling Maintenance Inspections

6.1 Conventional Systems Serving Single-Family Homes

All septic systems require regular maintenance, which should include inspection and pumping if necessary. Because pumpouts are the most regularly required type of maintenance for conventional systems, maintenance schedules may generally be based on the anticipated need for pumping. In some cases, however, systems may go for long periods without needing pumpout. Such systems should still be inspected at least once every 5 years to ensure that other types of maintenance and repair are not needed.

6.1.1 Conventional systems serving 1-2 persons per bedroom

When scheduling inspection based on the anticipated need for pumping, inspectors should consider two factors: tank volume and household occupancy. Table 6.1, "Longest Recommended Inspection Frequency in Years for Single-Family Residences on Conventional Systems," may be used to determine the maximum recommended interval between maintenance inspections. Table 6.1 also accounts for the 5-year inspection limit. As mentioned above, systems should be inspected at least once every 5 years to ensure proper function. To calculate number of persons per bedroom refer to Equation 3.2 in section 3.2.2.

Table 6.1 Longest Recommended Inspection Frequency in Years for Single-Family Residences on Conventional Systems

Tank Size (gallons)	Household Occupancy (number of people)			
	1-4	4-6	6-8	10 or more
1000	5	3	Undersized Tanks	
1250	5	4	3	
1500	5	5	4	3

Notes: a. Inspections frequencies are based on worst-case scenarios for solids accumulation as determined by the US Public Health Service study (1954) and T. Bounds study (1987); as well as the 5-year anticipated need for preventative maintenance.

b. Inspection frequencies are based on a household wastewater disposal rate of 150 gallons per bedroom per day.

c. "Undersized Tanks" means that based on ISDS Regulations, the tank size is substandard for the number of people indicated.

6.1.2 Conventional systems serving 1 person per bedroom or less

The inspection frequencies listed in Table 6.1 allow for fairly high household occupancy. Households that can document stable occupancy of 1 person per bedroom or less can extend their inspection frequencies to the maximum of 5 years. To calculate number of persons per bedroom refer to Equation 3.2 in section 3.2.2.

6.1.3 Effect of garbage grinders on maintenance

Garbage grinders can be compatible with well-designed conventional septic systems; however, they are known to increase scum layer accumulation rates by approximately 20 percent (Bounds, 1987). Certain food wastes tend to biodegrade slowly. For example, egg shells and coffee grounds break down at a very slow rate. Disposal of such wastes via a septic system will necessitate more frequent maintenance.

For a septic system with a garbage grinder, an owner should consider that maintenance pumpouts will probably be needed 1-2 years earlier than for the same system without a garbage grinder. Effluent filters are recommended for any system with a garbage grinder to prevent solids from carrying over to the soil absorption system (refer to section 4.4.2, "Effluent filters and gas baffles.") Garbage grinders are not recommended for use with substandard systems.

6.2 Nonconventional Systems Serving Single-Family Homes

6.2.1 Cesspools and other substandard systems

All substandard systems, including cesspools, systems with metal tanks and systems with undersized tanks, should be inspected[13] on a 1-3 year basis. Because cesspools are set deep into the ground, they are susceptible to groundwater infiltration. Cesspools should be inspected during the rainy season (i.e., early spring) if possible. The scheduling frequency should be based on the sensitivity and proximity of local natural resources as well as local conditions that predispose systems to failure. In particular, communities may wish to consider proximity to water resources (e.g., coastal resources, surface water supplies and wellheads), local soil type, local depth to groundwater, depth to restrictive layers (e.g., bedrock), lot size and household occupancy.

6.2.2 Alternative systems

A wide variety of alternative technologies are available for wastewater treatment. Rhode Island has formed a technical review committee to determine what forms of alternative treatment technology will be allowable in the state. These various alternative treatment technologies and their specific maintenance requirements are not described in this document. However, the companies that manufacture these systems are required by the state to make operation and maintenance information

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[13] Inspections for cesspools and substandard systems should always include pumping the system (see section 5.3, "Maintenance Inspection for Cesspools").

available to homeowners. Owners and inspectors should also refer to requirements for maintenance included as part of their permits.

6.3 Special Consideration for Systems Serving Rental Properties

Though not always the case, some renters tend to be less attentive to septic systems than are owners. In addition, rental properties are frequently occupied by more people per bedroom than single-family houses. Septic systems serving rental units with year-round occupancy should be inspected on a 1-3 year schedule. Septic systems serving summer rental units or other temporary rental units should be inspected every year.

Different tenants are likely to have different water-use habitats. For this reason, property owners should consider having their systems inspected within 6 months to a year after a change in tenancy.

Owners should consider doing regular water-use surveys to monitor for system leaks and level of water usage. Chapter 3 of this handbook describes how to detect leaks in various household water-using devices. For more information, readers may contact the American Water Works Association. *How Much is Enough? Controlling Water Demand in Apartment Buildings* (Judd, 1993) is one publication that describes leak diagnosis for household plumbing.

6.4 Suggested Policy for Scheduling Inspections in Community Programs

Communities adopting wastewater management programs may wish to simplify the inspection scheduling process. The following six statements could be used to frame such a policy. Table 6.2, "Policy for Inspection Frequency Based on Household Type and System Type," summarizes these policies.

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14. A standard tank is one that meets current DEM ISDS regulatory standards by size and construction.

Table 6.2 Policy for Inspection Frequency Based on Household Type and System Type

Household Type	System Type	Inspection Frequency
Water use of 75 gals./bedroom or less (i.e., 1 occupant per bedroom or less)	Conventional (standard tank)[a]	5 years
Single family	Conventional	5 years
Single family 3 or more bedrooms	Conventional (large tank)[b] Conventional (standard tank)	4 years 3 years
Rental or seasonal property	Any system	1-3 years (determined on a case-by-case basis)
Any household	Substandard (i.e., cesspool, metal tank, undersized tank, excessive occupancy, etc.) Innovative or alternative	1-3 years (determined on a case-by-case basis) Based on type of technology

Notes:
a. A standard tank is a tank that meets current RIDEM ISDS regulatory standards for size and construction.
b. A large tank is a septic tank that is larger than required by ISDS Regulations.

(a) All conventional systems with standard tanks,[14] serving a residence with low occupancy (1 person per bedroom or less), should be inspected on a 5-year schedule. Refer to Equation 3.2 in section 3.2.2 to calculate occupancy per bedroom.

(b) All conventional systems with at least 1000 gallon tanks, serving 1-2 bedroom homes, should be inspected on a 5-year schedule.

(c) All conventional systems with tanks that are larger than required by regulation and serving a residence with up to 2 persons per bedroom should be inspected on a 4-5 year schedule.[15] Refer to Equation 3.2 in section 3.2.2 to calculate occupancy per bedroom.

(d) All conventional systems with standard tanks, serving 3-bedroom or larger homes with up to 2 persons per bedroom, should be inspected on a 3-year schedule. Refer to Equation 3.2 in section 3.2.2 to calculate occupancy per bedroom.

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15. Large tanks are fairly rare and communities may wish to drop this provision.
16. Undersized tanks are tanks that do not meet DEM's current volumetric standards.

(e) All substandard systems, including cesspools, systems with metal tanks and systems with undersized tanks,[16] and systems serving households with occupancy of more than 2 persons per bedroom, should be inspected on a 1-3 year schedule to be determined by the community on a case-by-case basis. Refer to Equation 3.2 in section 3.2.2 to calculate occupancy per bedroom.

(f) All systems serving rental properties should be inspected on a 1-3 year schedule as determined by the community.

(g) All systems using alternative wastewater disposal mechanisms should be scheduled for inspection based on the type of technology and DEM permit requirements.

Table 6.3 Adjusted Inspection Intervals for Conventional Systems Serving Single Family Residences Based on Combined Solids Accumulation Since the Last Pumpout [a, b]

Combined Solids Accumulation		System Pumped 3 Years Ago	System Pumped 4 Years Ago	System Pumped 5 Years Ago
48-inch tank	**nonstandard depth tank**			
30-34 inches	3/5-3/4 of depth flow	System Analysis Required [c]		3 years
26-30 inches	1/2-3/5 of flow depth		3 years	4 years
20-26 inches	2/5-1/2 of depth flow	3 years	4 years	5 years
16-20 inches	1/3-2/5 of depth flow	4 years	5 years	5 years
< 16 inches	< 1/3 of depth flow	5 years	5 years	5 years

Notes:

a. Recommended inspection intervals are based on worst-case scenario for rate of solids accumulation, (Bounds, 1987).

b. Inspection intervals are valid for systems where scum makes up 20-33% of combined solids and sludge makes up 66-80% of combined solids (see also Table 5.1b). Other systems should be assessed by a design professional and are likely to need more frequent inspections.

c. "System Analysis Required" means that combined solids accumulation will necessitate maintenance every 2 years or less. Such systems may need upgrades (e.g., larger tank).

6.5 Evaluation of Inspection Schedules

Occasionally a system's inspection schedule may need adjustment. Whenever a home changes ownership or occupancy, changes to an inspection schedule should be considered in accordance with Table 6.3. Other conditions that necessitate an inspection schedule evaluation include evidence of system failure and greater or lesser than anticipated accumulation of solids in the septic tank.

If a system has no more than 26 inches of scum and sludge combined and the system requires only routine maintenance (i.e., pumpout), then the time between inspections may be increased as per Table 6.3. However, inspection intervals should never exceed 5 years and an inspector should only recommend lengthening an inspection interval if the system is also being pumped.

From time to time, an inspector may observe a system that has an overaccumulation of solids. If a system has an overaccumulation of solids (greater than 26 inches of combined solids), but no signs of failure, then use Table 6.3 to recommend a more appropriate inspection frequency.

Setting inspection frequencies after a system has failed is beyond the scope of this handbook. If a system has failed, it should be referred to a repair professional.

GLOSSARY OF TERMS

Alternative (Innovative) System: See “Septic System.”

Angled Mirror on a Pole: A pole of approximately 6 feet in length with a mirror attached to one end at a 45 degree angle. The device is used to see the interior parts of a septic tank, which are not otherwise visible from the manhole or inspection ports.

Application: See “System Records.”

As-Built Plans: See “System Drawing.”

Baffle: A downward extension from the ceiling of the septic tank that spans the sides, but leaves area underneath itself for wastewater flow. Baffles are typically designed to trap scum in the top portion of the septic tank.

Bedroom: Any room in a residential structure that is more than 100 square feet in floor area and has at least one window and a closeable passageway (i.e, doorway). Refer also to SD 1.00 of the ISDS Regulations for more detail.

Black water: Refers to sanitary sewage that is, in some substantial part, made up of human or animal excrement.

Building Sewer: A pipe beginning outside a building wall and extending to a septic system component (e.g., septic tank or cesspool).

Bypass: A pipe or other conveyance that allows sewage to short-circuit normal treatment. In a cesspool a bypass may also be referred to as an overflow pipe.

Bypasses are typically installed to prevent septage from backing up into the building sewer.

Certificate of Conformance: See “System Records.”

Cesspool: A buried chamber that receives sanitary sewage from a building sewer for the purpose of collecting solids and discharging liquids to the surrounding soil.
An overflow cesspool refers to a secondary cesspool intended to collect overflow from a primary cesspool. Cesspools in a series refers to two or more cesspools linked together, consecutively.

Clear Zone: The relatively clear liquid layer between scum layer and sludge layer in a septic tank. In a properly functioning tank, effluent is taken from the clear zone as it is relatively free of solids.

Combined Solids: The combined thickness of the scum layer and sludge layer. In a typical septic tank, which has 48-inch liquid depth, combined solids accumulation should not exceed 26 inches as measured at the effluent inspection port.

Conventional Septic System: See “Septic System.”

Design Plans: See “System Drawings.”

Distribution Box (D-box): A watertight compartment that receives septic tank effluent and distributes it in approximately equal amounts to two or more pipe lines of a soil absorption system.

Effluent Filter: A filter installed on the outlet side of a septic tank that traps solids to prevent them from carrying over to the distribution box and soil absorption system.

Gray Water: Wastewater that is discharged from a structure, but does not contain human or animal excrement or discharges from water closets. For example, gray water sources include sink water and washing machine discharge.

Handhole: A small access or inspection port (approximately 6-inch diameter) that allows access to a septic system component.

Inspection Report: See “System Records.”

ISDS Regulations: The most recently adopted *Rules and Regulations Establishing Minimum Standards Relating to Location, Design, Construction and Maintenance of Individual Sewage Disposal Systems*.

Riser: A cylinder, typically made of concrete or fiberglass, which allows easy access to the manhole or inspection ports of a septic system component.

Scum Layer: Scum is the wastewater constituent that is lighter than water and therefore tends to float. The scum layer is that portion of wastewater that accumulates in the top portion of a septic tank.

Scum Layer Measuring Device: A device for measuring the thickness of scum that accumulates in the upper part of a septic tank.

Septage Pumping Records: See “System Records.”

Septic System: A device that receives wastewater from a building sewer and typically discharges it to the soil on site.

> Alternative System: A septic system with components that are intended to deal with special site conditions (e.g., nitrogen-reduction systems, shallow trench soil absorption systems, sand filters).
>
> Conventional System: A septic system that includes a building sewer, septic tank and soil absorption system. Conventional systems may have substandard components.
>
> Substandard System: A septic system that does not meet the current minimum standards of the ISDS Regulations. Substandard systems include, but are not limited, to cesspools, systems with an undersized tanks and systems with metal tanks.

Septic System Inspections: For the purposes of this handbook, septic system inspections refer to inspections done for maintenance or for property transfers.

First Maintenance Inspection: The first inspection for maintenance purposes that is done on a septic system. First maintenance inspections involve some record and data gathering and locating of components that is usually not necessary for routine maintenance inspections.

Functional inspection: Inspection of a septic system that typically includes investigation of permit records, in-home plumbing evaluation, and evaluation of septic system components including flow trial and dye tracing, as appropriate. Functional inspections are primarily done at property transfers.

Routine Maintenance Inspection: An inspection of the septic tank or cesspool and the system site to determine the need for pumping and repairs. Routine maintenance inspections are typically done every 1-5 years.

Septic Tank: A receptacle that receives wastewater from a building sewer, segregates scum and sludge via settling, and discharges clarified effluent to a distribution box or soil absorption system.

48-Inch Tank: A septic tank with a liquid depth of 48 inches. 48 inch tanks are the industry standard.

Large Tank: A septic tank that has more liquid volume than required by the ISDS Regulations. Large tanks require less frequent maintenance than standard and undersized tanks.

Metal Tank: A septic tank that is constructed of metal, typically steel. Metal tanks are substandard and tend to rust out over the course of years.

Multicompartment Tank: A septic tank with two or more consecutively linked chambers. Multicompartment tanks generally improve the settling process and produce cleaner effluent than noncompartmentalized tanks.

Nonstandard-Depth Tank (e.g., lowboy or ledge tank): A septic tank that does not have a liquid depth of 48 inches.

Septic Tanks in Series: Two or more septic tanks linked together consecutively. Septic tanks in series, like multicompartmental tanks, generally produce a cleaner effluent than singular tanks.

Sludge Layer: Sludge is wastewater material that is heavier than water and therefore sinks. The sludge layer is that portion of wastewater that accumulates at the bottom of a septic tank.

Sludge Layer Measuring Device: A device for determining the depth of sludge that has accumulated in the bottom of a septic tank.

Soil Absorption System: A component of a septic system that allows wastewater to leach into the soil for the purpose of treatment. Soil absorption systems include, but are not limited to, seepage pits (i.e., galleys), disposal beds, disposal trenches and cesspools.

Substandard System: See "Septic System."

System Drawings: A schematic for a septic system that includes components and their locations.

> As-Built Drawings: System drawings that precisely and accurately indicate the installation of a completed septic system.
>
> Design Plans: System drawings that indicate specifications for the proposed installation of a septic system.

System Records: Written forms that indicate the design, use and maintenance of a septic system.

> Applications: Plans and specifications for installing, constructing, altering or repairing a septic system. There are three types of septic system application: Application for a New System, Application for Alteration, and Application for Repair. (See ISDS Regulations for more information.)
>
> Certificate of Conformance: A form issued by DEM, which indicates that an

installed system conforms with the ISDS Regulations. A municipality may not issue a certificate of occupancy without a certificate of conformance. Buildings may not be occupied or sold until a certificate of occupancy is issued. (See ISDS Regulations for more information.)

Certificate of Construction: A form filled out by an installer and approved by DEM, which indicates that a septic system was installed in accordance with permit plans as approved by DEM. Installers who encounter unanticipated conditions during construction, which prevent installation as per the permit plans, must file a revised application for DEM approval. Installers should leave a copy of the certificate in the home near the building sewer. (See the ISDS Regulations for more information.)

Inspection Reports: One of four reports prepared pursuant to this handbook: Functional Inspection Report, First Maintenance Inspection Report, Routine Maintenance Report, and Maintenance Report Supplement.

Septage Pumping Records: A bill or official record (e.g., an inspection report) that indicates that a septic system was pumped on a particular date.

Tees (Sanitary): A T-shaped pipe that is installed in a septic tank, typically on the effluent end, so as to prevent scum from flowing out of the tank.

Undersized Tanks: See “Septic System, Substandard System.”

Wastewater: For the purposes of this handbook, wastewater refers to gray or black water discharge from toilets, laundry tubs, washing machines, sinks, and dishwashers, as well as the contents of septic systems.

Wastewater Management Program: A program that either encourages or compels proper septic system maintenance within the boundaries of a municipality or other geographic region (i.e., wastewater management district). A wastewater management program may either work through a voluntary or an enforceable approach. Wastewater management programs may be involved in public education, technical assistance, financial assistance, maintenance record tracking as well as other activities associated with areawide management of septic systems.

Wastewater Management Official: A person who is charged with some aspect of operating a wastewater management program.

Water Treatment Appliance: A device that filters or softens the water supply to a building. Water treatment appliances, as referred to in this handbook, have backflush cycles.

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SEPTIC SYSTEM MAINTENANCE POLICY FORUM AND SUBCOMMITTEES

Septic System Maintenance Policy Forum

Sue Adamowicz; Rhode Island Department of Environmental Management
Rob Adler; US Environmental Protection Agency
Andy Alcusky; Beta Engineering
Linda Allen; Pete Fenner, Inc.
Martin Anderson; Fuss & O'Neill
Bob Ballou; Rhode Island Department of Environmental Management
Bill Bivona; Narragansett Conservation Commission
Jim Boyd; Coastal Resources Management Commission
Jeff Brownell; Save the Bay
Paul Brunetti; Griggs and Browne
Dave Burnham; Rhode Island Independent Contractors
Russ Chateauneuf; Rhode Island Department of Environmental Management
Clarkson Collins; Narragansett Community Development Department
Nicole Cromwell; Save the Bay
Kevin Cute; Coastal Resources Management Commission
Betsy Dake; Rhode Island Department of Environmental Management
Chris Deacutis; Rhode Island Department of Environmental Management
Steve DeNoyelle; Rhode Island Department of Mental Health, Retardation and Hospitals Facilities and Maintenance
Tom DePatie; Charlestown Wastewater Management Commission
Brenda Dillmann; Planning Consultant
Oscar L. Doucett; Fidelity Inspection Service
David Dow; University of Rhode Island
Laura Ernst; Coastal Resources Management Commission

William Freeman; Superior Home Inspection
Joe Frisella; Frisella Engineering
Wenly Ferguson; Save the Bay
John Gagnon; Second Opinion Home Inspection
Darlene Gardner; Superior Septic Service
Dan Geagan; Warwick Planning Department
Bob Gilstein; Portsmouth Planning Department
Alicia Good; Rhode Island Department of Environmental Management
Tom Groves; New England Interstate Water Pollution Control Commission
Christopher Hamblett; Save the Bay
Tom Hansen; Fuss & O'Neill
Robin Hedges; Rhode Island Clean Water Finance Agency
Nancy Hess; Charlestown Planning Department
Eric Izzi; New England Interstate Water Pollution Control Commission
Philip Johnson; New Shoreham Sewer Commission
Lorraine Joubert; University of Rhode Island
Janet Keller; Rhode Island Department of Environmental Management
Sue Kiernan; Rhode Island Department of Environmental Management
Kevin Klein; Brown University
Jennifer Langheld; Rhode Island Department of Environmental Management
Elizabeth Leach; Rhode Island Clean Water Finance Agency
Kathleen Leddy; Rhode Island Department of Administration
Susan Licardi; North Kingstown Water Department
George Loomis; University of Rhode Island
Don Lucas; Town of Old Saybrook, Connecticut
Jay Manning; Rhode Island Department of Environmental Management
Eugenia Marks; Audubon Society of Rhode Island
David McCurdy; Atlantic States Rural Water and Wastewater Association
Galen McGovern; Rhode Island Department of Environmental Management
Bob Mendoza; US Environmental Protection Agency
Ted Mercier; Home Check
Joe Migliore; Rhode Island Department of Environmental Management
Laura Miguel; Coastal Resources Management Commission
Scott Millar; Rhode Island Department of Environmental Management
Chris Miller; University of Rhode Island
Dave Monk; Salt Ponds Coalition

Brian Moore; Rhode Island Department of Environmental Management
Tom Mulhern; Rhode Island Realtors Association
Mickie Musselman; Rhode Island Department of Environmental Management
Carlene Newman; Rhode Island Department of Environmental Management
Ray Nickerson; South Kingstown Planning Department
Craig Onorato; Warwick Sewer Authority
Peter O'Rourke; Rhode Island Department of Environmental Management
Ernie Panciera; Rhode Island Department of Environmental Management
Meg Parulis; Town of Old Saybrook, CT
Dick Pastore; RP Engineering
Roger Pease; Charlestown Wastewater Management Commission
Tony Perri; John Perri and Sons
Jesse Perry; Ocean State Home Inspection
Margret Pilaro; Warwick Planning Department
Margherita Pryor; US Environmental Protection Agency
Richard Ribb; Rhode Island Department of Environmental Management
Steve Richtarik; Beta Engineering
M. James Riordan; Rhode Island Department of Environmental Management
Deb Robson; Rhode Island Department of Environmental Management
Bob Schmidt; Rhode Island Department of Environmental Management
Robert Scott; Atlantic States Rural Water and Wastewater Association
Frank Sheppard; University of Massachusetts
Anthony Simeone; Rhode Island Clean Water Finance Agency
John Slivey; Rhode Island Cesspool Cleaners
Gregory Snow; Beta Engineering
Sally Spadaro; Governor's Policy Office
Jonathan Stevens; Warwick Planning Department
JoAnne Sulak; US Environmental Protection Agency
Beth Tetreault; Glocester Wastewater Management Commission
Warren Towne; Rhode Island Department of Environmental Management
Suzanne Vetromile; Narrow River Preservation Association
Dennis Vinaheirto; Warwick Sewer Authority
Alison Walsh; US Environmental Protection Agency
Jeff Willis; Coastal Resources Management Commission
Mike Young; Burrillville Cesspool

Issues related to septic system maintenance and inspection can be complex and occasionally controversial. The policy forum created subcommittees as issues arose that required special consideration. Subcommittee meetings were open to all interested parties and were attended as follows:

Flow Testing Subcommittee

David Dow; University of Rhode Island
Joe Frisella; Frisella Engineering
Scott Millar; Rhode Island Department of Environmental Management
Brian Moore; Rhode Island Department of Environmental Management
Peter O'Rourke; Rhode Island Department of Environmental Management
M. James Riordan; Rhode Island Department of Environmental Management
Dennis Vinaheirto; Warwick Sewer Authority

Inspection Subcommittee

Dave Burnham; Rhode Island Independent Contractors
Nicole Cromwell; Save the Bay
Tom DePatie; Charlestown Wastewater Management Commission
David Dow; University of Rhode Island
Joe Frisella; Frisella Engineering
Dan Geagan; Warwick Planning Department
Phil Johnson; Town of New Shoreham
George Loomis; University of Rhode Island
Eugenia Marks; Audubon Society of Rhode Island
Scott Millar; Rhode Island Department of Environmental Management
Brian Moore; Rhode Island Department of Environmental Management
Craig Onorato; Warwick Sewer Authority
Margaret Pilaro; Warwick Department of Planning
M. James Riordan; Rhode Island Department of Environmental Management
Bob Schmidt; Rhode Island Department of Environmental Management
Gregory Snow; Beta Engineering
Alison Walsh; Save the Bay

Field-Testing Subcommittee

Paul Brunetti; Griggs & Browne
David Burnham; Rhode Island Independent Contractors
David Dow; University of Rhode Island
Joe Frisella; Frisella Engineering
Gary Fullerton; University of Rhode Island
Darlene Gardner; Superior Septic System Service
Rick Gardner, Jr.; Superior Septic System Service
George Loomis; University of Rhode Island
Sue Licardi; North Kingstown Water Department
M. James Riordan; Rhode Island Department of Environmental Management
Adam Sykes; University of Rhode Island

Home Inspector and Pumper Workgroup

Paul Brunetti; Griggs & Browne
Russ Chateauneuf; Rhode Island Department of Environmental Management
William Freeman; Superior Home Inspection
John Gagnon; Second Opinion Home Inspections
Darlene Gardner; Superior Septic Service
Rick Gardner; Superior Septic Service
Ted Mercier; House Check
Tony Perri; John Perri & Sons
Jesse Perry; Ocean State Home Inspections
M. James Riordan; Rhode Island Department of Environmental Management
John Slivey; Rhode Island Cesspool Cleaners
Mike Young; Burrillville Cesspool

Rhode Island Recommended

SEPTIC SYSTEM
FUNCTIONAL INSPECTION REPORT[1]

as described in
Septic System Checkup: The Rhode Island Handbook for Inspection

Inspection Date:______________________

CLIENT INFORMATION

Client's Name ____ Phone # ____________________

Inspection Street Address & Town ____

____

INSPECTOR INFORMATION

Inspector's Name ____

Company ____ Phone # ______________________

Street Address & Town ____

____

IMPORTANT NOTICE

This inspection report indicates the present condition of the system based on state-recommended inspection procedures, *but is in no way* a guarantee or warranty of future performance. The inspection report excludes and does not intend to cover components that are concealed or are otherwise not observable. Dry wells are not included in this inspection.

HOMEOWNER/OCCUPANT RECORDS & DATA, As Available (chapter 2)[2]

Information collected pursuant to this section is to be provided voluntarily and at the discretion of the property owner. The property owner is solely responsible for record and data accuracy and completeness. The inspector assumes no responsibility for the accuracy of information provided by the property owner.

Indicate whether the following information was made available during the inspection. Attach copies of available records. If the property owner states that any of the following services were not provided—or in the case of application records that the system was installed prior to regulations (1968) —indicate not applicable (N/A). If the property owner states that partial records were provided, indicate "partial."

Source of Records & Data

Records and data were given to the inspector by:

_______ Property owner _______ Realtor ________ Other ____________________________

Application Records

Yes	No	N/A	
☐	☐	☐	Applications for septic system (inclusive of new systems, alteration, repairs). Indicate the number of each: ______ New system ______ Alteration ______ Repairs
☐	☐	☐	Certificate of construction
☐	☐	☐	Certificate of conformance

Use Records

Yes	No	N/A	Partial	
☐	☐	☐	☐	Last two septage pumping bills
☐	☐	☐	☐	Water bills for the last 12-24 months

Maintenance Records

Yes	No	N/A	Partial	
☐	☐	☐	☐	Maintenance inspection reports

Resident Data

During the last 12 months, the inspected residence housed _____ year-round occupants

Plat Number ______ Lot Number ______

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1. The Functional Inspection Report is primarily intended for inspection as part of a property transfer or sale.
2. Chapter and section numbers refer to *Septic System Checkup: The Rhode Island Handbook for Inspection.*

IN-HOME PLUMBING EVALUATION (chapter 3)

Information reported in this section may in part be based on homeowner records and data. The inspector assumes no responsibility for inaccurate records or data.

Wastewater Routing (section 3.1)

Yes	No	Inconclusive	
☐	☐	☐	All grey and black water plumbing is routed to the ISDS. Comments: ____ ____

Occupancy/Water Use (section 3.2)

Yes	No	Inconclusive	
☐	☐	☐	Water records and owner data show water use is over 75 gallons per person per day (GPD), indicating high usage or potential plumbing problems. ____ gallons were used by ____ occupants during ____ months.
☐	☐	☐	Current occupancy is estimated to be over 2 occupants per bedroom, which may be stressful to the system. Owner data indicates there were ____ live-in occupants during previous ____ months. Based on in-home observations, there are ____ bedrooms.
☐	☐	☐	A garbage disposal is routed to the septic system and may place an added burden on it (section 6.1.3).

Leak Diagnosis (section 3.3)

The following fixtures were found and inspected (indicate #):___ toilets ___ bathtub faucets ___ basin faucets ___ showerheads

Yes	No	Inconclusive	
☐	☐	☐	A water treatment appliance backflushes to the septic system.
☐	☐	☐	There is evidence of plumbing leakage from: toilet, basin faucet, bathtub faucet, showerhead or water treatment appliance. (Circle one or more of the aforementioned.) Indicate floor and room: ___________

SYSTEM COMPONENT EVALUATION (chapters 1 and 5)

Type of septic system (section 1.2): ☐ Single Cesspool ☐ Conventional septic tank system ☐ Other __________________________

Type of tank, if present (section 1.2.2): ☐ Concrete ☐ Metal ☐ Other __________________________

Indicate if any of the following components or accessories are present:
___ ISDS effluent pump ___ D-box handhole ___ Effluent filter ___ In-door lift pump ___ Other __________________________

Access to the system (diagram below or attach existing drawings): ☐ At grade ☐ Below grade

a. Outline approximate shape of the house, indicate front (F) and back (B).
b. Use swing-tie measurements to indicate the manhole (main access) of the septic tank, if buried.
c. Sketch in septic tank and other components as well as important surface features that may help to locate parts of the system.

Cesspools, *before pumpout and dye tracing* (section 5.3)

Yes	No	Not Observable	
☐	☐	☐	There is evidence of structural damage (section 5.3.1 and 5.3.2).
☐	☐	☐	There may be an overflow, second cesspool, soil absorption system, or other outlet from the cesspool. Dye tracing is recommended (section 5.3.3).
☐	☐	☐	There is standing water in the cesspool above the invert (section 5.3.1).

Septic Tank, *before pumpout, flow trial and dye tracing* (section 5.1)

Yes	No	Not Observable	
☐	☐	☐	There is evidence of structural damage to the baffles, tees or superstructure of the tank (circle one or more)(section 5.1.8).
☐	☐		Based on visual observations, sewage or septage may bypass the soil absorption system via a pipe or other conveyance. If a flow trial is being done, dye tracing should also be done (section 5.6.1).
☐	☐		Flowage was seen or heard coming from the inlet even though all known water-use appliances/fixtures in the home are off. This condition may indicate in-home plumbing leakage (section 5.1.8). See also "In-Home Plumbing Evaluation" (chapter 3).
☐	☐		Scum and sludge layer thickness measurements were taken. Scum is ___ ins. and sludge is ___ ins. Indicate the appropriate "Recommended Action" in the Pumpout Guidelines table which follows (section 5.1.2).

Pumpout Guidelines for Conventional Systems (Table 5.1a)

Solids 48 inch depth tank		Recommended Action
Depth Criteria	**Nonstandard depth tank**	
Combined solids < 16 inches	Combined solids < 1/3 flow depth	Pump at owners discretion. Consider setting a new Maintenance Inspection Schedule (see section 6.5 "Evaluation of Inspection Schedules."
Combined solids = 16 - 34 inches	Combined solids = 1/3 - 3/4 flow depth	Pump the tank and re-inspect as per section 6.5 "Evaluation of Inspection Schedules."
Either: Combined solids > 34 inches, Sludge > 26 inches, or Scum > 11 inches	Either: Combined solids > 3/4 flow depth, Sludge > 1/2 flow depth, or Scum 1/5 flow depth	Pump the tank and consider a system analysis by a licensed designer. A new inspection schedule, which accounts for system capacity and use, should be set by the licensed designer.

SITE OBSERVATIONS (section 5.4)

Yes	No	Inconclusive	
☐	☐	☐	Impermeable surface such as concrete, asphalt, or brick is located approximately over the soil absorption system.
☐	☐	☐	There are one or more of the following signs of system malfunction present: ___ Septic odors ___ Ponding or wastewater breakout ___ Burnt out grass or ground staining over the soil absorption system (only indicate if one or more other signs are present). ___ Patches of lush green grass over the soil absorption system (only indicate if one or other signs are present).
☐	☐	☐	Trees, large shrubs or other plants with extensive root systems were observed in the vicinity (10 feet as per Rule 11.06(2) of the ISDS Regulations) of the soil absorption system.
☐	☐	☐	Heavy objects (e.g. cars or pools); or evidence from such objects (e.g. tracks and impressions) are in the vicinity (i.e. directly over) of the soil absorption system.
☐	☐	☐	Stormwater, sump pumps, foundation drains or roof runoff is diverted to flow into the septic system.
☐	☐	☐	An apparent cave-in or exposed component was identified. A flow trial is not recommended.

FLOW TRIAL AND DYE TRACING (section 5.5 and 5.6)

Flow trial (75 gals/bdrm. @ 5 - 10 gpm with less than 2 inch rise in septic tank fluid level (section 5.5))
Indicate one of the following:

___ Preliminary evaluation indicates that a flow trial should be performed at the septic tank outlet for any of the following reasons (indicate one or more; section 5.5.1):
 ___ Excessive depth of septic tank solids ___ Structural damage ___ No solids depths measured and no pumpout in over three years
___ Flow trial shows the system accepted ___ gals. over ___ mins. (flow trial volumes are approximates), which is:
 ___ At least 75 gals/bdrm. ___ Is less than 75 gals/bdrm.

___ Flow trial results were inconclusive for the following reasons (section 5.6.1): ____
____

Dye tracing, when indicated (section 5.6)
Indicate one of the following:
___ Dye tracing was not done, as no potential system bypasses were identified (sections 5.6.1 and 5.6.2).

___ Potential bypass(es) was/were identified but no dye tracing was performed for the following reasons (sections 5.6.1 and 5.5.1): ____________
____
___ Dye tracing was performed as ___ potential system bypasses had been identified. Dye tracing results were as follows:
 ___ No bypasses were confirmed.
 ___ ___ bypasses were confirmed originating from inside the home and ___ bypasses were confirmed that originate outside the home.

Describe where bypasses originate and terminate: ____
____

RESULTS & RECOMMENDATIONS

Results:
Inspection revealed (indicate one or more of the following):

___ System functions properly.
___ System is substandard or has substandard components. (Note reason(s) for indicating this on comment line below. Substandard systems may include, but are not limited to, cesspools, metal tanks, round tanks, undersized systems, and improper setbacks.)
___ Structural damage to the system (such as cracks in the septic tank or a soil absorption system cave-in).
___ Excessive wastewater backup in the soil absorption system.
___ Plumbing leaks or wastewater routing problems in the home.
___ Need for system maintenance.
___ Due to the condition of the system or lack of information, the inspection results are inconclusive.

Comments: ____
____
____

The system was last inspected or pumped on _______ (indicate date or N/A if there is no knowledge of previous maintenance) based on:
___ Pumping bill ___ Inspection report ___ Other ___________________________

Recommendations:
Indicate one or more of the following:
___ Further evaluation by a repair professional is recommended.
___ System upgrade should be considered.
___ Evaluation by a plumber is recommended.
___ Pumping and completion of the inspection is recommended.

Indicate one of the following (chapter 6)
___ Based on this inspection, the recommended maintenance interval is ___ (years) and should occur on ________________________ (date).
___ The system should receive further evaluation before a next inspection is scheduled.

Standard Inspection Schedules for Single-Family Residences on Conventional Systems (section 6.1.1)

Tank Size (gallons)	**Household Occupancy**			
	1-4	4-6	6-8	10 →
1000	5	3	**Undersized Tanks**	
1250	5	4	3	
1500	5	5	4	3

Please note: Substandard systems such as cesspools and systems with metal or undersized tanks should be on 1-3 year schedules, as should rental and seasonal properties. Innovative and alternative system should be scheduled based on DEM requirements.

Adjusted Inspection Schedules for Conventional Systems (section 6.5)

Combined Solids Accumulation **48 inch tank**	**nonstandard depth tank**	**System Pumped 3 Years Ago**	**System Pumped 4 Years Ago**	**System Pumped 5 Years Ago**
30"- 34"	3/5- 3/4 of flow depth	**System Analysis Required**		3 years
26"- 30"	1/2- 3/5 of flow depth		3 years	4 years
21"- 26"	2/5- 1/2 of flow depth	3 years	4 years	5 years
16"- 21"	1/3- 2/5 of flow depth	4 years	5 years	5 years
< 16"	< 1/3 of flow depth	5 years	5 years	5 years

INSPECTOR SIGNATURE

Inspector's Name (printed or typed)

Inspector's Signature

Rhode Island Recommended

SEPTIC SYSTEM
FIRST MAINTENANCE INSPECTION REPORT[1]

as described in
Septic System Checkup:
The Rhode Island Handbook for Inspection

Inspection Date:______________________

CLIENT INFORMATION

Client's Name ____ Phone # ___________________

Inspection Street Address & Town ____

____

INSPECTOR INFORMATION

Inspector's Name ____

Company ____ Phone # ______________________

Street Address & Town ____

____

IMPORTANT NOTICE

This inspection report indicates the present condition of the system based on state-recommended inspection procedures, *but is in no way* a guarantee or warranty of future performance. The inspection report excludes and does not intend to cover components that are concealed or are otherwise not observable. Dry wells are not included in this inspection.

HOMEOWNER/OCCUPANT RECORDS & DATA, As Available (see chapter 2)[2]

Information collected pursuant to this section is to be provided voluntarily and at the discretion of the property owner. The property owner is solely responsible for record and data accuracy and completeness. The inspector assumes no responsibility for the accuracy of information provided by the property owner.

Indicate whether the following information was made available during the inspection. Attach copies of available records. If the property owner states that any of the following services were not provided—or in the case of application records that the system was installed prior to regulations (1968) — indicate not applicable (N/A). If the property owner states that partial records were provided, indicate "partial."

Application Records

Yes	No	N/A	
☐	☐	☐	Applications for septic system (inclusive of new systems, alteration, repairs). Indicate the number of each: ______ New system ______ Alteration ______ Repair
☐	☐	☐	Certificate of construction
☐	☐	☐	Certificate of conformance

Maintenance and Inspection Records

Yes	No	N/A	Partial	
☐	☐	☐	☐	Last septage pumping bill
☐	☐	☐	☐	Last maintenance or home inspection report

---

1. The Home Inspection Report is primarily intended for inspection as part of a property transfer or sale. For information on reports for use during other inspection circumstances, refer to *Septic System Checkup: The Rhode Island Handbook for Inspection.*
2. Chapter and Section numbers refer to *Septic System Checkup*.

SYSTEM COMPONENT EVALUATION (chapters 1 and 5)

Type of septic system (section 1.2): ☐ Single Cesspool ☐ Conventional septic tank system ☐ Other ________________________

Type of tank, if present (section 1.2.2): ☐ Concrete ☐ Metal ☐ Other __________________________

Indicate if any of the following components or accessories are present:
___ ISDS effluent pump ___ D-box handhole ___ Effluent filter ___ In-door lift pump ___ Other __________________________

Access to the system (diagram below or attach existing drawings): ☐ At grade ☐ Below grade

a. Outline approximate shape of the house, indicate front (F) and back (B).
b. Use swing-tie measurements to indicate the manhole (main access) of the septic tank, if buried.
c. Sketch in septic tank and other components as well as important surface features that may help to locate parts of the system.

Cesspools, *before pumpout* (section 5.3)

Yes	No	Not Observable	
☐	☐	☐	There is evidence of structural damage (section 5.3.1 and 5.3.2).
☐	☐	☐	There may be an overflow, second cesspool, soil absorption system, or other outlet from the cesspool. Dye tracing is recommended (section 5.3.3).
☐	☐	☐	There is standing water in the cesspool above the invert (section 5.3.1).

Septic Tank, *before pumpout* (section 5.1)

Yes	No	Not Observable	
☐	☐	☐	There is evidence of structural damage to the baffles, tees or superstructure of the tank (circle one or more) (section 5.1.8).
☐	☐	☐	Based on visual observations, sewage or septage may bypass the soil absorption system via a pipe or other conveyance. If a flow trial is being done, dye tracing should also be done (section 5.6.1).
☐	☐	☐	Flowage was seen or heard coming from the inlet even though all known water-use appliances/fixtures in the home are off. This condition may indicate in-home plumbing leakage (section 5.1.8). Performing an in-home evaluation should be considered (chapter 3).
☐	☐	☐	Scum and sludge layer thickness measurements were taken. Scum is ___ ins. and sludge is ___ ins. Indicate the appropriate "Recommended Action" in the Pumpout Guidelines table which follows (section 5.1.2).

Pumpout Guidelines for Conventional Systems (Table 5.1a)

Solids Depth Criteria		Recommended Action
48 inch depth tank	Nonstandard depth tank	
Combined solids < 16 inches	Combined solids < 1/3 flow depth	Pump at owners discretion. Consider setting a new Maintenance Inspection Schedule (see section 6.5 "Evaluation of Inspection Schedules."
Combined solids = 16 - 34 inches	Combined solids = 1/3 - 3/4 flow depth	Pump the tank and re-inspect as per section 6.5 "Evaluation of Inspection Schedules."
Either: Combined solids > 34 inches, Sludge > 26 inches, or Scum > 11 inches	Either: Combined solids > 3/4 flow depth, Sludge > 1/2 flow depth, or Scum 1/5 flow depth	Pump the tank and consider a system analysis by a licensed designer. A new inspection schedule, which accounts for system capacity and use, should be set by the licensed designer.

SITE OBSERVATIONS (section 5.4)

Yes No Inconclusive

☐ ☐ ☐ Impermeable surface such as concrete, asphalt, or brick is located approximately over the soil absorption system.

☐ ☐ ☐ There are one or more of the following signs of system malfunction present:
___ Septic odors
___ Ponding or wastewater breakout
___ Burnt out grass or ground staining over the soil absorption system (only indicate if one or more other signs are present).
___ Patches of lush green grass over the soil absorption system (only indicate if one or other signs are present).

☐ ☐ ☐ Trees, large shrubs or other plants with extensive root systems were observed in the vicinity (10 feet as per Rule 11.06(2) of the ISDS Regulations) of the soil absorption system.

☐ ☐ ☐ Heavy objects (e.g. cars or pools); or evidence from such objects (e.g. tracks and impressions) are in the vicinity (i.e. directly over) of the soil absorption system.

☐ ☐ ☐ Stormwater, sump pumps, foundation drains or roof runoff is diverted to flow into the septic system.

☐ ☐ ☐ An apparent cave-in or exposed component was identified. A flow trial is not recommended.

RESULTS & RECOMMENDATIONS

Results:

Inspection revealed (indicate one or more of the following):

___ System fuctions properly.
___ System is ubstandard or has substandard components. (Note reason(s) for indicating this on comment line below. Substandard systems may include, but are not limited to, cesspools, metal tanks, round tanks, undersized systems, and improper setbacks.)
___ Structuraldamage to the system (such as cracks in the septic tank or a soil absorption system cave-in).
___ Excesive wastewater backup in the soil absorption system.
___ Need for system maintenance.
___ Due to th condition of the system or lack of information, the inspection results are inconclusive.

Comments: ____

____

____

The system was last inspected or pumped on _______ (indicate date or N/A if there is no knowledge of previous maintenance) based on:
___ Pumping bill ___ Inspection report ___ Other ___________________________

Recommendations:

Indicate one or more of the following:

___ Further evaluation by a repair professional is recommended.
___ System upgrade should be considered.
___ Evaluation by a plumber is recommended.
___ Pumping and completion of the inspection is recommended.

Indicate one of the following:

___ Based on this inspection, the recommended maintenance interval is ___ (years) and should occur on ________ (date) (sections 6.1. and 6.5).
___ The system should receive further evaluation before a next inspection is scheduled.

Standard Inspection Schedules for Single-FamilyResidences on Conventional Systems (section 6.1.1)

Tank Size	**Household Occupancy**			
	1-4	4-6	6-8	10 →
1000	5	3	**Undersized Tanks**	
1250	5	4	3	
1500	5	5	4	3

Please note: Substandard systems, such as cesspools and systems with metal or undersized tanks, should be on 1-3 year schedules, as should rental and seasonal properties. Innovative and alternative system should be scheduled based on DEM requirements.

Adjusted Inspection Schedules for Conventional Systems (section 6.5)

Combined Solids Accumulation		**System Pumped 3 Years Ago**	**System Pumped 4 Years Ago**	**System Pumped 5 Years Ago**
48 inch tank	**nonstandard depth tank**			
30”- 34”	3/5- 3/4 of flow depth	**System Analysis Required**		3 years
26”- 30”	1/2- 3/5 of flow depth		3 years	4 years
21”- 26”	2/5- 1/2 of flow depth	3 years	4 years	5 years
16”- 21”	1/3- 2/5 of flow depth	4 years	5 years	5 years
<16”	< 1/3 of flow depth	5 years	5 years	5 years

INSPECTOR SIGNATURE

Inspector’s Name (printed or typed)

Inspector’s Signature

Rhode Island Recommended

SEPTIC SYSTEM
ROUTINE MAINTENANCE INSPECTION REPORT[1]

as described in
Septic System Checkup:
The Rhode Island Handbook for Inspection

Inspection Date:______________________

CLIENT INFORMATION

Client's Name ____ Phone # ______________

Inspection Street Address & Town ____

____

INSPECTOR INFORMATION

Inspector's Name ____

Company ____ Phone # ______________

Street Address & Town ____

____

IMPORTANT NOTICE

This inspection report indicates the present condition of the system based on state-recommended inspection procedures, *but is in no way* a guarantee or warranty of future performance. The inspection report excludes and does not intend to cover components that are concealed or are otherwise not observable. Dry wells are not included in this inspection.

HOMEOWNER/OCCUPANT RECORDS & DATA, As Available (see chapter 2)[2]

Information collected pursuant to this section is to be provided voluntarily and at the discretion of the property owner. The property owner is solely responsible for record and data accuracy and completeness. The inspector assumes no responsibility for the accuracy of information provided by the property owner.

Indicate whether the following information was made available during the inspection. Attach copies of available records. If the property owner states that any of the following services were not provided—or in the case of application records that the system was installed prior to regulations (1968) — indicate not applicable (N/A). If the property owner states that partial records were provided, indicate "partial."

Maintenance and Inspection Records

Yes	No	N/A	Partial	
☐	☐	☐	☐	Last septage pumping bills
☐	☐	☐	☐	Last maintenance or home inspection report

SYSTEM COMPONENT EVALUATION

Cesspools, *before pumpout*:

Yes	No	Not Observable	
☐	☐	☐	There is evidence of structural damage (section 5.3.1 and 5.3.2).
☐	☐		There may be an overflow, second cesspool, soil absorption system, or other outlet from the cesspool. Dye tracing is recommended (section 5.3.3).
☐	☐		There is standing water in the cesspool above the invert (section 5.3.1).

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1. The Routine Maintenance Inspection Report is intended for use during a routine maintenance inspection. For information on reports for use during other inspection circumstances, refer to *Septic System Checkup: The Rhode Island Handbook for Inspection.*
2. Chapter and Section numbers refer to *Septic System Checkup*.

Septic Tank, *before pumpout*

Yes	No	Not Observable	
☐	☐	☐	There is evidence of structural damage to the baffles, tees or superstructure of the tank (circle one or more). A flow trial is not recommended (section 5.1.1 and 5.1.8).
☐	☐		Based on visual observations, sewage or septage may bypass the soil absorption system via a pipe or other conveyance. If a flow trial is being done, dye tracing should also be done (section 5.6.1).
☐	☐		Flowage was seen or heard coming from the inlet even though all known water-use appliances/fixtures in the home are off. This condition may indicate in-home plumbing leakage (section 5.1.8).
☐	☐		Scum and sludge layer thickness measurements were taken. Scum is ___ ins . and sludge is ___ ins. Indicate the appropriate "Recommended Action" in the Pumpout Guidelines table which follows (section 5.1.2).

Pumpout Guidelines for Conventional Systems (Table 5.1a)

Solids 48 inch depth tank Depth Criteria	Nonstandard depth tank	Recommended Action
Combined solids < 16 inches	Combined solids < 1/3 flow depth	Pump at owners discretion. Consider setting a new Maintenance Inspection Schedule (see section 6.5 "Evaluation of Inspection Schedules."
Combined solids = 16 - 34 inches	Combined solids = 1/3 - 3/4 flow depth	Pump the tank and re-inspect as per section 6.5 "Evaluation of Inspection Schedules."
Either: Combined solids > 34 inches, Sludge > 26 inches, or Scum > 11 inches	Either: Combined solids > 3/4 flow depth, Sludge > 1/2 flow depth, or Scum 1/5 flow depth	Pump the tank and consider a system analysis by a licensed designer. A new inspection schedule, which accounts for system capacity and use, should be set by the licensed designer.

SITE OBSERVATIONS (section 5.4)

Yes	No	Not Observable	
☐	☐	☐	Impermeable surface such as concrete, asphalt or brick is located approximately over the soil absorption system.
☐	☐	☐	There are one or more of the following signs of system malfunction present: ___ Septic odors ___ Ponding or wastewater breakout ___ Burnt out grass or ground staining over the soil absorption system (only indicate if one or more other signs are present). ___ Patches of lush green grass over the soil absorption system (only indicate if one or other signs are present).
☐	☐	☐	Trees, large shrubs or other plants with extensive root systems were observed in the vicinity (10 feet as per Rule 11.06(2) of the ISDS Regulations) of the soil absorption system.
☐	☐	☐	Heavy objects (e.g. cars or pools); or evidence from such objects (e.g. tracks and impressions) are in the vicinity (i.e. directly over) of the soil absorption system.
☐	☐	☐	Stormwater, sump pumps, foundation drains or roof runoff is diverted to flow into the septic system.
☐	☐	☐	An apparent cave-in or exposed component was identified. A flow trial is not recommended.

RESULTS & RECOMMENDATIONS

Results:

Inspection revealed (indicate one or more of the following):

___ System functions properly.
___ Structural damage to the system (such as cracks in the septic tank or a soil absorption system cave-in).
___ Excessive wastewater backup in the soil absorption system is indicated.
___ Need for system maintenance.
___ Due to the condition of the system or lack of information the inspection results are inconclusive.

Comments: ____

____

____

The system was last inspected or pumped on _______ (indicate date or N/A if there is no knowledge of previous maintenance) based on:
___ Pumping bill ___ Inspection report ___ Other _________________________

Recommendations
Indicate one or more of the following:
___ Further evaluation by a licensed designer is recommended.
___ System upgrade should be considered.
___ Evaluation by a plumber is recommended.
___ Pumping and completion of the inspection is recommended.

Indicate one of the following
___ Based on this inspection, the recommended maintenance interval is ___ (years) and should occur on ____________ (date).
___ The system should receive further evaluation before a next inspection is scheduled.

Standard Inspection Schedules for Single-Family Residences on Conventional Systems (section 6.1)

Tank Size (gallons)	**Household Occupancy**			
	1-4	4-6	6-8	10 →
1000	5	3	**Undersized Tanks**	
1250	5	4	3	
1500	5	5	4	3

Please note: Substandard systems such as cesspools and systems with metal or undersized tanks should be on 1-3 year schedules, as should rental and seasonal properties. Innovative and alternative system should be scheduled based on DEM requirements. To change schedules for systems with nonstandard-depth tank consult handbook.

Adjusted Inspection Schedules for Conventional Systems (section 6.5)

Combined Solids Accumulation		**System Pumped 3 Years Ago**	**System Pumped 4 Years Ago**	**System Pumped 5 Years Ago**
48 inch tank	**nonstandard depth tank**			
30”- 34”	3/5-3/4 of flow depth	**System Analysis Required**		3 years
26”- 30”	1/2-3/5 of flow depth		3 years	4 years
2”- 26”	2/5-1/2 of flow depth	3 years	4 years	5 years
16”- 21”	1/3-2/5 of flow depth	4 years	5 years	5 years
< 16”	< 1/3 of flow depth	5 years	5 years	5 years

INSPECTOR SIGNATURE

____
Inspector’s Name (printed or typed)

____
Inspector’s Signature

Rhode Island Recommended

SEPTIC SYSTEM
MAINTENANCE INSPECTION REPORT
SUPPLEMENTS[1]

as described in
Septic System Checkup:
The Rhode Island Handbook for Inspection

Inspection Date:_____________________

CLIENT INFORMATION

Client's Name ____ Phone # _______________

Inspection Street Address & Town ____

____

INSPECTOR INFORMATION

Inspector's Name ____

Company ____ Phone # _________________

Street Address & Town ____

____

FLOW TRIAL AND DYE TRACING (sections 5.5 and 5.6)

Flow trial: 75 gals/bdrm. @ 5 - 10 gpm with less than 2 inch rise in septic tank fluid level (section 5.5)[2]

Indicate one of the following:

___ Preliminary evaluation indicates that a flow trial should be performed at the septic tank outlet for any of the following reasons (indicate one or more; section 5.5.1):
- ___ Excessive depth of septic tank solids
- ___ Structural damage
- ___ No solids depths measured & no pumpout in over three years

___ Flow trial shows the system accepted ___ gals. over ____ mins. (flow trial volumes are approximates), which is:
- ___ At least 75 gals/bdrm.
- ___ Is less than 75 gals/bdrm.

___ Flow trial results were inconclusive for the following reasons (section 5.5.1): ____________________________________

____

Dye tracing , when indicated (section 5.6)

Indicate one of the following

___ Dye tracing was not done, as no potential system bypasses were identified (sections 5.6.1 and 5.6.2).

___ Potential bypass(es) was/were identified but no dye tracing was performed for the following reasons (sections 5.6.1. and 5.5.1):

___ Dye tracing was performed as ___ potential system bypasses had been identified. Dye tracing results were as follows:

___ No bypasses were confirmed.

___ Bypasses were confirmed.
- ___ bypasses were confirmed originating from inside the home and
- ___ bypasses were confirmed that originate outside the home.

Describe where bypasses originate and terminate: ____

____

INSPECTOR SIGNATURE

____
Inspector's Name (printed or typed)

____
Inspector's Signature

---

1. The Home Inspection Report is primarily intended for inspection as part of a property transfer or sale. For information on reports for use during other inspection circumstances, refer to *Septic System Checkup: The Rhode Island Handbook for Inspection*.
2. Chapter and Section numbers refer to *Septic System Checkup*.

APPENDIX D

Community Septic System Loan Policies and Procedures

830-RICR-10-15-3

TITLE 830 - INFRASTRUCTURE BANK

CHAPTER 10 - PROGRAMS

SUBCHAPTER 15 - SEPTIC AND SEWER

PART 3 - Community Septic System Loan Policies and Procedures

3.1 Purpose:

These Loan Policies and Procedures of Rhode Island Infrastructure Bank (the "Bank") have been established to govern the lending activities between the Bank and local governmental units in the state of Rhode Island in connection with the Community Septic System Loan Program ("CSSLP") under and pursuant to the State Water Pollution Control Revolving Funds, 33 U.S.C. §§ 1381 to 1388 and R.I. Gen. Laws Chapter 46-12.2 as amended.

3.2 Definitions:

Except as otherwise defined herein, the words and phrases used within these Loan Policies and Procedures have the same meaning as the words and phrases have in R.I. Gen. Laws Chapter 46-12.2 as amended.

3.3 Financial Assistance:

A. These Loan Policies and Procedures govern the provision of financial assistance to local governmental units to administer a program of septic system repair and cesspool closure in their community. The CSSLP is a source of funds to provide subsequent loans to property owners for the repair or replacement of failed or failing septic systems or substandard systems and cesspool closures within areas identified in the local government unit's On-site Wastewater Management Plan.

B. The Bank and the local governmental unit will establish a relationship to be evidenced by a loan agreement to provide financing for repair or replacement of failed, failing or substandard systems in that community. Rhode Island Housing and Mortgage Financing Corporation (RI Housing), or any other entity as selected by the Bank, or its successor, will be the loan servicer (the "Servicer") on the subsequent property owners loans. The Servicer will:

1. accept applications from property owners;

2. coordinate payments to septic system installers/cesspool closure contractors/property owners;

3. collect repayments from property owners;

4. credit the property owner repayments to the principal repayment obligation of the local governmental unit; and

5. make monthly reports to both the Bank and the local governmental unit.

3.4 Loan Application:

A. Requests for financing under the Community Septic System Loan Program should be submitted in writing by the chief executive officer or other authorized officer of the local governmental unit to the Executive Director of the Bank. The written request shall include:

1. A projection of the estimated need for repair or replacement of failed or failing system or cesspool as contemplated by the Community's program and identified in the On-site Wastewater Management Plan prepared by the local governmental unit.

2. Indication of approval of the local governmental unit program for on-site septic system repair or replacement or cesspool closure as outlined in its On-site Wastewater Management Plan by the Department of Environmental Management (DEM).

3. A description of the dedicated source of loan security in the event of property owner loan default or non-payment, i.e., pledge of general revenues from property taxes of cities and towns, property liens, or other source available to the local governmental unit and deemed appropriate by the Bank.

4. A description of the overall operation of the local governmental unit, including but not limited to the most recent annual report or audited financials, with an emphasis on

    a. legal structure;

    b. management;

    c. sources of revenues;

    d. operating expenses;

    e. operating surpluses or deficits;

f. actual results versus budget; and

g. sources of financial liquidity.

(1) The most recent annual report or audited financials may be submitted in satisfaction of all or any part of this item.

5. Legal authority or authorities to borrow from the Community Septic System Loan Program.

6. Other information reasonably requested by the Bank.

3.5 Loan Approval Process:

Subject to availability of Bank funds and to prioritization by DEM of programs as outlined in the communities' On-site Wastewater Management Plans, loan applications will be considered for approval by the Bank for any eligible local governmental unit. The local governmental unit will provide a general obligation pledge, note in fully marketable form, or other obligation deemed appropriate by the Bank to ensure repayment of the CSSLP loan. A credit review of the local governmental unit and report by the Executive Director will be taken into consideration by the Bank.

3.6 Terms and Conditions:

A. The property owner repayment stream will be credited towards the community's repayment obligation of the CSSLP loan.

B. Rate - The CSSLP loan to the local governmental unit from the Bank will be at a rate of zero percent (0%).The subsequent loans to property owners will carry an interest rate of zero percent (0%) and service fees equivalent to 1% of the outstanding balance of the property owners loan to be distributed as follows:

1.	Servicer	0.5%	Property Owner Loan Service Fee
2.	Bank	0.5%	Community Loan Service Fee
3.	1.0%	Total CSSLP Fees	

a. In addition to the service fees set forth above, the property owner shall also pay a loan origination fee (Loan Origination Fee) at the time of closing to the Servicer in the amount of three hundred dollars ($300.00).

  - b. (CSSLP loan rates and fees are subject to periodic changes as per § 3.10 of this Part.)

C. Community Fees - The local governmental unit will be responsible for its own out of pocket closing costs, i.e. borrower's counsel fees and financial advisor fees.

D. Amortization - The loan repayments from the property owners will provide the repayments to the Bank. As the primary borrower, the local government unit is responsible for any shortfall or default in the repayments from the property owners. Amortization on the local governmental unit's loan will begin on the first day of the quarter after the loan closing and on a quarterly basis thereafter. The Servicer will collect payments from the property owners and make payments to the Bank on behalf of the local governmental unit.

E. Prepayments - The loan may be prepaid by the borrower at any time but may be subject to a prepayment penalty based on the cost of reinvesting the prepayment, the cost of prepaying outstanding bonds of the Bank, or any other negative financial impact to the Bank.

F. Security - Loans will have a pledge of

1. general revenues; and/or
2. may be secured by any other assets and upon such other terms and conditions as the Bank deems appropriate to protect the interests of the other participants in the loan programs of the Bank; bondholders; other creditors of the Bank; bondholders; or the finances of the Bank.
   - a. The obligations of the Borrower may be subject to and dependent upon appropriations being made by the Borrower for such purposes.

G. Loan Advances - The local governmental unit will indicate in written form an estimate of its yearly requirement for septic system or substandard system repairs or cesspool closures. As loans to property owners are originated, the Bank will advance the necessary amount for disbursement for approved project costs. RI Housing will act as paying agent on behalf of the local governmental unit for payments to contractors/property owners for approved project costs.

H. Community Specific Criteria for Property Owners Loans - The community may apply specific property owner loan criteria such as; number of estimates needed from licensed septic system installers or cesspool closure contractors; maximum number of housing units per structure allowed access to CSSLP; owner-non-owner-occupied borrowers; whether inhabitants of areas planned for sewer extension are eligible; and other such specific requirements. The community may not raise or lower the current property owner CSSLP fee of 1% but may combine the CSSLP with other sources of money so as to provide a greater dollar amount available for loans or to provide a greater economic incentive for property owners to repair or replace the failed systems. Any additional criteria applied by the local governmental unit cannot negate or otherwise overrule any federal and state laws and regulations which apply to the CSSLP.

I. Ineligible Project Costs - Eligibility shall be subject to any restrictions mandated by the EPA.

J. On-site Wastewater Management Plan/Certificate of Approval - Prior to entering into a loan agreement the Borrower must have a Certificate of Approval ("CA") from the RIDEM for the Borrower's On-site Wastewater Management Plan.

3.7 Reporting Requirements:

A. Local governmental units will be required to provide information to the Bank during the life of the loan, including but not limited to:

1. A record of the number and type of repaired or replaced septic systems and cesspool closures funded by this program.
2. A copy of its Annual Audited Financial Statements in accordance with Generally Accepted Government Accounting Standards annually within nine months days of end of fiscal year.
3. Copies of reports submitted to RIDEM, the Environmental Protection Agency (EPA) and any other regulatory agency relating to the septic systems or cesspools financed by the Bank or the operation thereof, simultaneously with each submission.
4. Other information or reports as and when the Bank may reasonably require.

3.8 Loan Documents:

The terms and conditions of each loan will be evidenced by an agreement outlining the specific terms and conditions of the loan and such agreement will be accompanied by an opinion of counsel, as required by the Bank enabling act.

3.9 Compliance with State and Federal Law:

Recipients (the Borrower) of loans must comply with all applicable state, Federal, Bank and municipal laws, ordinances, rules and/or regulations.

3.10 Modifications:

Where deemed appropriate by the Bank, waiver or variation of any provisions herein may be made or additional requirements may be added.

3.11 Severability

If any provision of these rules and regulations or the application thereof to any local government unit, person, or corporation is held invalid by a court of competent jurisdiction, the remainder of the rules and regulations shall not be affected thereby. The invalidity of any section or sections or parts of any section or sections shall not affect the validity of the remainder of these rules and regulations.

830-RICR-10-15-3

TITLE 830 - INFRASTRUCTURE BANK

CHAPTER 10 - PROGRAMS

SUBCHAPTER 15 - SEPTIC AND SEWER

PART 3 - Community Septic System Loan Policies and Procedures (830-RICR-10-15-3)

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Editorial Note: This Part was filed with the Department of State prior to the launch of the Rhode Island Code of Regulations. As a result, this digital copy is presented solely as a reference tool. To obtain a certified copy of this Part, contact the Administrative Records Office at (401) 222-2473.

APPENDIX E

Summary of Rhode Island Municipal Onsite Wastewater Programs

RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF WATER RESOURCES

Summary of Rhode Island Municipal Onsite Wastewater Programs

September 30, 2014

The R.I. Department of Environmental Management (DEM) has established minimum standards for onsite wastewater treatment systems throughout the state- *Rules Establishing Minimum Standards Relating to Location, Design, Construction and Maintenance of Onsite Wastewater Treatment Systems*. The rules are available online at: http://www.dem.ri.gov/pubs/regs/regs/water/owts14.pdf. DEM also encourages municipalities to establish local programs to meet the onsite wastewater needs of each community. Cities and towns have authority under state law to establish local management programs to encourage or require septic system maintenance. Most of these programs have been created with the assistance of State Bond funds or Federal Nonpoint Source funds distributed through DEM grants (with the exception of New Shoreham, where an EPA grant was used). Towns use these funds to develop an onsite wastewater management plan (OWMP) designed to meet local needs. An OWMP describes the elements of the municipal management program for septic systems. Program elements may include, for example, passing an ordinance requiring system inspections, enhancing homeowner education, or specifying more stringent treatment requirements in environmentally sensitive areas. Once approved by DEM, an OWMP makes a town eligible to apply to the Community Septic System Loan Program (CSSLP). CSSLP has been the primary incentive for towns to develop an OWMP. CSSLP funds come from the State Revolving Fund and are administered by Rhode Island Housing. Money is used by participating towns to provide low-interest loans to homeowners to cover the costs associated with septic system repairs and upgrades.

This document provides a brief summary of local onsite wastewater management in Rhode Island. Eighteen towns have an approved OWMP; fourteen participate in the CSSLP. The following cities and towns are primarily served by sewers and have not initiated local efforts to manage septic systems: Barrington, Central Falls, East Providence, Lincoln, Newport, North Providence, Pawtucket, Providence, West Warwick, and Woonsocket.

Bristol: Much of the Town of Bristol is served by municipal sewers, but some onsite systems are in use. Bristol has an approved OWMP and is participating in the CSSLP. The plan calls for voluntary system inspections and homeowner education.

Burrillville: Burrillville does not have an active municipal onsite wastewater management program at this time.

Charlestown: Charlestown has an approved OWMP and has a robust municipal onsite wastewater management program in place. The town charter includes a dedicated staff person to run the onsite wastewater program. The town has a wastewater management ordinance requiring periodic inspection of onsite systems. The town also maintains a web-based septic system inventory and tracking program, and is in the midst of a town-wide cesspool phase-out program. Charlestown also participates in the CSSLP.

Coventry: Coventry has an approved OWMP and participates in the CSSLP. The approved OWMP proposes phased implementation of a management program based on improving homeowner awareness, creating a septic system inventory, and promoting voluntary system inspections. The management program focuses on making financial assistance available to repair or replace failed systems and cesspools.

Cranston: The City of Cranston is primarily served by sewers and does not have an active municipal onsite wastewater management program at this time.

Cumberland: Cumberland does not have an active municipal onsite wastewater management program at this time.

East Greenwich: East Greenwich has a municipal sewer system for the area east of Route 2, serving approximately two-thirds of the town’s population. The rest of the town is served by onsite systems. The town does not have an approved OWMP.

Exeter: Exeter has an approved OWMP. The plan calls for education and outreach efforts to encourage homeowners to properly maintain septic systems and recommends voluntary system inspections.

Foster: Foster has an approved OWMP. The plan utilizes education and outreach efforts to encourage voluntary system inspections. The town also utilizes a web-based inventory program.

Glocester: Glocester has an approved OWMP and has implemented a limited municipal onsite wastewater management program. The town participates in the CSSLP. The management program encourages voluntary system inspections. The town also requires local review and a special-use permit for proposed onsite systems located within 150 feet of a waterbody.

Hopkinton: Hopkinton has an approved OWMP. The plan calls for education and outreach efforts to encourage homeowners to properly maintain septic systems and recommends voluntary system inspections.

Jamestown: Jamestown has an approved OWMP and has a municipal onsite wastewater management program in place. The town participates in the CSSLP. Jamestown has an onsite wastewater management ordinance requiring septic system inspections at regular intervals. The town also has a High Groundwater Overlay Zone specifying additional septic system siting and treatment requirements. Jamestown uses a web-based inventory and tracking program to monitor septic system maintenance and track performance.

Johnston: Johnston has an approved OWMP and is participating in the CSSLP. The plan utilizes education and outreach efforts to encourage voluntary system inspections.

Little Compton: Little Compton does not have an active municipal onsite wastewater management program at this time.

Middletown: Middletown does not have an active municipal onsite wastewater management program at this time.

Narragansett: Narragansett has an approved OWMP and participates in the CSSLP. The town does not have an onsite wastewater management ordinance, but the zoning ordinance sets more stringent standards than the state regulations for septic system siting. The town utilities ordinance requires septic system pumping at least every 4 years, with records submitted to the town.

New Shoreham: The Town of New Shoreham has an approved OWMP and has a municipal onsite wastewater management program in place. The town has an onsite wastewater management ordinance requiring system inspections and maintenance. A town-wide cesspool phase-out program is ongoing. New Shoreham's zoning ordinance specifies treatment standards based on location and soil conditions. The town also participates in the CSSLP.

North Kingstown: The Town of North Kingstown has an approved OWMP and has a municipal onsite wastewater management program in place. The town has an onsite wastewater management ordinance requiring septic system inspection and maintenance at regular intervals. The town participates in the CSSLP with loan funds administered by the Water Department.

North Smithfield: North Smithfield currently has no formal municipal onsite wastewater management program. Basic outreach materials for septic system operations and maintenance are available on the Town's web site.

Portsmouth: Portsmouth does not currently have a DEM-approved municipal onsite wastewater management plan. The town is currently developing a program for enhanced management of onsite systems.

Richmond: Richmond has an approved OWMP. The plan calls for education and outreach efforts to encourage homeowners to properly maintain septic systems and recommends voluntary system inspections.

Scituate: Scituate has an approved OWMP. The plan utilizes education and outreach efforts to encourage voluntary system inspections. The town also utilizes a web-based inventory program. The town participates in the CSSLP.

Smithfield: Smithfield does not have an active municipal onsite wastewater management program at this time.

South Kingstown: South Kingstown has an approved OWMP and has an onsite wastewater management program in place. The town has a wastewater management ordinance requiring inspection of onsite systems. A town-wide cesspool phase-out is nearly complete with all required deadlines having passed. Cesspools discovered via the inspection program had to be upgraded within 5 years of discovery. Cesspools were also required to be upgraded within 12 months of the sale of a property. The South Kingstown zoning ordinance contains more stringent setbacks from natural features than the state requirements. South Kingstown uses a web-base inventory and tracking program and participates in the CSSLP.

Tiverton: Tiverton has an approved OWMP and an onsite wastewater management program, including a management ordinance. The town participates in the CSSLP. The ordinance requires septic system inspection and maintenance and mandates the installation of access risers and effluent filters when systems are repaired or upgraded. Tiverton is in the process of implementing a limited cesspool phase-out program. The Town has focused initially on the Stafford Pond watershed and has nearly completed upgrades in this area. Coastal areas in Tiverton are still subject to the R.I. Cesspool Act of 2007 because the Town program specifies later deadlines than the State program.

Warren: Although much of the Town of Warren is served by sewers, the Touisset Neck section of town is not. The Town has an approved OWMP for the un-sewered areas of town. The plan proposes an aggressive monitoring and oversight program with a web-based inventory and tracking system. Warren participates in the CSSLP.

Warwick: Much of Warwick is sewered, but a significant number of onsite systems remain. The city is in the process of implementing a mandatory sewer tie-in program. Lots with access to municipal sewers will be required to abandon their onsite system and connect to the sewer line upon sale of the property. The city is considering the development of a management program for those areas where sewer service will not be extended.

West Greenwich: The Town of West Greenwich does not have an active municipal onsite wastewater management program at this time.

Westerly: The Town of Westerly has a municipal sewer system serving the downtown area, corresponding to approximately half the town's population. The rest of the town is served by onsite systems. Westerly has an approved OWMP which calls for creation of a wastewater management district for areas not currently served by sewers and where the Wastewater Facilities Plan indicates sewer extensions are not planned. Within this district, the Town will create a homeowner education and outreach program and create a computerized inventory containing results of voluntary inspections. The town participates in the CSSLP.

APPENDIX F

Example CSSLP Fact Sheet

rihousing
Invest. Build. Believe.

Portsmouth Community Septic Loan Program

Offered by RIHousing in partnership with the Rhode Island Infrastructure Bank, the State Department of Environmental Management and the Town of Portsmouth.

The program goal is to safeguard public health, and protect and improve ground and surface water resources, by ensuring the proper functioning and maintenance of all septic systems in Portsmouth. The program makes low interest rate mortgages available to Portsmouth residents.

Loan Terms: ☐ 10 Years

PLEASE ATTACH THE FOLLOWING ITEMS TO YOUR APPLICATION

- ☐ a copy of 2 most recent pay stub(s) for each applicant
- ☐ a copy of each applicant's most recent signed tax return, along with last two years of W-2s *(Note: one tax return is acceptable in the case of joint returns)*
- ☐ a copy of the property deed with exhibit A
- ☐ a copy of most recent mortgage statement, real estate tax bill and homeowner's insurance
- ☐ a copy of social security and/or pension award letters *(or recent bank statement verifying receipt of social security and/or pension funds)*
- ☐ If self-employed or commissioned, provide copies of your completed federal tax returns from the last two years with all schedules attached

LOAN TERMS

- Loan term to 10 years
- 1% Fixed Rate
- Loan amounts to $25,000
- No income restrictions
- 45% debt-to-income ratio
- Owner-occupied and non-owner-occupied one- to four-family residential properties qualify

PROGRAM REQUIREMENTS

- All work must be completed by a Rhode Island-licensed installer
- Must have no current bankruptcies
- No current state or federal tax liens on the property
- DEM Certificate of Conformance required prior to disbursement

FEES

There is a $300.00 loan origination fee to be paid to the borrower at closing

Note: funds are available on a first-come, first-served basis. These funds are not intended for the purpose of refinancing an already completed septic system project.

CONTACT US

Call us today at 401-457-1127 with questions or complete and mail this application to:

RIHousing
44 Washington Street
Providence, RI 02903-1721
Attn: Community Lending

EQUAL HOUSING OPPORTUNITY

Appendix I

2023 Catch Basin Cleaning Records

City of Cranston, RI - Storm Structure Cleaning Records

01/01/2023 through 12/31/2023

2059 Records

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
7/10/2023	ST20425	13	VactorTruck	Truax1	Full	Clear	None
7/10/2023	ST210517	0	VactorTruck	Truax1	None	NotClear	None
7/10/2023	ST20416	1	VactorTruck	Truax1	Minimal	NotClear	None
7/10/2023	ST20426	2	VactorTruck	Truax1	Minimal	NotClear	None
7/10/2023	ST20428B	2	VactorTruck	Truax1	None	NotClear	None
7/10/2023	ST600023	0	VactorTruck	Truax1	None	Clear	None
7/10/2023	ST20427	2	VactorTruck	Truax1	None	NotClear	None
7/10/2023	ST20409	7	VactorTruck	Truax1	None	NotClear	None
7/10/2023	ST210327	2	VactorTruck	Truax1	None	NotClear	None
7/10/2023	ST17170	16	VactorTruck	Truax1	Minimal	NotClear	None
7/10/2023	ST17169	4	VactorTruck	Truax1	None	NotClear	None
7/10/2023	ST17168	4	VactorTruck	Truax1	None	NotClear	None
7/11/2023	ST6492	19	VactorTruck	Truax1	Minimal	Clear	None
7/11/2023	ST6490	2.89	VactorTruck	Truax1	Minimal	Clear	None
7/11/2023	ST6483	0	VactorTruck	Truax1	Minimal	Clear	None
7/11/2023	ST6487	3	VactorTruck	Truax1	None	Clear	None
7/11/2023	ST6503	2	VactorTruck	Truax1	None	Clear	None
7/11/2023	ST6502	14	VactorTruck	Truax1	None	Clear	None
7/11/2023	ST6504	21	VactorTruck	Truax1	None	Clear	None
7/11/2023	ST6507	19	VactorTruck	Truax1	None	Clear	None
7/11/2023	ST6508	13	VactorTruck	Truax1	None	Clear	None
7/11/2023	ST6509	2	VactorTruck	Truax1	None	Clear	None
7/11/2023	ST6511	2	VactorTruck	Truax1	None	Clear	None
7/11/2023	ST6512	6	VactorTruck	Truax1	None	Clear	None
7/11/2023	ST6515	15	VactorTruck	Truax1	Full	Clear	None
7/11/2023	ST6520	15	VactorTruck	Truax1	None	Clear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
7/11/2023	ST6521	7	VactorTruck	Truax1	None	Clear	None
7/11/2023	ST6522	10	VactorTruck	Truax1	None	Clear	None
7/11/2023	ST6392	9	VactorTruck	Truax1	None	Clear	None
7/11/2023	ST6393	26	VactorTruck	Truax1	None	Clear	None
7/11/2023	ST6395	10	VactorTruck	Truax1	None	Clear	None
7/11/2023	ST6394	7	VactorTruck	Truax1	Minimal	Clear	None
7/12/2023	ST6401	5	VactorTruck	Truax1	None	Clear	None
7/12/2023	ST6416	6	VactorTruck	Truax1	None	Clear	None
7/12/2023	ST6425	2	VactorTruck	Truax1	None	Clear	None
7/12/2023	ST6422	3	VactorTruck	Truax1	None	Clear	None
7/12/2023	ST20417	7	VactorTruck	Truax1	None	NotClear	None
7/12/2023	ST20421	4	VactorTruck	Truax1	None	NotClear	None
7/12/2023	ST6423	4	VactorTruck	Truax1	None	Clear	None
7/12/2023	ST6420	3	VactorTruck	Truax1	None	Clear	None
7/12/2023	ST17171	3	VactorTruck	Truax1	None	NotClear	None
7/12/2023	ST6427	9	VactorTruck	Truax1	None	Clear	None
7/12/2023	ST210328	6	VactorTruck	Truax1	None	NotClear	None
7/12/2023	ST6431	3	VactorTruck	Truax1	None	Clear	None
7/12/2023	ST6434	3	VactorTruck	Truax1	None	Clear	None
7/12/2023	ST6438	3	VactorTruck	Truax1	None	Clear	None
7/12/2023	ST6446	3	VactorTruck	Truax1	None	Clear	Strong
7/12/2023	ST6480	12	VactorTruck	Truax1	None	NotClear	None
7/12/2023	ST6194	12	VactorTruck	Truax1	Full	Clear	None
7/12/2023	ST6460	6	VactorTruck	Truax1	None	Clear	None
7/12/2023	ST6456	1	VactorTruck	Truax1	None	NotClear	None
7/12/2023	ST6195	20	VactorTruck	Truax1	None	Clear	None
7/12/2023	ST6197	6	VactorTruck	Truax1	None	N/A	None
7/12/2023	ST17154	10	VactorTruck	Truax1	None	NotClear	None
7/12/2023	ST6199	9	VactorTruck	Truax1	None	Clear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
7/12/2023	ST17146	5	VactorTruck	Truax1	None	NotClear	None
7/12/2023	ST17140	9	VactorTruck	Truax1	None	NotClear	None
7/12/2023	ST6200	6	VactorTruck	Truax1	None	Clear	None
7/12/2023	ST6203	3	VactorTruck	Truax1	None	Clear	None
7/12/2023	ST6209	4	VactorTruck	Truax1	None	Clear	None
7/12/2023	ST6206	4	VactorTruck	Truax1	None	Clear	None
7/12/2023	ST17138	4	VactorTruck	Truax1	None	NotClear	None
7/12/2023	ST6201	6	VactorTruck	Truax1	None	Clear	None
7/12/2023	ST17133	6	VactorTruck	Truax1	None	NotClear	None
7/12/2023	ST17129	3	VactorTruck	Truax1	None	NotClear	None
7/12/2023	ST17125	4	VactorTruck	Truax1	None	NotClear	None
7/12/2023	ST17122	5	VactorTruck	Truax1	None	NotClear	None
7/13/2023	ST6191	12	VactorTruck	Truax1	Full	Clear	None
7/13/2023	ST6447	12	VactorTruck	Truax1	None	Clear	None
7/13/2023	ST6436	3	VactorTruck	Truax1	None	Clear	None
7/13/2023	ST6433	60	VactorTruck	Truax1	None	Clear	None
7/13/2023	ST6432	8	VactorTruck	Truax1	None	Clear	None
7/13/2023	ST6429	14	VactorTruck	Truax1	None	Clear	None
7/13/2023	ST6426	9	VactorTruck	Truax1	None	Clear	Slight
7/13/2023	ST6188	6	VactorTruck	Truax1	None	Clear	None
7/13/2023	ST6182	10	VactorTruck	Truax1	None	Clear	None
7/13/2023	ST6177	24	VactorTruck	Truax1	Full	Clear	None
7/13/2023	ST6180	6	VactorTruck	Truax1	Full	Clear	None
7/13/2023	ST17121B	2	VactorTruck	Truax1	None	NotClear	None
7/13/2023	ST6181	20	VactorTruck	Truax1	None	Clear	None
7/13/2023	ST17119	6	VactorTruck	Truax1	None	NotClear	None
7/13/2023	ST17116	9	VactorTruck	Truax1	None	NotClear	None
7/13/2023	ST17112	3	VactorTruck	Truax1	None	NotClear	None
7/13/2023	ST17113	0	VactorTruck	Truax1	None	NotClear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
7/13/2023	ST17114	3	VactorTruck	Truax1	None	NotClear	None
7/13/2023	ST17115	1	VactorTruck	Truax1	None	NotClear	None
7/13/2023	ST210324	2	VactorTruck	Truax1	None	NotClear	None
7/13/2023	ST210323	1	VactorTruck	Truax1	None	NotClear	None
7/13/2023	ST17141	0	VactorTruck	Truax1	None	NotClear	None
7/13/2023	ST17145	3	VactorTruck	Truax1	None	NotClear	None
7/13/2023	ST17153	3	VactorTruck	Truax1	None	NotClear	None
7/13/2023	ST6457	5	VactorTruck	Truax1	None	NotClear	None
7/13/2023	ST6448	1	VactorTruck	Truax1	None	NotClear	None
7/13/2023	ST6479	12	VactorTruck	Truax1	None	NotClear	None
7/13/2023	ST20410	6	VactorTruck	Truax1	None	NotClear	None
7/14/2023	ST6184	48	VactorTruck	Truax1	Full	Clear	None
7/14/2023	ST6187	48	VactorTruck	Truax1	Full	Clear	None
7/14/2023	ST6190	24	VactorTruck	Truax1	Full	Clear	None
7/14/2023	ST6129	1	VactorTruck	Truax1	None	Clear	None
7/14/2023	ST6474	6	VactorTruck	Truax1	None	NotClear	None
7/14/2023	ST6475	22	VactorTruck	Truax1	None	NotClear	None
7/14/2023	ST6476	3	VactorTruck	Truax1	None	NotClear	None
7/14/2023	ST6477	22	VactorTruck	Truax1	None	NotClear	None
7/14/2023	ST6478	23	VactorTruck	Truax1	None	NotClear	None
7/17/2023	ST6461	3	VactorTruck	Truax1	Full	NotClear	None
7/17/2023	ST6464	8	VactorTruck	Truax1	Full	NotClear	None
7/17/2023	ST6467	16	VactorTruck	Truax1	Full	NotClear	None
7/17/2023	ST6471	12	VactorTruck	Truax1	Full	NotClear	None
7/17/2023	ST6473	0	VactorTruck	Truax1	Full	NotClear	None
7/18/2023	ST6344	11	VactorTruck	Truax1	None	NotClear	None
7/18/2023	ST6337	33	VactorTruck	Truax1	None	NotClear	None
7/18/2023	ST6497	0	VactorTruck	Truax1	Full	NotClear	None
7/18/2023	ST6496	1	VactorTruck	Truax1	Full	NotClear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
7/18/2023	ST6332	10	VactorTruck	Truax1	None	NotClear	None
7/18/2023	ST6329	6	VactorTruck	Truax1	Minimal	NotClear	None
7/18/2023	ST6321	6	VactorTruck	Truax1	None	NotClear	None
7/18/2023	ST6313	14	VactorTruck	Truax1	Minimal	NotClear	None
7/18/2023	ST6314	12	VactorTruck	Truax1	Minimal	NotClear	None
7/18/2023	ST6314	7	VactorTruck	Truax1	Minimal	NotClear	None
7/18/2023	ST6316	7	VactorTruck	Truax1	Minimal	NotClear	None
7/18/2023	ST6316	1	VactorTruck	Truax1	None	NotClear	None
7/18/2023	ST6318	0	VactorTruck	Truax1	None	NotClear	None
7/18/2023	ST6310	0	VactorTruck	Truax1	Full	NotClear	None
7/18/2023	ST6305	7	VactorTruck	Truax1	Full	NotClear	None
7/18/2023	ST6355	2	VactorTruck	Truax1	None	NotClear	None
7/18/2023	ST6356	3	VactorTruck	Truax1	Minimal	NotClear	None
7/19/2023	ST6357	4	VactorTruck	Truax1	None	NotClear	None
7/19/2023	ST6349	8	VactorTruck	Truax1	None	NotClear	None
7/19/2023	ST6350	16	VactorTruck	Truax1	None	NotClear	None
7/19/2023	ST6354	3	VactorTruck	Truax1	None	NotClear	None
7/19/2023	ST6306	10	VactorTruck	Truax1	Full	NotClear	None
7/19/2023	ST6309	12	VactorTruck	Truax1	Minimal	NotClear	None
7/19/2023	ST6322	5	VactorTruck	Truax1	None	Clear	None
7/19/2023	ST6330	7	VactorTruck	Truax1	Minimal	NotClear	None
7/19/2023	ST6336	16	VactorTruck	Truax1	Full	NotClear	None
7/19/2023	ST6343	24	VactorTruck	Truax1	None	NotClear	None
7/19/2023	ST6347	18	VactorTruck	Truax1	Full	NotClear	None
7/19/2023	ST6358	19	VactorTruck	Truax1	Full	Clear	None
7/19/2023	ST6387	13	VactorTruck	Truax1	Minimal	NotClear	None
7/19/2023	ST6384	20	VactorTruck	Truax1	Minimal	NotClear	None
7/19/2023	ST6376	18	VactorTruck	Truax1	Minimal	Clear	None
7/19/2023	ST6370	4	VactorTruck	Truax1	Full	NotClear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
7/19/2023	ST6365	12	VactorTruck	Truax1	None	NotClear	None
7/19/2023	ST6284	13	VactorTruck	Truax1	None	NotClear	None
7/19/2023	ST6285	6	VactorTruck	Truax1	None	Clear	None
7/24/2023	ST6281	12	VactorTruck	Truax1	None	NotClear	None
7/24/2023	ST6290	7	VactorTruck	Truax1	None	NotClear	None
7/24/2023	ST6297	9	VactorTruck	Truax1	None	NotClear	None
7/24/2023	ST6294	7	VactorTruck	Truax1	None	NotClear	None
7/24/2023	ST6291	16	VactorTruck	Truax1	None	NotClear	None
7/24/2023	ST6286	9	VactorTruck	Truax1	None	NotClear	None
7/24/2023	ST6283	9	VactorTruck	Truax1	None	NotClear	None
7/24/2023	ST6362	9	VactorTruck	Truax1	Minimal	NotClear	None
7/24/2023	ST6364	9	VactorTruck	Truax1	None	NotClear	None
7/24/2023	ST6371	6	VactorTruck	Truax1	None	NotClear	None
7/24/2023	ST6375	23	VactorTruck	Truax1	None	NotClear	None
7/24/2023	ST6383	13	VactorTruck	Truax1	None	NotClear	None
7/24/2023	ST6382	12	VactorTruck	Truax1	Full	NotClear	None
7/24/2023	ST6385	6	VactorTruck	Truax1	None	NotClear	None
7/24/2023	ST6298	12	VactorTruck	Truax1	None	NotClear	None
7/24/2023	ST6299	10	VactorTruck	Truax1	None	NotClear	None
7/24/2023	ST6390	15	VactorTruck	Truax1	None	Clear	None
7/25/2023	ST6213	21	VactorTruck	Truax1	None	NotClear	None
7/25/2023	ST6217	15	VactorTruck	Truax1	None	NotClear	None
7/25/2023	ST6235	5	VactorTruck	Truax1	None	NotClear	None
7/25/2023	ST6238	9	VactorTruck	Truax1	None	NotClear	None
7/25/2023	ST6264	6	VactorTruck	Truax1	None	NotClear	None
7/25/2023	ST6277	12	VactorTruck	Truax1	None	NotClear	None
7/25/2023	ST6276	0	VactorTruck	Truax1	None	N/A	None
7/25/2023	ST6275	11	VactorTruck	Truax1	None	NotClear	None
7/25/2023	ST6274	10	VactorTruck	Truax1	None	NotClear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
7/25/2023	ST6271	10	VactorTruck	Truax1	Minimal	NotClear	None
7/25/2023	ST6270	2	VactorTruck	Truax1	None	N/A	None
7/25/2023	ST500049	12	VactorTruck	Truax1	Full	NotClear	None
7/25/2023	ST500050	8	VactorTruck	Truax1	Minimal	NotClear	None
7/25/2023	ST500040	10	VactorTruck	Truax1	None	NotClear	None
7/25/2023	ST500042	7	VactorTruck	Truax1	Minimal	NotClear	None
7/25/2023	ST500045	3	VactorTruck	Truax1	Full	N/A	None
7/26/2023	ST500044	0	VactorTruck	Truax1	Full	NotClear	None
7/26/2023	ST500043	31	VactorTruck	Truax1	Full	NotClear	None
7/26/2023	ST500041	12	VactorTruck	Truax1	Minimal	NotClear	None
7/26/2023	ST500051	17	VactorTruck	Truax1	None	NotClear	None
7/26/2023	ST500052	5	VactorTruck	Truax1	Minimal	NotClear	None
7/26/2023	ST500055	1	VactorTruck	Truax1	None	NotClear	None
7/26/2023	ST500054	14	VactorTruck	Truax1	None	NotClear	None
7/26/2023	ST500053	14	VactorTruck	Truax1	None	NotClear	None
7/26/2023	ST500048	2	VactorTruck	Truax1	None	NotClear	None
7/26/2023	ST6269	6	VactorTruck	Truax1	None	NotClear	None
7/26/2023	ST6267	7	VactorTruck	Truax1	None	NotClear	None
7/27/2023	ST6174	7	VactorTruck	Truax1	None	NotClear	None
7/27/2023	ST6230	7	VactorTruck	Truax1	None	NotClear	None
7/27/2023	ST6230	7	VactorTruck	Truax1	Minimal	NotClear	None
7/27/2023	ST6227	1	VactorTruck	Truax1	None	NotClear	None
7/27/2023	ST6221	1	VactorTruck	Truax1	None	NotClear	None
7/27/2023	ST6221	1	VactorTruck	Truax1	None	NotClear	None
7/27/2023	ST6219	5	VactorTruck	Truax1	Full	NotClear	None
7/27/2023	ST6215	7	VactorTruck	Truax1	Full	NotClear	None
7/27/2023	ST6214	7	VactorTruck	Truax1	Full	NotClear	None
7/27/2023	ST6266	5	VactorTruck	Truax1	Full	NotClear	None
7/27/2023	ST6280	13	VactorTruck	Truax1	None	NotClear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
7/28/2023	ST6168	18	VactorTruck	Truax1	None	NotClear	None
7/28/2023	ST6165	18	VactorTruck	Truax1	None	NotClear	None
7/28/2023	ST6134	12	VactorTruck	Truax1	Minimal	NotClear	None
7/28/2023	ST6141	12	VactorTruck	Truax1	None	NotClear	None
7/28/2023	ST6142	8	VactorTruck	Truax1	None	NotClear	None
7/28/2023	ST6144	0	VactorTruck	Truax1	None	N/A	None
7/28/2023	ST6147	7	VactorTruck	Truax1	None	NotClear	None
7/28/2023	ST6149	2	VactorTruck	Truax1	None	N/A	None
7/28/2023	ST6151	6	VactorTruck	Truax1	Minimal	NotClear	None
7/28/2023	ST6151	6	VactorTruck	Truax1	Minimal	NotClear	None
7/28/2023	ST6154	0	VactorTruck	Truax1	None	N/A	None
8/1/2023	ST6155	3	VactorTruck	Truax1	None	NotClear	None
8/1/2023	ST6156	9	VactorTruck	Truax1	None	NotClear	None
8/1/2023	ST6160	0	VactorTruck	Truax1	None	N/A	None
8/1/2023	ST6159	7	VactorTruck	Truax1	None	NotClear	None
8/1/2023	ST6161	17	VactorTruck	Truax1	None	NotClear	None
8/1/2023	ST6162	2	VactorTruck	Truax1	None	NotClear	None
8/1/2023	ST6163	1	VactorTruck	Truax1	None	NotClear	None
8/1/2023	ST6139	5	VactorTruck	Truax1	Minimal	NotClear	None
8/1/2023	ST6359	6	VactorTruck	Truax1	None	NotClear	None
8/1/2023	ST6389	7	VactorTruck	Truax1	None	NotClear	None
8/1/2023	ST6282	17	VactorTruck	Truax1	None	NotClear	None
8/1/2023	ST6279	12	VactorTruck	Truax1	None	NotClear	None
8/1/2023	ST210583	2	VactorTruck	Truax1	None	N/A	None
8/1/2023	ST6262	6	VactorTruck	Truax1	None	NotClear	None
8/1/2023	ST6261	2	VactorTruck	Truax1	None	NotClear	None
8/2/2023	ST6247	12	VactorTruck	Truax1	None	NotClear	None
8/2/2023	ST6244	9	VactorTruck	Truax1	None	NotClear	None
8/2/2023	ST6249	12	VactorTruck	Truax1	None	NotClear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
8/2/2023	ST6255	0	VactorTruck	Truax1	None	N/A	None
8/2/2023	ST6256	12	VactorTruck	Truax1	None	NotClear	None
8/2/2023	ST6243	12	VactorTruck	Truax1	Minimal	NotClear	None
8/2/2023	ST6258	12	VactorTruck	Truax1	None	NotClear	None
8/2/2023	ST210584	12	VactorTruck	Truax1	None	NotClear	None
8/2/2023	ST6240	9	VactorTruck	Truax1	Minimal	NotClear	None
8/2/2023	ST6237	11	VactorTruck	Truax1	None	NotClear	None
8/2/2023	ST6263	10	VactorTruck	Truax1	None	NotClear	None
8/2/2023	ST6234	7	VactorTruck	Truax1	None	NotClear	None
8/2/2023	ST6220	4	VactorTruck	Truax1	None	NotClear	None
8/2/2023	ST6225	12	VactorTruck	Truax1	None	NotClear	None
8/2/2023	ST6231	12	VactorTruck	Truax1	None	NotClear	None
8/2/2023	ST6231	12	VactorTruck	Truax1	None	NotClear	None
8/2/2023	ST6164	16	VactorTruck	Truax1	None	NotClear	None
8/2/2023	ST6164	13	VactorTruck	Truax1	None	NotClear	None
8/2/2023	ST6167	13	VactorTruck	Truax1	None	NotClear	None
8/2/2023	ST6171	14	VactorTruck	Truax1	None	NotClear	None
8/2/2023	ST6101	12	VactorTruck	Truax1	None	NotClear	None
8/4/2023	ST210224	3	VactorTruck	Truax1	None	NotClear	None
8/4/2023	ST210421	7	VactorTruck	Truax1	None	NotClear	None
8/4/2023	ST210426	12	VactorTruck	Truax1	None	NotClear	None
8/4/2023	ST210431	12	VactorTruck	Truax1	None	NotClear	None
8/4/2023	ST210433	6	VactorTruck	Truax1	None	NotClear	None
8/4/2023	ST14216	14	VactorTruck	Truax1	None	NotClear	None
8/4/2023	ST14210	48	VactorTruck	Truax1	None	NotClear	None
8/4/2023	ST14208	12	VactorTruck	Truax1	None	NotClear	None
8/8/2023	ST6113	30	VactorTruck	Truax1	None	NotClear	None
8/9/2023	ST6105	5	VactorTruck	Truax1	Minimal	NotClear	None
8/9/2023	ST6108	3	VactorTruck	Truax1	None	NotClear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
8/9/2023	ST6110	14	VactorTruck	Truax1	None	NotClear	None
8/9/2023	ST6114	12	VactorTruck	Truax1	None	NotClear	None
8/9/2023	ST6117	14	VactorTruck	Truax1	None	NotClear	None
8/9/2023	ST6120	20	VactorTruck	Truax1	None	NotClear	None
8/9/2023	ST6122	13	VactorTruck	Truax1	None	NotClear	None
8/9/2023	ST6124	2	VactorTruck	Truax1	None	N/A	None
8/9/2023	ST6125	18	VactorTruck	Truax1	None	Clear	None
8/9/2023	ST6128	0	VactorTruck	Truax1	None	N/A	None
8/9/2023	ST6126	14	VactorTruck	Truax1	None	NotClear	None
8/9/2023	ST6118	14	VactorTruck	Truax1	None	NotClear	None
8/9/2023	ST6115	10	VactorTruck	Truax1	None	NotClear	None
8/9/2023	ST6111	6	VactorTruck	Truax1	None	NotClear	None
8/9/2023	ST6106	7	VactorTruck	Truax1	None	NotClear	None
8/9/2023	ST6098	8	VactorTruck	Truax1	None	NotClear	None
8/9/2023	ST6097	5	VactorTruck	Truax1	None	NotClear	None
8/9/2023	ST6096	12	VactorTruck	Truax1	None	NotClear	None
8/11/2023	ST3522	14	VactorTruck	Truax1	None	Clear	None
8/11/2023	ST3524	8	VactorTruck	Truax1	None	Clear	None
8/11/2023	ST6095	7	VactorTruck	Truax1	None	NotClear	None
8/11/2023	ST3530	8	VactorTruck	Truax1	None	Clear	None
8/11/2023	ST3531	4	VactorTruck	Truax1	None	Clear	None
8/11/2023	ST6104	12	VactorTruck	Truax1	None	NotClear	None
8/11/2023	ST3534	6	VactorTruck	Truax1	None	Clear	None
8/11/2023	ST3537	3	VactorTruck	Truax1	None	Clear	None
8/11/2023	ST6173	6	VactorTruck	Truax1	None	NotClear	None
8/11/2023	ST6173	6	VactorTruck	Truax1	None	NotClear	None
8/11/2023	ST3538	4	VactorTruck	Truax1	None	Clear	None
8/11/2023	ST6666	12	VactorTruck	Truax1	None	NotClear	None
8/11/2023	ST3541	6	VactorTruck	Truax1	None	Clear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
8/11/2023	ST6663	12	VactorTruck	Truax1	None	NotClear	None
8/11/2023	ST3544	4	VactorTruck	Truax1	Full	Clear	None
8/11/2023	ST6653	12	VactorTruck	Truax1	None	NotClear	None
8/11/2023	ST3540	6	VactorTruck	Truax1	None	Clear	None
8/11/2023	ST3536	2	VactorTruck	Truax1	None	Clear	None
8/11/2023	ST6650	12	VactorTruck	Truax1	None	NotClear	None
8/11/2023	ST3535	3	VactorTruck	Truax1	None	Clear	None
8/11/2023	ST3578	3	VactorTruck	Truax1	None	Clear	None
8/11/2023	ST6647	12	VactorTruck	Truax1	None	NotClear	None
8/11/2023	ST3579	7	VactorTruck	Truax1	None	Clear	None
8/11/2023	ST3581	6	VactorTruck	Truax1	None	Clear	None
8/11/2023	ST3583	3	VactorTruck	Truax1	None	Clear	None
8/11/2023	ST3584	7	VactorTruck	Truax1	None	Clear	None
8/11/2023	ST6671	15	VactorTruck	Truax1	None	NotClear	None
8/11/2023	ST6673	17	VactorTruck	Truax1	None	NotClear	None
8/11/2023	ST6682	23	VactorTruck	Truax1	None	NotClear	None
8/11/2023	ST6680	12	VactorTruck	Truax1	None	NotClear	None
8/11/2023	ST6678	7	VactorTruck	Truax1	None	NotClear	None
8/14/2023	ST6728	6	VactorTruck	Truax1	None	Clear	None
8/14/2023	ST6729	6	VactorTruck	Truax1	None	Clear	None
8/14/2023	ST6730	6	VactorTruck	Truax1	None	Clear	None
8/14/2023	ST6677	8	VactorTruck	Truax1	None	NotClear	None
8/14/2023	ST6732	4	VactorTruck	Truax1	None	Clear	None
8/14/2023	ST6736	7	VactorTruck	Truax1	None	Clear	None
8/14/2023	ST6722	6	VactorTruck	Truax1	None	Clear	None
8/14/2023	ST6721	5	VactorTruck	Truax1	None	Clear	None
8/14/2023	ST6689	12	VactorTruck	Truax1	None	NotClear	None
8/14/2023	ST6705	6	VactorTruck	Truax1	None	Clear	None
8/14/2023	ST6685	17	VactorTruck	Truax1	None	NotClear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
8/14/2023	ST6719	4	VactorTruck	Truax1	None	Clear	None
8/14/2023	ST6708	6	VactorTruck	Truax1	None	Clear	None
8/14/2023	ST6714	5	VactorTruck	Truax1	None	Clear	None
8/14/2023	ST6716	12	VactorTruck	Truax1	None	Clear	None
8/14/2023	ST6683	18	VactorTruck	Truax1	None	NotClear	None
8/14/2023	ST6717	5	VactorTruck	Truax1	None	Clear	None
8/14/2023	ST6718	3	VactorTruck	Truax1	None	N/A	None
8/14/2023	ST6631	12	VactorTruck	Truax1	None	NotClear	None
8/14/2023	ST6703	6	VactorTruck	Truax1	None	Clear	None
8/14/2023	ST6628	22	VactorTruck	Truax1	None	NotClear	None
8/14/2023	ST6701	4	VactorTruck	Truax1	None	Clear	None
8/14/2023	ST6621	30	VactorTruck	Truax1	None	NotClear	None
8/14/2023	ST6640	5	VactorTruck	Truax1	None	Clear	None
8/14/2023	ST6613	8	VactorTruck	Truax1	None	NotClear	None
8/14/2023	ST6645	8	VactorTruck	Truax1	None	Clear	None
8/14/2023	ST6594	17	VactorTruck	Truax1	None	NotClear	None
8/14/2023	ST6651	9	VactorTruck	Truax1	None	Clear	None
8/14/2023	ST6595	25	VactorTruck	Truax1	None	Clear	None
8/14/2023	ST6665	9	VactorTruck	Truax1	None	Clear	None
8/14/2023	ST6596	18	VactorTruck	Truax1	None	NotClear	None
8/14/2023	ST6598	10	VactorTruck	Truax1	None	NotClear	None
8/14/2023	ST6599	18	VactorTruck	Truax1	None	NotClear	None
8/14/2023	ST6605	16	VactorTruck	Truax1	None	NotClear	None
8/14/2023	ST6605	18	VactorTruck	Truax1	None	NotClear	None
8/14/2023	ST6607	20	VactorTruck	Truax1	None	NotClear	None
8/14/2023	ST6611	18	VactorTruck	Truax1	None	NotClear	None
8/14/2023	ST6611	8	VactorTruck	Truax1	None	NotClear	None
8/14/2023	ST6589	24	VactorTruck	Truax1	None	NotClear	None
8/22/2023	ST6145	4	VactorTruck	Truax1	None	Clear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
8/22/2023	ST3523	24	VactorTruck	Truax1	None	Clear	None
8/22/2023	ST3525	5	VactorTruck	Truax1	None	Clear	None
8/22/2023	ST3577	5	VactorTruck	Truax1	None	Clear	None
8/22/2023	ST3580	4	VactorTruck	Truax1	None	Clear	None
8/22/2023	ST3582	5	VactorTruck	Truax1	None	Clear	None
8/22/2023	ST3554	5	VactorTruck	Truax1	None	Clear	None
8/22/2023	ST3555	5	VactorTruck	Truax1	None	Clear	None
8/28/2023	ST6580	12	VactorTruck	Truax1	None	NotClear	None
8/28/2023	ST6576	28	VactorTruck	Truax1	None	NotClear	None
8/28/2023	ST6570	14	VactorTruck	Truax1	None	NotClear	None
8/28/2023	ST6623	24	VactorTruck	Truax1	None	NotClear	None
8/28/2023	ST6629	12	VactorTruck	Truax1	None	NotClear	None
8/28/2023	ST6636	12	VactorTruck	Truax1	None	NotClear	None
8/28/2023	ST3553	12	VactorTruck	Truax1	Full	NotClear	None
8/28/2023	ST3556	8	VactorTruck	Truax1	Minimal	NotClear	None
8/28/2023	ST3558	8	VactorTruck	Truax1	Full	NotClear	None
8/28/2023	ST3560	8	VactorTruck	Truax1	Full	NotClear	None
8/28/2023	ST3562	6	VactorTruck	Truax1	Full	NotClear	None
8/28/2023	ST3563	12	VactorTruck	Truax1	Full	NotClear	None
8/28/2023	ST3565	13	VactorTruck	Truax1	Full	NotClear	None
8/28/2023	ST3566	4	VactorTruck	Truax1	Full	NotClear	None
8/29/2023	ST3600	24	VactorTruck	Truax1	Full	NotClear	None
8/29/2023	ST3587	4	VactorTruck	Truax1	None	NotClear	None
8/29/2023	ST3591	8	VactorTruck	Truax1	Full	NotClear	None
8/29/2023	ST3593	36	VactorTruck	Truax1	Full	NotClear	None
8/29/2023	ST3570	6	VactorTruck	Truax1	Full	NotClear	None
8/31/2023	ST6968	6	VactorTruck	Truax1	None	Clear	
8/31/2023	ST6965	6	VactorTruck	Truax1	None	Clear	None
8/31/2023	ST6964	2	VactorTruck	Truax1	None	Clear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
8/31/2023	ST3559	18	VactorTruck	Truax1	Full	NotClear	None
8/31/2023	ST3573	18	VactorTruck	Truax1	Full	NotClear	None
8/31/2023	ST6960	8	VactorTruck	Truax1	None	Clear	None
8/31/2023	ST3575	14	VactorTruck	Truax1	None	NotClear	None
8/31/2023	ST6958	8	VactorTruck	Truax1	None	Clear	None
8/31/2023	ST6963	8	VactorTruck	Truax1	None	Clear	None
8/31/2023	ST3594	20	VactorTruck	Truax1	None	NotClear	None
8/31/2023	ST6957	22	VactorTruck	Truax1	None	Clear	None
8/31/2023	ST6955	14	VactorTruck	Truax1	None	Clear	None
8/31/2023	ST3595	28	VactorTruck	Truax1	None	NotClear	None
8/31/2023	ST6956	19	VactorTruck	Truax1	None	Clear	None
8/31/2023	ST6954	24	VactorTruck	Truax1	None	Clear	None
8/31/2023	ST3598	20	VactorTruck	Truax1	None	NotClear	None
8/31/2023	ST6953	22	VactorTruck	Truax1	None	Clear	None
8/31/2023	ST3601	6	VactorTruck	Truax1	None	NotClear	None
8/31/2023	ST6952	26	VactorTruck	Truax1	None	Clear	None
8/31/2023	ST6951	24	VactorTruck	Truax1	None	Clear	None
8/31/2023	ST3568	18	VactorTruck	Truax1	Full	NotClear	None
8/31/2023	ST6950	22	VactorTruck	Truax1	None	Clear	None
8/31/2023	ST3567	16	VactorTruck	Truax1	Minimal	NotClear	None
8/31/2023	ST6948	33	VactorTruck	Truax1	None	Clear	None
8/31/2023	ST17539	11	VactorTruck	Truax1	None	Clear	None
8/31/2023	ST3564	12	VactorTruck	Truax1	None	NotClear	None
8/31/2023	ST3561	18	VactorTruck	Truax1	None	NotClear	None
8/31/2023	ST17539	10	VactorTruck	Truax1	None	Clear	None
8/31/2023	ST17540	19	VactorTruck	Truax1	None	Clear	None
8/31/2023	ST3539	6	VactorTruck	Truax1	None	NotClear	None
8/31/2023	ST17541	13	VactorTruck	Truax1	None	Clear	None
8/31/2023	ST3605	24	VactorTruck	Truax1	None	NotClear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
8/31/2023	ST17537	14	VactorTruck	Truax1	None	Clear	None
8/31/2023	ST3608	12	VactorTruck	Truax1	None	NotClear	None
8/31/2023	ST3611	12	VactorTruck	Truax1	Minimal	NotClear	None
8/31/2023	ST17536	14	VactorTruck	Truax1	None	Clear	None
9/1/2023	ST3686	10	VactorTruck	Truax1	None	NotClear	None
9/1/2023	ST3271	12	VactorTruck	Truax1	None	NotClear	None
9/1/2023	ST3679	1	VactorTruck	Truax1	None	N/A	None
9/1/2023	ST3675	18	VactorTruck	Truax1	None	N/A	None
9/1/2023	ST3674	16	VactorTruck	Truax1	None	N/A	None
9/1/2023	ST3673	17	VactorTruck	Truax1	None	N/A	None
9/1/2023	ST3418	12	VactorTruck	Truax1	None	N/A	None
9/1/2023	ST3421	19	VactorTruck	Truax1	None	NotClear	None
9/1/2023	ST3424	24	VactorTruck	Truax1	None	NotClear	None
9/1/2023	ST3435	15	VactorTruck	Truax1	None	N/A	None
9/1/2023	ST3433	1	VactorTruck	Truax1	None	NotClear	None
9/1/2023	ST3429	1	VactorTruck	Truax1	None	N/A	None
9/1/2023	ST3427	3	VactorTruck	Truax1	None	NotClear	None
9/1/2023	ST3423	8	VactorTruck	Truax1	None	N/A	None
9/1/2023	ST3416	5	VactorTruck	Truax1	None	N/A	None
9/1/2023	ST3676	8	VactorTruck	Truax1	None	N/A	None
9/1/2023	ST3680	12	VactorTruck	Truax1	None	NotClear	None
9/1/2023	ST3274	9	VactorTruck	Truax1	None	N/A	None
9/1/2023	ST3612	18	VactorTruck	Truax1	None	NotClear	None
9/1/2023	ST3609	24	VactorTruck	Truax1	None	NotClear	None
9/1/2023	ST3603	6	VactorTruck	Truax1	None	NotClear	None
9/1/2023	ST3617	12	VactorTruck	Truax1	None	NotClear	None
9/1/2023	ST3272	14	VactorTruck	Truax1	Full	NotClear	None
9/11/2023	ST7235	20	VactorTruck	Truax1	None	Clear	None
9/11/2023	ST7216	21	VactorTruck	Truax1	None	Clear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
9/11/2023	ST7224	21	VactorTruck	Truax1	None	Clear	None
9/11/2023	ST7226	29	VactorTruck	Truax1	None	Clear	None
9/15/2023	ST3357	12	VactorTruck	Truax1	None	Clear	None
9/15/2023	ST3359	10	VactorTruck	Truax1	None	Clear	None
9/15/2023	ST3360	6	VactorTruck	Truax1	None	Clear	None
9/19/2023	ST3681	2	VactorTruck	Truax1	Minimal	NotClear	None
9/19/2023	ST3684	2	VactorTruck	Truax1	Minimal	NotClear	None
9/19/2023	ST3627	24	VactorTruck	Truax1	Minimal	NotClear	None
9/19/2023	ST3630	22	VactorTruck	Truax1	None	NotClear	None
9/19/2023	ST3629	20	VactorTruck	Truax1	None	NotClear	None
9/19/2023	ST3632	4	VactorTruck	Truax1	None	NotClear	None
9/19/2023	ST210179	2	VactorTruck	Truax1	None	NotClear	None
9/19/2023	ST3753	12	VactorTruck	Truax1	Minimal	NotClear	None
9/19/2023	ST3754	12	VactorTruck	Truax1	Minimal	NotClear	None
9/19/2023	ST3757	24	VactorTruck	Truax1	None	NotClear	None
9/19/2023	ST3759	30	VactorTruck	Truax1	None	NotClear	None
9/19/2023	ST210180	24	VactorTruck	Truax1	Full	NotClear	None
9/19/2023	ST3668	24	VactorTruck	Truax1	Minimal	NotClear	None
9/19/2023	ST3758	18	VactorTruck	Truax1	None	NotClear	None
9/19/2023	ST3665	10	VactorTruck	Truax1	None	NotClear	None
9/19/2023	ST3755	18	VactorTruck	Truax1	None	NotClear	None
9/19/2023	ST3755	6	VactorTruck	Truax1	None	NotClear	None
9/20/2023	ST3633	12	VactorTruck	Truax1	Minimal	NotClear	None
9/20/2023	ST3704	12	VactorTruck	Truax1	None	NotClear	None
9/20/2023	ST12792	21	VactorTruck	Truax1	None	Clear	None
9/20/2023	ST3708	7	VactorTruck	Truax1	None	NotClear	None
9/20/2023	ST3707	11	VactorTruck	Truax1	None	NotClear	None
9/20/2023	ST3737	18	VactorTruck	Truax1	None	Clear	None
9/20/2023	ST3736	20	VactorTruck	Truax1	None	Clear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
9/20/2023	ST3711	21	VactorTruck	Truax1	None	NotClear	None
9/20/2023	ST3738	16	VactorTruck	Truax1	None	Clear	None
9/20/2023	ST3741	13	VactorTruck	Truax1	None	Clear	None
9/20/2023	ST3714	12	VactorTruck	Truax1	Full	NotClear	None
9/20/2023	ST3744	6	VactorTruck	Truax1	None	Clear	None
9/20/2023	ST3751	13	VactorTruck	Truax1	None	Clear	None
9/20/2023	ST3752	12	VactorTruck	Truax1	None	Clear	None
9/20/2023	ST3715	22	VactorTruck	Truax1	Full	NotClear	None
9/20/2023	ST3702	5	VactorTruck	Truax1	None	Clear	None
9/20/2023	ST3700	2	VactorTruck	Truax1	None	Clear	None
9/20/2023	ST3705	7	VactorTruck	Truax1	Minimal	Clear	None
9/20/2023	ST3707	9	VactorTruck	Truax1	Minimal	Clear	None
9/20/2023	ST3718	12	VactorTruck	Truax1	Minimal	NotClear	None
9/20/2023	ST3695	6	VactorTruck	Truax1	None	NotClear	None
9/20/2023	ST3708	7	VactorTruck	Truax1	Minimal	N/A	None
9/20/2023	ST3712	6	VactorTruck	Truax1	None	Clear	None
9/20/2023	ST3699	25	VactorTruck	Truax1	Minimal	NotClear	None
9/20/2023	ST3696	9	VactorTruck	Truax1	None	NotClear	None
9/20/2023	ST3721	5	VactorTruck	Truax1	Minimal	Clear	None
9/20/2023	ST3662	4	VactorTruck	Truax1	Minimal	NotClear	None
9/20/2023	ST3723	7	VactorTruck	Truax1	None	Clear	None
9/20/2023	ST3661	2	VactorTruck	Truax1	None	NotClear	None
9/20/2023	ST3658	12	VactorTruck	Truax1	None	NotClear	None
9/20/2023	ST3660	5	VactorTruck	Truax1	None	N/A	None
9/20/2023	ST3645	17	VactorTruck	Truax1	None	NotClear	None
9/20/2023	ST3783	7	VactorTruck	Truax1	None	NotClear	None
9/20/2023	ST11156	8	VactorTruck	Truax1	None	Clear	None
9/20/2023	ST3784	12	VactorTruck	Truax1	None	NotClear	None
9/20/2023	ST11157	15	VactorTruck	Truax1	None	Clear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
9/20/2023	ST3786	12	VactorTruck	Truax1	None	NotClear	None
9/20/2023	ST3787	12	VactorTruck	Truax1	None	NotClear	None
9/21/2023	ST3636	10	VactorTruck	Truax1	Full	NotClear	None
9/21/2023	ST3761	21	VactorTruck	Truax1	Minimal	NotClear	None
9/21/2023	ST3649	8	VactorTruck	Truax1	None	NotClear	None
9/21/2023	ST3644	12	VactorTruck	Truax1	None	NotClear	None
9/21/2023	ST3653	10	VactorTruck	Truax1	None	NotClear	None
9/21/2023	ST3735	1	VactorTruck	Truax1	None	NotClear	None
9/21/2023	ST3731	10	VactorTruck	Truax1	Minimal	Clear	None
9/21/2023	ST3728	4	VactorTruck	Truax1	None	Clear	None
9/21/2023	ST3740	10	VactorTruck	Truax1	None	NotClear	None
9/21/2023	ST210184	5	VactorTruck	Truax1	None	Clear	None
9/21/2023	ST3652	24	VactorTruck	Truax1	None	NotClear	None
9/21/2023	ST3647	3	VactorTruck	Truax1	None	NotClear	None
9/21/2023	ST3726	18	VactorTruck	Truax1	Minimal	Clear	None
9/21/2023	ST3725	15	VactorTruck	Truax1	Minimal	Clear	None
9/21/2023	ST3724	8	VactorTruck	Truax1	Minimal	Clear	None
9/21/2023	ST3772	1	VactorTruck	Truax1	Full	NotClear	None
9/21/2023	ST3766	1	VactorTruck	Truax1	None	NotClear	None
9/21/2023	ST3727	5	VactorTruck	Truax1	Minimal	Clear	None
9/21/2023	ST210175	18	VactorTruck	Truax1	Minimal	NotClear	None
9/21/2023	ST10930	20	VactorTruck	Truax1	Minimal	Clear	None
9/21/2023	ST10943	2	VactorTruck	Truax1	None	Clear	None
9/21/2023	ST3637	12	VactorTruck	Truax1	Minimal	NotClear	None
9/21/2023	ST10942	6	VactorTruck	Truax1	None	Clear	None
9/21/2023	ST11012	15	VactorTruck	Truax1	Minimal	Clear	None
9/21/2023	ST3643	15	VactorTruck	Truax1	None	NotClear	None
9/21/2023	ST11013	5	VactorTruck	Truax1	Minimal	Clear	None
9/21/2023	ST3641	12	VactorTruck	Truax1	None	NotClear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
9/21/2023	ST11008	10	VactorTruck	Truax1	Minimal	Clear	None
9/21/2023	ST10995	10	VactorTruck	Truax1	None	Clear	None
9/21/2023	ST11029	20	VactorTruck	Truax1	Minimal	Clear	None
9/21/2023	ST3642	10	VactorTruck	Truax1	None	NotClear	None
9/21/2023	ST11025	15	VactorTruck	Truax1	Minimal	Clear	None
9/21/2023	ST11175	0	VactorTruck	Truax1	None	N/A	None
9/21/2023	ST11016	10	VactorTruck	Truax1	Minimal	Clear	None
9/21/2023	ST3293	28	VactorTruck	Truax1	None	NotClear	None
9/21/2023	ST11033	14	VactorTruck	Truax1	Minimal	Clear	None
9/21/2023	ST11036	15	VactorTruck	Truax1	Minimal	Clear	None
9/21/2023	ST11042	5	VactorTruck	Truax1	Minimal	Clear	None
9/21/2023	ST11039	13	VactorTruck	Truax1	Minimal	Clear	None
9/22/2023	ST3288	20	VactorTruck	Truax1	None	NotClear	None
9/22/2023	ST3301	18	VactorTruck	Truax1	None	NotClear	None
9/22/2023	ST500081	4	VactorTruck	Truax1	None	NotClear	None
9/22/2023	ST500084	8	VactorTruck	Truax1	None	NotClear	None
9/22/2023	ST500085	4	VactorTruck	Truax1	None	NotClear	None
9/22/2023	ST500080	12	VactorTruck	Truax1	None	NotClear	None
9/22/2023	ST210169	20	VactorTruck	Truax1	None	NotClear	None
9/22/2023	ST3214	12	VactorTruck	Truax1	None	NotClear	None
9/22/2023	ST3215	26	VactorTruck	Truax1	None	NotClear	None
9/22/2023	ST3247	7	VactorTruck	Truax1	None	NotClear	None
9/22/2023	ST3239	19	VactorTruck	Truax1	None	NotClear	None
9/22/2023	ST3238	8	VactorTruck	Truax1	None	NotClear	None
9/22/2023	ST3233	32	VactorTruck	Truax1	None	NotClear	None
9/22/2023	ST3227	12	VactorTruck	Truax1	None	NotClear	None
9/22/2023	ST3217	22	VactorTruck	Truax1	None	NotClear	None
9/22/2023	ST210168	26	VactorTruck	Truax1	None	NotClear	None
9/22/2023	ST3218	26	VactorTruck	Truax1	None	NotClear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
9/22/2023	ST3221	18	VactorTruck	Truax1	None	NotClear	None
9/22/2023	ST3228	20	VactorTruck	Truax1	None	NotClear	None
9/22/2023	ST3240	12	VactorTruck	Truax1	None	NotClear	None
9/22/2023	ST3241	12	VactorTruck	Truax1	None	NotClear	None
9/26/2023	ST14610	20	VactorTruck	Truax1	None	Clear	None
9/26/2023	ST14606	6	VactorTruck	Truax1	None	N/A	None
9/26/2023	ST3210	4	VactorTruck	Truax1	Full	NotClear	None
9/26/2023	ST14605	12	VactorTruck	Truax1	None	Clear	None
9/26/2023	ST3207	12	VactorTruck	Truax1	Full	NotClear	None
9/26/2023	ST7325	23	VactorTruck	Truax1	None	Clear	None
9/26/2023	ST3205	20	VactorTruck	Truax1	Minimal	NotClear	None
9/26/2023	ST7316	15	VactorTruck	Truax1	None	Clear	None
9/26/2023	ST7397	12	VactorTruck	Truax1	None	Clear	None
9/26/2023	ST3211	15	VactorTruck	Truax1	None	NotClear	None
9/26/2023	ST3196	24	VactorTruck	Truax1	None	NotClear	None
9/26/2023	ST7392	10	VactorTruck	Truax1	None	Clear	None
9/26/2023	ST7335	22	VactorTruck	Truax1	None	Clear	None
9/26/2023	ST3181	12	VactorTruck	Truax1	None	NotClear	None
9/26/2023	ST3188	4	VactorTruck	Truax1	Full	NotClear	None
9/26/2023	ST7338	22	VactorTruck	Truax1	None	Clear	None
9/26/2023	ST3270	24	VactorTruck	Truax1	Minimal	NotClear	None
9/26/2023	ST7359	17	VactorTruck	Truax1	None	Clear	None
9/26/2023	ST7361	15	VactorTruck	Truax1	Minimal	Clear	None
9/26/2023	ST3276	12	VactorTruck	Truax1	Minimal	NotClear	None
9/26/2023	ST7535	5	VactorTruck	Truax1	None	Clear	None
9/26/2023	ST3639	1	VactorTruck	Truax1	Minimal	NotClear	None
9/26/2023	ST7540	20	VactorTruck	Truax1	None	Clear	None
9/26/2023	ST3438	12	VactorTruck	Truax1	None	NotClear	None
9/26/2023	ST7544	23	VactorTruck	Truax1	None	Clear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
9/26/2023	ST3439	4	VactorTruck	Truax1	Minimal	NotClear	None
9/26/2023	ST7545	22	VactorTruck	Truax1	None	Clear	None
9/26/2023	ST3440	2	VactorTruck	Truax1	None	Clear	None
9/26/2023	ST7464	18	VactorTruck	Truax1	None	Clear	None
9/26/2023	ST3444	12	VactorTruck	Truax1	None	NotClear	None
9/26/2023	ST7462	15	VactorTruck	Truax1	None	Clear	None
9/26/2023	ST3405	13	VactorTruck	Truax1	None	NotClear	None
9/26/2023	ST7415	1	VactorTruck	Truax1	None	Clear	None
9/26/2023	ST7423	20	VactorTruck	Truax1	Full	Clear	None
9/26/2023	ST3406	12	VactorTruck	Truax1	None	NotClear	None
9/26/2023	ST7429	23	VactorTruck	Truax1	None	Clear	None
9/26/2023	ST3408	7	VactorTruck	Truax1	None	NotClear	None
9/26/2023	ST7432	22	VactorTruck	Truax1	None	Clear	None
9/26/2023	ST7416	21	VactorTruck	Truax1	None	Clear	None
9/26/2023	ST7447	21	VactorTruck	Truax1	None	Clear	None
9/27/2023	ST7449	19	VactorTruck	Truax1	None	Clear	None
9/27/2023	ST7558	21	VactorTruck	Truax1	None	Clear	None
9/27/2023	ST7556	22	VactorTruck	Truax1	None	Clear	None
9/27/2023	ST7553	17	VactorTruck	Truax1	None	Clear	None
9/27/2023	ST7835	1	VactorTruck	Truax1	None	Clear	None
9/27/2023	ST7833	15	VactorTruck	Truax1	None	Clear	None
9/27/2023	ST7832	14	VactorTruck	Truax1	None	NotClear	None
9/27/2023	ST7831	0	VactorTruck	Truax1	None	Clear	None
9/27/2023	ST3456	14	VactorTruck	Truax1	None	NotClear	None
9/27/2023	ST7830	32	VactorTruck	Truax1	None	Clear	None
9/27/2023	ST7845	22	VactorTruck	Truax1	None	Clear	None
9/27/2023	ST3459	12	VactorTruck	Truax1	None	NotClear	None
9/27/2023	ST3462	108	VactorTruck	Truax1	Minimal	NotClear	None
9/27/2023	ST7844	35	VactorTruck	Truax1	None	Clear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
9/27/2023	ST310024	1	VactorTruck	Truax1	Minimal	Clear	None
9/27/2023	ST3465	4	VactorTruck	Truax1	Minimal	NotClear	None
9/27/2023	ST7852	12	VactorTruck	Truax1	Minimal	Clear	None
9/27/2023	ST7851	17	VactorTruck	Truax1	None	Clear	None
9/27/2023	ST500023	7	VactorTruck	Truax1	None	NotClear	None
9/27/2023	ST500024	6	VactorTruck	Truax1	Minimal	NotClear	None
9/27/2023	ST7850	24	VactorTruck	Truax1	None	Clear	None
9/27/2023	ST500029	12	VactorTruck	Truax1	None	NotClear	None
9/27/2023	ST7843	38	VactorTruck	Truax1	None	Clear	None
9/27/2023	ST500028	1	VactorTruck	Truax1	Minimal	NotClear	None
9/27/2023	ST7841	15	VactorTruck	Truax1	None	Clear	None
9/27/2023	ST7838	24	VactorTruck	Truax1	None	Clear	None
9/27/2023	ST500019	8	VactorTruck	Truax1	None	NotClear	None
9/27/2023	ST7837	13	VactorTruck	Truax1	None	Clear	None
9/27/2023	ST3471	19	VactorTruck	Truax1	None	NotClear	None
9/27/2023	ST7565	5	VactorTruck	Truax1	None	Clear	None
9/27/2023	ST3474	8	VactorTruck	Truax1	None	NotClear	None
9/27/2023	ST7568	20	VactorTruck	Truax1	None	Clear	None
9/27/2023	ST7597	9	VactorTruck	Truax1	Minimal	Clear	None
9/27/2023	ST7803	20	VactorTruck	Truax1	Minimal	Clear	None
9/27/2023	ST7792	10	VactorTruck	Truax1	None	Clear	None
9/27/2023	ST7790	10	VactorTruck	Truax1	Minimal	Clear	None
9/27/2023	ST7787	16	VactorTruck	Truax1	None	Clear	None
9/27/2023	ST3475	21	VactorTruck	Truax1	None	NotClear	None
9/27/2023	ST17630	25	VactorTruck	Truax1	None	Clear	None
9/27/2023	ST17629	25	VactorTruck	Truax1	None	Clear	None
9/27/2023	ST17624	10	VactorTruck	Truax1	None	Clear	None
9/27/2023	ST17622	13	VactorTruck	Truax1	None	Clear	None
9/28/2023	ST11146	7	VactorTruck	Truax1	Full	NotClear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
9/28/2023	ST11142	24	VactorTruck	Truax1	None	NotClear	None
9/28/2023	ST11139	24	VactorTruck	Truax1	None	NotClear	None
9/28/2023	ST11138	24	VactorTruck	Truax1	None	NotClear	None
9/28/2023	ST3856	20	VactorTruck	Truax1	None	NotClear	None
9/28/2023	ST3858	24	VactorTruck	Truax1	None	NotClear	None
9/28/2023	ST11058	30	VactorTruck	Truax1	None	NotClear	None
9/28/2023	ST10957	24	VactorTruck	Truax1	None	NotClear	None
9/28/2023	ST10955	24	VactorTruck	Truax1	None	NotClear	None
9/28/2023	ST10952	30	VactorTruck	Truax1	None	NotClear	None
9/28/2023	ST10953B	24	VactorTruck	Truax1	None	NotClear	None
9/28/2023	ST3854	2	VactorTruck	Truax1	None	NotClear	None
9/28/2023	ST3826	12	VactorTruck	Truax1	None	NotClear	None
9/28/2023	ST3825	1	VactorTruck	Truax1	Minimal	NotClear	None
9/28/2023	ST3834	15	VactorTruck	Truax1	None	NotClear	None
9/28/2023	ST3855	21	VactorTruck	Truax1	None	NotClear	None
9/28/2023	ST10946	22	VactorTruck	Truax1	None	NotClear	None
9/28/2023	ST10953	38	VactorTruck	Truax1	None	NotClear	None
9/28/2023	ST10956	18	VactorTruck	Truax1	None	NotClear	None
9/28/2023	ST10958	24	VactorTruck	Truax1	None	NotClear	None
9/28/2023	ST10907	7	VactorTruck	Truax1	None	NotClear	None
9/28/2023	ST10909	26	VactorTruck	Truax1	None	NotClear	None
9/28/2023	ST10908	12	VactorTruck	Truax1	None	NotClear	None
10/2/2023	ST8961	5	VactorTruck	Truax1	Minimal	Clear	None
10/2/2023	ST11279	1	VactorTruck	Truax1	None	N/A	None
10/2/2023	ST8957	2	VactorTruck	Truax1	Minimal	Clear	None
10/2/2023	ST8922	5	VactorTruck	Truax1	None	Clear	None
10/2/2023	ST11279	1	VactorTruck	Truax1	None	N/A	None
10/2/2023	ST11278	1	VactorTruck	Truax1	None	N/A	None
10/2/2023	ST8925	6	VactorTruck	Truax1	None	Clear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
10/2/2023	ST11283	2	VactorTruck	Truax1	None	NotClear	None
10/2/2023	ST8929	10	VactorTruck	Truax1	Minimal	Clear	None
10/2/2023	ST10891	4	VactorTruck	Truax1	None	NotClear	None
10/2/2023	ST8927	7	VactorTruck	Truax1	None	Clear	None
10/2/2023	ST10890	5	VactorTruck	Truax1	None	NotClear	None
10/2/2023	ST8932	10	VactorTruck	Truax1	None	Clear	None
10/2/2023	ST11261	7	VactorTruck	Truax1	None	N/A	None
10/2/2023	ST8930	10	VactorTruck	Truax1	Minimal	Clear	None
10/2/2023	ST11260	1	VactorTruck	Truax1	None	NotClear	None
10/2/2023	ST8936	10	VactorTruck	Truax1	Full	Clear	None
10/2/2023	ST11259	17	VactorTruck	Truax1	None	NotClear	None
10/2/2023	ST8934	10	VactorTruck	Truax1	None	Clear	None
10/2/2023	ST11237	2	VactorTruck	Truax1	None	N/A	None
10/2/2023	ST11236	1	VactorTruck	Truax1	None	N/A	None
10/2/2023	ST8938	5	VactorTruck	Truax1	None	Clear	None
10/2/2023	ST11248	1	VactorTruck	Truax1	None	N/A	None
10/2/2023	ST8939	30	VactorTruck	Truax1	None	Clear	None
10/2/2023	ST11254	7	VactorTruck	Truax1	None	NotClear	None
10/2/2023	ST8942	10	VactorTruck	Truax1	None	Clear	None
10/2/2023	ST9969	2	VactorTruck	Truax1	None	NotClear	None
10/2/2023	ST8944	27	VactorTruck	Truax1	None	Clear	None
10/2/2023	ST9057	1	VactorTruck	Truax1	None	Clear	None
10/2/2023	ST9056	15	VactorTruck	Truax1	None	Clear	None
10/2/2023	ST9049	19	VactorTruck	Truax1	None	Clear	None
10/2/2023	ST600061	15	VactorTruck	Truax1	None	NotClear	None
10/2/2023	ST9046	5	VactorTruck	Truax1	None	Clear	None
10/2/2023	ST600063	12	VactorTruck	Truax1	None	NotClear	None
10/2/2023	ST9297	5	VactorTruck	Truax1	None	Clear	None
10/2/2023	ST9293	10	VactorTruck	Truax1	None	Clear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
10/2/2023	ST600065	6	VactorTruck	Truax1	None	NotClear	None
10/2/2023	ST600067	28	VactorTruck	Truax1	None	NotClear	None
10/2/2023	ST10240	25	VactorTruck	Truax1	None	Clear	None
10/2/2023	ST10239	23	VactorTruck	Truax1	None	Clear	None
10/2/2023	ST600069	6	VactorTruck	Truax1	None	NotClear	None
10/2/2023	ST10238	15	VactorTruck	Truax1	None	Clear	None
10/2/2023	ST600071	6	VactorTruck	Truax1	None	NotClear	None
10/2/2023	ST600072	15	VactorTruck	Truax1	None	NotClear	None
10/2/2023	ST10237	14	VactorTruck	Truax1	Minimal	Clear	None
10/2/2023	ST14589	30	VactorTruck	Truax1	None	Clear	None
10/2/2023	ST600070	24	VactorTruck	Truax1	None	NotClear	None
10/2/2023	ST14590	10	VactorTruck	Truax1	None	Clear	None
10/2/2023	ST600068	15	VactorTruck	Truax1	None	NotClear	None
10/2/2023	ST600066	20	VactorTruck	Truax1	None	NotClear	None
10/2/2023	ST4016	15	VactorTruck	Truax1	None	Clear	None
10/2/2023	ST600064	12	VactorTruck	Truax1	None	NotClear	None
10/2/2023	ST3958	9	VactorTruck	Truax1	Minimal	Clear	None
10/2/2023	ST600062	25	VactorTruck	Truax1	None	NotClear	None
10/2/2023	ST3956	15	VactorTruck	Truax1	None	Clear	None
10/2/2023	ST3955	20	VactorTruck	Truax1	None	Clear	None
10/2/2023	ST6744	0	VactorTruck	Truax1	None	N/A	None
10/3/2023	ST8515	11	VactorTruck	Truax1	None	Clear	None
10/3/2023	ST8476	18	VactorTruck	Truax1	None	Clear	None
10/3/2023	ST10177	15	VactorTruck	Truax1	None	Clear	None
10/3/2023	ST14630	18	VactorTruck	Truax1	None	Clear	None
10/3/2023	ST17661	15	VactorTruck	Truax1	None	Clear	None
10/3/2023	ST210395	20	VactorTruck	Truax1	None	Clear	None
10/3/2023	ST20057	32	VactorTruck	Truax1	None	Clear	None
10/3/2023	ST17660	20	VactorTruck	Truax1	None	Clear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
10/3/2023	ST10242	12	VactorTruck	Truax1	None	Clear	None
10/3/2023	ST3994	25	VactorTruck	Truax1	None	Clear	None
10/3/2023	ST8656	30	VactorTruck	Truax1	None	N/A	None
10/3/2023	ST3997	1	VactorTruck	Truax1	None	Clear	None
10/3/2023	ST8988	9	VactorTruck	Truax1	None	NotClear	None
10/3/2023	ST4013	10	VactorTruck	Truax1	None	Clear	None
10/3/2023	ST8992	2	VactorTruck	Truax1	None	NotClear	None
10/3/2023	ST14555	44	VactorTruck	Truax1	None	Clear	None
10/3/2023	ST8687	18	VactorTruck	Truax1	None	NotClear	None
10/3/2023	ST14546	6	VactorTruck	Truax1	None	Clear	None
10/3/2023	ST14543	18	VactorTruck	Truax1	None	Clear	None
10/3/2023	ST9164	14	VactorTruck	Truax1	None	NotClear	None
10/3/2023	ST1361	10	VactorTruck	Truax1	None	Clear	None
10/3/2023	ST9196	12	VactorTruck	Truax1	None	NotClear	None
10/3/2023	ST1363	10	VactorTruck	Truax1	None	Clear	None
10/3/2023	ST1362	5	VactorTruck	Truax1	None	Clear	None
10/3/2023	ST210314	12	VactorTruck	Truax1	None	NotClear	None
10/3/2023	ST14527	10	VactorTruck	Truax1	None	Clear	None
10/3/2023	ST14550	6	VactorTruck	Truax1	Minimal	Clear	None
10/3/2023	ST14562	6	VactorTruck	Truax1	Minimal	Clear	None
10/3/2023	ST1872	15	VactorTruck	Truax1	None	Clear	None
10/3/2023	ST9206	6	VactorTruck	Truax1	None	NotClear	None
10/3/2023	ST2126	22	VactorTruck	Truax1	None	Clear	None
10/3/2023	ST2132	15	VactorTruck	Truax1	None	Clear	None
10/3/2023	ST2134	21	VactorTruck	Truax1	None	Clear	None
10/3/2023	ST210315	4	VactorTruck	Truax1	None	NotClear	None
10/3/2023	ST2149	17	VactorTruck	Truax1	None	Clear	Strong
10/3/2023	ST9026	12	VactorTruck	Truax1	None	NotClear	None
10/3/2023	ST2160	10	VactorTruck	Truax1	Minimal	Clear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
10/4/2023	ST4047	4	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST17490	2	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST17491	2	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST17492	2	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST17496	2	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST4075	2	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST11181	20	VactorTruck	Truax1	None	NotClear	None
10/4/2023	ST14996	2	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST5738	2	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST5723	1	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST5726	11	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST11178	11	VactorTruck	Truax1	None	NotClear	None
10/4/2023	ST5480	5	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST3891	24	VactorTruck	Truax1	Minimal	NotClear	None
10/4/2023	ST5475	5	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST5455	5	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST3886	17	VactorTruck	Truax1	Minimal	NotClear	None
10/4/2023	ST5469	5	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST17480	4	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST3885	6	VactorTruck	Truax1	None	NotClear	None
10/4/2023	ST17481	2	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST17487	5	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST1988	7	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST3876	8	VactorTruck	Truax1	Full	NotClear	None
10/4/2023	ST1985	10	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST3875	1	VactorTruck	Truax1	Full	NotClear	None
10/4/2023	ST1982	5	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST1976	16	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST11185	24	VactorTruck	Truax1	None	NotClear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
10/4/2023	ST3862	1	VactorTruck	Truax1	None	NotClear	None
10/4/2023	ST1993	13	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST3868	12	VactorTruck	Truax1	Minimal	NotClear	None
10/4/2023	ST1992	10	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST17486	5	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST1991	10	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST3863	24	VactorTruck	Truax1	None	NotClear	None
10/4/2023	ST17488	27	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST17478	10	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST5453	18	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST5484	22	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST5734	12	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST3900	12	VactorTruck	Truax1	Full	NotClear	None
10/4/2023	ST14994	3	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST17485	10	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST3901	12	VactorTruck	Truax1	None	NotClear	None
10/4/2023	ST4026	9	VactorTruck	Truax1	None	Clear	None
10/4/2023	ST10906	12	VactorTruck	Truax1	None	NotClear	None
10/4/2023	ST11023	10	VactorTruck	Truax1	None	NotClear	None
10/4/2023	ST10986	4	VactorTruck	Truax1	None	NotClear	None
10/4/2023	ST10986	12	VactorTruck	Truax1	None	NotClear	None
10/4/2023	ST10985	12	VactorTruck	Truax1	None	NotClear	None
10/4/2023	ST10983	12	VactorTruck	Truax1	None	NotClear	None
10/5/2023	ST15016	33	VactorTruck	Truax1	Minimal	Clear	None
10/5/2023	ST10913	12	VactorTruck	Truax1	None	NotClear	None
10/5/2023	ST10938	24	VactorTruck	Truax1	None	NotClear	None
10/5/2023	ST10937	15	VactorTruck	Truax1	None	NotClear	None
10/5/2023	ST15013	40	VactorTruck	Truax1	None	Clear	None
10/5/2023	ST15009	5	VactorTruck	Truax1	None	Clear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
10/5/2023	ST13096	13	VactorTruck	Truax1	None	Clear	None
10/5/2023	ST13097	20	VactorTruck	Truax1	None	Clear	None
10/5/2023	ST3820	18	VactorTruck	Truax1	None	NotClear	None
10/5/2023	ST3822	4	VactorTruck	Truax1	None	NotClear	None
10/5/2023	ST3802	12	VactorTruck	Truax1	None	NotClear	None
10/5/2023	ST13117	15	VactorTruck	Truax1	None	Clear	None
10/5/2023	ST13119	20	VactorTruck	Truax1	None	Clear	None
10/5/2023	ST10966	1	VactorTruck	Truax1	None	N/A	None
10/5/2023	ST10970	1	VactorTruck	Truax1	None	N/A	None
10/5/2023	ST13121	5	VactorTruck	Truax1	None	Clear	None
10/5/2023	ST210201	18	VactorTruck	Truax1	None	NotClear	None
10/5/2023	ST11979	12	VactorTruck	Truax1	None	Clear	None
10/5/2023	ST11985	8	VactorTruck	Truax1	None	Clear	None
10/5/2023	ST11047	24	VactorTruck	Truax1	Full	NotClear	None
10/5/2023	ST12153	18	VactorTruck	Truax1	None	Clear	None
10/5/2023	ST7197	6	VactorTruck	Truax1	None	NotClear	None
10/5/2023	ST7195	6	VactorTruck	Truax1	None	NotClear	None
10/5/2023	ST12111	23	VactorTruck	Truax1	Minimal	Clear	None
10/5/2023	ST12185	15	VactorTruck	Truax1	Minimal	Clear	None
10/5/2023	ST12190	8	VactorTruck	Truax1	None	Clear	None
10/5/2023	ST11199	12	VactorTruck	Truax1	None	NotClear	None
10/5/2023	ST12189	12	VactorTruck	Truax1	Minimal	Clear	None
10/5/2023	ST11201	32	VactorTruck	Truax1	None	NotClear	None
10/5/2023	ST12191	10	VactorTruck	Truax1	Minimal	Clear	None
10/5/2023	ST12188	15	VactorTruck	Truax1	None	Clear	None
10/5/2023	ST12186	5	VactorTruck	Truax1	Minimal	Clear	None
10/5/2023	ST11203	24	VactorTruck	Truax1	None	NotClear	None
10/5/2023	ST12183	20	VactorTruck	Truax1	None	Clear	None
10/5/2023	ST11200	24	VactorTruck	Truax1	None	NotClear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
10/5/2023	ST7201	18	VactorTruck	Truax1	None	N/A	None
10/5/2023	ST7205	12	VactorTruck	Truax1	None	NotClear	None
10/5/2023	ST7204	12	VactorTruck	Truax1	None	NotClear	None
10/5/2023	ST7202	12	VactorTruck	Truax1	None	NotClear	None
10/5/2023	ST11197	18	VactorTruck	Truax1	None	NotClear	None
10/5/2023	ST11196	12	VactorTruck	Truax1	None	NotClear	None
10/5/2023	ST11196	12	VactorTruck	Truax1	None	NotClear	None
10/5/2023	ST11193	12	VactorTruck	Truax1	None	NotClear	None
10/5/2023	ST7188	2	VactorTruck	Truax1	Minimal	NotClear	None
10/5/2023	ST7187	12	VactorTruck	Truax1	None	NotClear	None
10/6/2023	ST4773	15	VactorTruck	Truax1	None	Clear	None
10/6/2023	ST4778	25	VactorTruck	Truax1	None	Clear	None
10/6/2023	ST4758	12	VactorTruck	Truax1	None	Clear	None
10/6/2023	ST4760	12	VactorTruck	Truax1	None	Clear	None
10/6/2023	ST4692	9	VactorTruck	Truax1	None	Clear	None
10/6/2023	ST4689	13	VactorTruck	Truax1	None	Clear	None
10/6/2023	ST4684	18	VactorTruck	Truax1	None	Clear	None
10/6/2023	ST4694	13	VactorTruck	Truax1	None	Clear	None
10/6/2023	ST4763	13	VactorTruck	Truax1	None	Clear	None
10/6/2023	ST4766	13	VactorTruck	Truax1	None	Clear	None
10/6/2023	ST4780	13	VactorTruck	Truax1	None	Clear	None
10/6/2023	ST4775	13	VactorTruck	Truax1	None	Clear	None
10/6/2023	ST4686	13	VactorTruck	Truax1	None	Clear	None
10/10/2023	ST17528	24	VactorTruck	Truax1	None	NotClear	None
10/10/2023	ST4665	24	VactorTruck	Truax1	None	NotClear	None
10/11/2023	ST4678	10	VactorTruck	Truax1	None	Clear	None
10/11/2023	ST4676	10	VactorTruck	Truax1	None	Clear	None
10/11/2023	ST4666	10	VactorTruck	Truax1	None	Clear	None
10/11/2023	ST4716	30	VactorTruck	Truax1	Minimal	Clear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
10/11/2023	ST17557	75	VactorTruck	Truax1	None	Clear	None
10/11/2023	ST4656	12	VactorTruck	Truax1	None	Clear	None
10/11/2023	ST4702	25	VactorTruck	Truax1	None	Clear	None
10/11/2023	ST4701	23	VactorTruck	Truax1	None	Clear	None
10/11/2023	ST4732	15	VactorTruck	Truax1	None	Clear	None
10/11/2023	ST4733	30	VactorTruck	Truax1	None	Clear	None
10/11/2023	ST4724	2	VactorTruck	Truax1	None	Clear	None
10/11/2023	ST4720	21	VactorTruck	Truax1	None	Clear	None
10/11/2023	ST4719	10	VactorTruck	Truax1	Minimal	Clear	None
10/11/2023	ST5107	30	VactorTruck	Truax1	Minimal	Clear	None
10/11/2023	ST5112	20	VactorTruck	Truax1	None	Clear	None
10/11/2023	ST5122	12	VactorTruck	Truax1	None	Clear	None
10/11/2023	ST5121	6	VactorTruck	Truax1	None	Clear	None
10/11/2023	ST5120	13	VactorTruck	Truax1	None	Clear	None
10/11/2023	ST5115	30	VactorTruck	Truax1	None	Clear	None
10/11/2023	ST5110	28	VactorTruck	Truax1	None	Clear	None
10/11/2023	ST5096	0	VactorTruck	Truax1	None	Clear	None
10/11/2023	ST5090	30	VactorTruck	Truax1	None	Clear	None
10/16/2023	ST4529	21	VactorTruck	Truax1	None	Clear	None
10/16/2023	ST4522	25	VactorTruck	Truax1	None	Clear	None
10/16/2023	ST4546	20	VactorTruck	Truax1	None	Clear	None
10/16/2023	ST4547	18	VactorTruck	Truax1	None	Clear	None
10/16/2023	ST4740	6	VactorTruck	Truax1	None	NotClear	None
10/16/2023	ST4557	12	VactorTruck	Truax1	None	Clear	None
10/16/2023	ST4559	14	VactorTruck	Truax1	None	Clear	None
10/16/2023	ST4740	6	VactorTruck	Truax1	None	NotClear	None
10/16/2023	ST4738	6	VactorTruck	Truax1	None	N/A	None
10/16/2023	ST7252	4	VactorTruck	Truax1	None	Clear	None
10/16/2023	ST4834	12	VactorTruck	Truax1	None	NotClear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
10/16/2023	ST7257	11	VactorTruck	Truax1	None	Clear	None
10/16/2023	ST4793	12	VactorTruck	Truax1	None	N/A	None
10/16/2023	ST7250	12	VactorTruck	Truax1	None	Clear	None
10/16/2023	ST4809	0	VactorTruck	Truax1	None	N/A	None
10/16/2023	ST4812	10	VactorTruck	Truax1	None	NotClear	None
10/16/2023	ST7251	11	VactorTruck	Truax1	None	Clear	None
10/16/2023	ST7258	22	VactorTruck	Truax1	None	Clear	None
10/16/2023	ST210186	23	VactorTruck	Truax1	None	Clear	None
10/16/2023	ST4556	38	VactorTruck	Truax1	None	Clear	None
10/16/2023	ST4548	20	VactorTruck	Truax1	None	Clear	None
10/16/2023	ST4549	9	VactorTruck	Truax1	None	Clear	None
10/16/2023	ST4831	24	VactorTruck	Truax1	None	NotClear	None
10/16/2023	ST4540	13	VactorTruck	Truax1	None	Clear	None
10/16/2023	ST4833	24	VactorTruck	Truax1	None	N/A	None
10/16/2023	ST4536	5	VactorTruck	Truax1	None	Clear	None
10/16/2023	ST4747	35	VactorTruck	Truax1	None	N/A	None
10/16/2023	ST4794	18	VactorTruck	Truax1	None	NotClear	None
10/16/2023	ST4798	14	VactorTruck	Truax1	None	NotClear	None
10/16/2023	ST4537	12	VactorTruck	Truax1	None	Clear	None
10/16/2023	ST4525	13	VactorTruck	Truax1	None	Clear	None
10/16/2023	ST4523	17	VactorTruck	Truax1	None	Clear	None
10/16/2023	ST4528	12	VactorTruck	Truax1	None	Clear	None
10/16/2023	ST17503	12	VactorTruck	Truax1	None	NotClear	None
10/16/2023	ST4517	10	VactorTruck	Truax1	None	Clear	None
10/16/2023	ST4518	11	VactorTruck	Truax1	None	Clear	None
10/16/2023	ST17501	12	VactorTruck	Truax1	None	NotClear	None
10/16/2023	ST4521	24	VactorTruck	Truax1	None	Clear	None
10/16/2023	ST4558	13	VactorTruck	Truax1	None	Clear	None
10/16/2023	ST17500	12	VactorTruck	Truax1	None	NotClear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
10/16/2023	ST4562	16	VactorTruck	Truax1	None	Clear	None
10/16/2023	ST210187	16	VactorTruck	Truax1	None	Clear	None
10/16/2023	ST4532	7	VactorTruck	Truax1	None	NotClear	None
10/16/2023	ST7243	8	VactorTruck	Truax1	None	NotClear	None
10/17/2023	ST6873	30	VactorTruck	Truax1	None	NotClear	None
10/17/2023	ST5062	25	VactorTruck	Truax1	None	Clear	None
10/17/2023	ST6818	24	VactorTruck	Truax1	None	NotClear	None
10/17/2023	ST5025	18	VactorTruck	Truax1	None	Clear	None
10/17/2023	ST6819	12	VactorTruck	Truax1	None	NotClear	None
10/17/2023	ST5083	27	VactorTruck	Truax1	None	Clear	None
10/17/2023	ST6823	2	VactorTruck	Truax1	Full	NotClear	None
10/17/2023	ST5078	26	VactorTruck	Truax1	None	Clear	None
10/17/2023	ST6858	12	VactorTruck	Truax1	None	NotClear	None
10/17/2023	ST6859	12	VactorTruck	Truax1	None	NotClear	None
10/17/2023	ST5052	35	VactorTruck	Truax1	None	Clear	None
10/17/2023	ST6841	24	VactorTruck	Truax1	None	NotClear	None
10/17/2023	ST4981	28	VactorTruck	Truax1	None	Clear	None
10/17/2023	ST5041	23	VactorTruck	Truax1	None	Clear	None
10/17/2023	ST7027	12	VactorTruck	Truax1	None	NotClear	None
10/17/2023	ST5039	27	VactorTruck	Truax1	None	Clear	None
10/17/2023	ST7028	15	VactorTruck	Truax1	None	NotClear	None
10/17/2023	ST7032	24	VactorTruck	Truax1	None	NotClear	None
10/17/2023	ST5018	16	VactorTruck	Truax1	None	Clear	None
10/17/2023	ST5023	31	VactorTruck	Truax1	None	Clear	None
10/17/2023	ST7033	3	VactorTruck	Truax1	None	NotClear	None
10/17/2023	ST5064	33	VactorTruck	Truax1	None	Clear	None
10/17/2023	ST5057	20	VactorTruck	Truax1	None	Clear	None
10/17/2023	ST7036	12	VactorTruck	Truax1	None	NotClear	None
10/17/2023	ST4989	26	VactorTruck	Truax1	None	Clear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
10/17/2023	ST7037	18	VactorTruck	Truax1	None	NotClear	None
10/17/2023	ST7018	24	VactorTruck	Truax1	None	NotClear	None
10/17/2023	ST4987	9	VactorTruck	Truax1	None	Clear	None
10/17/2023	ST4983	14	VactorTruck	Truax1	None	Clear	None
10/17/2023	ST7020	24	VactorTruck	Truax1	None	NotClear	None
10/17/2023	ST7022	24	VactorTruck	Truax1	None	NotClear	None
10/17/2023	ST4595	33	VactorTruck	Truax1	Full	Clear	None
10/17/2023	ST4596	27	VactorTruck	Truax1	None	Clear	None
10/17/2023	ST4594	17	VactorTruck	Truax1	Minimal	Clear	None
10/17/2023	ST6851	6	VactorTruck	Truax1	None	NotClear	None
10/17/2023	ST6861	12	VactorTruck	Truax1	None	NotClear	None
10/17/2023	ST17552	38	VactorTruck	Truax1	Full	Clear	None
10/17/2023	ST17551	30	VactorTruck	Truax1	None	Clear	None
10/17/2023	ST6856	18	VactorTruck	Truax1	None	N/A	None
10/17/2023	ST17554	31	VactorTruck	Truax1	None	Clear	None
10/17/2023	ST17553	23	VactorTruck	Truax1	None	Clear	None
10/17/2023	ST6817	24	VactorTruck	Truax1	None	NotClear	None
10/17/2023	ST310018	25	VactorTruck	Truax1	None	Clear	None
10/17/2023	ST6872	24	VactorTruck	Truax1	None	NotClear	None
10/17/2023	ST310019	7	VactorTruck	Truax1	Minimal	Clear	None
10/18/2023	ST4372	20	VactorTruck	Truax1	None	Clear	None
10/18/2023	ST4392	15	VactorTruck	Truax1	None	Clear	None
10/18/2023	ST4395	24	VactorTruck	Truax1	None	Clear	None
10/18/2023	ST7059	18	VactorTruck	Truax1	None	NotClear	None
10/18/2023	ST4423	21	VactorTruck	Truax1	None	Clear	None
10/18/2023	ST7040	12	VactorTruck	Truax1	None	NotClear	None
10/18/2023	ST4400	15	VactorTruck	Truax1	None	Clear	None
10/18/2023	ST7085	12	VactorTruck	Truax1	None	NotClear	None
10/18/2023	ST7083	18	VactorTruck	Truax1	None	NotClear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
10/18/2023	ST4425	24	VactorTruck	Truax1	None	Clear	None
10/18/2023	ST7041	24	VactorTruck	Truax1	None	NotClear	None
10/18/2023	ST4469	28	VactorTruck	Truax1	None	Clear	None
10/18/2023	ST7060	12	VactorTruck	Truax1	None	NotClear	None
10/18/2023	ST4467	30	VactorTruck	Truax1	None	Clear	None
10/18/2023	ST4462	30	VactorTruck	Truax1	Minimal	Clear	None
10/18/2023	ST4470	18	VactorTruck	Truax1	None	Clear	None
10/18/2023	ST7062	18	VactorTruck	Truax1	None	NotClear	None
10/18/2023	ST4476	34	VactorTruck	Truax1	None	Clear	None
10/18/2023	ST7055	26	VactorTruck	Truax1	None	NotClear	None
10/18/2023	ST7071	10	VactorTruck	Truax1	Minimal	NotClear	None
10/18/2023	ST4465	2	VactorTruck	Truax1	None	Clear	None
10/18/2023	ST4458	2	VactorTruck	Truax1	None	Clear	None
10/18/2023	ST7080	12	VactorTruck	Truax1	Full	NotClear	None
10/18/2023	ST7047	20	VactorTruck	Truax1	None	NotClear	None
10/18/2023	ST4443	12	VactorTruck	Truax1	None	Clear	None
10/18/2023	ST4444	24	VactorTruck	Truax1	None	Clear	None
10/18/2023	ST7050	12	VactorTruck	Truax1	None	NotClear	None
10/18/2023	ST4448	10	VactorTruck	Truax1	None	Clear	None
10/18/2023	ST7081	1	VactorTruck	Truax1	None	NotClear	None
10/18/2023	ST4429	13	VactorTruck	Truax1	None	Clear	None
10/18/2023	ST4420	15	VactorTruck	Truax1	None	Clear	None
10/18/2023	ST7043	12	VactorTruck	Truax1	None	NotClear	None
10/18/2023	ST4419	22	VactorTruck	Truax1	None	Clear	None
10/18/2023	ST7086	5	VactorTruck	Truax1	None	NotClear	None
10/18/2023	ST7089	12	VactorTruck	Truax1	None	NotClear	None
10/18/2023	ST7091	11	VactorTruck	Truax1	None	NotClear	None
10/18/2023	ST4421	27	VactorTruck	Truax1	None	Clear	None
10/18/2023	ST7096	24	VactorTruck	Truax1	None	NotClear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
10/18/2023	ST4478	22	VactorTruck	Truax1	None	Clear	None
10/18/2023	ST4471	27	VactorTruck	Truax1	None	Clear	None
10/18/2023	ST7097	12	VactorTruck	Truax1	None	NotClear	None
10/18/2023	ST4459	20	VactorTruck	Truax1	None	Clear	None
10/18/2023	ST210520	8	VactorTruck	Truax1	None	NotClear	None
10/18/2023	ST4566	22	VactorTruck	Truax1	None	Clear	None
10/18/2023	ST210524	6	VactorTruck	Truax1	None	NotClear	None
10/18/2023	ST17511	10	VactorTruck	Truax1	Minimal	Clear	None
10/19/2023	ST10669	32	VactorTruck	Truax1	None	Clear	None
10/19/2023	ST10698	20	VactorTruck	Truax1	Full	Clear	None
10/19/2023	ST10703	10	VactorTruck	Truax1	Minimal	Clear	None
10/19/2023	ST10721	30	VactorTruck	Truax1	None	Clear	None
10/19/2023	ST10729	30	VactorTruck	Truax1	None	Clear	None
10/19/2023	ST10728	13	VactorTruck	Truax1	None	Clear	None
10/19/2023	ST10735	5	VactorTruck	Truax1	None	Clear	None
10/19/2023	ST10746	20	VactorTruck	Truax1	Full	Clear	None
10/19/2023	ST10090	3	VactorTruck	Truax1	None	Clear	None
10/19/2023	ST10086	20	VactorTruck	Truax1	None	Clear	None
10/19/2023	ST12273	20	VactorTruck	Truax1	Minimal	Clear	None
10/19/2023	ST12275	30	VactorTruck	Truax1	None	Clear	None
10/19/2023	ST12246	10	VactorTruck	Truax1	None	Clear	None
10/19/2023	ST12278	10	VactorTruck	Truax1	None	Clear	None
10/19/2023	ST12253	30	VactorTruck	Truax1	None	Clear	None
10/19/2023	ST12254	50	VactorTruck	Truax1	None	Clear	None
10/19/2023	ST12257	45	VactorTruck	Truax1	None	Clear	None
10/19/2023	ST12259	30	VactorTruck	Truax1	None	Clear	None
10/19/2023	ST12264	35	VactorTruck	Truax1	Full	Clear	None
10/19/2023	ST210316	30	VactorTruck	Truax1	None	Clear	None
10/19/2023	ST10736	10	VactorTruck	Truax1	None	Clear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
10/19/2023	ST11344	1	VactorTruck	Truax1	None	N/A	None
10/19/2023	ST10734	16	VactorTruck	Truax1	None	Clear	None
10/19/2023	ST10731	10	VactorTruck	Truax1	None	Clear	None
10/19/2023	ST11343	6	VactorTruck	Truax1	None	N/A	None
10/19/2023	ST7172	28	VactorTruck	Truax1	None	N/A	None
10/19/2023	ST10727	40	VactorTruck	Truax1	Minimal	Clear	None
10/19/2023	ST7153	6	VactorTruck	Truax1	None	NotClear	None
10/19/2023	ST10725	40	VactorTruck	Truax1	None	Clear	None
10/19/2023	ST7156	12	VactorTruck	Truax1	None	NotClear	None
10/19/2023	ST10720	20	VactorTruck	Truax1	None	Clear	None
10/19/2023	ST7176	8	VactorTruck	Truax1	None	NotClear	None
10/19/2023	ST11298	24	VactorTruck	Truax1	None	N/A	None
10/19/2023	ST10704	25	VactorTruck	Truax1	Full	Clear	None
10/19/2023	ST11300	7	VactorTruck	Truax1	None	NotClear	None
10/20/2023	ST9976	4	VactorTruck	Truax1	None	NotClear	None
10/20/2023	ST210434	26	VactorTruck	Truax1	None	Clear	None
10/20/2023	ST210438	35	VactorTruck	Truax1	None	Clear	None
10/20/2023	ST9975	8	VactorTruck	Truax1	None	NotClear	None
10/20/2023	ST210494	30	VactorTruck	Truax1	None	Clear	None
10/20/2023	ST11250	12	VactorTruck	Truax1	Minimal	NotClear	None
10/20/2023	ST210492	20	VactorTruck	Truax1	None	Clear	None
10/20/2023	ST210489	10	VactorTruck	Truax1	None	Clear	None
10/20/2023	ST11239	12	VactorTruck	Truax1	None	NotClear	None
10/20/2023	ST210487	13	VactorTruck	Truax1	None	Clear	None
10/20/2023	ST11234	15	VactorTruck	Truax1	None	NotClear	None
10/20/2023	ST15352	45	VactorTruck	Truax1	None	Clear	None
10/20/2023	ST11232	10	VactorTruck	Truax1	None	NotClear	None
10/20/2023	ST11228	1	VactorTruck	Truax1	None	N/A	None
10/20/2023	ST15286	20	VactorTruck	Truax1	None	Clear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
10/20/2023	ST15283	24	VactorTruck	Truax1	None	Clear	None
10/20/2023	ST11216	11	VactorTruck	Truax1	None	NotClear	None
10/20/2023	ST15232	35	VactorTruck	Truax1	None	Clear	None
10/20/2023	ST10884	1	VactorTruck	Truax1	None	N/A	None
10/20/2023	ST11288	13	VactorTruck	Truax1	Full	NotClear	Strong
10/20/2023	ST15242	20	VactorTruck	Truax1	None	Clear	None
10/20/2023	ST11286	1	VactorTruck	Truax1	None	N/A	None
10/20/2023	ST1398	16	VactorTruck	Truax1	None	Clear	None
10/20/2023	ST15240	15	VactorTruck	Truax1	None	Clear	None
10/20/2023	ST210362	1	VactorTruck	Truax1	None	N/A	None
10/20/2023	ST7137	12	VactorTruck	Truax1	None	NotClear	None
10/20/2023	ST15213	50	VactorTruck	Truax1	None	Clear	None
10/20/2023	ST7112	12	VactorTruck	Truax1	None	NotClear	None
10/20/2023	ST15214	20	VactorTruck	Truax1	None	Clear	None
10/20/2023	ST15217	35	VactorTruck	Truax1	None	Clear	None
10/20/2023	ST11276	1	VactorTruck	Truax1	None	NotClear	None
10/20/2023	ST15233	18	VactorTruck	Truax1	None	Clear	None
10/20/2023	ST7200	1	VactorTruck	Truax1	None	N/A	None
10/20/2023	ST11056	1	VactorTruck	Truax1	None	N/A	None
10/20/2023	ST11069	3	VactorTruck	Truax1	None	N/A	None
10/20/2023	ST11067	2	VactorTruck	Truax1	None	N/A	None
10/20/2023	ST8519	6	VactorTruck	Truax1	None	Clear	None
10/20/2023	ST11067	2	VactorTruck	Truax1	None	N/A	None
10/20/2023	ST8507	7	VactorTruck	Truax1	None	Clear	None
10/20/2023	ST210238	13	VactorTruck	Truax1	None	Clear	None
10/20/2023	ST8504	4	VactorTruck	Truax1	None	Clear	None
10/20/2023	ST11092	12	VactorTruck	Truax1	Full	NotClear	None
10/20/2023	ST11115	12	VactorTruck	Truax1	None	N/A	None
10/20/2023	ST15344	13	VactorTruck	Truax1	None	Clear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
10/23/2023	ST9389	12	VactorTruck	Truax1	None	NotClear	None
10/23/2023	ST9338	12	VactorTruck	Truax1	None	NotClear	None
10/23/2023	ST9313	1	VactorTruck	Truax1	Full	NotClear	None
10/23/2023	ST9286	1	VactorTruck	Truax1	None	NotClear	None
10/23/2023	ST9286	5	VactorTruck	Truax1	Full	NotClear	None
10/23/2023	ST9124	5	VactorTruck	Truax1	Full	NotClear	None
10/23/2023	ST9133	2	VactorTruck	Truax1	Full	NotClear	None
10/23/2023	ST9134	12	VactorTruck	Truax1	None	NotClear	None
10/23/2023	ST9122	12	VactorTruck	Truax1	None	NotClear	None
10/23/2023	ST9325	6	VactorTruck	Truax1	None	NotClear	None
10/23/2023	ST9334	12	VactorTruck	Truax1	None	NotClear	None
10/23/2023	ST12319	4	VactorTruck	Truax1	None	NotClear	None
10/23/2023	ST9368	12	VactorTruck	Truax1	None	NotClear	None
10/23/2023	ST9353	12	VactorTruck	Truax1	None	NotClear	None
10/23/2023	ST9330	7	VactorTruck	Truax1	None	NotClear	None
10/23/2023	ST9120	11	VactorTruck	Truax1	None	NotClear	None
10/23/2023	ST9094	12	VactorTruck	Truax1	None	NotClear	None
10/23/2023	ST9351	12	VactorTruck	Truax1	None	NotClear	None
10/23/2023	ST9366	20	VactorTruck	Truax1	None	NotClear	None
10/23/2023	ST10504	12	VactorTruck	Truax1	None	NotClear	None
10/23/2023	ST10500	22	VactorTruck	Truax1	None	NotClear	None
10/23/2023	ST10480	2	VactorTruck	Truax1	None	N/A	None
10/23/2023	ST9104	1	VactorTruck	Truax1	Minimal	NotClear	None
10/25/2023	ST9425	12	VactorTruck	Truax1	None	NotClear	None
10/25/2023	ST9465	21	VactorTruck	Truax1	None	N/A	None
10/25/2023	ST500065	37	VactorTruck	Truax1	None	Clear	None
10/25/2023	ST9393	2	VactorTruck	Truax1	None	N/A	None
10/25/2023	ST500066	37	VactorTruck	Truax1	None	Clear	None
10/25/2023	ST9391	6	VactorTruck	Truax1	None	NotClear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
10/25/2023	ST3126	38	VactorTruck	Truax1	None	Clear	None
10/25/2023	ST3125	30	VactorTruck	Truax1	None	Clear	None
10/25/2023	ST9391	6	VactorTruck	Truax1	None	NotClear	None
10/25/2023	ST9452	18	VactorTruck	Truax1	None	NotClear	None
10/25/2023	ST3095	15	VactorTruck	Truax1	None	Clear	None
10/25/2023	ST9478	0	VactorTruck	Truax1	None	N/A	None
10/25/2023	ST3093	26	VactorTruck	Truax1	None	Clear	None
10/25/2023	ST9436	24	VactorTruck	Truax1	None	NotClear	None
10/25/2023	ST9435	12	VactorTruck	Truax1	None	NotClear	None
10/25/2023	ST9428	18	VactorTruck	Truax1	None	NotClear	None
10/25/2023	ST9480	24	VactorTruck	Truax1	None	NotClear	None
10/25/2023	ST9388	18	VactorTruck	Truax1	None	NotClear	None
10/25/2023	ST9395	12	VactorTruck	Truax1	None	NotClear	None
10/25/2023	ST9414	6	VactorTruck	Truax1	None	NotClear	None
10/25/2023	ST12323	6	VactorTruck	Truax1	None	NotClear	None
10/25/2023	ST12321	18	VactorTruck	Truax1	None	NotClear	None
10/25/2023	ST10111	1	VactorTruck	Truax1	None	N/A	None
10/25/2023	ST10076	12	VactorTruck	Truax1	None	NotClear	None
10/25/2023	ST9370	2	VactorTruck	Truax1	None	NotClear	None
10/25/2023	ST3097	35	VactorTruck	Truax1	None	Clear	None
10/25/2023	ST3096	30	VactorTruck	Truax1	None	Clear	None
10/25/2023	ST9431	6	VactorTruck	Truax1	None	NotClear	None
10/25/2023	ST3108	23	VactorTruck	Truax1	None	Clear	None
10/25/2023	ST3117	20	VactorTruck	Truax1	None	Clear	None
10/25/2023	ST9295	3	VactorTruck	Truax1	None	NotClear	None
10/25/2023	ST210115	15	VactorTruck	Truax1	None	Clear	None
10/25/2023	ST3085	18	VactorTruck	Truax1	None	Clear	None
10/25/2023	ST3143	9	VactorTruck	Truax1	Minimal	Clear	None
10/25/2023	ST3148	11	VactorTruck	Truax1	None	Clear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
10/25/2023	ST13161	18	VactorTruck	Truax1	None	NotClear	None
10/25/2023	ST3168	12	VactorTruck	Truax1	None	Clear	None
10/25/2023	ST10080	6	VactorTruck	Truax1	None	NotClear	None
10/25/2023	ST3163	11	VactorTruck	Truax1	None	Clear	None
10/25/2023	ST3158	10	VactorTruck	Truax1	None	Clear	None
10/25/2023	ST3154	12	VactorTruck	Truax1	None	Clear	None
10/25/2023	ST210503	12	VactorTruck	Truax1	None	NotClear	None
10/26/2023	ST8705	24	VactorTruck	Truax1	None	NotClear	None
10/26/2023	ST8817	24	VactorTruck	Truax1	None	NotClear	None
10/26/2023	ST8830	30	VactorTruck	Truax1	None	NotClear	None
10/26/2023	ST8845	24	VactorTruck	Truax1	None	N/A	None
10/26/2023	ST8847	24	VactorTruck	Truax1	None	N/A	None
10/26/2023	ST8847	24	VactorTruck	Truax1	None	NotClear	None
10/26/2023	ST8831	24	VactorTruck	Truax1	None	NotClear	None
10/26/2023	ST9625	12	VactorTruck	Truax1	None	N/A	None
10/26/2023	ST9637	12	VactorTruck	Truax1	None	N/A	None
10/26/2023	ST9640	6	VactorTruck	Truax1	None	NotClear	None
10/26/2023	ST9672	1	VactorTruck	Truax1	Full	NotClear	None
10/26/2023	ST9264	24	VactorTruck	Truax1	None	N/A	None
10/26/2023	ST9274	6	VactorTruck	Truax1	None	NotClear	None
10/26/2023	ST9266	18	VactorTruck	Truax1	None	N/A	None
10/26/2023	ST9798	24	VactorTruck	Truax1	None	N/A	None
10/26/2023	ST9783	26	VactorTruck	Truax1	None	N/A	None
10/26/2023	ST9786	12	VactorTruck	Truax1	None	NotClear	None
10/26/2023	ST9777	2	VactorTruck	Truax1	None	NotClear	None
10/26/2023	ST12325	3	VactorTruck	Truax1	None	NotClear	None
10/26/2023	ST12327	3	VactorTruck	Truax1	None	NotClear	None
10/26/2023	ST11949	3	VactorTruck	Truax1	None	NotClear	None
10/26/2023	ST12021	2	VactorTruck	Truax1	None	NotClear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
10/27/2023	ST500002	4	VactorTruck	Truax1	Full	NotClear	None
10/27/2023	ST500175	25	VactorTruck	Truax1	Full	Clear	None
10/27/2023	ST500176	5	VactorTruck	Truax1	None	Clear	None
10/27/2023	ST3351	13	VactorTruck	Truax1	None	Clear	None
10/27/2023	ST1563	34	VactorTruck	Truax1	Minimal	NotClear	None
10/27/2023	ST3353	23	VactorTruck	Truax1	Full	Clear	None
10/27/2023	ST3362	18	VactorTruck	Truax1	None	Clear	None
10/27/2023	ST1043	32	VactorTruck	Truax1	None	NotClear	None
10/27/2023	ST3345	10	VactorTruck	Truax1	None	Clear	None
10/27/2023	ST1046	22	VactorTruck	Truax1	None	NotClear	None
10/27/2023	ST3343	21	VactorTruck	Truax1	None	Clear	None
10/27/2023	ST1067	0	VactorTruck	Truax1	None	N/A	None
10/27/2023	ST1079	18	VactorTruck	Truax1	None	NotClear	None
10/27/2023	ST1081	24	VactorTruck	Truax1	None	Clear	None
10/27/2023	ST3369	31	VactorTruck	Truax1	None	Clear	None
10/27/2023	ST3381	15	VactorTruck	Truax1	Full	Clear	None
10/27/2023	ST1093	12	VactorTruck	Truax1	None	NotClear	None
10/27/2023	ST3392	20	VactorTruck	Truax1	None	Clear	None
10/27/2023	ST3395	32	VactorTruck	Truax1	None	Clear	None
10/27/2023	ST1092	12	VactorTruck	Truax1	None	NotClear	None
10/27/2023	ST3396	25	VactorTruck	Truax1	None	Clear	None
10/27/2023	ST1091	12	VactorTruck	Truax1	None	N/A	None
10/27/2023	ST3397	40	VactorTruck	Truax1	Minimal	Clear	None
10/27/2023	ST3401	25	VactorTruck	Truax1	Minimal	Clear	None
10/27/2023	ST3487	25	VactorTruck	Truax1	Full	Clear	None
10/27/2023	ST1038	48	VactorTruck	Truax1	None	N/A	None
10/27/2023	ST1035	18	VactorTruck	Truax1	None	NotClear	None
10/27/2023	ST3499	20	VactorTruck	Truax1	None	Clear	None
10/27/2023	ST3500	13	VactorTruck	Truax1	Full	Clear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
10/27/2023	ST3501	15	VactorTruck	Truax1	Full	Clear	None
10/27/2023	ST6550	15	VactorTruck	Truax1	None	Clear	None
10/27/2023	ST1029	36	VactorTruck	Truax1	None	NotClear	None
10/27/2023	ST1565	12	VactorTruck	Truax1	None	NotClear	None
10/27/2023	ST6554	15	VactorTruck	Truax1	None	Clear	None
10/27/2023	ST1094	13	VactorTruck	Truax1	None	NotClear	None
10/27/2023	ST6536	32	VactorTruck	Truax1	Minimal	Clear	None
10/27/2023	ST1078	4	VactorTruck	Truax1	None	N/A	None
10/27/2023	ST1519	9	VactorTruck	Truax1	None	NotClear	None
10/27/2023	ST6539	15	VactorTruck	Truax1	None	Clear	None
10/27/2023	ST6531	30	VactorTruck	Truax1	None	Clear	None
10/27/2023	ST1459	6	VactorTruck	Truax1	None	NotClear	None
10/27/2023	ST6551	24	VactorTruck	Truax1	None	Clear	None
10/27/2023	ST1475	48	VactorTruck	Truax1	None	N/A	None
10/27/2023	ST6091	23	VactorTruck	Truax1	None	Clear	None
10/27/2023	ST1474	38	VactorTruck	Truax1	None	N/A	None
10/30/2023	ST3069	12	VactorTruck	Truax1	Full	NotClear	None
10/30/2023	ST3071	8	VactorTruck	Truax1	Full	NotClear	None
10/30/2023	ST3068	6	VactorTruck	Truax1	Full	NotClear	None
10/30/2023	ST2990	6	VactorTruck	Truax1	Full	NotClear	None
10/30/2023	ST2999	6	VactorTruck	Truax1	Full	NotClear	None
10/31/2023	ST210054	21	VactorTruck	Truax1	None	NotClear	None
10/31/2023	ST2457	28	VactorTruck	Truax1	Full	NotClear	None
10/31/2023	ST210057	19	VactorTruck	Truax1	None	NotClear	None
10/31/2023	ST2330	6	VactorTruck	Truax1	None	N/A	None
10/31/2023	ST2381	24	VactorTruck	Truax1	None	NotClear	None
10/31/2023	ST2384	6	VactorTruck	Truax1	None	NotClear	None
10/31/2023	ST2408	12	VactorTruck	Truax1	Full	NotClear	None
10/31/2023	ST2338	12	VactorTruck	Truax1	None	NotClear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
10/31/2023	ST2284	24	VactorTruck	Truax1	None	NotClear	None
10/31/2023	ST2282	18	VactorTruck	Truax1	Full	NotClear	None
10/31/2023	ST2206	12	VactorTruck	Truax1	Full	NotClear	None
10/31/2023	ST2216	12	VactorTruck	Truax1	Minimal	NotClear	None
10/31/2023	ST2501	12	VactorTruck	Truax1	None	NotClear	None
10/31/2023	ST2240	1	VactorTruck	Truax1	Full	NotClear	None
10/31/2023	ST2296	12	VactorTruck	Truax1	None	NotClear	None
10/31/2023	ST1641	12	VactorTruck	Truax1	None	N/A	None
10/31/2023	ST1643	12	VactorTruck	Truax1	None	NotClear	None
10/31/2023	ST1569	24	VactorTruck	Truax1	None	NotClear	None
10/31/2023	ST1030	16	VactorTruck	Truax1	None	NotClear	None
11/1/2023	ST1090	0	VactorTruck	Truax1	None	NotClear	None
11/1/2023	ST11484	6	VactorTruck	Truax1	None	NotClear	None
11/1/2023	ST11489	6	VactorTruck	Truax1	None	NotClear	None
11/1/2023	ST11482	6	VactorTruck	Truax1	Minimal	NotClear	None
11/1/2023	ST10772	12	VactorTruck	Truax1	None	NotClear	None
11/1/2023	ST10770	12	VactorTruck	Truax1	None	NotClear	None
11/1/2023	ST2601	6	VactorTruck	Truax1	None	NotClear	None
11/1/2023	ST2850	12	VactorTruck	Truax1	None	NotClear	None
11/1/2023	ST13060	12	VactorTruck	Truax1	None	NotClear	None
11/1/2023	ST13439	12	VactorTruck	Truax1	None	NotClear	None
11/1/2023	ST13441	12	VactorTruck	Truax1	None	NotClear	None
11/1/2023	ST13451	10	VactorTruck	Truax1	None	NotClear	None
11/1/2023	ST13461	24	VactorTruck	Truax1	None	N/A	None
11/1/2023	ST13493	12	VactorTruck	Truax1	None	NotClear	None
11/1/2023	ST13831	11	VactorTruck	Truax1	None	N/A	None
11/1/2023	ST12914	12	VactorTruck	Truax1	None	NotClear	None
11/1/2023	ST12409	12	VactorTruck	Truax1	None	NotClear	None
11/2/2023	ST12899	4	VactorTruck	Truax1	None	N/A	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
11/2/2023	ST12888	24	VactorTruck	Truax1	None	NotClear	None
11/2/2023	ST12860	12	VactorTruck	Truax1	None	NotClear	None
11/2/2023	ST12862	18	VactorTruck	Truax1	None	NotClear	None
11/2/2023	ST12768	14	VactorTruck	Truax1	None	NotClear	None
11/2/2023	ST12722	36	VactorTruck	Truax1	None	NotClear	None
11/2/2023	ST12840	26	VactorTruck	Truax1	None	NotClear	None
11/2/2023	ST12833	18	VactorTruck	Truax1	None	NotClear	None
11/2/2023	ST12527	18	VactorTruck	Truax1	None	NotClear	None
11/2/2023	ST12523	24	VactorTruck	Truax1	None	NotClear	None
11/2/2023	ST12524	18	VactorTruck	Truax1	None	NotClear	None
11/2/2023	ST12487	6	VactorTruck	Truax1	None	NotClear	None
11/2/2023	ST12495	24	VactorTruck	Truax1	None	NotClear	None
11/2/2023	ST12433	18	VactorTruck	Truax1	None	NotClear	None
11/2/2023	ST12450	21	VactorTruck	Truax1	None	NotClear	None
11/2/2023	ST13907	18	VactorTruck	Truax1	None	NotClear	None
11/2/2023	ST13829	12	VactorTruck	Truax1	None	NotClear	None
11/3/2023	ST6032	20	VactorTruck	Truax1	None	NotClear	None
11/3/2023	ST17002	8	VactorTruck	Truax1	Full	NotClear	None
11/3/2023	ST210310	8	VactorTruck	Truax1	None	NotClear	None
11/3/2023	ST12981	1	VactorTruck	Truax1	None	NotClear	None
11/3/2023	ST12996	6	VactorTruck	Truax1	None	NotClear	None
11/3/2023	ST2871	12	VactorTruck	Truax1	None	NotClear	None
11/3/2023	ST12957	13	VactorTruck	Truax1	None	NotClear	None
11/3/2023	ST6059	1	VactorTruck	Truax1	None	NotClear	None
11/3/2023	ST210035	2	VactorTruck	Truax1	None	N/A	None
11/3/2023	ST210031	12	VactorTruck	Truax1	None	NotClear	None
11/3/2023	ST1781	5	VactorTruck	Truax1	None	NotClear	None
11/3/2023	ST1719	1	VactorTruck	Truax1	Full	NotClear	None
11/3/2023	ST6057	6	VactorTruck	Truax1	None	NotClear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
11/3/2023	ST12966	12	VactorTruck	Truax1	None	NotClear	None
11/3/2023	ST2846	6	VactorTruck	Truax1	None	NotClear	None
11/3/2023	ST2748	12	VactorTruck	Truax1	None	NotClear	None
11/3/2023	ST2756	6	VactorTruck	Truax1	None	NotClear	None
11/3/2023	ST2758	12	VactorTruck	Truax1	None	NotClear	None
11/3/2023	ST13734	24	VactorTruck	Truax1	None	NotClear	None
11/6/2023	ST16556	1	VactorTruck	Truax1	None	N/A	None
11/6/2023	ST16550	1	VactorTruck	Truax1	None	N/A	None
11/6/2023	ST16545	18	VactorTruck	Truax1	None	NotClear	None
11/6/2023	ST16523	12	VactorTruck	Truax1	None	NotClear	None
11/6/2023	ST16638	10	VactorTruck	Truax1	None	NotClear	None
11/6/2023	ST16663	12	VactorTruck	Truax1	None	N/A	None
11/6/2023	ST16500	12	VactorTruck	Truax1	None	NotClear	None
11/6/2023	ST16459	18	VactorTruck	Truax1	None	NotClear	None
11/6/2023	ST16207	6	VactorTruck	Truax1	None	N/A	None
11/6/2023	ST16190	12	VactorTruck	Truax1	None	NotClear	None
11/6/2023	ST16216	18	VactorTruck	Truax1	None	NotClear	None
11/6/2023	ST600051	12	VactorTruck	Truax1	None	NotClear	None
11/6/2023	ST16616	12	VactorTruck	Truax1	None	NotClear	None
11/6/2023	ST16603	1	VactorTruck	Truax1	None	N/A	None
11/6/2023	ST16417	4	VactorTruck	Truax1	None	NotClear	None
11/6/2023	ST16412	1	VactorTruck	Truax1	None	NotClear	None
11/6/2023	ST16269	1	VactorTruck	Truax1	None	N/A	None
11/6/2023	ST16195	2	VactorTruck	Truax1	None	NotClear	None
11/6/2023	ST16213	8	VactorTruck	Truax1	None	NotClear	None
11/6/2023	ST15871	12	VactorTruck	Truax1	None	NotClear	None
11/8/2023	ST16356	1	VactorTruck	Truax1	None	N/A	None
11/8/2023	ST16352	1	VactorTruck	Truax1	None	N/A	None
11/8/2023	ST16331	30	VactorTruck	Truax1	None	N/A	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
11/8/2023	ST16326	6	VactorTruck	Truax1	None	NotClear	None
11/8/2023	ST13538	6	VactorTruck	Truax1	None	NotClear	None
11/8/2023	ST13535	18	VactorTruck	Truax1	None	NotClear	None
11/8/2023	ST13527	12	VactorTruck	Truax1	None	NotClear	None
11/8/2023	ST13523	16	VactorTruck	Truax1	None	NotClear	None
11/8/2023	ST13705	12	VactorTruck	Truax1	None	NotClear	None
11/8/2023	ST13718	14	VactorTruck	Truax1	None	NotClear	None
11/8/2023	ST13725	24	VactorTruck	Truax1	None	NotClear	None
11/8/2023	ST13732	2	VactorTruck	Truax1	None	N/A	None
11/8/2023	ST13743	2	VactorTruck	Truax1	None	NotClear	None
11/8/2023	ST13747	30	VactorTruck	Truax1	None	NotClear	None
11/8/2023	ST13748	12	VactorTruck	Truax1	None	NotClear	None
11/8/2023	ST13521	6	VactorTruck	Truax1	None	NotClear	None
11/9/2023	ST15742	12	VactorTruck	Truax1	None	NotClear	None
11/9/2023	ST15739	18	VactorTruck	Truax1	None	NotClear	None
11/9/2023	ST15544	3	VactorTruck	Truax1	None	N/A	None
11/9/2023	ST15584	1	VactorTruck	Truax1	None	N/A	None
11/9/2023	ST16346	12	VactorTruck	Truax1	None	NotClear	None
11/9/2023	ST16360	1	VactorTruck	Truax1	None	N/A	None
11/9/2023	ST15783	24	VactorTruck	Truax1	None	NotClear	None
11/9/2023	ST15761	58	VactorTruck	Truax1	None	NotClear	None
11/9/2023	ST15778	24	VactorTruck	Truax1	None	NotClear	None
11/9/2023	ST15759	12	VactorTruck	Truax1	None	NotClear	None
11/9/2023	ST15601	12	VactorTruck	Truax1	None	NotClear	None
11/9/2023	ST15416	6	VactorTruck	Truax1	None	NotClear	None
11/9/2023	ST15427	12	VactorTruck	Truax1	None	NotClear	None
11/9/2023	ST15406	6	VactorTruck	Truax1	None	NotClear	None
11/9/2023	ST15348	18	VactorTruck	Truax1	None	NotClear	None
11/9/2023	ST15348	12	VactorTruck	Truax1	None	NotClear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
11/9/2023	ST15359	12	VactorTruck	Truax1	None	NotClear	None
11/10/2023	ST15917	6	VactorTruck	Truax1	None	NotClear	None
11/10/2023	ST210350	1	VactorTruck	Truax1	None	N/A	None
11/10/2023	ST16419	12	VactorTruck	Truax1	None	N/A	None
11/10/2023	ST16002	28	VactorTruck	Truax1	None	NotClear	None
11/10/2023	ST16006	1	VactorTruck	Truax1	None	N/A	None
11/10/2023	ST16012	48	VactorTruck	Truax1	None	NotClear	None
11/10/2023	ST16025	1	VactorTruck	Truax1	None	N/A	None
11/10/2023	ST15175	2	VactorTruck	Truax1	None	NotClear	None
11/10/2023	ST210469	1	VactorTruck	Truax1	None	NotClear	None
11/10/2023	ST210471	1	VactorTruck	Truax1	None	NotClear	None
11/10/2023	ST210479	2	VactorTruck	Truax1	None	N/A	None
11/10/2023	ST210480	12	VactorTruck	Truax1	None	NotClear	None
11/10/2023	ST210480	18	VactorTruck	Truax1	None	NotClear	None
11/10/2023	ST210481	18	VactorTruck	Truax1	None	NotClear	None
11/10/2023	ST210486	1	VactorTruck	Truax1	None	NotClear	None
11/10/2023	ST210491	12	VactorTruck	Truax1	None	NotClear	None
11/10/2023	ST210441	12	VactorTruck	Truax1	None	NotClear	None
11/10/2023	ST210436	18	VactorTruck	Truax1	None	NotClear	None
11/10/2023	ST12298	6	VactorTruck	Truax1	None	NotClear	None
11/10/2023	ST12296	6	VactorTruck	Truax1	None	NotClear	None
11/10/2023	ST12285	36	VactorTruck	Truax1	None	NotClear	None
11/14/2023	ST5686	20	VactorTruck	Truax1	None	NotClear	None
11/14/2023	ST5693	3	VactorTruck	Truax1	Minimal	NotClear	None
11/14/2023	ST5701	18	VactorTruck	Truax1	None	NotClear	None
11/14/2023	ST5703	26	VactorTruck	Truax1	None	NotClear	None
11/14/2023	ST5680	12	VactorTruck	Truax1	None	NotClear	None
11/14/2023	ST5682	12	VactorTruck	Truax1	None	NotClear	None
11/14/2023	ST5676	12	VactorTruck	Truax1	None	NotClear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
11/14/2023	ST5715	12	VactorTruck	Truax1	None	NotClear	None
11/14/2023	ST4201	12	VactorTruck	Truax1	None	NotClear	None
11/14/2023	ST5171	42	VactorTruck	Truax1	None	NotClear	None
11/14/2023	ST4141	1	VactorTruck	Truax1	None	N/A	None
11/14/2023	ST4143	12	VactorTruck	Truax1	None	NotClear	None
11/14/2023	ST4132	6	VactorTruck	Truax1	None	NotClear	None
11/14/2023	ST4137	2	VactorTruck	Truax1	None	N/A	None
11/14/2023	ST4138	15	VactorTruck	Truax1	None	NotClear	None
11/14/2023	ST4185	4	VactorTruck	Truax1	None	N/A	None
11/30/2023	ST8254	4	VactorTruck	Truax1	None	Clear	None
12/4/2023	ST17652	31	VactorTruck	Truax1	None	Clear	Slight
12/4/2023	ST17654	30	VactorTruck	Truax1	None	Clear	None
12/4/2023	ST9936	0	VactorTruck	Truax1	None	Clear	None
12/4/2023	ST5133	16	VactorTruck	Truax1	None	Clear	None
12/4/2023	ST6747	23	VactorTruck	Truax1	None	Clear	None
12/4/2023	ST5131	36	VactorTruck	Truax1	None	Clear	None
12/4/2023	ST6772	0	VactorTruck	Truax1	Minimal	Clear	None
12/4/2023	ST5155	29	VactorTruck	Truax1	None	Clear	None
12/4/2023	ST5159	10	VactorTruck	Truax1	None	Clear	None
12/4/2023	ST4864	20	VactorTruck	Truax1	None	Clear	None
12/4/2023	ST4865	25	VactorTruck	Truax1	None	Clear	None
12/4/2023	ST11363	4	VactorTruck	Truax1	None	Clear	None
12/4/2023	ST4868	9	VactorTruck	Truax1	None	Clear	None
12/4/2023	ST11351	13	VactorTruck	Truax1	None	Clear	None
12/4/2023	ST4870	25	VactorTruck	Truax1	None	Clear	None
12/4/2023	ST4878	17	VactorTruck	Truax1	None	Clear	None
12/4/2023	ST6967	0	VactorTruck	Truax1	None	Clear	None
12/4/2023	ST4896	15	VactorTruck	Truax1	None	Clear	None
12/4/2023	ST7038	3	VactorTruck	Truax1	None	Clear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
12/4/2023	ST4898	28	VactorTruck	Truax1	None	Clear	None
12/4/2023	ST7045	22	VactorTruck	Truax1	None	Clear	None
12/4/2023	ST4927	26	VactorTruck	Truax1	None	Clear	None
12/4/2023	ST4930	3	VactorTruck	Truax1	None	Clear	None
12/4/2023	ST4929	3	VactorTruck	Truax1	None	Clear	None
12/4/2023	ST6867	0	VactorTruck	Truax1	None	Clear	None
12/4/2023	ST6866	0	VactorTruck	Truax1	None	Clear	None
12/4/2023	ST4931	26	VactorTruck	Truax1	None	Clear	None
12/4/2023	ST4932	25	VactorTruck	Truax1	None	Clear	None
12/4/2023	ST4919	21	VactorTruck	Truax1	None	Clear	None
12/4/2023	ST4921	17	VactorTruck	Truax1	None	Clear	None
12/5/2023	ST5034	25	VactorTruck	Truax1	None	Clear	None
12/5/2023	ST5031	30	VactorTruck	Truax1	None	Clear	None
12/5/2023	ST5164	2	VactorTruck	Truax1	Full	Clear	None
12/5/2023	ST5006	28	VactorTruck	Truax1	None	Clear	None
12/5/2023	ST5008	18	VactorTruck	Truax1	None	Clear	None
12/5/2023	ST5002	8	VactorTruck	Truax1	None	Clear	None
12/5/2023	ST4995	26	VactorTruck	Truax1	None	Clear	None
12/5/2023	ST4999	32	VactorTruck	Truax1	None	Clear	None
12/5/2023	ST5000	28	VactorTruck	Truax1	None	Clear	None
12/5/2023	ST17568	18	VactorTruck	Truax1	Full	Clear	None
12/5/2023	ST17567	28	VactorTruck	Truax1	None	Clear	None
12/5/2023	ST5127	10	VactorTruck	Truax1	None	Clear	None
12/5/2023	ST5126	13	VactorTruck	Truax1	None	Clear	None
12/5/2023	ST5075	16	VactorTruck	Truax1	None	Clear	None
12/5/2023	ST5085	32	VactorTruck	Truax1	None	Clear	None
12/5/2023	ST5093	40	VactorTruck	Truax1	None	Clear	None
12/6/2023	ST5207	14	VactorTruck	Truax1	None	Clear	None
12/6/2023	ST5212	19	VactorTruck	Truax1	None	Clear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
12/6/2023	ST5217	17	VactorTruck	Truax1	None	Clear	None
12/6/2023	ST5223	18	VactorTruck	Truax1	None	N/A	None
12/6/2023	ST5235	22	VactorTruck	Truax1	None	N/A	None
12/6/2023	ST5192	2	VactorTruck	Truax1	Minimal	Clear	None
12/6/2023	ST5249	26	VactorTruck	Truax1	None	N/A	None
12/6/2023	ST5263	18	VactorTruck	Truax1	None	N/A	None
12/6/2023	ST5758	12	VactorTruck	Truax1	None	Clear	None
12/6/2023	ST5770	14	VactorTruck	Truax1	None	Clear	None
12/6/2023	ST14643	4	VactorTruck	Truax1	None	Clear	None
12/6/2023	ST14642	15	VactorTruck	Truax1	None	Clear	None
12/6/2023	ST5299	21	VactorTruck	Truax1	None	N/A	None
12/6/2023	ST5298	23	VactorTruck	Truax1	None	Clear	None
12/6/2023	ST5340	9	VactorTruck	Truax1	None	Clear	None
12/6/2023	ST5431	32	VactorTruck	Truax1	None	Clear	None
12/6/2023	ST5429	20	VactorTruck	Truax1	None	Clear	None
12/7/2023	ST8254	22	VactorTruck	Truax1	None	Clear	None
12/7/2023	ST11563	12	VactorTruck	Truax1	None	Clear	None
12/7/2023	ST11559	22	VactorTruck	Truax1	None	Clear	None
12/7/2023	ST11560	33	VactorTruck	Truax1	None	N/A	None
12/7/2023	ST11553	20	VactorTruck	Truax1	None	Clear	None
12/7/2023	ST11552	15	VactorTruck	Truax1	None	Clear	None
12/7/2023	ST11753	12	VactorTruck	Truax1	None	Clear	None
12/7/2023	ST11772	17	VactorTruck	Truax1	None	Clear	None
12/7/2023	ST11787	16	VactorTruck	Truax1	None	N/A	None
12/8/2023	ST310022	24	VactorTruck	Truax1	None	Clear	None
12/8/2023	ST13246	6	VactorTruck	Truax1	None	NotClear	None
12/8/2023	ST310021	24	VactorTruck	Truax1	None	Clear	None
12/8/2023	ST14866	18	VactorTruck	Truax1	None	Clear	None
12/8/2023	ST210287	12	VactorTruck	Truax1	None	NotClear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
12/8/2023	ST14862	25	VactorTruck	Truax1	None	Clear	None
12/8/2023	ST310023	33	VactorTruck	Truax1	None	Clear	None
12/8/2023	ST13281	8	VactorTruck	Truax1	None	NotClear	None
12/8/2023	ST14861	18	VactorTruck	Truax1	None	Clear	None
12/8/2023	ST7580	20	VactorTruck	Truax1	None	Clear	None
12/8/2023	ST13282	6	VactorTruck	Truax1	Full	NotClear	None
12/8/2023	ST17671	24	VactorTruck	Truax1	None	Clear	None
12/8/2023	ST14857	14	VactorTruck	Truax1	None	Clear	None
12/8/2023	ST13280	8	VactorTruck	Truax1	Full	NotClear	None
12/8/2023	ST7582	12	VactorTruck	Truax1	None	Clear	None
12/8/2023	ST7759	33	VactorTruck	Truax1	None	Clear	None
12/8/2023	ST4178	18	VactorTruck	Truax1	None	Clear	None
12/8/2023	ST4127	15	VactorTruck	Truax1	None	Clear	None
12/8/2023	ST13367	30	VactorTruck	Truax1	None	NotClear	None
12/8/2023	ST4124	17	VactorTruck	Truax1	None	Clear	None
12/8/2023	ST7760	18	VactorTruck	Truax1	None	Clear	None
12/8/2023	ST1592	18	VactorTruck	Truax1	None	NotClear	None
12/8/2023	ST4101	16	VactorTruck	Truax1	None	Clear	None
12/8/2023	ST13279	2	VactorTruck	Truax1	None	NotClear	None
12/8/2023	ST210101	21	VactorTruck	Truax1	Full	Clear	None
12/8/2023	ST7818	16	VactorTruck	Truax1	None	Clear	None
12/8/2023	ST4287	2	VactorTruck	Truax1	None	Clear	None
12/8/2023	ST7808	17	VactorTruck	Truax1	None	Clear	None
12/8/2023	ST4343	6	VactorTruck	Truax1	None	Clear	None
12/8/2023	ST7797	18	VactorTruck	Truax1	None	Clear	None
12/8/2023	ST1603	24	VactorTruck	Truax1	None	NotClear	None
12/8/2023	ST4378	2	VactorTruck	Truax1	None	Clear	None
12/8/2023	ST4386	1	VactorTruck	Truax1	None	Clear	None
12/8/2023	ST1687	1	VactorTruck	Truax1	Full	NotClear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
12/8/2023	ST7798	16	VactorTruck	Truax1	Full	Clear	None
12/8/2023	ST4388	2	VactorTruck	Truax1	None	Clear	None
12/8/2023	ST210084	2	VactorTruck	Truax1	None	Clear	None
12/8/2023	ST1122	12	VactorTruck	Truax1	None	NotClear	None
12/8/2023	ST7796	25	VactorTruck	Truax1	None	Clear	None
12/9/2023	ST1307	16	VactorTruck	Truax1	None	NotClear	None
12/9/2023	ST1309	3	VactorTruck	Truax1	None	NotClear	None
12/9/2023	ST17463	12	VactorTruck	Truax1	None	NotClear	None
12/9/2023	ST2029	16	VactorTruck	Truax1	None	NotClear	None
12/9/2023	ST1999	18	VactorTruck	Truax1	None	NotClear	None
12/9/2023	ST2007	12	VactorTruck	Truax1	None	NotClear	None
12/9/2023	ST2009	3	VactorTruck	Truax1	None	NotClear	None
12/9/2023	ST17465	2	VactorTruck	Truax1	None	NotClear	None
12/9/2023	ST1328	16	VactorTruck	Truax1	None	NotClear	None
12/9/2023	ST1333	12	VactorTruck	Truax1	None	NotClear	None
12/9/2023	ST1329	12	VactorTruck	Truax1	None	NotClear	None
12/9/2023	ST14366	6	VactorTruck	Truax1	None	NotClear	None
12/9/2023	ST14372	12	VactorTruck	Truax1	None	NotClear	None
12/9/2023	ST1268	6	VactorTruck	Truax1	None	NotClear	None
12/9/2023	ST14370	12	VactorTruck	Truax1	None	NotClear	None
12/9/2023	ST14364	12	VactorTruck	Truax1	None	NotClear	None
12/9/2023	ST1956	6	VactorTruck	Truax1	None	NotClear	None
12/11/2023	ST11765	4	VactorTruck	Truax1	None	Clear	None
12/11/2023	ST1566	26	VactorTruck	Truax1	Full	Clear	None
12/11/2023	ST11783	10	VactorTruck	Truax1	None	Clear	None
12/11/2023	ST1765	28	VactorTruck	Truax1	None	Clear	None
12/11/2023	ST11778	13	VactorTruck	Truax1	None	Clear	None
12/11/2023	ST1717	16	VactorTruck	Truax1	Full	Clear	None
12/11/2023	ST17279	10	VactorTruck	Truax1	None	NotClear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
12/11/2023	ST11799	17	VactorTruck	Truax1	None	Clear	None
12/11/2023	ST1743	23	VactorTruck	Truax1	None	Clear	None
12/11/2023	ST11842	15	VactorTruck	Truax1	None	Clear	None
12/11/2023	ST1180	6	VactorTruck	Truax1	Minimal	Clear	None
12/11/2023	ST11843	23	VactorTruck	Truax1	None	Clear	None
12/11/2023	ST11827	14	VactorTruck	Truax1	None	Clear	None
12/11/2023	ST2887	28	VactorTruck	Truax1	None	Clear	None
12/11/2023	ST11825	4	VactorTruck	Truax1	None	Clear	None
12/11/2023	ST17269	15	VactorTruck	Truax1	Minimal	NotClear	None
12/11/2023	ST2922	19	VactorTruck	Truax1	None	Clear	None
12/11/2023	ST17270	10	VactorTruck	Truax1	Full	NotClear	None
12/11/2023	ST11878	6	VactorTruck	Truax1	None	Clear	None
12/11/2023	ST500247	8	VactorTruck	Truax1	None	Clear	None
12/11/2023	ST2745	6	VactorTruck	Truax1	None	Clear	None
12/11/2023	ST11880	16	VactorTruck	Truax1	None	Clear	None
12/11/2023	ST2761	5	VactorTruck	Truax1	Full	Clear	None
12/11/2023	ST12029	11	VactorTruck	Truax1	None	Clear	None
12/11/2023	ST2692	35	VactorTruck	Truax1	None	Clear	None
12/11/2023	ST11049	4	VactorTruck	Truax1	None	NotClear	None
12/11/2023	ST12028	19	VactorTruck	Truax1	None	Clear	None
12/11/2023	ST11414	0	VactorTruck	Truax1	Full	Clear	None
12/11/2023	ST12023	22	VactorTruck	Truax1	None	Clear	None
12/11/2023	ST11048	6	VactorTruck	Truax1	None	NotClear	None
12/11/2023	ST12019	30	VactorTruck	Truax1	None	Clear	None
12/11/2023	ST11059	10	VactorTruck	Truax1	Minimal	NotClear	None
12/11/2023	ST11285	10	VactorTruck	Truax1	None	NotClear	None
12/11/2023	ST11287	18	VactorTruck	Truax1	None	NotClear	None
12/11/2023	ST17412	10	VactorTruck	Truax1	None	NotClear	None
12/12/2023	ST210333	16	VactorTruck	Truax1	None	Clear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
12/12/2023	ST7648	20	VactorTruck	Truax1	None	NotClear	None
12/12/2023	ST7653	1	VactorTruck	Truax1	Minimal	Clear	None
12/12/2023	ST13888	22	VactorTruck	Truax1	None	Clear	None
12/12/2023	ST310010	12	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST310011	5	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST7755	24	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST13903	18	VactorTruck	Truax1	None	Clear	None
12/12/2023	ST310009	30	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST13872	6	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST7739	4	VactorTruck	Truax1	None	NotClear	None
12/12/2023	ST310008	17	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST210330	12	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST7707	10	VactorTruck	Truax1	None	NotClear	None
12/12/2023	ST13878	12	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST7702	6	VactorTruck	Truax1	Minimal	NotClear	None
12/12/2023	ST10294	35	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST7728	4	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST7709	4	VactorTruck	Truax1	None	NotClear	None
12/12/2023	ST13834	57	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST13811	8	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST13809	4	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST7776	34	VactorTruck	Truax1	None	NotClear	None
12/12/2023	ST10295	29	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST10293	25	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST20344	39	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST13590	27	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST10292	20	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST7269	3	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST13845	26	VactorTruck	Truax1	None	N/A	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
12/12/2023	ST17535	58	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST7270	16	VactorTruck	Truax1	None	NotClear	None
12/12/2023	ST13832	8	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST4564	25	VactorTruck	Truax1	None	NotClear	None
12/12/2023	ST17534	7	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST8876	16	VactorTruck	Truax1	None	NotClear	None
12/12/2023	ST13790	44	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST8866	6	VactorTruck	Truax1	None	NotClear	None
12/12/2023	ST10289	16	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST10286	12	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST13583	20	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST17545	20	VactorTruck	Truax1	None	NotClear	None
12/12/2023	ST10291	6	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST13816	8	VactorTruck	Truax1	None	Clear	None
12/12/2023	ST8894	2	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST13464	2	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST7314	24	VactorTruck	Truax1	None	NotClear	None
12/12/2023	ST8893	4	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST8891	3	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST13511	24	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST310014	1	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST8892	16	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST13512	6	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST13513	18	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST17531	20	VactorTruck	Truax1	None	NotClear	None
12/12/2023	ST17533	35	VactorTruck	Truax1	None	N/A	None
12/12/2023	ST13515	70	VactorTruck	Truax1	None	N/A	None
12/13/2023	ST13719	10	VactorTruck	Truax1	None	N/A	None
12/13/2023	ST13043	12	VactorTruck	Truax1	None	N/A	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
12/13/2023	ST7233	30	VactorTruck	Truax1	None	NotClear	None
12/13/2023	ST13044	18	VactorTruck	Truax1	None	N/A	None
12/13/2023	ST13040	12	VactorTruck	Truax1	None	N/A	None
12/13/2023	ST13041	17	VactorTruck	Truax1	None	N/A	None
12/13/2023	ST13042	36	VactorTruck	Truax1	None	N/A	None
12/13/2023	ST7231	19	VactorTruck	Truax1	None	NotClear	None
12/13/2023	ST13735	12	VactorTruck	Truax1	None	N/A	None
12/13/2023	ST7230	30	VactorTruck	Truax1	None	NotClear	None
12/13/2023	ST13736	16	VactorTruck	Truax1	None	N/A	None
12/13/2023	ST13959	30	VactorTruck	Truax1	None	N/A	None
12/13/2023	ST7221	32	VactorTruck	Truax1	Minimal	NotClear	None
12/13/2023	ST7220	20	VactorTruck	Truax1	None	NotClear	None
12/13/2023	ST11788	2	VactorTruck	Truax1	None	N/A	None
12/13/2023	ST7219	18	VactorTruck	Truax1	None	NotClear	None
12/13/2023	ST7213	41	VactorTruck	Truax1	None	N/A	None
12/13/2023	ST13852	16	VactorTruck	Truax1	None	N/A	None
12/13/2023	ST11155	2	VactorTruck	Truax1	Minimal	Clear	None
12/13/2023	ST7248	1	VactorTruck	Truax1	None	N/A	None
12/13/2023	ST11158	19	VactorTruck	Truax1	None	N/A	None
12/13/2023	ST5125	18	VactorTruck	Truax1	None	N/A	None
12/13/2023	ST11291	10	VactorTruck	Truax1	None	NotClear	None
12/13/2023	ST11159	6	VactorTruck	Truax1	None	N/A	None
12/13/2023	ST5051	30	VactorTruck	Truax1	None	N/A	None
12/13/2023	ST11290	24	VactorTruck	Truax1	None	NotClear	None
12/13/2023	ST11162	10	VactorTruck	Truax1	None	N/A	None
12/13/2023	ST7247	2	VactorTruck	Truax1	None	N/A	None
12/13/2023	ST11163	11	VactorTruck	Truax1	None	N/A	None
12/13/2023	ST13737	26	VactorTruck	Truax1	None	Clear	None
12/13/2023	ST11109	13	VactorTruck	Truax1	Minimal	Clear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
12/13/2023	ST13738	24	VactorTruck	Truax1	None	Clear	None
12/13/2023	ST11107	7	VactorTruck	Truax1	None	N/A	None
12/13/2023	ST13739	26	VactorTruck	Truax1	None	Clear	None
12/13/2023	ST11111	22	VactorTruck	Truax1	None	N/A	None
12/13/2023	ST13742	12	VactorTruck	Truax1	None	Clear	None
12/13/2023	ST13520	4	VactorTruck	Truax1	None	N/A	None
12/13/2023	ST10953C	28	VactorTruck	Truax1	None	N/A	None
12/13/2023	ST13519	42	VactorTruck	Truax1	None	N/A	None
12/14/2023	ST10448	7	VactorTruck	Truax1	None	N/A	None
12/14/2023	ST10471	5	VactorTruck	Truax1	None	N/A	None
12/14/2023	ST10402	10	VactorTruck	Truax1	None	N/A	None
12/14/2023	ST10398	2	VactorTruck	Truax1	None	Clear	None
12/14/2023	ST10389	8	VactorTruck	Truax1	None	N/A	None
12/14/2023	ST12429	21	VactorTruck	Truax1	None	N/A	None
12/14/2023	ST210270	4	VactorTruck	Truax1	None	N/A	None
12/14/2023	ST12431	26	VactorTruck	Truax1	None	N/A	None
12/14/2023	ST10575	8	VactorTruck	Truax1	None	N/A	None
12/14/2023	ST12905	20	VactorTruck	Truax1	None	N/A	None
12/14/2023	ST15506	20	VactorTruck	Truax1	None	N/A	None
12/14/2023	ST12403	33	VactorTruck	Truax1	None	N/A	None
12/14/2023	ST12404	36	VactorTruck	Truax1	None	N/A	None
12/14/2023	ST500285	20	VactorTruck	Truax1	None	N/A	None
12/14/2023	ST12479	19	VactorTruck	Truax1	None	N/A	None
12/14/2023	ST12486	28	VactorTruck	Truax1	None	N/A	None
12/14/2023	ST15514	10	VactorTruck	Truax1	None	N/A	None
12/14/2023	ST12511	17	VactorTruck	Truax1	None	N/A	None
12/14/2023	ST15645	14	VactorTruck	Truax1	None	N/A	None
12/14/2023	ST15640	8	VactorTruck	Truax1	None	N/A	None
12/14/2023	ST12541	14	VactorTruck	Truax1	None	N/A	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
12/14/2023	ST15604	6	VactorTruck	Truax1	None	N/A	None
12/14/2023	ST12538	23	VactorTruck	Truax1	None	N/A	None
12/14/2023	ST20142	12	VactorTruck	Truax1	None	N/A	None
12/14/2023	ST15768	32	VactorTruck	Truax1	None	N/A	None
12/14/2023	ST15674	24	VactorTruck	Truax1	None	N/A	None
12/14/2023	ST12855	61	VactorTruck	Truax1	None	N/A	None
12/14/2023	ST12855	30	VactorTruck	Truax1	None	N/A	None
12/14/2023	ST16354	5	VactorTruck	Truax1	Full	Clear	Slight
12/14/2023	ST16362	2	VactorTruck	Truax1	Minimal	Clear	Slight
12/14/2023	ST12879	24	VactorTruck	Truax1	None	N/A	None
12/14/2023	ST12868	24	VactorTruck	Truax1	None	N/A	None
12/15/2023	ST12640	16	VactorTruck	Truax1	None	N/A	None
12/15/2023	ST12414	10	VactorTruck	Truax1	None	N/A	None
12/15/2023	ST12885	2	VactorTruck	Truax1	None	N/A	None
12/15/2023	ST12870	27	VactorTruck	Truax1	None	N/A	None
12/15/2023	ST12832	38	VactorTruck	Truax1	None	N/A	None
12/15/2023	ST12721	36	VactorTruck	Truax1	None	N/A	None
12/15/2023	ST14701	10	VactorTruck	Truax1	None	NotClear	None
12/15/2023	ST12715	22	VactorTruck	Truax1	None	N/A	None
12/15/2023	ST14748	10	VactorTruck	Truax1	None	NotClear	None
12/15/2023	ST12708	23	VactorTruck	Truax1	None	N/A	None
12/15/2023	ST13663	6	VactorTruck	Truax1	None	N/A	None
12/15/2023	ST12943	34	VactorTruck	Truax1	None	N/A	None
12/15/2023	ST14958	36	VactorTruck	Truax1	None	N/A	None
12/15/2023	ST13641	4	VactorTruck	Truax1	None	Clear	None
12/15/2023	ST14773	36	VactorTruck	Truax1	None	NotClear	None
12/15/2023	ST12954	19	VactorTruck	Truax1	None	N/A	None
12/15/2023	ST13668	7	VactorTruck	Truax1	None	Clear	None
12/15/2023	ST14938	6	VactorTruck	Truax1	None	NotClear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
12/15/2023	ST12984	19	VactorTruck	Truax1	None	N/A	None
12/15/2023	ST14952	15	VactorTruck	Truax1	None	NotClear	None
12/15/2023	ST13035	21	VactorTruck	Truax1	None	Clear	None
12/15/2023	ST6042	36	VactorTruck	Truax1	None	N/A	None
12/15/2023	ST13627	19	VactorTruck	Truax1	None	Clear	None
12/15/2023	ST11328	18	VactorTruck	Truax1	None	NotClear	None
12/15/2023	ST20053	16	VactorTruck	Truax1	None	N/A	None
12/15/2023	ST11327	16	VactorTruck	Truax1	None	NotClear	None
12/15/2023	ST11119	12	VactorTruck	Truax1	None	NotClear	None
12/15/2023	ST14537	5	VactorTruck	Truax1	None	N/A	None
12/15/2023	ST13544	12	VactorTruck	Truax1	None	Clear	None
12/15/2023	ST11117	6	VactorTruck	Truax1	None	NotClear	None
12/15/2023	ST14533	4	VactorTruck	Truax1	None	N/A	None
12/15/2023	ST11114	12	VactorTruck	Truax1	Minimal	NotClear	None
12/15/2023	ST14531	6	VactorTruck	Truax1	None	N/A	None
12/15/2023	ST11112	4	VactorTruck	Truax1	None	NotClear	None
12/15/2023	ST13541	32	VactorTruck	Truax1	None	Clear	None
12/15/2023	ST11103	5	VactorTruck	Truax1	None	NotClear	None
12/15/2023	ST11057	2	VactorTruck	Truax1	None	N/A	None
12/15/2023	ST210220	18	VactorTruck	Truax1	None	NotClear	None
12/15/2023	ST11089	10	VactorTruck	Truax1	None	Clear	None
12/15/2023	ST11065	4	VactorTruck	Truax1	None	NotClear	None
12/15/2023	ST11118	5	VactorTruck	Truax1	None	NotClear	None
12/15/2023	ST11121	14	VactorTruck	Truax1	Full	NotClear	None
12/15/2023	ST11122	22	VactorTruck	Truax1	None	NotClear	None
12/15/2023	ST14969	18	VactorTruck	Truax1	None	NotClear	None
12/16/2023	ST14560	8	VactorTruck	Truax1	None	N/A	None
12/16/2023	ST14582	3	VactorTruck	Truax1	Full	Clear	None
12/16/2023	ST14585	20	VactorTruck	Truax1	Minimal	Clear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
12/16/2023	ST210394	3	VactorTruck	Truax1	None	N/A	None
12/16/2023	ST14593	4	VactorTruck	Truax1	None	Clear	None
12/16/2023	ST17515	29	VactorTruck	Truax1	Minimal	Clear	None
12/16/2023	ST14597	18	VactorTruck	Truax1	None	Clear	None
12/16/2023	ST17519	2	VactorTruck	Truax1	None	N/A	None
12/16/2023	ST10225	24	VactorTruck	Truax1	None	N/A	None
12/16/2023	ST11345	19	VactorTruck	Truax1	None	N/A	None
12/16/2023	ST10222	26	VactorTruck	Truax1	None	Clear	None
12/16/2023	ST10199	18	VactorTruck	Truax1	None	N/A	None
12/16/2023	ST11342	12	VactorTruck	Truax1	None	Clear	None
12/16/2023	ST10196	16	VactorTruck	Truax1	None	N/A	None
12/16/2023	ST7168	1	VactorTruck	Truax1	None	N/A	None
12/16/2023	ST10211	24	VactorTruck	Truax1	None	N/A	None
12/16/2023	ST10215	24	VactorTruck	Truax1	None	N/A	None
12/16/2023	ST7170	18	VactorTruck	Truax1	None	N/A	None
12/16/2023	ST10206	38	VactorTruck	Truax1	None	N/A	None
12/16/2023	ST210360	25	VactorTruck	Truax1	None	N/A	None
12/16/2023	ST10204	12	VactorTruck	Truax1	None	N/A	None
12/16/2023	ST11268	1	VactorTruck	Truax1	Full	N/A	None
12/16/2023	ST10202	31	VactorTruck	Truax1	None	N/A	None
12/16/2023	ST10185	36	VactorTruck	Truax1	None	N/A	None
12/16/2023	ST600074	28	VactorTruck	Truax1	None	N/A	None
12/16/2023	ST13197	3	VactorTruck	Truax1	None	Clear	None
12/16/2023	ST7167	2	VactorTruck	Truax1	Full	N/A	None
12/16/2023	ST9252	24	VactorTruck	Truax1	None	N/A	None
12/16/2023	ST4509	17	VactorTruck	Truax1	None	N/A	None
12/16/2023	ST8696	26	VactorTruck	Truax1	None	N/A	None
12/16/2023	ST8744	8	VactorTruck	Truax1	None	N/A	None
12/16/2023	ST8581	15	VactorTruck	Truax1	None	N/A	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
12/19/2023	ST10877	4	VactorTruck	Truax1	Full	Clear	None
12/19/2023	ST3476	20	VactorTruck	Truax1	None	N/A	None
12/19/2023	ST3399	12	VactorTruck	Truax1	None	N/A	None
12/19/2023	ST10881	3	VactorTruck	Truax1	None	N/A	None
12/19/2023	ST16066	1	VactorTruck	Truax1	None	N/A	None
12/19/2023	ST16026	6	VactorTruck	Truax1	None	N/A	None
12/19/2023	ST3334	46	VactorTruck	Truax1	None	N/A	None
12/19/2023	ST16027	6	VactorTruck	Truax1	None	N/A	None
12/19/2023	ST3329	12	VactorTruck	Truax1	None	N/A	None
12/19/2023	ST16037	6	VactorTruck	Truax1	None	N/A	None
12/19/2023	ST3328	3	VactorTruck	Truax1	None	N/A	None
12/19/2023	ST3402	2	VactorTruck	Truax1	None	N/A	None
12/19/2023	ST16071	4	VactorTruck	Truax1	None	N/A	None
12/19/2023	ST3403	24	VactorTruck	Truax1	None	N/A	None
12/19/2023	ST15391	30	VactorTruck	Truax1	None	Clear	None
12/19/2023	ST3255	14	VactorTruck	Truax1	Full	Clear	None
12/19/2023	ST3425	32	VactorTruck	Truax1	None	N/A	None
12/19/2023	ST15367	9	VactorTruck	Truax1	None	N/A	None
12/19/2023	ST3515	36	VactorTruck	Truax1	Full	Clear	None
12/19/2023	ST2977	8	VactorTruck	Truax1	None	N/A	None
12/19/2023	ST15340	10	VactorTruck	Truax1	None	N/A	None
12/19/2023	ST2976	6	VactorTruck	Truax1	None	N/A	None
12/19/2023	ST15339	34	VactorTruck	Truax1	None	N/A	None
12/19/2023	ST3739	6	VactorTruck	Truax1	None	N/A	None
12/19/2023	ST3729	8	VactorTruck	Truax1	Full	Clear	None
12/19/2023	ST11943	10	VactorTruck	Truax1	None	NotClear	None
12/19/2023	ST3806	2	VactorTruck	Truax1	Full	Clear	None
12/19/2023	ST10929	3	VactorTruck	Truax1	Full	Clear	None
12/19/2023	ST12042	5	VactorTruck	Truax1	None	NotClear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
12/19/2023	ST12044	13	VactorTruck	Truax1	None	N/A	None
12/19/2023	ST210320	18	VactorTruck	Truax1	Full	Clear	None
12/19/2023	ST5461	36	VactorTruck	Truax1	None	Clear	None
12/19/2023	ST11172	14	VactorTruck	Truax1	Minimal	Clear	None
12/19/2023	ST4236	24	VactorTruck	Truax1	None	N/A	None
12/19/2023	ST11191	8	VactorTruck	Truax1	None	N/A	None
12/19/2023	ST13645	6	VactorTruck	Truax1	None	NotClear	None
12/19/2023	ST11186	42	VactorTruck	Truax1	Full	Clear	None
12/19/2023	ST5378	26	VactorTruck	Truax1	Full	Clear	None
12/19/2023	ST13426	16	VactorTruck	Truax1	None	NotClear	None
12/19/2023	ST210418	8	VactorTruck	Truax1	None	NotClear	None
12/20/2023	ST210472	6	VactorTruck	Truax1	Full	Clear	None
12/20/2023	ST210474	4	VactorTruck	Truax1	None	Clear	None
12/20/2023	ST210476	25	VactorTruck	Truax1	None	N/A	None
12/20/2023	ST210475	4	VactorTruck	Truax1	None	N/A	None
12/20/2023	ST210470	15	VactorTruck	Truax1	None	N/A	None
12/20/2023	ST210445	14	VactorTruck	Truax1	None	N/A	None
12/20/2023	ST15151	9	VactorTruck	Truax1	None	N/A	None
12/20/2023	ST15154	8	VactorTruck	Truax1	None	N/A	None
12/20/2023	ST15152	12	VactorTruck	Truax1	None	N/A	None
12/20/2023	ST15118	12	VactorTruck	Truax1	None	N/A	None
12/20/2023	ST15147	9	VactorTruck	Truax1	None	N/A	None
12/20/2023	ST15141	12	VactorTruck	Truax1	None	N/A	None
12/20/2023	ST15135	12	VactorTruck	Truax1	None	N/A	None
12/20/2023	ST16560	6	VactorTruck	Truax1	None	N/A	None
12/20/2023	ST210501	14	VactorTruck	Truax1	None	N/A	None
12/20/2023	ST210439	12	VactorTruck	Truax1	None	N/A	None
12/20/2023	ST12221	12	VactorTruck	Truax1	None	N/A	None
12/20/2023	ST12219	10	VactorTruck	Truax1	None	N/A	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
12/20/2023	ST12287	6	VactorTruck	Truax1	None	N/A	None
12/20/2023	ST12305	28	VactorTruck	Truax1	None	N/A	None
12/20/2023	ST12347	14	VactorTruck	Truax1	None	Clear	None
12/20/2023	ST12341	14	VactorTruck	Truax1	None	N/A	None
12/20/2023	ST13081	36	VactorTruck	Truax1	Full	Clear	None
12/20/2023	ST13083	18	VactorTruck	Truax1	None	N/A	None
12/20/2023	ST13084	18	VactorTruck	Truax1	None	N/A	None
12/20/2023	ST11540	15	VactorTruck	Truax1	None	N/A	None
12/21/2023	ST210372	25	VactorTruck	Truax1	None	NotClear	None
12/21/2023	ST17548	10	VactorTruck	Truax1	None	Clear	None
12/21/2023	ST10775	9	VactorTruck	Truax1	None	Clear	None
12/21/2023	ST11309	13	VactorTruck	Truax1	None	NotClear	None
12/21/2023	ST14259	6	VactorTruck	Truax1	None	Clear	None
12/21/2023	ST2900	2	VactorTruck	Truax1	None	Clear	None
12/21/2023	ST11321	15	VactorTruck	Truax1	None	NotClear	None
12/21/2023	ST7234	34	VactorTruck	Truax1	None	Clear	None
12/21/2023	ST2901	14	VactorTruck	Truax1	None	Clear	None
12/21/2023	ST14283	0	VactorTruck	Truax1	None	Clear	None
12/21/2023	ST14977	4	VactorTruck	Truax1	None	NotClear	None
12/21/2023	ST7214	33	VactorTruck	Truax1	None	N/A	None
12/21/2023	ST14298	14	VactorTruck	Truax1	None	Clear	None
12/21/2023	ST14765	8	VactorTruck	Truax1	None	NotClear	None
12/21/2023	ST14314	8	VactorTruck	Truax1	None	Clear	None
12/21/2023	ST7256	26	VactorTruck	Truax1	None	N/A	None
12/21/2023	ST14310	10	VactorTruck	Truax1	None	Clear	None
12/21/2023	ST14744	9	VactorTruck	Truax1	None	NotClear	None
12/21/2023	ST17453	1	VactorTruck	Truax1	Full	Clear	None
12/21/2023	ST7246	42	VactorTruck	Truax1	Full	N/A	None
12/21/2023	ST14730	1	VactorTruck	Truax1	None	N/A	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
12/21/2023	ST210414	6	VactorTruck	Truax1	None	Clear	None
12/21/2023	ST210344	8	VactorTruck	Truax1	Full	Clear	None
12/21/2023	ST14727	5	VactorTruck	Truax1	None	NotClear	None
12/21/2023	ST14379	9	VactorTruck	Truax1	None	Clear	None
12/21/2023	ST4533	18	VactorTruck	Truax1	None	N/A	None
12/21/2023	ST17510	30	VactorTruck	Truax1	None	N/A	None
12/21/2023	ST1281	17	VactorTruck	Truax1	None	NotClear	None
12/21/2023	ST210416	24	VactorTruck	Truax1	Minimal	Clear	None
12/21/2023	ST1274	2	VactorTruck	Truax1	None	NotClear	None
12/21/2023	ST17513	30	VactorTruck	Truax1	None	N/A	None
12/21/2023	ST1275	2	VactorTruck	Truax1	None	N/A	None
12/21/2023	ST17450	8	VactorTruck	Truax1	None	Clear	None
12/21/2023	ST1296	4	VactorTruck	Truax1	None	NotClear	None
12/21/2023	ST17522	2	VactorTruck	Truax1	Full	Clear	None
12/21/2023	ST14296	9	VactorTruck	Truax1	None	Clear	None
12/21/2023	ST4801	2	VactorTruck	Truax1	None	N/A	None
12/21/2023	ST1335	11	VactorTruck	Truax1	None	Clear	None
12/21/2023	ST14541	0	VactorTruck	Truax1	None	Clear	None
12/21/2023	ST17527	16	VactorTruck	Truax1	None	N/A	None
12/21/2023	ST14204	3	VactorTruck	Truax1	None	Clear	None
12/21/2023	ST14446	10	VactorTruck	Truax1	None	NotClear	None
12/21/2023	ST17452	40	VactorTruck	Truax1	None	N/A	None
12/21/2023	ST15015	3	VactorTruck	Truax1	Full	NotClear	None
12/21/2023	ST14202	8	VactorTruck	Truax1	None	Clear	None
12/21/2023	ST11235	6	VactorTruck	Truax1	None	N/A	None
12/21/2023	ST12336	12	VactorTruck	Truax1	None	Clear	None
12/21/2023	ST11258	4	VactorTruck	Truax1	None	N/A	None
12/21/2023	ST17403	6	VactorTruck	Truax1	None	N/A	None
12/21/2023	ST10116	5	VactorTruck	Truax1	None	Clear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
12/21/2023	ST17408	2	VactorTruck	Truax1	None	N/A	None
12/21/2023	ST17413	3	VactorTruck	Truax1	None	N/A	None
12/21/2023	ST10078	12	VactorTruck	Truax1	None	Clear	None
12/21/2023	ST17410	8	VactorTruck	Truax1	None	N/A	None
12/21/2023	ST10082	6	VactorTruck	Truax1	None	Clear	None
12/21/2023	ST210435	8	VactorTruck	Truax1	None	Clear	None
12/21/2023	ST210440	9	VactorTruck	Truax1	None	Clear	None
12/21/2023	ST6600	9	VactorTruck	Truax1	None	N/A	None
12/21/2023	ST210505	12	VactorTruck	Truax1	None	Clear	None
12/21/2023	ST15011	8	VactorTruck	Truax1	None	NotClear	None
12/22/2023	ST10859	18	VactorTruck	Truax1	None	N/A	None
12/22/2023	ST20330	6	VactorTruck	Truax1	None	N/A	None
12/22/2023	ST13098	22	VactorTruck	Truax1	None	Clear	None
12/22/2023	ST13099	12	VactorTruck	Truax1	None	Clear	None
12/22/2023	ST13107	9	VactorTruck	Truax1	None	Clear	None
12/22/2023	ST5741	24	VactorTruck	Truax1	None	N/A	None
12/22/2023	ST13108	6	VactorTruck	Truax1	None	Clear	None
12/22/2023	ST12339	7	VactorTruck	Truax1	None	Clear	None
12/22/2023	ST2032	38	VactorTruck	Truax1	None	N/A	None
12/22/2023	ST12333	3	VactorTruck	Truax1	None	Clear	None
12/22/2023	ST5685	5	VactorTruck	Truax1	None	N/A	None
12/22/2023	ST12156	13	VactorTruck	Truax1	None	Clear	None
12/22/2023	ST14601	14	VactorTruck	Truax1	None	N/A	None
12/22/2023	ST11992	6	VactorTruck	Truax1	None	Clear	None
12/22/2023	ST14600	38	VactorTruck	Truax1	None	N/A	None
12/22/2023	ST11812	9	VactorTruck	Truax1	None	Clear	None
12/22/2023	ST11811	33	VactorTruck	Truax1	None	Clear	None
12/22/2023	ST11857	5	VactorTruck	Truax1	None	Clear	None
12/22/2023	ST10101	54	VactorTruck	Truax1	None	N/A	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
12/22/2023	ST10748	1	VactorTruck	Truax1	None	Clear	None
12/22/2023	ST10756	6	VactorTruck	Truax1	None	N/A	None
12/22/2023	ST11857	32	VactorTruck	Truax1	None	Clear	None
12/22/2023	ST11861	30	VactorTruck	Truax1	None	Clear	None
12/22/2023	ST9053	6	VactorTruck	Truax1	None	N/A	None
12/22/2023	ST11862	6	VactorTruck	Truax1	None	Clear	None
12/22/2023	ST9051	11	VactorTruck	Truax1	None	N/A	None
12/22/2023	ST9027	5	VactorTruck	Truax1	None	N/A	None
12/22/2023	ST11863	8	VactorTruck	Truax1	None	Clear	None
12/22/2023	ST9018	45	VactorTruck	Truax1	None	N/A	None
12/23/2023	ST13184	10	VactorTruck	Truax1	None	N/A	None
12/26/2023	ST11895	38	VactorTruck	Truax1	None	N/A	None
12/26/2023	ST11899	14	VactorTruck	Truax1	None	NotClear	None
12/26/2023	ST13124	9	VactorTruck	Truax1	None	N/A	None
12/26/2023	ST13151	12	VactorTruck	Truax1	None	N/A	None
12/26/2023	ST210393	1	VactorTruck	Truax1	None	N/A	None
12/26/2023	ST11722	20	VactorTruck	Truax1	None	N/A	None
12/26/2023	ST11605	2	VactorTruck	Truax1	None	N/A	None
12/26/2023	ST11738	18	VactorTruck	Truax1	None	NotClear	None
12/26/2023	ST11741	16	VactorTruck	Truax1	None	N/A	None
12/26/2023	ST2646	18	VactorTruck	Truax1	None	NotClear	None
12/26/2023	ST210420	8	VactorTruck	Truax1	None	NotClear	None
12/26/2023	ST13449	23	VactorTruck	Truax1	None	N/A	None
12/26/2023	ST14846	35	VactorTruck	Truax1	None	N/A	None
12/26/2023	ST14845	10	VactorTruck	Truax1	None	N/A	None
12/26/2023	ST7887	14	VactorTruck	Truax1	None	NotClear	None
12/26/2023	ST7902	12	VactorTruck	Truax1	Minimal	NotClear	None
12/26/2023	ST7862	10	VactorTruck	Truax1	None	NotClear	None
12/26/2023	ST7899	8	VactorTruck	Truax1	None	NotClear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
12/26/2023	ST7900	18	VactorTruck	Truax1	None	NotClear	None
12/27/2023	ST7875	0	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST11364	9	VactorTruck	Truax1	None	Clear	None
12/27/2023	ST7232	34	VactorTruck	Truax1	Full	Clear	None
12/27/2023	ST11359	14	VactorTruck	Truax1	None	Clear	None
12/27/2023	ST7229	41	VactorTruck	Truax1	Minimal	Clear	None
12/27/2023	ST2140	12	VactorTruck	Truax1	None	NotClear	None
12/27/2023	ST17074	6	VactorTruck	Truax1	None	Clear	None
12/27/2023	ST2139	20	VactorTruck	Truax1	None	NotClear	None
12/27/2023	ST7901	28	VactorTruck	Truax1	Minimal	Clear	None
12/27/2023	ST11358	24	VactorTruck	Truax1	None	Clear	None
12/27/2023	ST2146	10	VactorTruck	Truax1	None	NotClear	None
12/27/2023	ST7903	8	VactorTruck	Truax1	Minimal	Clear	None
12/27/2023	ST11357	11	VactorTruck	Truax1	None	Clear	None
12/27/2023	ST7905	24	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST2148	6	VactorTruck	Truax1	Full	NotClear	None
12/27/2023	ST7212	25	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST2155	2	VactorTruck	Truax1	None	NotClear	None
12/27/2023	ST7211	21	VactorTruck	Truax1	Minimal	Clear	None
12/27/2023	ST7984	22	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST7210	15	VactorTruck	Truax1	Full	Clear	None
12/27/2023	ST2154	10	VactorTruck	Truax1	None	NotClear	None
12/27/2023	ST7130	32	VactorTruck	Truax1	None	Clear	None
12/27/2023	ST7986	30	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST210074	12	VactorTruck	Truax1	None	Clear	None
12/27/2023	ST7131	9	VactorTruck	Truax1	None	Clear	None
12/27/2023	ST7132	2	VactorTruck	Truax1	None	Clear	None
12/27/2023	ST1873	12	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST7996	24	VactorTruck	Truax1	None	N/A	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
12/27/2023	ST500104	2	VactorTruck	Truax1	None	Clear	None
12/27/2023	ST8451	6	VactorTruck	Truax1	Full	Clear	None
12/27/2023	ST4486	18	VactorTruck	Truax1	Full	Clear	None
12/27/2023	ST2099	23	VactorTruck	Truax1	None	NotClear	None
12/27/2023	ST5578	20	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST8449	14	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST2086	10	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST6895	2	VactorTruck	Truax1	None	Clear	None
12/27/2023	ST5582	6	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST6894	2	VactorTruck	Truax1	None	Clear	None
12/27/2023	ST2084	15	VactorTruck	Truax1	None	NotClear	None
12/27/2023	ST5583	6	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST8453	23	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST6890	4	VactorTruck	Truax1	None	Clear	None
12/27/2023	ST8503	8	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST6924	0	VactorTruck	Truax1	None	Clear	None
12/27/2023	ST5584	6	VactorTruck	Truax1	Minimal	Clear	None
12/27/2023	ST2064	10	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST5595	3	VactorTruck	Truax1	Minimal	Clear	None
12/27/2023	ST2056	3	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST7051	17	VactorTruck	Truax1	None	Clear	None
12/27/2023	ST210065	6	VactorTruck	Truax1	None	NotClear	None
12/27/2023	ST5588	8	VactorTruck	Truax1	None	Clear	None
12/27/2023	ST8497	26	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST210527	10	VactorTruck	Truax1	None	Clear	None
12/27/2023	ST5586	7	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST210066	2	VactorTruck	Truax1	None	NotClear	None
12/27/2023	ST8498	17	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST210522	12	VactorTruck	Truax1	None	Clear	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
12/27/2023	ST5579	4	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST2054	20	VactorTruck	Truax1	None	NotClear	Slight
12/27/2023	ST5608	4	VactorTruck	Truax1	Minimal	Clear	None
12/27/2023	ST210565	6	VactorTruck	Truax1	None	Clear	None
12/27/2023	ST8430	16	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST2058	10	VactorTruck	Truax1	None	NotClear	Slight
12/27/2023	ST1353	1	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST210563	6	VactorTruck	Truax1	None	Clear	None
12/27/2023	ST1344	2	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST8396	17	VactorTruck	Truax1	None	Clear	None
12/27/2023	ST2082	30	VactorTruck	Truax1	None	NotClear	None
12/27/2023	ST1396	16	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST8398	18	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST1393	6	VactorTruck	Truax1	None	Clear	None
12/27/2023	ST6769	3	VactorTruck	Truax1	None	Clear	None
12/27/2023	ST6771	2	VactorTruck	Truax1	None	Clear	None
12/27/2023	ST2094	24	VactorTruck	Truax1	None	NotClear	None
12/27/2023	ST6772	2	VactorTruck	Truax1	None	Clear	None
12/27/2023	ST8330	11	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST6758	4	VactorTruck	Truax1	None	Clear	None
12/27/2023	ST2106	25	VactorTruck	Truax1	None	NotClear	None
12/27/2023	ST1419	14	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST8310	6	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST6761	16	VactorTruck	Truax1	None	Clear	None
12/27/2023	ST2107	18	VactorTruck	Truax1	None	NotClear	None
12/27/2023	ST6775	12	VactorTruck	Truax1	None	Clear	None
12/27/2023	ST2105	20	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST8200	24	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST1421	15	VactorTruck	Truax1	None	N/A	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
12/27/2023	ST8223	7	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST6778	6	VactorTruck	Truax1	None	Clear	None
12/27/2023	ST2097	8	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST1852	10	VactorTruck	Truax1	None	NotClear	None
12/27/2023	ST1867	28	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST6792	34	VactorTruck	Truax1	None	Clear	None
12/27/2023	ST1853	20	VactorTruck	Truax1	None	NotClear	None
12/27/2023	ST1868	16	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST8243	9	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST8239	14	VactorTruck	Truax1	None	N/A	None
12/27/2023	ST1850	10	VactorTruck	Truax1	Minimal	NotClear	None
12/27/2023	ST3520	28	VactorTruck	Truax1	None	Clear	None
12/27/2023	ST3519	7	VactorTruck	Truax1	None	Clear	None
12/28/2023	ST4881	20	VactorTruck	Truax1	None	N/A	None
12/29/2023	ST16555	2	VactorTruck	Truax1	Minimal	Clear	None
12/29/2023	ST16552	7	VactorTruck	Truax1	None	N/A	None
12/29/2023	ST11977	8	VactorTruck	Truax1	None	N/A	None
12/29/2023	ST8678	20	VactorTruck	Truax1	None	N/A	None
12/29/2023	ST8657	20	VactorTruck	Truax1	None	N/A	None
12/29/2023	ST8630	22	VactorTruck	Truax1	None	N/A	None
12/29/2023	ST8663	12	VactorTruck	Truax1	None	N/A	None
12/29/2023	ST8994	12	VactorTruck	Truax1	None	N/A	None
12/29/2023	ST9636	12	VactorTruck	Truax1	None	N/A	None
12/29/2023	ST9554	6	VactorTruck	Truax1	None	N/A	None
12/29/2023	ST13179	30	VactorTruck	Truax1	None	N/A	None
12/29/2023	ST9801	16	VactorTruck	Truax1	None	N/A	None
12/29/2023	ST1843	6	VactorTruck	Truax1	None	N/A	None
12/29/2023	ST11331	19	VactorTruck	Truax1	None	N/A	None
12/29/2023	ST10302	54	VactorTruck	Truax1	None	N/A	None

Date	ID	Debris (in.) Removed	Vehicle	Driver	Active FLow?	Color?	Odor?
12/29/2023	ST10296	4	VactorTruck	Truax1	None	N/A	None
12/29/2023	ST8233	28	VactorTruck	Truax1	None	N/A	None
12/29/2023	ST8262	16	VactorTruck	Truax1	None	N/A	None

Appendix J

2023 Summary of SSO's
73 Hybrid Dr. Deficiency Letter
29 Poppy Dr. Deficiency Letter
109 Hillwood St. Deficiency Letter
Hope Rd. Oil Dumping Remediation

APPENDIX A

City of Cranston - 2023 Detail Summary of SSO's / Third Party Releases

Time of Occruance			Event Identifier		Release Details									
Date	Start Time	End Time	Event #	Release #	Event Description	Receiving Stream	Nature of Release	St. Number	Location	Release to:	Gallons Released	Notification	Measures Taken to prevent further release	Cause of Last incident
1/27/2023	7:00	15:00	1	1	Broken Pipe	No	Failed repair [Note-1]	36	Burnham Avenue	Soil	2,500	RIDEM City of Cranston	Dig down repair of pipe; full pipe replacement	N/A
2/1/2023	9:30	12:00	2	1	Broken Pipe	No	Heavy paper [Note-2]	247	Garfield Avenue	Street	100	City of Cranston	This is private line. Discussed O&M responsibilities and approach with owner	
3/24/2023	11:00	13:00	3	1	Broken Pipe	No	Construction Impact damage [Note-3]	16	Garden Hills Court	Soil	50	City of Cranston	Event caused by impact damage from construction activiites. Collaborated with utility oontractor on system mark outs.	N/A
4/10/2023	11:00	13:00	4	1	Blocked GSP	No	Heavy paper [Note-4]	141	Franklin Ave	Street	100	City of Cranston	Performed high presure pipe cleaning and removed asphalt debris. Performed CCTV inspeciton on affected pipe and surrounding network.	N/A
5/18/2023	7:19	16:00	5	1	Broken Pipe	Yes	Failed repair [Note-5]	1706	Scituate Avenue	Receiving Stream	100	City of Cranston	Private system (Holy Apostle Church) failed repair by Providence Water. There have been numerous failed repairs by Prov Water as part of their water main extension work.	
9/13/2023	7:00	13:30	6	1	Broken Gate Valve bolts	Yes	Rotted gate valve bonnet bolts [Note-6]		Shun Pike at Green Hill Rd.	Receiving Stream	5,240	RIDEM City of Cranston	Dig down repair of pipe; Replaced valve bonnet bolts	N/A
9/30/2023	9:00	12:00	7	1	Blocked manhole	No	Roots [Note-7]	16	Oak Street	Third party basement	200	City of Cranston	Performed high presure pipe cleaning and removed asphalt debris. Performed CCTV inspeciton on affected pipe and surrounding network.	11/16/2014
12/1/2023	8:00	9:30	8	1	Blocked GSP	No	Brick & Debris [Note-8]		Plainfield Pike	Street	85	City of Cranston	Performed high presure pipe cleaning and removed asphalt debris. Performed CCTV inspeciton on affected pipe and surrounding network.	N/A

Note(s):

1. Event was result of an old lead joint pipe repair fail. Affected pipe was removed and replaced.
2. Privately owned system blocked with paper towels caused a release to the ground.
3. Impact damage from Providence Water hydrant installation work caused a pipe break and release to soil.
4. Event was attributed to paper debris within the affected pipe. Follow up cctv inspection revealed a substandard pipe connection causing a pipe sag. Dig down repair was performed, correcting the sag.
5. Substandard repair work from Providence Water's water main extension work caused an SSO on a private low pressure force main lateral.
6. Affected valve bolts replaced with stainless steel bolts.
7. Root intrusion causing a pipe blockage resulted in release to a third party basement. Affected manhole and pipe was roto-rooted.
8. Foreign material (bricks) likely attributed to recent road repair work. O&M work revised to include pre/post inspection on road work involving manhole resetting.

Kenneth J. Hopkins
Mayor

Justin Mateus, P.E.
Acting Director of Public Works

DEPARTMENT OF PUBLIC WORKS
CITY HALL, ROOM 109
869 PARK AVENUE
CRANSTON, RHODE ISLAND 02910

September 19, 2023

William Roche
Anne Roche
73 Hybrid Drive
Cranston, RI 02920

Re: Water Discharge to City Right of Way
73 Hybrid Drive, Cranston, RI
Plat 10 / Lot 822

Dear Property Owner:

It has come to the attention of this office that there is a discharge of water located at the above address. Water is collecting in the gutter line of the street and based on the observed backwash hose it is assumed to be from regular pool maintenance. The preferred option for pool maintenance activities is for the water to be discharged within the limits of your property. Any discharge of pool related water is required to be dechlorinated in accordance with Chapter 12.04.061 Code of the City of Cranston, entitled "Illicit Discharges".

A copy of the applicable code is attached, for your use and records. Failure to comply with the above may result in referral to our legal counsel for further processing and resolution.

Sincerely,

Edward J Tally

Edward Tally
Environmental Program Manager

cc: J. Mateus, P.E., Acting Director of Public Works
D. Rodio, Building Official
C. Millea, City Solicitor

(401) 780-3175

FAX (401)780-3176

12.04.061 - Illicit discharges.

Illicit discharges to the municipal storm sewer system are comprised of non-stormwater discharges that are expressly prohibited from the municipal storm sewer system unless the discharges have received all required federal, state and local permits including the National Pollutant Discharge Elimination (NPDES) or is included in one of the following categories of discharges: water line flushing, landscape irrigation, diverted stream flows, rising groundwaters, uncontaminated groundwater infiltration, uncontaminated pumped groundwater discharges from potable water sources, foundation drains, air conditioning condensation, irrigation water springs, water from crawl space sumps, footing drains, lawn watering, individual residential car washing, flows from riparian habitats and wetlands, dechlorinated swimming pool discharges, street wash water discharges, flows from firefighting activities.

If an illicit discharge to the municipal storm sewer system is detected, the owner shall cease the discharge. If the discharge does not cease within seven calendar days, the owner may be fined seventy-five dollars ($75.00) per day that the violation goes unrepaired and the city of Cranston shall have the right to take whatever action it deems necessary to correct the violations and to assess a lien on the subject property in an amount equal to the cost of the remedial actions. The lien shall be enforced in the manner provided or authorized by law for the enforcement of common law liens on personal property. The lien shall be recorded in the land evidence records of the city of Cranston and shall incur legal interest from the date of the recording. The imposition of any penalty shall not exempt the offender from compliance with the provisions of this section, including revocation of the performance bond or assessment of a lien on the property.

(Ord. 05-19 § 1 (part))

Kenneth J. Hopkins
Mayor

Justin Mateus, P.E.
Acting Director of Public Works

DEPARTMENT OF PUBLIC WORKS
CITY HALL, ROOM 109
869 PARK AVENUE
CRANSTON, RHODE ISLAND 02910

September 19, 2023

Pablo Cabrera
29 Poppy Drive
Cranston, RI 02920

Re: Water Discharge to City Right of Way
29 Poppy Drive, Cranston, RI
Plat 10 / Lot 800

Dear Property Owner:

It has come to the attention of this office that there is a discharge of water located at the above address. Water is collecting in the gutter line of the street and based on the observed backwash hose it is assumed to be from regular pool maintenance. The preferred option for pool maintenance activities is for the water to be discharged within the limits of your property. Any discharge of pool related water is required to be dechlorinated in accordance with Chapter 12.04.061 Code of the City of Cranston, entitled "Illicit Discharges".

A copy of the applicable code is attached, for your use and records. Failure to comply with the above may result in referral to our legal counsel for further processing and resolution.

Sincerely,

Edward J Tally

Edward Tally
Environmental Program Manager

cc: J. Mateus, P.E., Acting Director of Public Works
D. Rodio, Building Official
C. Millea, City Solicitor

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If an illicit discharge to the municipal storm sewer system is detected, the owner shall cease the discharge. If the discharge does not cease within seven calendar days, the owner may be fined seventy-five dollars ($75.00) per day that the violation goes unrepaired and the city of Cranston shall have the right to take whatever action it deems necessary to correct the violations and to assess a lien on the subject property in an amount equal to the cost of the remedial actions. The lien shall be enforced in the manner provided or authorized by law for the enforcement of common law liens on personal property. The lien shall be recorded in the land evidence records of the city of Cranston and shall incur legal interest from the date of the recording. The imposition of any penalty shall not exempt the offender from compliance with the provisions of this section, including revocation of the performance bond or assessment of a lien on the property.

(Ord. 05-19 § 1 (part))

Kenneth J. Hopkins
Mayor

Justin Mateus, P.E.
Acting Director of Public Works

DEPARTMENT OF PUBLIC WORKS
CITY HALL, ROOM 109
869 PARK AVENUE
CRANSTON, RHODE ISLAND 02910

October 6, 2023

Matthew C. Hull
109 Hillwood Street
Cranston, RI 02920

Re: Sewer Building Lateral Deficiency
Plat 7 / Lot 422

Dear Mr. Hull:

The Department of Public Works (DPW) and Veolia Water, the City's designee for the sewer collection system, responded to an inquiry regarding the condition and foul odor emanating from an open trench at the above address. Staff from Veolia Water observed and reported raw sewerage was being discharged into the trench from a failed cleanout.

Based on observations and discussions with the property owner this condition has persisted for some time without remedy. This letter is to inform you that the building lateral and sewer clean out need to immediately be repaired by a licensed drain layer with proper permits pulled from the DPW and building officials office in accordance with Annex A, Design of Sewers.

In the event there is not a timely resolution to this matter the DPW will forward to the solicitor's office for legal action, including but not limited to, coordination of a repair, property lien, and/or fines. Please see the enclosed applicable sewer use ordinances.

Should you have any questions or require additional information or service I encourage you to contact Ed Tally at (401) 780-3173.

Sincerely,

Justin Mateus

Justin Mateus, P.E.
Environmental Program Manager

cc: E. Tally, P.E., Director of Public Works
C. Millea, City Solicitor
D. Rodio, Building Official
P. Murray, Plumbing Inspector
J. Ayotte, Veolia Water
E. Salisbury, Veolia Water

13.08.050 Unsanitary discharges.

It shall be unlawful for any person to place, deposit or permit to be deposited in any unsanitary manner on public or private property within the city or in any area under the jurisdiction of the city, any human or animal excrement, garbage or objectionable waste.

(Ord. No. 2013-24, § 1, 7-22-13)

13.08.120 Service connection cleaning.

If during inspection a building lateral clean out trap cannot be penetrated for lateral inspection or cleaning, the property owner shall replace it with a PVC wye at their expense. If a property owner cleans the building lateral, they shall also immediately clean the street lateral to prevent it from being plugged by debris removed from the building lateral.

(Ord. No. 2013-24, § 1, 7-22-13)

13.08.150 Costs.

All costs and expense incident to the installation, inspection, and connections of the building drain, building lateral and street lateral, including private sewers or drains, shall be borne by the owner. The city or its authorized representative will provide the owner with a list of approved contractors with whom the owner shall contract for the installation of building laterals and street laterals. The owner shall indemnify the city from any loss or damage that may directly or indirectly be occasioned by the installation of the building lateral and street lateral and shall submit a certificate of insurance.

(Ord. No. 2013-24, § 1, 7-22-13)

24 HR. EMERGENCY SERVICES
401-300-6791

NEWTON B. WASHBURN, LLC
ENVIRONMENTAL SERVICES

April 3, 2023

Mr. Ed Talley
City of Cranston

Ms. Nicole Pelletier
RIDEM Office of Compliance and Inspection

Re: spill remediation, field/840 Hope Rd, Cranston

NBW mobilized to the above address in response to a release of dumped oil drums. The drums were pumped out and cleared with a field dexel test, the empty drums were removed and disposed of, bill of lading attached for your reference. The impacted area was excavated and the impacted soils stockpiled on site for later disposal upon profile submittal and acceptance.

Confirmatory samples were taken so as to document RIDEM compliance utilizing the residential property standard of 500 ppm total petroleum hydrocarbons maximum allowable residual concentration. The excavation was monitored and driven by on site PID analysis so as to ensure efficacy. Once the excavation was completed, confirmatory samples were taken with formal results for total petroleum hydrocarbons for all samples being non detect (ND) for that parameter. The metals analysis was for reference only identifying baseline with no severe excursions, taking into consideration the function of the land and the use of pesticides and fertilizers.

The area of excavation was sampled as per the attached plan and submitted to the lab for formal reports. Five samples were taken with total petroleum hydrocarbon and RCRA 8 metals analyses so as to cover the waste oil dumping impact. All reports are attached for your reference demonstrating full compliance for the site. The area of excavation was only 2 to 4 inches in depth and upon completion, being a planted corn field, was smoothed and evened out thereby closing the site.

The impacted soils were loaded and removed for disposal to RIRRC Landfill, Johnston RI, weight ticket attached.

Please call with any questions or comments.

Sincerely,
Wes Hodge
Newton B. Washburn, LLC.
P.O. Box 19582
Johnston, RI. 02919
(401) 647-9606 office
www.nbwenvironmentalservices.com

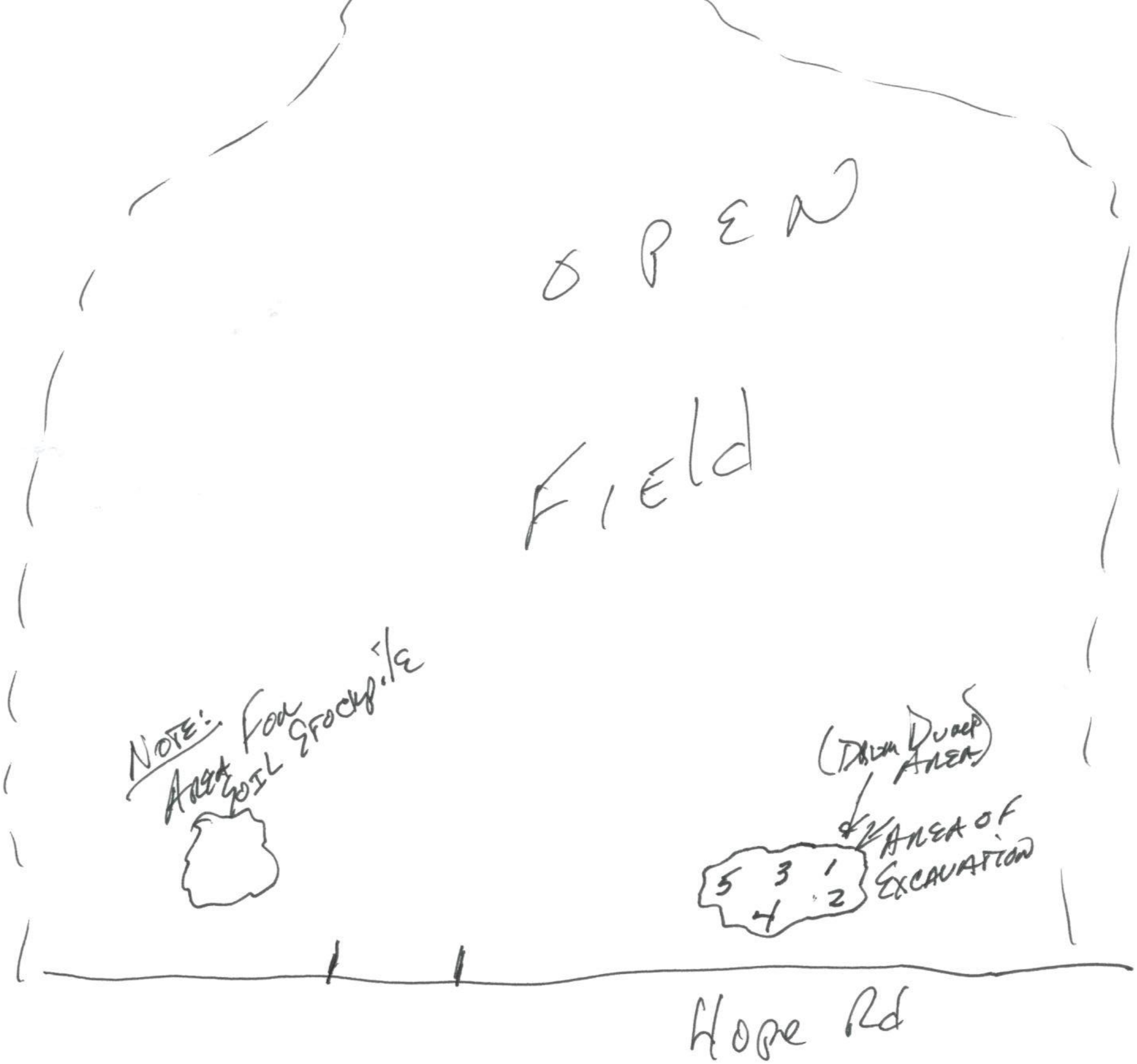
REG # 27176
RI-877 MA-518
TNH-0423
CT-HW-840

Hope Rd Cranston Additional Pics 2

Hope Rd Cranston Additional Pics 1

Hope Rd Pics 1

Hope Rd Pics 2


OPEN
Field
NOTE: AREA FOR SOIL STOCKPILE
(DRUM DUMP AREA)
AREA OF EXCAVATION
5
3
1
4
2
Hope Rd

New England Testing Laboratory, Inc.
(401) 353-3420

REPORT OF ANALYTICAL RESULTS

NETLAB Work Order Number: 3C09053
Client Project: NBW

Report Date: 16-March-2023

Prepared for:

Wes Hodge
Newton B. Washburn, LLC
759 East Road
North Scituate, RI 02857

Richard Warila, Laboratory Director
New England Testing Laboratory, Inc.
59 Greenhill Street
West Warwick, RI 02893
rich.warila@newenglandtesting.com

Samples Submitted :

The samples listed below were submitted to New England Testing Laboratory on 03/09/23. The group of samples appearing in this report was assigned an internal identification number (case number) for laboratory information management purposes. The client's designations for the individual samples, along with our case numbers, are used to identify the samples in this report. This report of analytical results pertains only to the sample(s) provided to us by the client which are indicated on the custody record. The case number for this sample submission is 3C09053. Custody records are included in this report.

Lab ID	Sample	Matrix	Date Sampled	Date Received
3C09053-01	1	Soil	03/09/2023	03/09/2023
3C09053-02	2	Soil	03/09/2023	03/09/2023
3C09053-03	3	Soil	03/09/2023	03/09/2023
3C09053-04	4	Soil	03/09/2023	03/09/2023
3C09053-05	5	Soil	03/09/2023	03/09/2023

Request for Analysis

At the client's request, the analyses presented in the following table were performed on the samples submitted.

1 (Lab Number: 3C09053-01)

Analysis	**Method**
Arsenic	EPA 6010C
Barium	EPA 6010C
Cadmium	EPA 6010C
Chromium	EPA 6010C
Lead	EPA 6010C
Mercury	EPA 7471B
Selenium	EPA 6010C
Silver	EPA 6010C
Total Petroleum Hydrocarbons	EPA-8100-mod

2 (Lab Number: 3C09053-02)

Analysis	**Method**
Arsenic	EPA 6010C
Barium	EPA 6010C
Cadmium	EPA 6010C
Chromium	EPA 6010C
Lead	EPA 6010C
Mercury	EPA 7471B
Selenium	EPA 6010C
Silver	EPA 6010C
Total Petroleum Hydrocarbons	EPA-8100-mod

3 (Lab Number: 3C09053-03)

Analysis	**Method**
Arsenic	EPA 6010C
Barium	EPA 6010C
Cadmium	EPA 6010C
Chromium	EPA 6010C
Lead	EPA 6010C
Mercury	EPA 7471B
Selenium	EPA 6010C
Silver	EPA 6010C
Total Petroleum Hydrocarbons	EPA-8100-mod

4 (Lab Number: 3C09053-04)

Analysis	**Method**
Arsenic	EPA 6010C
Barium	EPA 6010C
Cadmium	EPA 6010C
Chromium	EPA 6010C
Lead	EPA 6010C
Mercury	EPA 7471B
Selenium	EPA 6010C
Silver	EPA 6010C
Total Petroleum Hydrocarbons	EPA-8100-mod

5 (Lab Number: 3C09053-05)

Analysis	**Method**

Request for Analysis (continued)

5 (Lab Number: 3C09053-05) (continued)

Analysis	Method
Arsenic	EPA 6010C
Barium	EPA 6010C
Cadmium	EPA 6010C
Chromium	EPA 6010C
Lead	EPA 6010C
Mercury	EPA 7471B
Selenium	EPA 6010C
Silver	EPA 6010C
Total Petroleum Hydrocarbons	EPA-8100-mod

Method References

Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW846, USEPA

Case Narrative

Sample Receipt:

The samples associated with this work order were received in appropriately cooled and preserved containers. The chain of custody was adequately completed and corresponded to the samples submitted.

Exceptions: None

Analysis:

All samples were prepared and analyzed within method specified holding times and according to NETLAB's documented standard operating procedures. The results for the associated calibration, method blank and laboratory control sample (LCS) were within method specified quality control requirements and allowances. Results for all soil samples, unless otherwise indicated, are reported on a dry weight basis.

Exceptions: None

Results: Total Metals

Sample: 1

Lab Number: 3C09053-01 (Soil)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Arsenic	ND		1.16	mg/kg	03/10/23	03/15/23
Barium	**11.9**		0.38	mg/kg	03/10/23	03/15/23
Cadmium	ND		0.58	mg/kg	03/10/23	03/15/23
Chromium	**1.51**		0.58	mg/kg	03/10/23	03/15/23
Lead	**3.60**		0.58	mg/kg	03/10/23	03/15/23
Mercury	ND		0.166	mg/kg	03/14/23	03/15/23
Selenium	ND		1.16	mg/kg	03/10/23	03/15/23
Silver	ND		1.16	mg/kg	03/10/23	03/15/23

Results: Total Metals

Sample: 2

Lab Number: 3C09053-02 (Soil)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Arsenic	ND		1.39	mg/kg	03/10/23	03/15/23
Barium	**15.6**		0.46	mg/kg	03/10/23	03/15/23
Cadmium	ND		0.69	mg/kg	03/10/23	03/15/23
Chromium	**5.17**		0.69	mg/kg	03/10/23	03/15/23
Lead	**7.09**		0.69	mg/kg	03/10/23	03/15/23
Mercury	ND		0.173	mg/kg	03/14/23	03/15/23
Selenium	ND		1.39	mg/kg	03/10/23	03/15/23
Silver	ND		1.39	mg/kg	03/10/23	03/15/23

Results: Total Metals

Sample: 3

Lab Number: 3C09053-03 (Soil)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Arsenic	**1.80**		1.27	mg/kg	03/10/23	03/15/23
Barium	**15.6**		0.42	mg/kg	03/10/23	03/15/23
Cadmium	ND		0.63	mg/kg	03/10/23	03/15/23
Chromium	**6.08**		0.63	mg/kg	03/10/23	03/15/23
Lead	**3.95**		0.63	mg/kg	03/10/23	03/15/23
Mercury	ND		0.173	mg/kg	03/14/23	03/15/23
Selenium	ND		1.27	mg/kg	03/10/23	03/15/23
Silver	ND		1.27	mg/kg	03/10/23	03/15/23

Results: Total Metals

Sample: 4

Lab Number: 3C09053-04 (Soil)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Arsenic	**3.20**		1.36	mg/kg	03/10/23	03/15/23
Barium	**17.5**		0.45	mg/kg	03/10/23	03/15/23
Cadmium	**0.79**		0.68	mg/kg	03/10/23	03/15/23
Chromium	**7.42**		0.68	mg/kg	03/10/23	03/15/23
Lead	**6.79**		0.68	mg/kg	03/10/23	03/15/23
Mercury	ND		0.176	mg/kg	03/14/23	03/15/23
Selenium	ND		1.36	mg/kg	03/10/23	03/15/23
Silver	ND		1.36	mg/kg	03/10/23	03/15/23

Results: Total Metals

Sample: 5

Lab Number: 3C09053-05 (Soil)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Arsenic	ND		1.36	mg/kg	03/10/23	03/15/23
Barium	**14.2**		0.45	mg/kg	03/10/23	03/15/23
Cadmium	ND		0.68	mg/kg	03/10/23	03/15/23
Chromium	**8.04**		0.68	mg/kg	03/10/23	03/15/23
Lead	**4.81**		0.68	mg/kg	03/10/23	03/15/23
Mercury	ND		0.182	mg/kg	03/14/23	03/15/23
Selenium	ND		1.36	mg/kg	03/10/23	03/15/23
Silver	ND		1.36	mg/kg	03/10/23	03/15/23

Results: Total Petroleum Hydrocarbons

Sample: 1

Lab Number: 3C09053-01 (Soil)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Total Petroleum Hydrocarbons	ND		29	mg/kg	03/10/23	03/13/23

Surrogate(s)	Recovery%	Limits	Date Prepared	Date Analyzed
Chlorooctadecane	*104%*	*50-130*	03/10/23	03/13/23

Results: Total Petroleum Hydrocarbons

Sample: 2

Lab Number: 3C09053-02 (Soil)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Total Petroleum Hydrocarbons	ND		31	mg/kg	03/10/23	03/14/23
Surrogate(s)	Recovery%		Limits			
Chlorooctadecane	*113%*		*50-130*		03/10/23	03/14/23

Results: Total Petroleum Hydrocarbons

Sample: 3

Lab Number: 3C09053-03 (Soil)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Total Petroleum Hydrocarbons	ND		31	mg/kg	03/10/23	03/14/23

Surrogate(s)	Recovery%	Limits		
Chlorooctadecane	*106%*	*50-130*	03/10/23	03/14/23

Results: Total Petroleum Hydrocarbons

Sample: 4

Lab Number: 3C09053-04 (Soil)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Total Petroleum Hydrocarbons	ND		32	mg/kg	03/10/23	03/14/23
Surrogate(s)	Recovery%		Limits			
Chlorooctadecane	*122%*		*50-130*		03/10/23	03/14/23

Results: Total Petroleum Hydrocarbons

Sample: 5

Lab Number: 3C09053-05 (Soil)

Analyte	Result	Qual	Reporting Limit	Units	Date Prepared	Date Analyzed
Total Petroleum Hydrocarbons	ND		32	mg/kg	03/13/23	03/14/23
Surrogate(s)	Recovery%		Limits			
Chlorooctadecane	*108%*		*50-130*		03/13/23	03/14/23

Quality Control

Total Metals

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: B3C0486 - Metals Digestion Soils										
Blank (B3C0486-BLK1)					Prepared: 03/10/23 Analyzed: 03/13/23					
Lead	ND		0.50	mg/kg						
Silver	ND		1.00	mg/kg						
Arsenic	ND		1.00	mg/kg						
Barium	ND		0.33	mg/kg						
Cadmium	ND		0.50	mg/kg						
Chromium	ND		0.50	mg/kg						
Selenium	ND		1.00	mg/kg						
LCS (B3C0486-BS1)					Prepared: 03/10/23 Analyzed: 03/13/23					
Cadmium	95.7		0.50	mg/kg	100		95.7	85-115		
Silver	44.5		1.00	mg/kg	40.0		111	85-115		
Arsenic	18.8		1.00	mg/kg	20.0		94.0	85-115		
Chromium	96.4		0.50	mg/kg	100		96.4	85-115		
Barium	86.4		0.33	mg/kg	100		86.4	85-115		
Lead	94.1		0.50	mg/kg	100		94.1	85-115		
Selenium	18.6		1.00	mg/kg	20.0		92.8	85-115		
Batch: B3C0634 - Metals Cold-Vapor Mercury										
Blank (B3C0634-BLK1)					Prepared: 03/14/23 Analyzed: 03/15/23					
Mercury	ND		0.140	mg/kg						
LCS (B3C0634-BS1)					Prepared: 03/14/23 Analyzed: 03/15/23					
Mercury	0.526		0.140	mg/kg	0.500		105	93-114		
LCS Dup (B3C0634-BSD1)					Prepared: 03/14/23 Analyzed: 03/15/23					
Mercury	0.523		0.140	mg/kg	0.500		105	93-114	0.628	200

Quality Control
(Continued)

Total Metals (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: B3C0634 - Metals Cold-Vapor Mercury (Continued)										
Matrix Spike (B3C0634-MS1)		Source: 3C09002-01			Prepared: 03/14/23 Analyzed: 03/15/23					
Mercury	5.09		1.15	mg/kg dry	4.10	0.298	117	80-120		
Matrix Spike (B3C0634-MS2)		Source: 3C09038-01			Prepared: 03/14/23 Analyzed: 03/15/23					
Mercury	0.779		0.181	mg/kg dry	0.646	0.079	108	80-120		
Matrix Spike Dup (B3C0634-MSD1)		Source: 3C09002-01			Prepared: 03/14/23 Analyzed: 03/15/23					
Mercury	5.15		1.16	mg/kg dry	4.13	0.298	117	80-120	1.16	20

Quality Control
(Continued)

Total Petroleum Hydrocarbons

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: B3C0475 - EPA 3546										
Blank (B3C0475-BLK1)					Prepared: 03/10/23 Analyzed: 03/13/23					
Total Petroleum Hydrocarbons	ND		27	mg/kg						
Surrogate: Chlorooctadecane			*9.06*	mg/kg	*8.33*		*109*	*50-130*		
LCS (B3C0475-BS1)					Prepared: 03/10/23 Analyzed: 03/13/23					
Total Petroleum Hydrocarbons	347		27	mg/kg	667		52.0	44.7-125		
Surrogate: Chlorooctadecane			*9.47*	mg/kg	*8.33*		*114*	*50-130*		
LCS Dup (B3C0475-BSD1)					Prepared: 03/10/23 Analyzed: 03/13/23					
Total Petroleum Hydrocarbons	461		27	mg/kg	667		69.1	44.7-125	28.2	200
Surrogate: Chlorooctadecane			*10.3*	mg/kg	*8.33*		*123*	*50-130*		
Batch: B3C0503 - EPA 3546										
Blank (B3C0503-BLK1)					Prepared & Analyzed: 03/13/23					
Total Petroleum Hydrocarbons	ND		27	mg/kg						
Surrogate: Chlorooctadecane			*10.7*	mg/kg	*8.33*		*129*	*50-130*		
LCS (B3C0503-BS1)					Prepared & Analyzed: 03/13/23					
Total Petroleum Hydrocarbons	507		27	mg/kg	667		76.0	44.7-125		
Surrogate: Chlorooctadecane			*10.0*	mg/kg	*8.33*		*120*	*50-130*		
LCS Dup (B3C0503-BSD1)					Prepared & Analyzed: 03/13/23					
Total Petroleum Hydrocarbons	395		27	mg/kg	667		59.3	44.7-125	24.7	200
Surrogate: Chlorooctadecane			*9.76*	mg/kg	*8.33*		*117*	*50-130*		

Notes and Definitions

Item	Definition
Wet	Sample results reported on a wet weight basis.
ND	Analyte NOT DETECTED at or above the reporting limit.

3C0 9053b

New England Testing Laboratory
59 Greenhill Street
West Warwick, RI 02893
1-888-863-8522

Chain of Custody Record

Project No.:
Project Name/Location: CRANSTON 2
Client: NBW
Email to:
Report To: NBW
Invoice To: NBW

Date	Time	Comp	Grab	Sample I.D.	Matrix: Aqueous	Matrix: Soil	Matrix: Other	No. of Containers	Preservative	Tests**: TPH	Tests**: RCRA8
3-9-23	1135A		✓	1		✓		1		✓	✓
				2		✓		1		✓	✓
				3		✓		1		✓	✓
				4		✓		1		✓	✓
				5		✓		1		✓	✓

Sampled By:	Date/Time: 3-9-23 1135A	Received By:	Date/Time
Relinquished By:	Date/Time: 3-9-23 215	Received By: Ayumi Terun	Date/Time: 3-9-23 1415

Laboratory Remarks:

Temp. Received: 5

Special Instructions:

RHODE ISLAND RESOURCE RECOVERY CORPORATION

APPENDIX A

Submission Check List

ITEMS		Attached Material		
		YES	NO	N/A
1	Generator Waste Profle Sheet	✓		
2	Analytical Data (less than 1 year old)	✓		
3	Analytical Data (historical if applicable)			
4	Laboratory Accreditation Letter			
5	Site Map	✓		
6	Remedial Action Work Plan (Summary & Remedy)			
7	Regulatory Agency Remedy Approval Letter(s)			

**If response is Not Applicable (N/A) or No, please provide an explanation as to why these documents were not or did not need to be included.

RESPONSE:

Company Name (Generator):	City of Cranston
Date:	3-21-23
Authorized Representative Name:	Ed Tally
Authorized Representative Signature:	Edmund J Talley

APPENDIX B

RHODE ISLAND RESOURCE RECOVERY CORPORATION

FILLED OUT BY RIRRC

PROFILE:

GENERATOR PROFILE SHEET

I. Generator Information

Date: 3/21/23
Generator Name: City of Cranston
Generator Site Address: VACANT LOT - Hope Rd #840
City: Cranston County: State: RI Zip:
Generator Mailing Address (if different): 860 Park Ave
City: Cranston County: State: RI Zip:
Generator Contact Name: Ed Jolly
Phone Number: 780 3173 Fax Number: —

II. Transporter Information

Transporter Name: NBW
Transporter Address: 759 East Rd
City: No. Scituate County: State: RI Zip: 02857
Transporter Contact Name: Wes Hodge
Phone Number: 786 2451 Fax Number: —

III. Material Stream Information

Name/Type of Material ☐ Urban Fill / Contaminated Soil ☑ Petroleum Cont. Soil ☐ Incinerator Ash ☐ Street Sweepings ☐ Slag & Foundry Sand ☐ Dredge Soils ☐ Sludge Incineration Residue ☐ Other
Process Generating Material: DUMPED DRUMS
Type of Material: ☐ INDUSTRIAL ☐ COMMERCIAL ☐ RESIDENTIAL ☑ FARM
Estimated Volume: ☑ CUBIC YARDS: 5 ☐ TONS: ☐ OTHER
Frequency: ☑ ONE TIME ☐ DAILY ☐ WEEKLY ☐ MONTHLY ☐ OTHER ☐ PHASE(S)
Special Handling Instructions:

Free Liquids: ☐ YES or ☑ NO Content %	Odor (describe):	% Solids:	% Sulfate	%Organic	pH:	Flash Point:

IV. Physical Description of Material

Gravel

V. Source of Material Contamination/ Description of Process Generating Material

UNKNOWN oil Drums Dumped on Site

VI. Benefits to RIRRC Good Compostable Soil

GENERATOR PROFILE SHEET (continued)

VII. Representative Sample Certification

Is the representative sample collected to prepare this profile and laboratory analysis, collected in accordance with U.S. EPA 40 CFR 261.20 (c) guidelines or equivalent rules?	☑ YES or ☐ NO
Sample Date: 3-9-23	Type of Sample: ☐ COMPOSITE SAMPLE ☑ GRAB SAMPLE
Sampler's Employer: MBW.	
Sampler's Name (printed): Wes Hodges	Signature:

VIII. Performed Analysis: (Please Refer to Appendix C for Individual Material Testing Requirements)

☑ RCRA 8 Metals (TCLP)
☑ Metals (Total)
☐ Volatile Organic Compounds (VOCs)
☐ Semi-Volatile Organic Compounds (SVOCs)
☐ Polycyclic Aromatic Hydrocarbons (PAH)
☑ Total Petroleum Hydrocarbons (TPH)
  ☐ GRO
  ☐ DRO
☑ Polychlorinated Biphenyls (PCB)
☐ Pesticides
☐ Herbicides
☐ Reactivity: Cyanide

☐ Reactivity: Sulfide
☐ Sulfate
☐ pH
☑ Flash Point
☐ Free liquids
☐ % Solids
☐ % Organic
☐ Particle Size
☐ Water Content
☐ OTHER:
☐ OTHER:
☐ OTHER:

Attach Laboratory Analytical Report (and/or Material Safety Data Sheet)
Including Required Parameters Provided for this Profile

Does this waste or generating process contain regulated concentrations of the following Pesticides and/or Herbicides: Chlordane, Endrin, Heptachlor (and it epoxides), Lindane, Methoxychlor, Toxaphene, 2,4-D, or 2, 4, 5-TP Silvex as defined in 40 CFR 261.33?	☐ YES or ☑ NO
Does this waste or generating process cause it to exceed OSHA exposure limits from high levels of Hydrogen Sulfide or Hydrogen Cyanide as defined in 40 CFR 261.23?	☐ YES or ☑ NO
Does this waste contain regulated concentrations of Polychlorinated Biphenls (PCBs) as defined in 40 CFR Part 761?	☐ YES or ☑ NO
Does this waste contain regulated concentrations of listed hazardous wastes defined in 40 CFR 261.31, 261.32, 261.33, including RCRA F-Listed Solvents?	☐ YES or ☑ NO
Does this waste contain regulated concentrations of 2, 3, 7, 8-Tetrachlorodibenzodioxen (2, 3, 7, 8-TCCD), or any other dioxin as defined in 40 CFR 261.31?	☐ YES or ☑ NO
Is this a regulated Toxic Material as defined by Federal and/or State regulations?	☐ YES or ☑ NO
Is this a regulated Radioactive Waste as defined by Federal and/or State regulations?	☐ YES or ☑ NO
Is this a regulated Medical or Infectious Waste as defined by Federal and/or State regulations?	☐ YES or ☑ NO
Is this waste generated at a Federal Superfund Clean Up Site monitored by EPA?	☐ YES or ☑ NO
Is the waste generated at a State Site Clean Up Site monitored by RIDEM?	☐ YES or ☑ NO
Does this material comply with the R.I.G.L 23-19-13.1 – Disposal of Out of State Waste?	☑ YES or ☐ NO

IX. GENERATOR CERTIFICATION

I hereby certify that to the best of my knowledge and belief, the information contained herein is a true and accurate description of the waste material being offered for disposal or reuse. I further certify that by utilizing this profile, neither I nor any other employee of the company will deliver for disposal or attempt to deliver for disposal any waste which is classified as toxic waste, hazardous waste or infectious waste, or any other material this facility is prohibited from accepting by law. Our company hereby agrees to fully indemnify this disposal facility against any damages resulting from this certification being inaccurate or untrue. I further certify that the company had not altered the form or content of this profile sheet as provided by the Rhode Island Resource Recovery Corporation (RIRRC).

Ed Talley
AUTHORIZED REPRESENTATIVE NAME AND TITLE (PRINTED)

Edward J Talley
AUTHORIZED REPRESENTATIVE SIGNATURE

City of Cranston
COMPANY NAME

3-21-23
DATE

RHODE ISLAND RESOURCE RECOVERY CORPORATION
CENTRAL LANDFILL
65 SHUN PIKE
JOHNSTON, RI 02919
OFFICE 401.942.1430
FAX 401.946.5174

104236949
RECEIPT DOCUMENT NUMBER

BILL TO
NEWT051922 - SOIL
NEWTON B WASHBURN, LLC
P.O. BOX 19582
JOHNSTON, RI02919-

HAULER
NEWT051922 - SOIL
NEWTON B WASHBURN, LLC
P.O. BOX 19582
JOHNSTON, RI02919-

DATE	ENTRY TIME	OPER.	EXIT TIME	OPER.
3/29/23	14:40:51	ML	15:01:25	MJL

VEHICLE NUMBER	VEHICLE TYPE	PLATE NUMBER	TRANSACTION TYPE
NBW	Small Dump Truck	NBW RI	Inbound

MEASUREMENT	POUNDS	TONS	SCALE
GROSS:	26940	13.47	Scale 2
TARE:	16340	8.17	Scale 3
NET:	10600	5.30	

CODE	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT
358	ALT CVR- NON HAZD PROCESSED SOIL	5.30	Ton		
	Host Comunity Fee				
	Fuel Surcharge				
				TOTAL AMOUNT	

DECLARATION REGARDING WASTE DELIVERY

The undersigned declares, under the penalty of perjury that 100% of the solid waste delivered to the Central Landfill in the vehicle and on the date above was, generated and collected in Rhode Island, is not Hazardous Waste and does not contain in excess of 20%, recyclable material by weight, as defined by DEM regulation, and complies with all applicable laws and regulations.

Driver Signature: 03/29/2023 [illegible]

STRAIGHT BILL OF LADING – SHORT FORM

NOTICE: Shippers of hazardous materials must enter 24-hour emergency response telephone number under "Emergency Response Phone Number."

Original—Not Negotiable

Date 2·21·23

Bill of Lading No.

Shipper No.

Carrier No.

MBW (Name of Carrier)

TO: Consignee 145 Shun Pike

Street

Destination Johnston RI

Zip Code

Route:

Vehicle No.

FROM: Shipper City of Cranston

Street 840 Hope Rd

Origin Cranston RI

Zip Code

SCAC

Emergency Response Phone Number

Commodities requiring special or additional care or attention in handling or stowing must be so marked and packaged as to ensure safe transportation with ordinary care. See Section 2(e) of National Motor Freight Classification, Item 360.

No. Shipping Units	+HM	Kind of Packaging, Description of Articles Special Marks and Exceptions	Weight (Subject to Correction)*	Rate or Class	CHARGES
1T		OFF Spec Product Mixed Oils	195 gal.		
4T		5 MT Drums For Disp.	100#		

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading state whether weight is "carrier's or shipper's weight".

REMIT C.O.D. TO: ADDRESS

C.O.D. Amt. $

C.O.D. FEE: PREPAID ☐ COLLECT ☐ $

TOTAL CHARGES: $

Note–Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.

The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding

$ ________ per ________

Subject to Section 7 of the conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement.

The carrier shall not make delivery of this shipment without payment of freight and all other charges.

(Signature of Consignor)

FREIGHT CHARGES

Check Appropriate Box:

☐ Freight prepaid

☐ Collect

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of, said property over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment or (2) in the applicable motor carrier classification or tariff, if this is a motor carrier shipment. Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

Mark with "RQ" if appropriate to designate Hazardous Materials as defined in the U.S. Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading per 172.201(a)(1) (iii) of Title 49 Code of Federal Regulations. Also when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

The format and content of hazardous item list is the responsibility of individual company interpretation of requirements as described in 49 Code of Federal Regulations 172, Subpart C-Shipping Papers. Such description consists of the following per Sections 172.201 (Hazardous Material Table) and Sections 172.202 and 172.203: Proper shipping name, hazardous class, UN identification number, packing group, and subsidiary class(es).

Note: Liability limitation for loss or damage in this shipment may be applicable. See 49 United States Code, Sections 14706(c (1)(A) and (B).

SHIPPER

PER

CARRIER

PER

1

This is to certify that the above named materials are properly classified, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the U.S. Department of Transportation.

Carrier acknowledges receipt of packages and any required placards. Carrier certifies emergency response information was made available and/or carrier has the U.S. Department of Transportation emergency response guidebook or equivalent documentation in the vehicle. Property described above is received in good order, except as noted.

Appendix K

Erosion and Sediment Control Inspections

2023 Building Permits Flagged for Erosion Control Inspections

Count	Record ID	Record Type	Address	Date Created	Status	Erosion Control
1	131735	Route Slip	450 WILBUR AVENUE, Cranston, RI 02921	1/4/2023 14:03	Complete	Yes
2	131813	Route Slip	809 PIPPIN ORCHARD ROAD, Unit 34-22-0, Cranston, RI 02921	1/10/2023 14:31	Complete	Yes
3	131963	Route Slip	9 SCARLETT WAY, CRANSTON, RI 02921	1/20/2023 18:12	Complete	Yes
4	132280	Route Slip	8 ORCHARD VALLEY DR, CRANSTON, RI 02921	2/14/2023 17:26	Complete	Yes
5	132516	Route Slip	777 CRANSTON ST BUILDING B, CRANSTON, RI 02920	3/2/2023 20:46	Complete	Yes
6	132542	1) Building Permit	54 VAUGHN LANE, Cranston, RI 02823	3/6/2023 1:22	Active	Yes
7	132597	Route Slip	395 PHENIX AVENUE, Cranston, RI 02920	3/8/2023 15:44	Complete	Yes
8	132613	Route Slip	54 VAUGHN LANE, Cranston, RI 02823	3/9/2023 14:10	Complete	Yes
9	132708	Route Slip	1320 OAKLAWN AVENUE, Cranston, RI 02920	3/15/2023 20:21	Complete	Yes
10	132782	1) Building Permit	104 GLENHAM ROAD, Cranston, RI 02921	3/21/2023 19:14	Active	Yes
11	132830	Route Slip	105 BRACKEN STREET, Cranston, RI 02920	3/24/2023 12:48	Complete	Yes
12	133081	Route Slip	5 OLNEY ARNOLD ROAD, Cranston, RI 02921	4/7/2023 19:04	Complete	Yes
13	133115	1) Building Permit	26 VILLAGE AVENUE, Cranston, RI 02920	4/11/2023 15:51	Active	Yes
14	133116	Route Slip	26 VILLAGE AVENUE, Cranston, RI 02920	4/11/2023 16:06	Complete	Yes
15	133226	Route Slip	81 RANDALL STREET, Cranston, RI 02920	4/17/2023 16:30	Complete	Yes
16	133227	Route Slip	1340 PLAINFIELD ST (REAR), CRANSTON, RI 02920	4/17/2023 17:03	Complete	Yes
17	133228	1) Building Permit	90 RANDALL STREET, CRANSTON, RI 02920	4/17/2023 17:28	Complete	Yes
18	133232	Route Slip	90 RANDALL STREET, CRANSTON, RI 02920	4/17/2023 18:45	Complete	Yes
19	133469	1) Building Permit	25 SUMMIT DR, Cranston, RI 02920	4/30/2023 19:40	Active	Yes
20	133480	Route Slip	25 SUMMIT DR, Cranston, RI 02920	5/1/2023 14:08	Complete	Yes
21	133488	1) Building Permit	2050 PLAINFIELD PIKE, Cranston, RI 02921	5/1/2023 17:12	Complete	Yes
22	133493	Route Slip	2050 PLAINFIELD PIKE, Cranston, RI 02921	5/1/2023 19:08	Complete	Yes
23	133630	Route Slip	7 SPRING STREET, Cranston, RI 02910	5/9/2023 17:20	Active	Yes
24	133791	Route Slip	8 QUEEN STREET, Cranston, RI 02920	5/17/2023 16:48	Complete	Yes
25	133882	1) Building Permit	17 DOREEN COURT, CRANSTON, RI 02921	5/23/2023 15:06	Complete	Yes
26	133883	Route Slip	17 DOREEN COURT, CRANSTON, RI 02921	5/23/2023 15:16	Complete	Yes
27	133971	Route Slip	5 ASHTON COURT, CRANSTON, RI 02921	5/30/2023 15:22	Complete	Yes
28	134076	Route Slip	4 ASHTON COURT, CRANSTON, RI 02921	6/5/2023 17:00	Complete	Yes
29	134212	Route Slip	28-30 FLETCHER AVENUE, Cranston, RI 02920	6/13/2023 13:19	Active	Yes
30	134465	Route Slip	318 FARMINGTON AVENUE, Cranston, RI 02920	6/28/2023 13:59	Complete	Yes
31	134491	1) Building Permit	73 CARDINAL RD, CRANSTON, RI 02921	6/29/2023 14:59	Active	Yes
32	134492	Route Slip	73 CARDINAL RD, CRANSTON, RI 02921	6/29/2023 15:13	Complete	Yes
33	134519	1) Building Permit	38 KOUTSOGIANE DR, CRANSTON, RI 02920	6/30/2023 13:19	Complete	Yes
34	134520	Route Slip	38 KOUTSOGIANE DR, CRANSTON, RI 02920	6/30/2023 13:33	Complete	Yes
35	134666	1) Building Permit	63 LANTERN HILL DR, CRANSTON, RI 02921	7/11/2023 16:37	Active	Yes
36	134669	1) Building Permit	502 OAKLAWN AVENUE, Cranston, RI 02920	7/11/2023 17:38	Active	Yes
37	134699	Route Slip	63 LANTERN HILL DR, CRANSTON, RI 02921	7/13/2023 13:52	Complete	Yes
38	134812	1) Building Permit	67 LANTERN HILL DR, CRANSTON, RI 02921	7/20/2023 13:59	Active	Yes
39	134814	Route Slip	67 LANTERN HILL DR, CRANSTON, RI 02921	7/20/2023 14:24	Complete	Yes
40	134833	1) Building Permit	12-14 MATHEWSON STREET, Cranston, RI 02920	7/20/2023 18:58	Active	Yes
41	134840	Route Slip	12-14 MATHEWSON STREET, Cranston, RI 02920	7/21/2023 12:47	Complete	Yes
42	134854	Route Slip	777 CRANSTON ST BUILDING C, CRANSTON, RI 02920	7/21/2023 19:10	Complete	Yes
43	134877	Route Slip	178-B HIGHLAND ST, CRANSTON, RI 02921	7/24/2023 19:05	Complete	Yes
44	135010	Route Slip	55 CARDINAL RD, CRANSTON, RI 02921	8/1/2023 18:55	Complete	Yes
45	135212	Route Slip	747 PONTIAC AVENUE, Cranston, RI 02910	8/15/2023 19:17	Complete	Yes
46	135483	Route Slip	502 OAKLAWN AVENUE, Cranston, RI 02920	9/5/2023 17:42	Complete	Yes
47	135596	Route Slip	21 SUMMIT DRIVE, Cranston, RI 02920	9/12/2023 14:33	Active	Yes
48	135617	Route Slip	596 DYER AVE, CRANSTON, RI 02920	9/13/2023 13:34	Complete	Yes
49	135858	Route Slip	0 PEPPER MILL LANE, Cranston, RI 02921	9/27/2023 15:45	Active	Yes
50	135980	Route Slip	160-170 COMSTOCK PARKWAY, Cranston, RI 02921	10/4/2023 19:53	Active	Yes
51	136088	Route Slip	28 ASHLEY STREET, Cranston, RI 02920	10/12/2023 14:03	Complete	Yes
52	136552	1) Building Permit	175 FARMINGTON AVENUE, Cranston, RI 02920	11/7/2023 21:07	Active	Yes
53	136567	Route Slip	175 FARMINGTON AVENUE, Cranston, RI 02920	11/8/2023 15:22	Complete	Yes
54	136646	Route Slip	88 PRISCILLA DRIVE, Cranston, RI 02921	11/13/2023 16:52	Complete	Yes
55	136905	Route Slip	42 NELSON ROAD, Cranston, RI 02921	11/29/2023 19:30	Complete	Yes
56	137014	Route Slip	1355 SCITUATE AVENUE, Cranston, RI 02921	12/6/2023 19:55	Active	Yes

Appendix L

City of Cranston BMP’s

ID	Location	Type of BMP	Ownership	Description
1	Twin Birch Drive	Infiltration Basin	City	Behind house #88
2	Natick Avenue (North)	Infiltration Basin	City	At the intersection with Phenix Ave
3	Natick Avenue (South)	Infiltration Basin	City	North of the intersection with Eva Ln
4	Glenham Road	Infiltration Basin	City	At the intersection with Cohasset Ln
5	Beechwood Drive	Infiltration Basin	City	Between #111 and #117
6	Dercole Drive	Infiltration Basin	City	At the end of the road
7	Pontiac Avenue	Infiltration Basin	City	At the intersection with Commercial Way
8	Bluejay Drive	Infiltration Basin	City	At the intersection with Plainfield Pike
9	Squantum Street	Infiltration Basin	City	At the end of the road
10	Stafford Court	Infiltration Basin	City	Along Kenney Dr at Slater Rd
11	Natick Ave (Central)	Infiltration Basin	City	Between #515 and #539
12	Narragansett Boulevard (North)	Infiltration Basin	City	Behind #87 on Grand Ave
13	Buxton Drive	Infiltration Basin	Private	At the intersection with Bakewell Ct
14	Stamp Farm Road (East)	Infiltration Basin	Unknown	Behind #61 on Comstock Pkwy
15	Sailor Way	Infiltration Basin	Unknown	Behind #2050 on Plainfield Pike
16	Arrow Way	Infiltration Basin	City	Behind house #51
17	Whispering Pines Drive (West)	Infiltration Basin	City	South of the intersection with Heritage Ct
18	Whispering Pines Drive (East)	Infiltration Basin	City	West of the intersection with Phenix Ave
19	Webb Street (South)	Infiltration Basin	City	At the WWTP back gate
20	Webb Street (North)	Infiltration Basin	City	At the WWTP back gate
21	Justin Way	Infiltration Basin	City	Behind House #9 and #15
22	Valley View Circle	Infiltration Basin	City	At the end of the road
23	Locut Glen Court/Fringetree Drive	Infiltration Basin	City	At the end of both roads
24	Ridgevale Court	Infiltration Basin	City	At the intersection with Wilbur Ave
25	Pine Hill Drive	Infiltration Basin	City	At the end of the road
26	Phesant Hill Lane	Infiltration Basin	City	Between #39 and #51
27	Cobblestone Terrace	Infiltration Basin	City	Behind house #44
28	Heritage Court	Infiltration Basin	City	At the end of the road
29	Maple Farms Road	Infiltration Basin	City	At the end of the road
30	Silo Drive	Infiltration Basin	City	Behind house #45
31	Derby Lane	Infiltration Basin	City	At the end of the road, behind house #22
32	Carrie Ann Drive	Infiltration Basin	City	At the end of the road, next to house #73
33	Kimberly Lane (South)	Infiltration Basin	City	Behind house #15
34	Kimberly Lane (North)	Infiltration Basin	City	Behind house #57
35	Fox Run	Infiltration Basin	City	At the end of the road, behind house #10
36	Red Hawk Drive (East)	Infiltration Basin	City	Between #90 and #94
37	Fox Ridge Drive (West)	Infiltration Basin	City	Behind house #105 and #24 on Scaralia Rd
38	Red Hawk Drive (West)	Infiltration Basin	City	Next to house #14
39	Briarbrook Lane	Infiltration Basin	City	At the intersection with Lebaron Ct
40	Council Rock Road	Infiltration Basin	City	Between #112 and #128
41	Bakewell Court	Infiltration Basin	City	At the end of the road
42	Derbyshire Drive	Infiltration Basin	City	At the end of the road
43	Peveril Road	Infiltration Basin	City	Across the street from #60
44	Orchard Valley Drive (North)	Infiltration Basin	City	Behind house #63
45	Orchard Valley Drive (South)	Infiltration Basin	City	At the intersection with Polo Cir
46	Pepper Mill Lane	Infiltration Basin	City	At the end of the road, behind house #15
47	Alpine Estates Drive	Infiltration Basin	City	Access road near the intersection with Dove Ct
48	Starline Way	Infiltration Basin	City	Next to the storage facility
49	Stamp Farm Road (West)	Infiltration Basin	City	Next to house #33
50	Amflex Drive (West)	Infiltration Basin	City	At the intersection with Sailor Way
51	Penny Lane	Infiltration Basin	City	At the end of the road
52	Gianna Drive	Infiltration Basin	City	Behind house #10 and #14
53	NONE			
54	NONE			
55	Amflex Drive (East)	Infiltration Basin	City	Next to house #60
56	Pine Ridge Road	Infiltration Basin	Unknown	Behind house #1 and #23
57	Rome Court	Infiltration Basin	City	Between #173 and #185
58	NONE			
59	Jay Court	Infiltration Basin	City	Across the street from #32
60	NONE			
61	Fox Ridge Drive (East)	Infiltration Basin	City	Behind house #166 and #170
62	Nina Court	Infiltration Basin	City	Between #1 and #11

63	NONE			
64	NONE			
65	Pond View Road	Infiltration Basin	Private	Behind the Walmart on Plainfield Pike
66	Sanctuary Drive	Infiltration Basin	City	At the end of the road, behind #12
67	Castleton Drive	Infiltration Basin	Private	At the intersection with Buxton Dr
68	Laura Circle	Infiltration Basin	City	At the intersection with Mayfield Ave
69	Orchard Valley Drive	Infiltration Basin	City	At the intersection with Pipping Orchard Rd
70	Jennifer Circle	Infiltration Basin	City	At the end of the road, behind house #9 and #15
71	Elena Street	Infiltration Basin	City	Behind #426 on Atwood Ave
72	Cardinal Road	Infiltration Basin	City	At the end of the road
73	Whispering Pines Drive	Infiltration Basin	City	At the end of the road, next to #60
74	Cohasset Lane (South)	Infiltration Basin	City	Behind house #85
75	Cohasset Lane (Central)	Infiltration Basin	City	Across the street from #39
76	Cohasset Lane (North)	Infiltration Basin	City	Between # 4 and #8
77	Narragansett Boulevard (South)	Bioretention Basin	City	Between Sefton Dr and Strathmore Rd
78	Ocean Road (Stillhouse Cove)	Vortechnic Unit	City	
79	Windsor Road (Stillhouse Cove)	Vortechnic Unit	City	
80	Shaw Avenue	Vortechnic Unit	City	
81	Norwood Avenue	Vortechnic Unit	City	
82	Armington Street	Vortechnic Unit	City	
83	Speck Park Field	Underground Infiltration	City	Parking Lot at end of Carlton Street
84	Cottage Street	Infiltration Basin	City	At end of road behind guardrail
85	Barrett Street	Underground Infiltration	City	At end of road in front of #95

Appendix M

RIRRC Municipal Data Survey

Category	**Question**	**Your information here**
Contact	**City/Town**	Cranston
	Full municipality name	City of Cranston
	Website	www.cranstonri.com
	Contact person	Joseph DiCarlo
	Title	Clean City Coordinator
	Address	869 Park Avenue, Cranston, RI 02910
	Phone	401-780-3174
	Email	JDiCarlo@CranstonRI.org
Annual Program Expenses (optional)	**How is the municipal solid waste management system funded?**	General fund
	Trash - Admin & Promotion	$70,000.00
	Trash - Curbside	$2,679,717.60
	Trash - Transfer Station Operation	
	Trash - Tipping Fees	$1,461,577.50
	Total Annual Costs: Trash	**$4,211,295.10**
	Notes: Annual Trash Costs	
	MRF Recycling - Admin & Promotion	
	MRF Recycling - Curbside	$2,679,717.60
	MRF Recycling - Transfer Station or Recycling Center	
	Total Annual Costs: MRF Recycling	**$2,679,717.60**
	Notes: Annual MRF Recycling Costs	
	Leaf & Yard Waste - Admin & Promotion Cost	
	Leaf & Yard Waste - Curbside Cost	
	Leaf & Yard Waste - Compost Facility Operation	
	Leaf & Yard Waste - Tipping Fees	$85,250.00
	Total Annual Costs: Leaf & Yard Waste	**$85,250.00**
	Notes: Annual Leaf & Yard Waste Costs	
	Special/Bulky Waste - Admin & Promotion Cost	$50,000.00
	Special/Bulky Waste - Curbside Cost	
	Special/Bulky Waste - Transfer Station, Recycling Center, or DPW Yard Operation	
	Special/Bulky Waste - Disposal Fees	
	Total Annual Costs: Special/Bulky Waste	**$50,000.00**
	Notes: Special/Bulky Waste Costs	
	Total Program Expenses	**$7,026,262.70**
	Notes: Total Program Expenses	
Curbside Trash Pickup	**Is there curbside trash pick up?**	Yes
	Trash hauler type(s)	Contractor
	Trash contractor	Waste Management
	Trash contract end date	6/30/2025
	Trash collection method	Automatic
	Trash truck type	Other (explain in notes)
	Number of trash trucks	5
	Trash collection schedule	Weekly
	Number of trash collection days per week	5
	Maximum units per structure served for curbside trash	4
	Number of households served for curbside trash (Not just the total population that CAN use it, but those that do, if you have this information)	29,275
	If the number of households served for curbside trash has changed since last year, briefly explain why (e.g. # of permits issued, new tax assessor count, new builds, etc.)	
	Notes (if applicable)	Truck types consist of side loaders, rear loaders and split body rear loaders, depending on the area .2023 they received a new style automated dual split compartment truck to pick up both trash and recycling used in estates and other areas
Curbside Recycling Pickup	**Is there curbside recycling pick up?**	Yes
	Recycling hauler type(s)	Contractor
	Recycling contractor	Waste Management
	Recycling contract end date	6/30/2025
	Recycling collection method	Automatic
	Recycling truck type	Other (explain in notes)

	Number of recycling trucks	5
	Recycling collection schedule	Weekly
	Number of recycling collection days per week	5
	Maximum units per structure served for curbside recycling	4

	Number of households served for curbside recycling	29,275
	If the number of households served for curbside recycling has changed since last year, briefly explain why (e.g. # of permits issued, new tax assessor count, new builds, etc.)	
	Notes (if applicable)	Truck types consist of side loaders, rear loaders and split body rear loaders, depending on the area.2023 they received a new style automated dual split compartment truck to pick up both trash and recycling used in Estates and other areas
Licensed Haulers	**Does the municipality license haulers?**	Yes, for commercial businesses and roll offs
	Which materials are haulers licensed for?	Trash only
	Annual licensing fee	Depends on the amount of vehicles: 1-2 vehicles is $100/yr.; 3-5 vehicles is $200/yr.; 6-10 vehicles is $500/yr.; 10 or more is $1,000/yr.
	List of licensed haulers	
	Do any licensed haulers receive the municipal rate and/or a cap allotment? If yes, how, and which haulers? e.g. haul to municipal transfer station (consolidated and hauled to RIRRC), direct haul to RIRRC under municipality's account, through monthly adjustment based on customer rolls, etc.	
	Notes (if applicable)	
Multi-Families Served	**Is any trash or recycling from multi-families or condos (over your max. units per structure served) included in the municipal program?**	No
	Which materials are included for multi-families/condos?	
	What is required for multi-families/condos to be included? (such as: request permission to city/town, sign up through commercial recycling program, etc.)	
	How are the materials from these multi-families/condos tipped under the municipality's account at RIRRC? e.g. picked up with residential material on curbside route, direct haul to RIRRC on a dedicated route under municipality's account, hauled to transfer station and consolidated with other municipal material. etc.	
	Notes (if applicable)	
Curbside Permit	**Is a permit required for residents to take part in the curbside collection program?**	No
	Annual user fee for residential curbside collection program	
	Permit date range	
	Notes (if applicable)	
Curbside Enforcement	**Does the municipality conduct curbside enforcement?**	Yes
	Which materials are enforced curbside?	Both trash and recycling
	Are there ordinances that allow for fines?	Yes
	Describe the enforcement method briefly (oops tags, Resource Recovery hang tags, letters, warnings/fines, etc.)	The City sends out letters for either non-service noted by our private contractor or for infractions reported to the DPW. Letters are sent with recycling flyers from RIRRC or flyer with overflow trash bag llocations if needed .
	Number of tags, letters and/or fines issued	400 letters sent to residents from information given from the private contractor upon service
	Notes (if applicable)	
Primary Drop Off Facility	**Primary drop-off facility type**	DPW Yard
	Name of the primary drop-off facility (if applicable)	Highway Yard
	Primary drop-off facility operator	Municipality
	Primary drop-off facility contractor	
	Primary drop off facility hauler (if different from operator)?	
	Primary drop-off facility operator or hauler contract end date	
	Primary drop-off facility address	935 Phenix Avenue, Cranston, RI 02910
	Primary drop-off facility hours	Monday-Friday 7:00 am-2:30pm
	Who is permitted to use the primary drop-off facility? E.g. residents only, residents of specific municipalities, local businesses, licensed subscription haulers, any/all RI residents or private haulers, etc.	Residents only
	List of materials accepted at the primary drop-off facility	E-waste, books, metals, motor oil and filters and tires. Mattresses & box springs on Thursdays by appointment.
	Is there a swap area for residents to take or leave items in good condition?	
	Additional instructions for residents	
Drop Off	**Is a permit required for the primary drop-off facility?**	No

Permit	**User fee for the primary drop-off facility**	
	Permit date range	
	Notes (if applicable)	
Trash Drop Off	**Is there drop-off for trash?**	No drop-off
	Number of households served for trash drop-off (Not just the total population that CAN use it, but those that do, if you have this information)	

	If the number of households served for trash drop-off has changed since last year, briefly explain why (e.g. # of permits issued, new tax assessor count, new builds, etc.)	
	Notes (if applicable)	
Recycling Drop Off	**Is there drop-off for recycling?**	No drop-off
	Number of households served for recycling drop-off	
	If the number of households served for recycling drop-off has changed since last year, briefly explain why (e.g. # of permits issued, new tax assessor count, new builds, etc.)	
	Notes (if applicable)	
Secondary Drop Off Facility	**Secondary drop-off facility type**	No
	Name of the secondary drop-off facility (if applicable)	
	Secondary drop-off facility operator	
	Secondary drop-off facility contractor	
	Secondary drop off facility hauler (if different from operator)?	
	Secondary drop-off facility address	
	Secondary drop-off facility hours	
	Who is permitted to use the secondary drop-off facility? E.g. residents only, residents of specific municipalities, local businesses, licensed subscription haulers, any/all RI residents or private haulers, etc.	
	List of materials accepted at the secondary drop-off facility	
	Additional instructions for residents	
No Bin, No Barrel Policy	**Does the municipality have a No Bin, No Barrel policy (NBNB)?**	Yes
	Start date of NBNB policy	10/1/2009
	Program description / instructions for residents	Leave the recycling cart on the curb until trash is collected.
Pay As You Throw Policy	**Does the municipality have a Pay-As-You-Throw (PAYT) policy?**	Yes, there's a partial PAYT program (overflow bags)
	Start date of PAYT policy	3/1/2015
	Where residents participate in the PAYT program	Curbside
	Method of PAYT program	Bags
	Price per bag or tag	$2.00
	Number of bags per pack or tags per sheet	5
	Total cost per pack/sheet	$10.00
	Where can residents acquire bags or tags? E.g. transfer station, city/town hall, local stores	Local stores, listed on our website
	Price per pound or ton, if weighed	
	Program description / instructions for residents	Leave the overflow bag/bags curbside next to the trash cart on day of pickup and WM will pick up.
Organics	**Does the municipality accept leaf & yard waste?**	Yes
	Name of leaf & yard waste compost facility (other than RIRRC)	
	Leaf & yard waste compost facility operator	
	Describe the compost facility operation / processing / finished compost distribution	
	Leaf & yard waste hauler type(s)	Contractor
	Leaf & yard waste contractor	Waste Management
	Does the municipality chip brush or Christmas trees?	No
	How is the chipped brush used internally or distributed to residents?	
	Does the municipality offer food waste collection or composting to residents or schools? If yes, explain.	No
	Notes (if applicable)	
Outreach	**Did the municipality distribute printed information containing RI's mixed recycling guidelines and local programs to ALL residents served in your program (i.e. included in your curbside collection program or permitted users of your transfer station) last year? If yes, describe the method of distribution.**	No
	List and/or describe other methods for communicating RI's mixed recycling guidelines and local program information to residents such as the city/town's website, social media channels, email newsletters, new resident packets, newspaper ads, mobile message boards, post flyers in municipal buildings, etc.	RI's mixed recycling guidelines are connected to the Public Works webpage. We also send out flyers to residents who request and received non-service from our private contractor based on a daily list sent to our office.
	What social media channels are used (Facebook, Twitter, YouTube, etc.) and what kind of content is shared?	None reported

	List and/or describe any other special events or programs that aimed to educate residents about waste and recycling this year such as one-day recycling events, shredding events, Earth Day cleanups, community events, special programs with schools, etc.	There were multiple Eart Day clean ups done in the City of Cranston in 2023. Some by private organizations and others by elected officials .
	Notes (if applicable)	
Carts	**Does the municipality distribute carts for trash or recycling?**	Yes
	Material(s) collected in carts	Both trash and recycling
	Start date of the cart collection program	6/1/2014
	Initial trash cart size (gallons)	64, 35
	Can residents change trash cart sizes?	Yes, one-time fee to upgrade size
	Charge to upgrade trash cart size (as selected above)	$31.00 per set
	Alternate trash cart sizes (gallons)	
	Options for additional trash carts	There's a yearly rental fee for additional cart(s)
	Charge for an additional trash cart (as selected above)	$150
	Are broken trash carts replaced for free?	Yes
	Charge to replace a broken trash cart (as selected above)	
	Trash cart manufacturer	Cascade Engineering
	Trash cart color: body and lid (if different from body)	Gray
	Trash carts notes (if applicable)	
	Initial recycling cart size (gallons)	64, 35
	Can residents change recycling cart sizes?	Yes, one-time fee to upgrade size
	Charge to upgrade recycling cart size (as selected above)	$31.00 per set
	Alternate recycling cart sizes (gallons)	
	Options for additional recycling carts	There's a yearly rental fee for additional cart(s)
	Charge for an additional recycling cart (as selected above)	$150
	Are broken recycling carts replaced for free?	Yes
	Charge to replace a broken recycling cart (as selected above)	
	Recycling cart manufacturer	Cascade Engineering
	Recycling cart color: body and lid (if different from body)	Blue
	Number of recycling carts distributed last year	
	Recycling carts notes (if applicable)	
	Notes that apply to both trash and recycling carts (if applicable)	There's an $80 fee to replace a stolen or missing cart
Recycling Bins	**Does the municipality distribute 22-gallon recycling bins?**	No
	Where do residents acquire 22-gallon recycling bins?	
	Charge for a 22-gallon recycling bin	
	Are broken 22-gallon recycling bins replaced for free?	
	Number of recycling bins distributed last year	
	Can residents use their own container as a recycling bin? If so, what's the maximum size allowed?	
	Notes (if applicable)	
Compost Bins	**Does the municipality distribute compost bins?**	No
	Where do residents acquire compost bins?	
	Charge for compost bin	
	Instructions for residents	
Public Space Receptacles	**Does the municipality provide public spaces receptacles?**	Yes
	Materials collected in public spaces receptacles	Trash only
	Receptacle locations **(E.g. downtown areas/streets, beaches, outdoor recreation facilities, indoor recreation facilities, other parks and playgrounds, other locations)**	Playgrounds, outside of municipal buildings and in a few business sections in the City. Rolfe Square and in Edgewood section of Broad St.
	Receptacle types and sizes **E.g. 55-gallon drums, wrought iron barrels, Bigbelly solar, Ecubes, etc.**	Mostly wrought iron barrels with plastic bags inserted to them
	Number of trash receptacles	50-80 depending on the time of year
	Number of recycling receptacles	None
	Who empties the barrels and how often? **E.g. DPW staff, Parks & Rec staff, contractor, etc.**	Depending on the location, twice a week to daily
	Notes (if applicable)	
Schools Served	**Is school trash and/or recycling tipped under the municipality's account at RIRRC?**	Yes
	Materials collected from schools	Both trash and recycling
	Number of students served	10,590

	How are the materials from these schools tipped under the municipality's account at RIRRC? e.g. picked up with residential material on curbside route, direct haul to RIRRC on a dedicated route under municipality's account including under a dedicated school account, hauled to transfer station and consolidated with other municipal material, etc.	Schools are serviced by our private contractor and starting in July 2023 are being billed on tonnage based dedidicated loads with municipal buildings based on service day and dumpster size at locations. Recycling is picked in 96-gal carts by the residential route trucks.
	If "no" to the above question, how are schools included in the program? E.g. included in the municipal contract for hauling only, material is picked up on mixed commercial routes, etc.	
	Notes (if applicable)	
Municipal Buildings Served	**Is municipal building (city/town hall, police, fire, etc.) trash and/or recycling tipped under the municipality's account at RIRRC?**	Yes
	Materials collected from municipal buildings	Both trash and recycling
	List of municipal buildings served	City Hall, Senior Center, Police Station, Fire Stations, Libraries
	Number of employees served	1,700
	How are the materials from these municipal buildings tipped under the municipality's account at RIRRC? e.g. picked up with residential material on curbside route, direct haul to RIRRC on a dedicated route under municipality's account, hauled to transfer station and consolidated with other municipal material, etc.	Yes, it's picked up on dedicated route and brought to RIRRC under the city's account.
	If "no" to the above question, how are municipal buildings included in the program? E.g. included in the municipal contract for hauling only, material is picked up on mixed commercial routes, etc.	
	Notes (if applicable)	
Commercial Entities Served	**Is any commercial/business trash or recycling included in the municipal program?**	No
	Materials collected from businesses	
	Number of businesses served	
	Notes (if applicable)	
Assessment of Current Program and Service Levels	**In relation to your municipality's solid waste and recycling services it provides to residents:**	
	Are residents able to adequately access the services?	Yes
	How effective is it at achieving desired outcomes?	Very effective. Residents are well informed of services provided by calling the Public Works office and speaking to staff, as well as going to the city's website.
	Are there any major issues related to administration of the services?	No
	Indication of how the quality of service is likely to change over the planning horizon (such as improve, stay the same, worsen) and the reasons why such a change is expected (such as population changes).	Stay the same for the length of the current contract with private contractor
Solid Waste, Recycling & Diversion Goals	**Goal #1: Statutory Mandate**	Reach a 35% Recycling Rate
	Goal #2: Statutory Mandate	Reach a 50% Diversion Rate
	Goal #3: List Your Own Goal	
	Goal #4: List Your Own Goal	
Tons Diverted to Facilities Other Than RIRRC (If Applicable)	**Alphabetical List of Materials Diverted from Your Municipal Program (not brought to RIRRC)** *If you accept an item for diversion, both the **tons** and **name of the recycler** must be filled in to receive diversion credit.* *Please use the Notes line to indicate where materials are diverted from (i.e. resident drop-off and/or municipal buildings, etc.)*	
	Antifreeze	
	Total Tons in CY Sent to Other Facilities (Not RIRRC)	0.18
	Name of Recycler (Not RIRRC)	Clean Harbors Environmental Services Inc
	Notes (if applicable)	
	Appliances	*if tracked separately from scrap metal*
	Total Tons in CY Sent to Other Facilities (Not RIRRC)	34.74
	Name of Recycler (Not RIRRC)	Full Circle Recycling
	Notes (if applicable)	Includes appliances with Freon
	Appliances with Freon	*if tracked separately from appliances*
	Total Tons in CY Sent to Other Facilities (Not RIRRC)	
	Name of Recycler (Not RIRRC)	Full Circle Recycling
	Notes (if applicable)	Included in appliances
	Asphalt, Brick & Concrete	*not from commercial entities*
	Total Tons in CY Sent to Other Facilities (Not RIRRC)	
	Name of Recycler (Not RIRRC)	
	Notes (if applicable)	
	Auto Batteries	

	Total Tons in CY Sent to Other Facilities (Not RIRRC)	
	Name of Recycler (Not RIRRC)	

	Notes (if applicable)	
	Batteries (Household)	
	Total Tons in CY Sent to Other Facilities (Not RIRRC)	
	Name of Recycler (Not RIRRC)	
	Notes (if applicable)	
	Bicycles	*if tracked separately using a reuse vendor*
	Total Tons in CY Sent to Other Facilities (Not RIRRC)	
	Name of Recycler (Not RIRRC)	
	Notes (if applicable)	
	Books	*collected through book drop-off bin or library*
	Total Tons in CY Sent to Other Facilities (Not RIRRC)	1.89
	Name of Recycler (Not RIRRC)	Discover Books
	Notes (if applicable)	
	Brush (Chipped)	*if tracked separately from trees or L&YW*
	Total Tons in CY Sent to Other Facilities (Not RIRRC)	
	Name of Recycler (Not RIRRC)	
	Notes (if applicable)	
	Bulky Rigid Plastic	*not sent to RIRRC*
	Total Tons in CY Sent to Other Facilities (Not RIRRC)	
	Name of Recycler (Not RIRRC)	
	Notes (if applicable)	
	Christmas Trees	*not sent to RIRRC, if tracked separately*
	Total Tons in CY Sent to Other Facilities (Not RIRRC)	
	Name of Recycler (Not RIRRC)	
	Notes (if applicable)	
	Clothing & Textiles	
	Total Tons in CY Sent to Other Facilities (Not RIRRC)	130.48
	Name of Recycler (Not RIRRC)	Big Brothers Big Sisters of RI
	Notes (if applicable)	72,275 lbs from home pick ups and 188,688 lbs from 7 collections bins on Cranston sites
	Compost Bins	*500 lb. credit per bin, 10 year lifespan of bin*
	Total <u>Tons</u> for credit (use calculator to convert)	
	Notes (if applicable)	
	Construction & Demolition Debris	*not from commercial entities*
	Total Tons in CY Sent to Other Facilities (Not RIRRC)	
	Name of Recycler (Not RIRRC)	
	Notes (if applicable)	
	Cooking Oil	
	Total Tons in CY Sent to Other Facilities (Not RIRRC)	
	Name of Recycler (Not RIRRC)	
	Notes (if applicable)	
	Electronic Waste	
	Total Tons in CY Sent to Other Facilities (Not RIRRC)	56.52
	Name of Recycler (Not RIRRC)	Indie Cycle, LLC
	Notes (if applicable)	
	Fluorescent Bulbs	
	Total Tons in CY Sent to Other Facilities (Not RIRRC)	
	Name of Recycler (Not RIRRC)	
	Notes (if applicable)	
	Food Scraps	*from muni programs: residents or schools*
	Total Tons in CY Sent to Other Facilities (Not RIRRC)	
	Name of Recycler (Not RIRRC)	
	Notes (if applicable)	
	Household Items for Reuse	*from swap area (if quantifiable)*
	Total Tons in CY Sent to Other Facilities (Not RIRRC)	
	Name of Recycler (Not RIRRC)	
	Notes (if applicable)	
	Leaf & Yard Waste	*not sent to RIRRC*
	Total Tons in CY Sent to Other Facilities (Not RIRRC)	
	Name of Recycler (Not RIRRC)	
	Notes (if applicable)	

	Mattresses	*not MRC tons - RIRRC will enter MRC tons*
	Total Tons in CY Sent to Other Facilities (Not RIRRC)	15.48
	Name of Recycler (Not RIRRC)	Wheelabrator
	Notes (if applicable)	Picked up by WM curbside

	Motor Oil	
	Total Tons in CY Sent to Other Facilities (Not RIRRC)	6.13
	Name of Recycler (Not RIRRC)	Clean Harbors Environmental Services Inc
	Notes (if applicable)	
	Motor Oil Filters	
	Total Tons in CY Sent to Other Facilities (Not RIRRC)	0.27
	Name of Recycler (Not RIRRC)	Clean Harbors Environmental Services Inc
	Notes (if applicable)	
	Paint	
	Total Tons in CY Sent to Other Facilities (Not RIRRC)	
	Name of Recycler (Not RIRRC)	
	Notes (if applicable)	
	Propane Tanks	*if tracked separately from scrap metal*
	Total Tons in CY Sent to Other Facilities (Not RIRRC)	
	Name of Recycler (Not RIRRC)	
	Notes (if applicable)	
	Scrap Metal	*can include all metal: appliances/Freon/propane*
	Total Tons in CY Sent to Other Facilities (Not RIRRC)	14.00
	Name of Recycler (Not RIRRC)	Schnitzer Steel
	Notes (if applicable)	
	Shredded Paper	*from shredding events hosted by muni*
	Total Tons in CY Sent to Other Facilities (Not RIRRC)	
	Name of Recycler (Not RIRRC)	
	Notes (if applicable)	
	Tires	*not sent to RIRRC*
	Total Tons in CY Sent to Other Facilities (Not RIRRC)	
	Name of Recycler (Not RIRRC)	
	Notes (if applicable)	
	Other	Type Item Name Here
	Total Tons in CY Sent to Other Facilities (Not RIRRC)	
	Name of Recycler (Not RIRRC)	
	Notes (if applicable)	
	Other	Type Item Name Here
	Total Tons in CY Sent to Other Facilities (Not RIRRC)	
	Name of Recycler (Not RIRRC)	
	Notes (if applicable)	
	Other	Type Item Name Here
	Total Tons in CY Sent to Other Facilities (Not RIRRC)	
	Name of Recycler (Not RIRRC)	
	Notes (if applicable)	