Abrams Creek and Lower Opequon Creek Combined

Sediment and Bacteria TMDL Action Plan

PERMIT NUMBER VAR040053

Submitted to DEQ:

May 2020

CITY OF WINCHESTER, VIRGINIA - ABRAMS CREEK AND LOWER OPEQUON CREEK COMBINED SEDIMENT AND BACTERIA TMDL ACTION PLAN

INTRODUCTION

The City of Winchester has prepared this Abrams Creek and Lower Opequon Creek Combined Sediment and Bacteria TMDL Action Plan to address the Special Condition for approved local TMDLs (Part II.B) in the City's MS4 Permit. The City's approach for preparation of this Action Plan is based on the requirements listed in the MS4 General Permit and DEQ's Guidance Memo No. GM-16-2006 (dated November 21,2016). Each of the sections in this Action Plan will address one or more of the required action plan content items as listed on the DEQ Local TMDL Action Plan Guidance Document referenced above.

TMDL REPORT AND POLLUTANT IMPAIRMENTS

1. The name(s) of the Final TMDL report(s); 2. The pollutant(s) causing the impairment(s);

The City of Winchester was assigned aggregated Waste Load Allocations (WLAs) under the approved TMDL report entitled *Opequon Watershed TMDLs for Benthic Impairments: Abrams Creek and Lower Opequon Creek, Frederick and Clarke Counties, Virginia dated July 2003 and Revised October 2003*. Stream segments on Abrams Creek (Segment ID: VAV-B09R_ABR01A00) and the Lower Opequon Creek (Segment ID: VAV-B09R_OPE01A00) were both listed as impaired on Virginia's Section 303(d) Total Maximum Daily Load Priority List and Report due to water quality violations of the general standard (listed as a benthic impairment). Analyses of physical, chemical, biological, and observational data indicated that sediment was the most probable cause of the benthic impairments in both stream segments. TMDLs were therefore developed for sediment to address the benthic impairments in Abrams Creek and Lower Opequon Creek.

The City of Winchester was also assigned an aggregated WLA under the approved TMDL report entitled *Bacteria TMDLs for Abrams Creek and Upper and Lower Opequon Creek Located in Frederick and Clarke County, Virginia dated October 2003 and Revised January 2004*. Stream segments on Abrams Creek (Segment ID: VAV-B09R_ABR01A00), Upper Opequon Creek (Segment ID VAV-B08R_OPE01A00), and the Lower Opequon Creek (Segment ID: VAV-B09R_OPE01A00) were listed as impaired on Virginia's Section 303(d) Total Maximum Daily Load Priority List and Report due to water quality violations of the general standard for fecal coliform.

WLA ASSIGNED TO THE MS4

3. *The WLA(s) assigned to the MS4 as aggregate or individual WLAs;*

The City of Winchester (VAR040053) and VDOT (VAR040032) MS4s were assigned aggregated sediment WLAs in the Final TMDL report as follows:

- Abrams Creek TMDL Sediment WLA = 442.7 Metric Tons/Year or 975,985 lbs/year
- Lower Opequon Creek Sediment WLA = 269.2 Metric Tons/Year or 593,484 lbs/year

In order to remedy the water quality impairment pertaining to fecal coliform, TMDLs were developed for the new water quality standards for bacteria, which state that the calendar-month geometric mean concentration of E. coli shall not exceed 126 cfu/100 mL, and that no single sample can exceed a concentration of 235 cfu/100mL. The City of Winchester (VAR040053) and VDOT (VAR040032) MS4s were assigned an aggregated WLA in the Final TMDL report as follows:

- Abrams Creek TMDL Bacteria WLA = 19.4×10^{12} cfu/year fecal coliform

The remainder of this Action Plan will focus on addressing the City's plan for complying with the WLAs assigned to the City under both of these TMDLs.

SIGNIFICANT SOURCES OF POC(S)

4. *Significant sources of POC(s) from facilities of concern owned or operated by the MS4 operator that are not covered under a separate VPDES permit. A significant source of pollutant(s) from a facility of concern means a discharge where the expected pollutant loading is greater than the average pollutant loading for the land use identified in the TMDL.*

During the first half of 2013, the City's engineering consultant evaluated City owned/operated properties for potential sources of pollutants for which the City was assigned a waste load allocation (WLA) in a State Water Control Board approved Total Maximum Daily Load (TMDL). The consultant performed an initial potential source evaluation task that utilized the City's Geographic Information System (GIS) to identify and characterize eighty one City owned/operated properties for land use type (the City's zoning layer) and the presence/absence of MS4 outfalls on the property. The outcome of the initial potential source evaluation task identified six City owned/operated properties requiring further site review and runoff characterization.

The City owned/operated properties found to require a site review and runoff characterization triggered an on-site field reconnaissance task to review and assess the on-the-ground conditions for each of the City owned/operated properties. The consultant documented potential pollutant of concern (POC) generating activities (storage, transfer, transport, or disposal) on each site, stormwater pollution potential from the site (exposure to precipitation), and locations of outfalls.

Based on the results of this study, the City incorporated additional pollution prevention activities and training materials into the Pollution Prevention/Good Housekeeping for Municipal Operations (BMPs 6.1 thru 6.7) section of its MS4 Program Plan to further address bacteria and sediment as pollutants of concern. A copy of the full memo report documenting evaluation of the City owned/operated properties for potential WLA pollutant sources is provided in Attachment 1 to this Action Plan.

At the beginning of 2020, the City reviewed the original study results, and practices derived from the 2013 analysis in comparison to current operations at these facilities. Based on this recent review, it is the City's opinion, that the BMPs being implemented are still providing effective pollutant containment and that no new significant sources of POC have emerged in recent years.

EXISTING OR NEW BEST MANAGEMENT PRACTICES

5. *Existing or new management practices, control techniques, and system design and engineering methods, that have been or will be implemented as part of the MS4 Program Plan that are applicable to reducing the pollutant for which the WLA was established;*

Recognizing that sediment and bacteria pollutant discharges from the City's MS4 need to be controlled to the maximum extent practicable in order to protect the water quality in the streams that flow throughout it, the City's political leadership and staff enacted several changes to the City's Code in order to facilitate a reduction in these pollutant discharges. These Code changes included:

- Reduced the threshold for regulated land disturbing activities from 10,000 ft^2 to 5,000 ft^2 under Chapter 9 Article 2 (Sediment)
- Instituted stream buffer protection under Chapter 9 Article 4 (Sediment and Bacteria)
- Prohibited feeding of waterfowl under Chapter 5 Article 3 (Bacteria)

In addition to these strong legal mechanisms for controlling pollutant discharges, the City also incorporated many new Best Management Practices (BMPs) into its MS4 Program Plan that target sediment and bacteria and focus on source control. The following is a list of thirty MS4 Program Plan BMPs that the City is implementing to specifically address the reduction of sediment and bacteria pollutant loads from the City's MS4:

- *BMP 1.1. City Stormwater Webpage (Sediment and Bacteria)* - The City will maintain a web page dedicated to the City's stormwater management program and will distribute stormwater program messages and related information to its citizens via this tool.
- *BMP 1.2. Social Media (Sediment and Bacteria)* - The City will use its Facebook and Twitter accounts to deliver its stomwater program messages and to distribute stormwater related information to its citizens.

- *BMP 1.3. Public Events (Sediment and Bacteria)* - The City will participate in public events such as the Community Wellness Festival to deliver its stomwater program messages and to distribute stormwater related information to its citizens.
- *BMP 1.4. Publications - Print and Electronic (Sediment and Bacteria)* - The City will use publications such as its Cit-E newsletter to deliver its stomwater program messages and to distribute stormwater related information to its citizens.
- *BMP 1.5. Watershed and Stormwater Educational Opportunities Program (Sediment and Bacteria)* - The City will continue to implement its Watershed and Stormwater Opportunities Education Program directed at students in Winchester City Public Schools.
- *BMP 1.6. Other Message Delivery (Sediment and Bacteria)* - The City will utilize other types of message delivery such as "Clean Up After Your Dog" signage at the City's Dog Park to reach targeted audiences within the City.
- *BMP 1.7. Educational Materials (Sediment and Bacteria)* - The City will retain copies (electronic or hard copy) of educational materials utilized in delivery of its messages regarding high priority water quality issues to target audiences.
- *BMP 2.3. Stormwater Complaint Hotlines (Sediment and Bacteria)* - The City will maintain its current stormwater complaint hotlines to encourage public reporting of water quality and stormwater maintenance related issues to include potential illicit discharges to the MS4.
- *BMP 2.4. Promotion of the Local Environmental Events (Sediment and Bacteria)* - The City will annually promote a total of four events encouraging public participation and involvement in Household Hazardous Waste Collection Days and the Adopt-A-Stream program.
- *BMP 2.6. Sponsorship of Adopt-A-Stream Program (Sediment and Bacteria)* - The City will continue to promote the Adopt-A-Stream program by sponsoring an annual stream clean-up day.
- *BMP 3.3. Legal Authority – IDDE (Sediment and Bacteria)* - The City will maintain legal authority prohibiting illicit discharges into the MS4.
- *BMP 3.4. IDDE Investigation and Follow-Up (Sediment and Bacteria)* - The City will investigate and conduct follow-up on potential illicit discharges in accordance with procedures included in the City's Illicit Discharge Detection and Elimination (IDDE) Standard Operating Procedures Manual.
- *BMP 3.5. MS4 Outfall Dry Weather Field Screening (Sediment and Bacteria)* - The City will conduct dry weather screening on fifty (50) MS4 outfalls annually using procedures included in the City's Illicit Discharge Detection and Elimination (IDDE) Standard Operating Procedures Manual.
- *BMP 3.6. Illicit Discharge Tracking and Documentation (Sediment and Bacteria)* - The City will track and document suspected and illicit discharges, as well as, the City's investigation, follow-up and enforcement actions in accordance with the procedures included in the City's Illicit Discharge Detection and Elimination (IDDE) Standard Operating Procedures Manual.
- *BMP 3.9. Household Waste Reduction (Sediment and Bacteria)* - The City will continue to provide weekly waste collection services for City residents to include fall

leaf collection services, yard waste collection services, and bulky waste collection services.

- *BMP 3.10. Elimination of Sanitary Sewage Seepage from Public Sewers (Bacteria)* - The City will continue, as part of its sanitary sewer utilities program, to implement its inflow and infiltration program to replace or slipline sanitary sewers to prevent illicit discharges.
- *BMP 4.1. Legal Authority – Erosion and Sediment Control (Sediment)* - The City will maintain legal authority for implementation of a local erosion and sediment control program consistent with 9VAC25-840-10 et. seq.
- *BMP 4.2. Land Disturbing Activity Plan Review (Sediment)* - The City will require submission of complete Land Disturbance Permit Application and Virginia Stormwater Management Program Permit Packages for regulated land disturbance activities.
- *BMP 4.3. VPDES Construction Activity Permit Coordination (Sediment)* - The City will not authorize initiation of land disturbance activities until it receives evidence that the applicant has applied for and obtained coverage under the Virginia General Permit for Discharges of Stormwater from Construction Activities, including a completed general permit registration statement as required under City Code Section 9-50.
- *BMP 4.4. Land Disturbing Activity Inspections (Sediment)* - The City will maintain a land disturbance inspection program consistent with the requirements of Section 9-39 of the City Code to include inspection for compliance with Section 9- 58 of the City Code which requires implementation of a pollution prevention plan and Section 9-67 of the City Code requiring compliance with the approved stormwater management plan.
- *BMP 4.5. Land Disturbing Activity Tracking and Recordkeeping (Sediment)* - The City will maintain its existing program to track land disturbance activities which provides the necessary information for routine inspections, as-built inspections, surveys, and determining which areas may be most likely to incur heavier than normal sediment loading.
- *BMP 5.2. Private Stormwater Management Facility Inspections (Sediment and Bacteria)* - The City will maintain a post development stormwater management facility inspection program in accordance with Section 9-67 of the City Code and will perform inspections on these facilities at least once every five (5) years.
- *BMP 5.3. Maintenance Agreements (Sediment and Bacteria)* - The City will continue to require executed maintenance agreements for stormwater management facilities in accordance with Section 9-63 of the City Code.
- *BMP 5.4. City-Owned Stormwater Management Facility Inspections (Sediment and Bacteria)* - The City Division of Engineering will inspect stormwater management facilities owned/operated by the City annually using procedures identified in the Public Stormwater Management Facility Inspection Standard Operating Procedures Manual.
- *BMP 5.5. City-Owned Stormwater Management Facility Maintenance (Sediment and Bacteria)* - The City Division of Public Works will conduct maintenance on City-Owned Stormwater Management Facilities, as necessary, and in response to Division of Engineering inspections.

- *BMP 6.1. Standard Operating Procedures (Sediment and Bacteria)* - The City will develop and implement standard operating procedures for pollution prevention to be incorporated into daily operational activities.
- *BMP 6.2. Stormwater Pollution Prevention Plans (Sediment and Bacteria)* - The City will develop a stormwater pollution prevention plan (SWPPP) for the equipment and maintenance facility located at Jim Barnett Park.
- *BMP 6.4. Pollution Prevention Inspections (Sediment and Bacteria)* - The City will conduct an annual pollution prevention inspection at the equipment and maintenance facility located at Jim Barnett Park.
- *BMP 6.5. Staff Training (Sediment and Bacteria)* - The City will conduct staff training in accordance with the training schedule and training modules included in the City of Winchester Stormwater Training Plan.
- *BMP 6.6. Street Sweeping (Sediment and Bacteria)* - The City will continue its street sweeping program and track the amount of litter, sediment, and debris removed.

More detailed descriptions for each of these BMPs can be found in the City's MS4 Program Plan which is available for download at http://www.winchesterva.gov/engineering/stormwater . The City plans to continue implementation of these BMPs to address the sediment and bacteria WLAs listed in the aforementioned TMDLs. Based on the results of the City's Action Plan assessment methodology (as described in Section 9 of this Action Plan), an adaptive iterative approach will be used to enhance/replace these BMPs to achieve the most effective plan for reducing the discharge of sediment and bacteria from the City's MS4 and to meet the assigned TMDL WLAs.

LEGAL AUTHORITIES

6. *Legal authorities such as ordinances, state, federal, and other permits, orders, specific contract language, and inter-jurisdictional agreements applicable to reducing the POCs identified in each respective TMDL.*

The City has reviewed its MS4 Program Plan and ordinances to evaluate its ability to comply with the Special Condition for approved (other than the Chesapeake Bay TMDL) TMDLs (Part II.B) in the MS4 Permit. Based on this review, it is the City's opinion that Winchester does not require any new or modified legal authorities or policies to meet the requirements of this special condition. The following is a list of the City's relevant existing legal authorities and policies:

- City of Winchester's Water Protection Ordinance (Chapter 9 of the City Code)
- City of Winchester's MS4 Program Plan
- City of Winchester's Public Services Standards Manual
- City of Winchester's Animals and Fowl Ordinance (Chapter 5 of the City Code)

ENHANCEMENTS TO PUBLIC EDUCATION, OUTREACH, AND EMPLOYEE TRAINING

7. *Enhancements to public education, outreach, and employee training programs to also promote methods to eliminate and reduce discharges of the POC(s) for which a WLA has been assigned.*

Enhancements to Public Education and Outreach Program

The City continues to implement a very robust public education and outreach program as part of its MS4 Program Plan. The City's webpage is the primary public education and outreach tool utilized for reaching the program's targeted audiences and providing for distribution of educational materials to convey the appropriate messages. Publications currently available for download from the City's Stormwater webpage include the following:

- Stormwater Complaint Hotline Flyer (Sediment and Bacteria)
- EPA's "After the Storm" Video Series (Sediment and Bacteria)
- "Pick it Up, It's Your Doodie" Pet Waste Brochure (Bacteria)
- "Please Do Not Feed the Waterfowl" Wildlife Waste Brochure (Bacteria)
- "How to Make Your Own Rain Barrel" Presentation (Sediment)
- "Adopt-A-Stream" Flyer (Sediment and Bacteria)

As can be seen from this list, the City has utilized several of these publications to directly address the pollutants of concern (sediment and bacteria) for which a WLA has been assigned to the City. The following publications were customized for the City's use and are now available for download on the City's stormwater webpage:

- *After the Storm Brochure - English* - English version of this brochure customized with the City's contact information. (Sediment and Bacteria)
- *After the Storm Brochure - Spanish* - Spanish version of this brochure customized with the City's contact information. (Sediment and Bacteria)
- *SepticSmart Short Rack Brochure in English* - English version of this brochure customized with the City's contact information. (Bacteria)
- *SepticSmart Short Rack Brochure in Spanish* - English version of this brochure customized with the City's contact information. (Bacteria)
- *Make Your Home the Solution to Stormwater Pollution Brochure* - English version of this brochure customized with the City's contact information. (Sediment and Bacteria)
- *Kids Stormwater Stickers* - Print sheets of stormwater stickers that can be printed on sticky back paper. (Sediment and Bacteria)

These publications will also be distributed at future public events. The City is seeking to broaden its reach of the targeted audiences for reduction of sediment and bacteria discharges by offering several of these publications in both English and Spanish.

Another enhancement to the City's program designed specifically to address source control of bacteria is the City's promotion of picking up pet waste through the use of "*Clean Up After Your Dog*" signs which were placed at the Dog Park located in Jim Barnett Park. These signs along with the dog park rules clearly inform pet owners that they must clean up after their pets with the supplied waste bags and dispose of the bags in the provided sealed container located in the park.

Through these enhancements to the City's Public Education and Outreach Program, the City expects to further reduce the discharge of both sediment and bacteria into local streams.

Enhancements to Employee Training Program

The City's employee training program consists of four different PowerPoint training modules. All four modules have been modified to specifically address the pollutants of concern (sediment and bacteria) for which a WLA has been assigned to the City. These four training modules and their recent enhancements are described below:

Module 1: Recognition and Reporting of Illicit Discharges - Make City staff more aware of the City's focus and procedures to prevent, detect, and eliminate illicit discharges. This module was enhanced to include identification and reporting of illicit discharges associated with both sediment and bacteria sources.

Module 2: Pollution Prevention Practices (PPP) used in Road, Street, and Parking Lot Maintenance - Provide City employees an understanding on how to prevent stormwater pollution during the City's street, parking, and drainage operations by adhering to SOPs and good housekeeping practices. This module was enhanced to include prevention of sediment laden runoff from entering the MS4. Specifically, the training covers control of concrete cutting slurries, erosion & sediment controls, and building material stockpile protection.

Module 3: Pollution Prevention Practices used for Fleet and Facility Operations - Increase employee awareness on how to reduce stormwater pollution from daily fleet and facility operations by adhering to SOPs and good housekeeping practices. This module was enhanced to include proper storage of materials to minimize the release of sediment into the MS4 and implementation of a SWPPP on the City Yards facility.

Module 4: Minimizing Stormwater Pollution from Parks and Grounds Maintenance - Increase awareness on how to minimize stormwater pollution from parks and ground operation/maintenance activities by adhering to good housekeeping practices. This module was enhanced to include training on proper storage of materials to minimize the release of sediment into the MS4 and promotion of the use of the City's Dog Park along with enforcement of the City's requirements for clean-up and proper disposal of pet waste in City parks. Furthermore this module was enhanced to include landscaping techniques for reducing the congregation of waterfowl and enforcement of the City's ordinance against feeding waterfowl.

BMP/MILESTONES IMPLEMENTATION SCHEDULE

8. A schedule of interim milestones and implementation of the items in 5, 6, and 7.

As permitted in Section II.B.2 of the MS4 General Permit and referred to in DEQ's Local TMDL Action Plan Guidance Document, the City is proposing to implement this Action Plan in multiple stages over multiple permit cycles using an adaptive iterative approach. This approach will allow the City to gather the necessary data and information to determine the most effective BMPs/management strategies for controlling POC loads along with identifying targeted areas for their implementation to meet the TMDL WLAs for bacteria and sediment. The following schedule is proposed for implementation of the BMPs and milestone activities included in this Action Plan for the current permit cycle ending on October 31, 2023:

BMP/Milestone Activity	Schedule
Submission of Local TMDL Action Plan to DEQ	May 1, 2020
BMP 1.1. City Stormwater Webpage	Annually
BMP 1.2. Social Media	Annually
BMP 1.3. Public Events	Annually
BMP 1.4. Publications - Print and Electronic	Annually
BMP 1.5. Watershed and Stormwater Educational Opportunities Program	Annually
BMP 1.6. Other Message Delivery	Annually
BMP 1.7. Educational Materials	Annually
BMP 2.3. Stormwater Complaint Hotlines	Annually
BMP 2.4. Promotion of the Local Environmental Events	Annually
BMP 2.6. Sponsorship of Adopt-A-Stream Program	Annually
BMP 3.3. Legal Authority – IDDE	Annually
BMP 3.4. IDDE Investigation and Follow-Up	Annually
BMP 3.5. MS4 Outfall Dry Weather Field Screening	Annually
BMP 3.6. Illicit Discharge Tracking and Documentation	Annually
BMP 3.9. Household Waste Reduction	Annually
BMP 3.10. Elimination of Sanitary Sewage Seepage from Public Sewers	Annually
BMP 4.1. Legal Authority – E and SC	Annually
BMP 4.2. Land Disturbing Activity Plan Review	Annually
BMP 4.3. VPDES Construction Activity Permit Coordination	Annually
BMP 4.4. Land Disturbing Activity Inspections	Annually
BMP 4.5. Land Disturbing Activity Tracking and Recordkeeping	Annually
BMP 5.2. Private Stormwater Management Facility Inspections	Every 5 Years
BMP 5.3. Maintenance Agreements	Annually
BMP 5.4. City-Owned Stormwater Management Facility Inspections	Annually
BMP 5.5. City-Owned Stormwater Management Facility Maintenance	As-Needed
BMP 6.1. Standard Operating Procedures	Annually
BMP 6.2. Stormwater Pollution Prevention Plans	Annually
BMP 6.4. Pollution Prevention Inspections	Annually
BMP 6.5. Staff Training	Annually
BMP 6.6. Street Sweeping	Annually
Prepare WQ Monitoring Reports	Annually

METHODS TO ASSESS TMDL ACTION PLAN

9. Methods to assess TMDL Action Plans for their effectiveness in reducing the pollutants identified in the WLAs.

In order to assess the effectiveness of the City's Abrams Creek and Lower Opequon Creek Combined Sediment and Bacteria TMDL Action Plan, the City prepared a Water Quality (WQ) Monitoring Program. The City is actively collecting water quality samples (TSS and fecal coliform) from representative MS4 outfalls that discharge into the impaired reaches of Abrams Creek and Lower Opequon Creek. The City will utilize the water quality data collected under the monitoring program to: Identify potential sources of discharge of the POCs; target locations within the MS4 permit area for implementation of BMPs; and ultimately to assess the overall effectiveness of the Action Plan in reducing the discharge of the POCs from the City's MS4.

During the current permit cycle, the City is looking to establish baseline levels that can be used as comparisons for future data analyzes. Four (4) stormwater locations were sampled and analyzed for total suspended solids (TSS) and Escherichia Coli. The results have been summarized in the tables below:

Total Suspended Solids (TSS) Sample Data (mg/L)			
Outfall Point	**12/6/2016**	**6/19/2017**	**7/30/2018**
OT-11	3.00	<1.0*	123.00
OT-34	98.70	584.00	212.00
OT-42	31.00	53.60	25.20
OT-54	35.20	5.80	2.80
*Note: Sample was obtained on 06/05/2017.			

Table 1: Total Suspended Solids (TSS) Sample Data

Escherichia Coli Sample Data (CFU/100 ml)				
Outfall Point	**12/6/2016**	**6/19/2017**	**7/30/2018**	**1/24/2019**
OT-11	0.00	0.00	450.00	233.00
OT-34	680.00	-	-	0
OT-42	160.00	380.00	-	467.00
OT-54	0.00	240.00	550.00	633.00

Table 2: Escherichia Coli Sample Data

Samples were taken during varying rainfall events to ensure a comprehensive data pool for future analysis. The City will continue it's WQ Monitoring Program going forward. This data will be used to determine if any adjustments are necessary to the Action Plan with regards to the BMPs/management strategies for controlling POC loads. At the end of each MS4 permit reporting

period, the City will also prepare annual WQ monitoring reports to be included with City's MS4 Annual Report.

MEASURABLE GOALS AND METRICS TO TRACK COMPLIANCE

10. Measurable goals and the metrics that the permittee and DEQ will use to track those goals (and the milestones required by the permit). Evaluation metrics other than monitoring may be used to determine compliance with the TMDL(s).

The City intends to demonstrate its progress on implementation of this Action Plan by tracking, monitoring, and reporting on BMP/milestone activity progress in its MS4 Program Annual Report that is submitted to DEQ on October 1st of each permit year. In the Annual Report, the City will provide updates on the status of each of the BMP/milestone activities listed under Section 8 of this Action Plan to include compliance with the proposed schedule. The City will also continue its Water Quality Monitoring Program to further track potential increase in POC loads and better adjust its stormwater strategy. In accordance with the adaptive iterative approach adopted by the City, referenced in this Action Plan, the City may modify/replace BMPs, as necessary, to achieve the most effective plan for reducing the discharge of sediment and bacteria from the City's MS4 and meeting the assigned TMDL WLAs.

ATTACHMENT 1 – EVALUATION OF THE CITY OWNED/OPERATED PROPERTIES FOR POTENTIAL WLA POLLUTANT SOURCES REPORT

Memo

To: Ms. Kelly Henshaw

From: GKY & Associates, Inc.

Date: May 30, 2013

Re: Report of Evaluation of City Owned Properties for WLA Pollutant Sources

---

Introduction

In accordance with the City of Winchester's MS4 Program plan, GKY & Associates, Inc. (GKY) evaluated City owned/operated properties for potential sources of pollutants for which the City was assigned a waste load allocation (WLA) in a State Water Control Board approved Total Maximum Daily Load (TMDL). GKY performed an initial potential source evaluation task that utilized the City's Geographic Information Systems (GIS) to identify and characterize City owned/operated properties, land use type (the City's zoning layer) for each property and regulated outfall location/presence on each property. The outcome of the initial potential source evaluation task identified City owned/operated properties requiring further site review and runoff characterization. For the City owned/operated properties found to require a site review and runoff characterization, GKY performed field reconnaissance on site to review and assess the on-the-ground conditions for each of the City owned/operated properties and document potential pollution generating activities (storage, transfer, transport, or disposal) on each site, stormwater pollution potential from the site (exposure to precipitation), and locations of outfalls. Detailed summaries for the initial potential source evaluation task and site review task are provided below.

Task 1. Perform Initial Potential Source Evaluation.

GKY utilized the City's GIS to perform a potential source evaluation by combining two data layers provided by the City of Winchester (Winchester_City_Parcels and Corporate_Limits). These two layers were merged with a regulated outfalls layer and overlaid on aerial imagery. Eighty one (81) City owned/operated properties were analyzed based on two criteria that would trigger the need for a field visit to the site. The criteria evaluated were as follows: (1) The presence of regulated outfalls on-site that would allow for an adequate water sampling location, and (2) The presence of potential sources of E.Coli (Animal/Waterfowl activity) or TSS (Denuded Areas or stockpiling)

Based on the GIS analysis, it was determined that six (6) City owned/operated properties met both criteria laid forth to warrant a site review. The sites are listed in Table 1.

Table 1. GIS determination of City owned or operated sites requiring a site field visit.

Site	Site Name	Site Address
1	Hollingsworth House	E S 1360 South Pleasant Valley Road
2	Moose Lodge	S S 215 East Cork Street
3	Court Square Auto park	E S 4-10 South Cameron Street
4	Jim Barnett Park	S S 1001 East Cork Street
5	Shawnee Springs Reserve	S S 301 East Pall Mall Street
6*	Frederick Douglas Elementary	S S 100 West Cedarmeade Avenue
**Note: Site 6 Was not evaluated per City of Winchester instructions*		

Task 2. Perform Site Reviews.

GKY performed field reconnaissance for each of the sites listed in Table 1 to evaluate and assess potential pollution generating activities on the City owned properties. Furthermore, the field visits allowed the team to analyze the drainage aspects, land cover, and infrastructure (piping, culverts, channels) that would result in determining representative sampling locations. GKY took several photos per site, as well as any important notes. A brief summary of each site, representative photo(s), and an explanation as to whether the site qualifies for sampling is provided below.

Site 1 – Hollingsworth House (Representative sampling locations not present).

The Hollingsworth House sits nested in the lower western corner of Jim Barnett Park. The land cover consists primarily of a grassed property, with a riparian buffer along the banks of the stream that divides the site. Due to the presence of the stream, waterfowl and other animal indicators raise the probability of an *E.Coli* presence. On site there are 3 regulated outfalls, but sampling at these locations would not be representative of the site itself. Two outfalls located closest to the road, drain only the road and none of the site, whereas the third outfall drains the

access road within the site, but doesn't have the sampling indicators needed to justify the presence of E.Coli or TSS. Figure 1 illustrates the land cover characteristics and outfall locations (red asterisks') for the Hollingsworth House.

Figure 1. Hollingsworth House Land Cover and Outfall Locations.

Site 2 – Moose Lodge (Representative sampling locations not present).

The Moose Lodge parcel runs parallel to a concrete channel, which conveys one of the City's urban streams. The property consists primarily of the lodge and its associated parking lot, as well as a grassed area towards the southern part of the site. Four outfalls drain this parcel and the significant presence of leaf detritus, sediment, and plant debris throughout the parking lot provide quality TSS indicators. Originally, this site met all of the criteria set forth to qualify as representative sampling location, but after correspondence with the City it was determined that the City property encompasses only the concrete channel area which includes the outfalls, and not the Moose Lodge property. Site photos are shown in Figures 2 and 3.

Figure 2. Moose Lodge Site Overall

Figure 3. Concrete Channel (Actual City Owned Property)

Site 3 – Court Square Auto Park (Representative sampling locations not present).

Court Square Auto Park is located in Downtown/Old Town Winchester. The property has a large, multi-deck parking garage on it and is almost 100% impervious. An urban stream runs under the parking garage which raises the probability of the presence of E.Coli essentially "on-site", but the representative outfalls derive from the roof drains of the parking garage, which are not likely to be sources of E.Coli or TSS. Due to the lack of optimal sampling locations on site these outfalls would not be classified as a representative outfall sampling locations. Site characteristics and outfalls are shown in Figures 4 and 5.

Figure 4. Court Square outfall locations (Roof Drains)

Figure 5. Stream running parallel and under Court Square Auto Park. Note: The outfalls discharge to the stream, but only drain the parking garage.

Site 4 – Jim Barnett Park (Representative sampling locations not present).

Jim Barnett Park is a large park comprised of several different land covers. The park has recreational fields, drainage ponds, maintenance locations with large stockpiles, and a dog park all having indicators of TSS, E.Coli, or both. The site also has 3 regulated outfalls within the parcel limits. The park is an ideal location for representative sampling, but as seen with the previous sites, the regulated outfalls on site drain adjacent properties and thus cannot adequately represent the City parcel through sampling. Site characteristics are shown in Figures 6 and 7.

Figure 6. Duck Pond with waterfowl present. Note: There is no regulated outfall at the downstream portion of this pond, so sampling cannot be performed.

Figure 7. Regulated outfall within Jim Barnett Park limits. Outfall drains a Shenandoah University owned parking lot.

Site 5 – Shawnee Springs Reserve (Representative sampling location present).

Shawnee Springs Reserve is a wildlife and park area, having open grassed space, wooded riparian areas, a stream that runs the extent of the entire property, and a walking trail for pedestrian use. The site is bordered to the north by the City Yards Facility, and has five regulated outfalls. As seen in the previous sites, the majority of the outfalls drained adjacent properties, and thus cannot be used as representative outfalls for that specific site. Of the five

outfalls onsite, only one drained the site, showed the presence of TSS, and could easily be accessed to gather a representative sample, and thus was chosen as a quality sampling location. Figure 8 below shows the entire parcel and identifies the location of the representative outfall. Figures 9 and 10 show the representative outfall and upland drainage contributing to the outfall respectively.

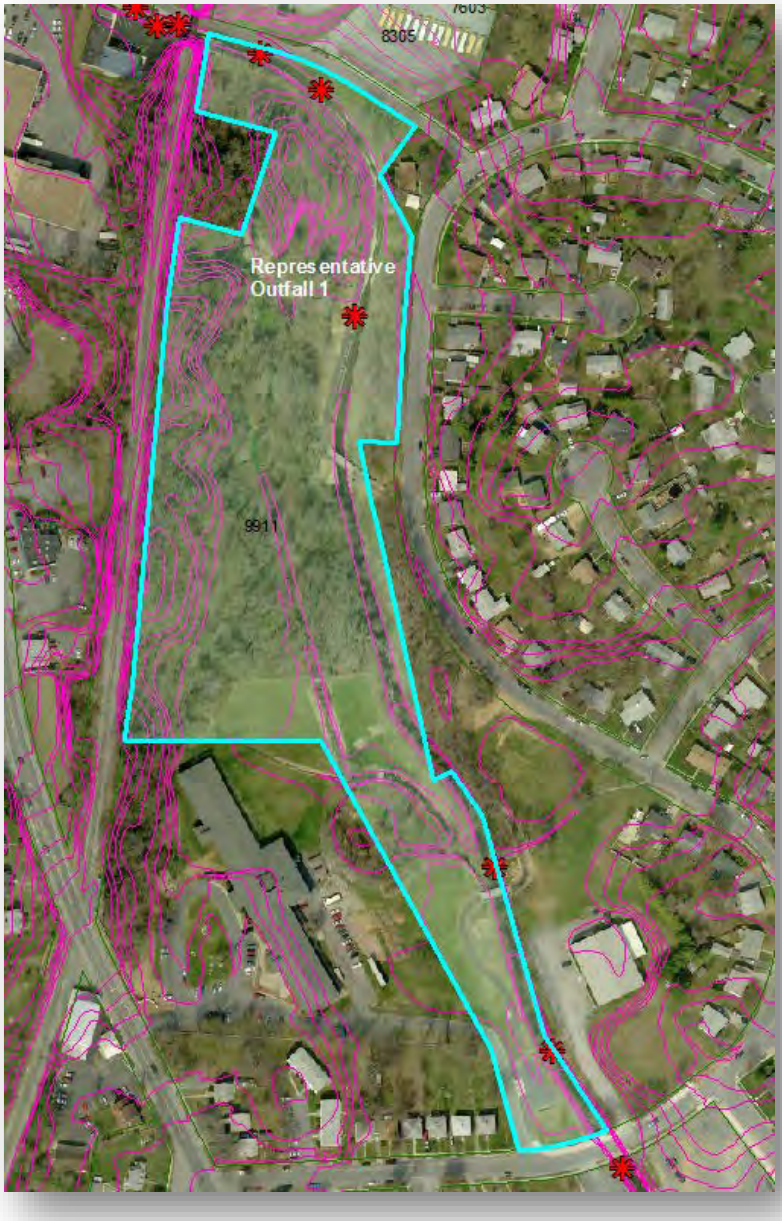


Figure 8. Shawnee Springs Reserve site overall. Representative Outfall 1 is shown in white text.

Figure 9. Front of Representative Outfall 1.

Figure 10. Upland drainage to Representative Outfall 1.

Task 3. Perform Representative Sampling

As part of the site review for Shawnee Springs Reserve, two samples (1) TSS, and (2) E.coli, were required during two sampling periods (October through March and April through September) in order to comply with the sampling procedures set forth in Section I.B.6.a and I.B.6.b of the current Virginia Small MS4 General Permit.

The first sampling took place on February 19, 2013. The field conditions were cold with a temperature right above freezing, and the total precipitation for that day was approximately 0.15 inches. The samples were collected approximately at 8:25 a.m. and received by Environmental Systems Service (ESS) by 10:30 a.m. The lab results are shown in Figure 11. The second of the two samplings took place on May 7, 2013. The field conditions were windy with a mean temperature of 56˚C, and a total daily precipitation of 1.35 inches. The sample was taken approximately at 10:15 a.m. and received by ESS by 12:30 pm. Figure 12 illustrates the sample results. The full laboratory analysis can be seen in Attachment 2.

Sample ID#:	0013520	**Sample Source:**	Winchester VA
Sample Date/Time:	02/19/2013 / 08:25	**Date Received:**	02/19/2013

Parameter	Results	Unit	Report Limit	Method	Analysis Date	Time	INIT
Escherichia coli (100 ml)	<1	MPN	1	COLILERT	02/19/2013	11:25	JI
Total Suspended Solids	10.8	mg/l	1.00	SM 19 2540D	02/19/2013	16:07	JI

Figure 11. February 19, 2013 Sample Results

Sample ID#:	0016669	**Sample Source:**	Shawnee Park, Winchester VA
Sample Date/Time:	05/07/2013 / 10:15	**Date Received:**	05/07/2013

Parameter	Results	Unit	Report Limit	Method	Analysis Date	Time	INIT
Escherichia coli (100 ml)	161.6	MPN	1	COLILERT	05/07/2013	12:28	JI
Total Suspended Solids	19.6	mg/l	1.00	SM 19 2540D	05/08/2013	10:42	EP

Figure 12. May 7, 2013 Sample Results

Task 4. Estimate Runoff Volume & Pollutant Loads

Per Section I.B.7 of the current Virginia Small MS4 General Permit, the City of Winchester is required to estimate the runoff volume and pollutant loads (for pollutants identified in the WLAs) discharged by the MS4. GKY utilized Purdue University's Long Term Hydrologic Impact Analysis (L-THIA) model to determine the City of Winchester's MS4 hydrologic and non-point source pollutant discharge characteristics.

Model Background and Winchester L-THIA Development

L-THIA is based on more than 30 years of daily precipitation data for the United States. The model is primarily used to estimate changes in recharge, runoff volumes, and non-point source pollutant loads from MS4s for which the City was assigned a waste load allocation (WLA) in a State Water Control Board approved Total Maximum Daily Load (TMDL). The pollutant loading evaluated utilizing L-THIA was TSS and Fecal Coliform, the latter of the two converted to E.*Coli* concentrations using Equation's 1 and 2.

Equation 1. Fecal Coliform (FC) to E.*Coli* Translator Equation for L-THIA Pollutant Loads[1].

$$E.Coli = 0.988 \times FC^{0.919}$$

Where, the bacteria concentrations (FC and E.*Coli*) are millions of coliform.

[1] HSPF Model Calibration and Verification for Bacteria TMDLs, "Guidance Memo No. 03-2012 Commonwealth of Virginia, Department of Environmental Quality, Water Division, September 3, 2003, p.4.

Equation 2. Fecal Coliform (FC) to E.*Coli* Translator Equation for samples[2].

$$E.Coli\ Concentration = 2^{-0.0172} \times (FC\ Concentration^{0.91905})$$

Where, the bacteria concentrations (FC and E.*Coli*) are in cfu/100mL.

[2] Bacteria TMDLs for Abrams Creek and Upper and Lower Opequon Creek Located in Frederick and Clarke County, Virginia, Virginia Tech Department of Biological Systems Engineering, October 2003, Revised January 2004, p.135.

Model Inputs

L-THIA uses the following model inputs to generate pollutant loading results: (1) State and County, (2) Hydrologic Soil Group (HSG), and (3) Land use. Per Winchester's guidance, we utilized the City's zoning layer in GIS and converted their zoning land classifications to match the L-THIA land use classes. The conversions can be seen in Table 2.

After the land use was reclassified, soils data was needed to further develop the model. To date, the City of Winchester hasn't had a detailed soil study performed, and thus state soil survey data was used. The vast majority of the City had HSG B as the underlying soil media, with a small portion of HSG C in the lower south eastern corner.

The land use reclassification and soil group layers were evaluated in GIS to determine the area breakouts for each soil group and corresponding land use. These parameters became the final inputs to the L-THIA model and are summarized in Table 3.

Table 2. Land Use conversion from Winchester Zoning Layer to L-THIA Land use classification.

L-THIA LAND USES	WINCHESTER ZONING CLASSIFICATION	WINCHESTER TO L-THIA
Commercial	Central Business District	Commercial
Industrial	Commercial Industrial District	Commercial
Low Density Residential	Health Services District	Commercial
Agricultural	Highway Commercial District	Commercial
Water/Wetlands	Medical Center District	Commercial
Grass/Pasture	Planned Commercial	Commercial
Forest	High Density Residential District	High Density Residential
High Density Residential	Higher Education District	High Density Residential
	Limited High Density Residential	High Density Residential

	Medium Density Residential District	High Density Residential
	Residential Business District	High Density Residential
	Residential Office District	High Density Residential
	Intensive Industrial District	Industrial
	Limited Industrial District	Industrial
	Education, Institution, and Public Use District	Low Density Residential
	Low Density Residential District	Low Density Residential

Table 3. L-THIA Model Inputs

L_THIA Land Use	Soil Group	Area Total (ac)
Commercial	B	1207.38
High Density Residential	B	1465.51
Industrial	B	336.03
Low Density Residential	B	1772.39
Commercial	C	37.84
High Density Residential	C	74.77
Industrial	C	180.22

Model Results

Once the model inputs were generated, they were run in L-THIA to determine the pollutant loadings for both TSS and Fecal Coliform (Converted to E.Coli using Eq.1). The annual TSS and E.Coli results can be seen in Tables 4 and 5 respectively, and the L-THIA results are provided in Attachment 1.

Table 4. Annual Total Suspended Solids (TSS) in lbs. Pollutant Loading

Land Use	Soil	TSS (lbs.)
Commercial	B	202608
High Density Residential	B	94030
Industrial	B	42113
Low Density Residential	B	34674
Commercial	C	7822
High Density Residential	C	7632
Industrial	C	29343
Total		***418222***

Table 5. Annual E.Coli (millions) Pollutant Loading

Land Use	Soil	E.Coli (millions)
Commercial	B	44034
High Density Residential	B	76384
Industrial	B	13132
Low Density Residential	B	30538
Commercial	C	2213
High Density Residential	C	7599
Industrial	C	9421
Total		***183321***

Task 5. Document Results in a Brief Memorandum Report

This memo report serves as GKY's deliverable under Task 5 of the scope of work.

Attachments

Attachment 1: L-THIA Model Results

SUMMARY OF SCENARIOS
State: Virginia
County: Winchester

Land Use	Hydrologic Soil Group	Current	acres Scenario 1	Scenario 2
Commercial	B	1207.38	0	0
High Density Residential	B	1465.514	0	0
Industrial	B	336.0322	0	0
Low Density Residential	B	1772.39	0	0
Commercial	C	37.84	0	0
High Density Residential	C	74.77	0	0
Industrial	C	180.224	0	0

RUNOFF RESULTS
Avg. Annual Runoff Volume (acre-ft)

Land Use	Current	Scenario 1	Scenario 2
Commercial	1339.84	0	0
High Density Residential	841.73	0	0
Industrial	255.47	0	0
Low Density Residential	310.39	0	0
Commercial	51.72	0	0
High Density Residential	68.32	0	0
Industrial	178.00	0	0
Total Annual Volume (acre-ft)	3045.51	0	0

Avg. Annual Runoff Depth (in)

Current	Scenario 2	Scenario 3
7.20	0	0

Avg. Runoff Depth by Landuse

Land Use	Hydrologic Soil group	Curve Number	Runoff Depth (in)
Commercial	B	92	13.37
High Density Residential	B	85	6.92
Industrial	B	88	9.16
Low Density Residential	B	70	2.11
Commercial	C	94	16.47
High Density Residential	C	90	11.01
Industrial	C	91	11.9
Average Annual Rainfall Depth (in)			39.71

NONPOINT SOURCE POLLUTANT RESULTS

Nitrogen (lbs)

Land Use	Current	Scenario 1	Scenario 2
Commercial	4891	0	0
High Density Residential	4174	0	0
Industrial	877	0	0
Low Density Residential	1539	0	0
Commercial	188	0	0
High Density Residential	338	0	0
Industrial	611	0	0
Total	12618	0	0

Phosphorous (lbs)

Land Use	Current	Scenario 1	Scenario 2
Commercial	1168	0	0
High Density Residential	1307	0	0
Industrial	194	0	0
Low Density Residential	482	0	0
Commercial	45	0	0
High Density Residential	106	0	0
Industrial	135	0	0
Total	3437	0	0

Suspended Solids (lbs)

Land Use	Current	Scenario 1	Scenario 2
Commercial	202608	0	0
High Density Residential	94030	0	0
Industrial	42113	0	0
Low Density Residential	34674	0	0
Commercial	7822	0	0
High Density Residential	7632	0	0
Industrial	29343	0	0
Total	418222	0	0

Lead (lbs)

Land Use	Current	Scenario 1	Scenario 2
Commercial	47	0	0
High Density Residential	20	0	0

Industrial	10	0	0
Low Density Residential	7	0	0
Commercial	1	0	0
High Density Residential	1	0	0
Industrial	7	0	0
Total	93	0	0

Copper (lbs)

Land Use	Current	Scenario 1	Scenario 2
Commercial	52	0	0
High Density Residential	20	0	0
Industrial	10	0	0
Low Density Residential	7	0	0
Commercial	2	0	0
High Density Residential	1	0	0
Industrial	7	0	0
Total	99	0	0

Zinc (lbs)

Land Use	Current	Scenario 1	Scenario 2
Commercial	657	0	0
High Density Residential	183	0	0
Industrial	170	0	0
Low Density Residential	67	0	0
Commercial	25	0	0
High Density Residential	14	0	0
Industrial	118	0	0
Total	1234	0	0

Cadmium (lbs)

Land Use	Current	Scenario 1	Scenario 2
Commercial	3	0	0
High Density Residential	1	0	0
Industrial	1	0	0
Low Density Residential	0.634	0	0
Commercial	0.135	0	0
High Density Residential	0.139	0	0
Industrial	0.970	0	0
Total	6.878	0	0

Chromium (lbs)			
Land Use	Current	Scenario 1	Scenario 2
Commercial	36	0	0
High Density Residential	4	0	0
Industrial	4	0	0
Low Density Residential	1	0	0
Commercial	1	0	0
High Density Residential	0.390	0	0
Industrial	3	0	0
Total	49.39	0	0

Nickel (lbs)			
Land Use	Current	Scenario 1	Scenario 2
Commercial	43	0	0
High Density Residential	22	0	0
Industrial	5	0	0
Low Density Residential	8	0	0
Commercial	1	0	0
High Density Residential	1	0	0
Industrial	4	0	0
Total	84	0	0

BOD (lbs)			
Land Use	Current	Scenario 1	Scenario 2
Commercial	83963	0	0
High Density Residential	58482	0	0
Industrial	9745	0	0
Low Density Residential	21566	0	0
Commercial	3241	0	0
High Density Residential	4747	0	0
Industrial	6790	0	0
Total	188534	0	0

COD (lbs)			
Land Use	Current	Scenario 1	Scenario 2
Commercial	423470	0	0
High Density Residential	113524	0	0
Industrial	31672	0	0

Low Density Residential	41863	0	0
Commercial	16349	0	0
High Density Residential	9215	0	0
Industrial	22067	0	0
Total	658160	0	0

Oil & Grease (lbs)

Land Use	Current	Scenario 1	Scenario 2
Commercial	32855	0	0
High Density Residential	3898	0	0
Industrial	2088	0	0
Low Density Residential	1437	0	0
Commercial	1268	0	0
High Density Residential	316	0	0
Industrial	1455	0	0
Total	43317	0	0

Fecal Coliform (millions of coliform)

Land Use	Current	Scenario 1	Scenario 2
Commercial	114496	0	0
High Density Residential	208493	0	0
Industrial	30691	0	0
Low Density Residential	76884	0	0
Commercial	4420	0	0
High Density Residential	16924	0	0
Industrial	21384	0	0
Total	473292	0	0

Fecal Strep (millions of coliform)

Land Use	Current	Scenario 1	Scenario 2
Commercial	298685	0	0
High Density Residential	583782	0	0
Industrial	19300	0	0
Low Density Residential	215276	0	0
Commercial	11531	0	0
High Density Residential	47388	0	0
Industrial	13447	0	0
Total	1189409	0	0

Attachment 2: ESS Lab Results

Environmental Systems Service, Ltd.

Analytical Report

GKY & Associates
ATTN: Casey Kight
4229 Lafayette Ctr Dr, St 1041
Chantilly, VA 20151

Report Date: 02/25/2013
Job #:
Customer #: 0001470
Customer PO #:
Collected By: Customer
Sample Location:

Sample ID#: 0013520 **Sample Source:** Winchester VA
Sample Date/Time: 02/19/2013 / 08:25 **Date Received:** 02/19/2013

Parameter	Results	Unit	Report Limit	Method	Analysis Date	Time	INIT
Escherichia coli (100 ml)	<1	MPN	1	COLILERT	02/19/2013	11:25	JI
Total Suspended Solids	10.8	mg/l	1.00	SM 19 2540D	02/19/2013	16:07	JI

Environmental Systems Service, Ltd.

Analytical Report

GKY & Associates
ATTN: David Breindel
4229 Lafayette Ctr Dr, St 1850
Chantilly, VA 20151

Report Date: 05/14/2013
Job #:
Customer #: 0001470
Customer PO #:
Collected By: Customer
Sample Location: City of Winchester

Sample ID#: 0016669
Sample Date/Time: 05/07/2013 / 10:15
Sample Source: Shawnee Park, Winchester VA
Date Received: 05/07/2013

Parameter	Results	Unit	Report Limit	Method	Analysis Date	Time	INIT
Escherichia coli (100 ml)	161.6	MPN	1	COLILERT	05/07/2013	12:28	JI
Total Suspended Solids	19.6	mg/l	1.00	SM 19 2540D	05/08/2013	10:42	EP

ATTACHMENT 2 – WATER QUALITY MONITORING PROGRAM SAMPLING DATA

RP16121421

GREENWAY
ENVIRONMENTAL
LABORATORY

151 Windy Hill Lane, Winchester, Virginia 22602 | (540) 662-4185 | www.greenwayeng.com | akaval@greenwayeng.com

SAMPLE SUMMARY

Client Project ID :
Stormwater Outfall 001

Report To : Client Name: City of Winchester Engineering Department Attn: Robert Brown
Client Address: 301 Cork Street P.O.#.:
City, State, Zip: Winchester, VA, 22601

The laboratory has analyzed the following samples:

Client Sample ID	Matrix	Sample ID	Collection D/T	Received D/T	Collected by
OT-11 Grab 120616	Storm Water	16120606.01	12/06/2016 11:15	12/6/2016 13:44	Russel I B. Loy
OT-34 Grab 120616	Storm Water	16120606.02	12/06/2016 11:15	12/6/2016 13:44	Robert A. Brown
OT-42 Grab 120616	Storm Water	16120606.03	12/06/2016 11:15	12/6/2016 13:44	Ernest Rose Jr.
OT-54 Grab 120616	Storm Water	16120606.04	12/06/2016 11:35	12/6/2016 13:44	D.E. Makely

This Laboratory is NELAP accredited.
I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.

VELAP ID# 460028

RP16121421

GREENWAY
ENVIRONMENTAL
LABORATORY

151 Windy Hill Lane, Winchester, Virginia 22602 | (540) 662-4185 | www.greenwayeng.com | akaval@greenwayeng.com

TERM AND QUALIFIER DEFINITION

General Term Definition	
Conc.	Concentration
DF	Dilution Factor - the factor applied to the reported data due to sample preparation, dilution, or moisture content
ND	Non Detect - Not Detected at or above adjusted reporting limit
J	Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit
RL	adjusted Reporting Limit (QL – Quantification Limit)
MDL	adjusted Method Detection Limit (LOD – Limit of Detection)
RegLimit	Regulatory Limit
mg/l	Milligrams per Liter/ppm
mg/kg	Milligrams per Kilogram
ppm	Parts per Million
µg/L	Micrograms per Liter/ppb
µg/g	Micrograms per Gram
ppb	Parts per Billion
gr/gal	Grains per Gallon
SU	Standard Units
CCU	Cobalt Color Units
NTU	Nephelometric Turbidity Units
µS/cm	Microsiemens per cm at 25C
P/A	Presence/Absence
MPN	Most Probable Number
RB	Reagent Blank
MB	Method Blank
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LFM	Laboratory Fortified Matrix (MS – Matrix Spike)
LFMD	Laboratory Fortified Matrix Duplicate (MSD – Matrix Spike Duplicate)
DUP	Sample Duplicate
RPD	Relative Percent Difference
%Rec	Percent Recovery

Qualifier Definition

This Laboratory is NELAP accredited.

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.

VELAP ID# 460028

RP16121421

GREENWAY
ENVIRONMENTAL
LABORATORY

151 Windy Hill Lane, Winchester, Virginia 22602 | (540) 662-4185 | www.greenwayeng.com | akaval@greenwayeng.com

CERTIFICATE OF ANALYSIS

Client Name:	City of Winchester Engineering Department	Attn:	Robert Brown
Project ID:	Stormwater Outfall 001	Date:	12/14/2016 12:13 PM

Job ID :	16120606	Sample Matrix:	Storm Water
Client Sample ID:	OT-11 Grab 120616	Date Collected:	12/06/2016
Job Sample ID:	16120606.01	Time Collected:	11:15
Other Information:	OT-11	Site Address:	301 Cork Street Winchester, VA 22601

Conclusion:

Test Method	Parameter/Test Description	Result	Units	RL	DF	MDL	Q	Date/Time Prepared	Date/Time Analyzed	Analyst
SM 2540D-2011	Total Suspended Solids (TSS)									
	TSS	3.0	mg/L	1.0	1			12/08/2016 18:29	12/09/2016 10:35	CJO

This Laboratory is NELAP accredited.

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.

VELAP ID# 460028

RP16121421

GREENWAY ENVIRONMENTAL LABORATORY

151 Windy Hill Lane, Winchester, Virginia 22602 | (540) 662-4185 | www.greenwayeng.com | akaval@greenwayeng.com

CERTIFICATE OF ANALYSIS

Client Name:	City of Winchester Engineering Department	Attn:	Robert Brown
Project ID:	Stormwater Outfall 001	Date:	12/14/2016 12:13 PM

Job ID :	16120606	Sample Matrix:	Storm Water
Client Sample ID:	OT-34 Grab 120616	Date Collected:	12/06/2016
Job Sample ID:	16120606.02	Time Collected:	11:15
Other Information:	OT-34	Site Address:	301 Cork Street Winchester, VA 22601

Conclusion:

Test Method	Parameter/Test Description	Result	Units	RL	DF	MDL	Q	Date/Time Prepared	Date/Time Analyzed	Analyst
SM 2540D-2011	Total Suspended Solids (TSS)									
	TSS	98.7	mg/L	7.0	7			12/08/2016 18:29	12/09/2016 10:49	CJO

This Laboratory is NELAP accredited.

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.

VELAP ID# 460028

RP16121421

GREENWAY
ENVIRONMENTAL
LABORATORY

151 Windy Hill Lane, Winchester, Virginia 22602 | (540) 662-4185 | www.greenwayeng.com | akaval@greenwayeng.com

CERTIFICATE OF ANALYSIS

Client Name:	City of Winchester Engineering Department	Attn:	Robert Brown
Project ID:	Stormwater Outfall 001	Date:	12/14/2016 12:13 PM

Job ID :	16120606	Sample Matrix:	Storm Water
Client Sample ID:	OT-42 Grab 120616	Date Collected:	12/06/2016
Job Sample ID:	16120606.03	Time Collected:	11:15
Other Information:	OT-42	Site Address:	301 Cork Street Winchester, VA 22601

Conclusion:

Test Method	Parameter/Test Description	Result	Units	RL	DF	MDL	Q	Date/Time Prepared	Date/Time Analyzed	Analyst
SM 2540D-2011	Total Suspended Solids (TSS)									
	TSS	31.0	mg/L	5.0	5			12/08/2016 18:29	12/09/2016 10:46	CJO

This Laboratory is NELAP accredited.

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.

VELAP ID# 460028

RP16121421

GREENWAY
ENVIRONMENTAL
LABORATORY

151 Windy Hill Lane, Winchester, Virginia 22602 | (540) 662-4185 | www.greenwayeng.com | akaval@greenwayeng.com

CERTIFICATE OF ANALYSIS

Client Name:	City of Winchester Engineering Department	Attn:	Robert Brown
Project ID:	Stormwater Outfall 001	Date:	12/14/2016 12:13 PM

Job ID :	16120606	Sample Matrix:	Storm Water
Client Sample ID:	OT-54 Grab 120616	Date Collected:	12/06/2016
Job Sample ID:	16120606.04	Time Collected:	11:35
Other Information:	OT-54	Site Address:	301 Cork Street Winchester, VA 22601

Conclusion:

Test Method	Parameter/Test Description	Result	Units	RL	DF	MDL	Q	Date/Time Prepared	Date/Time Analyzed	Analyst
SM 2540D-2011	Total Suspended Solids (TSS)									
	TSS	35.2	mg/L	4.0	4			12/08/2016 18:29	12/09/2016 10:47	CJO

This Laboratory is NELAP accredited.

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.

VELAP ID# 460028

RP16121421

GREENWAY
ENVIRONMENTAL
LABORATORY

151 Windy Hill Lane, Winchester, Virginia 22602 | (540) 662-4185 | www.greenwayeng.com | akaval@greenwayeng.com

QUALITY CONTROL DATA

Analysis : Total Suspended Solids (TSS) **Method :** SM 2540D-2011 **Matrix:** Storm Water

QC Batch ID : Qb16120807 **Created Date :** 12/12/2016 **Created By :** CObert

Samples in This QC Batch : 16120606.01,02,03,04

Sample Preparation PB16120805 SM 2540D-2011 CObert

QC Type: Method Blank

	Parameter	CAS	Result	Units	DF	RL	SDL	Qual
Method Blank	TSS		<1.0	mg/L	1	1.0		
Method Blank 2	TSS		<1.0	mg/L	1	1.0		

QC Type: Duplicate

	QC Sample ID	Parameter	Result	QC Sample Result	Units	RPD	RPD CtrlLimit	Qual
Dup4	16120709.01	TSS	24.5	23.5	mg/L	2.1	20	
Dup2	16120504.01	TSS	3.0	3.0	mg/L	0.0	20	
Dup3	16120605.01	TSS	9.2	8.6	mg/L	3.4	20	
Dup	16120704.01	TSS	9.8	9.7	mg/L	1.0	20	

QC Type: LCS/LCSD

	Parameter	LCS Spk Amt	LCS Result	LCS % Rec	LCSD Spk Amt	LCSD Result	LCS % Rec	RPD	RPD CtrlLimit	% Rec CtrlLimit	Qual
LCS	TSS	100	96.0	96	100	100	100	4.1	20	80-120	
LCS2	TSS	100	102	102						80-120	
LCS2D	TSS	100	104	104						80-120	

Refer to the Definition page for terms.

This Laboratory is NELAP accredited.

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.

VELAP ID# 460028

RP16121421

GREENWAY
ENVIRONMENTAL
LABORATORY

151 Windy Hill Lane, Winchester, Virginia 22602 | (540) 662-4185 | www.greenwayeng.com | akaval@greenwayeng.com

SAMPLE CONDITION CHECKLIST

Client Name : City of Winchester Engineering Department		**Contact :**	Robert Brown
Client Address : 301 Cork Street		**Contact Phone :**	540-667-2376
JobID : 16120606	**Date Received :** 12/06/2016	**Time Received :**	01:44 PM
Temperature :	**Sample pH :**		
ThermometerID : IR CC 1	**pHPaperID :**		

Comments : Include actions taken to resolve discrepancies/problem:

	Check Points	Yes	No	N/A
1	Sample(s) received in laboratory in a cooler with ice.	✔		
2	All temperatures <6C on receipt (<10C for bacteriological) if no, the answer to Questions #3 and #4 must be "YES" in order for the sample to be considered properly preserved).		✔	
3	Cooling began immediately (within 15 minutes) after collection.	✔		
4	Samples received on the same day as sample collection.	✔		
5	Ice surrounding all samples in cooler.	✔		
6	COC form contains sampler(s) signature(s) and is properly relinquished by sampler(s) and courier(s).	✔		
7	COC form contains date and time of sample collection.	✔		
8	Sample containers arrived intact.	✔		
9	Samples were received in Greenway-provided containers.	✔		
10	Sample(s) were received in appropriate containers.	✔		
11	Sample(s) were properly preserved (includes thermal preservation).	✔		
12	All samples were properly labeled on receipt (distinguishable).	✔		
13	Sampling dates and times on bottles match COC.	✔		
14	Bottle count on COC matches number of bottles received.	✔		
15	Sample amount is sufficient for analyses requested	✔		
16	Samples received within the hold time.	✔		

CheckIn By : Sara Porter CheckIn Date : 12/06/2016

This Laboratory is NELAP accredited.

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.

VELAP ID# 460028

16120606

LABORATORY CHAIN-OF-CUSTODY RECORD

RP16121421 1

OT-54 Grab 120616

GREENWAY ENVIRONMENTAL LABORATORY

151 Windy Hill Lane. Winchester, VA 22602 Phone: (540) 662-4185

Owner Name and Address of Sampling Site City of Winchester Engineering Department 301 Cork Street Winchester, VA 22601 **Billing/Mailing Address (if different)** 15 N. Cameron St. Winchester, VA 22601 **Contact Phone:** Reports: Robert Brown 540-667-2376 Invoices: Kelly Henshaw: 540-667-1815 **Identifying No.(s)** VPDES: VAN/VAG: Other (list):	**Sampling Date:** 12-6-16 Grab: **Sampler (print)** D.E. MAKELY **Sampler (signature)** DE Makely	**Sampling Time(s)** 11:35 Grab: **Sample Source** (Outfall 001, Final Eff., etc.) ~~Outfall 001~~ OT-54 **Type** (WW, SW, GW, PW, STW, S) STW = Stormwater **Regulatory Agency** ☒ NPDES ☐ DEQ ☐ DCLS/ODW ☐ None ☐ Other (list):

Field Data (temp, pH, dissolved oxygen, TRC, etc.) (optional – for client convenience only)

Relinquished by Sampler	Date/Time	Received by (signature)	Date/Time	Condition
DE Makely	12-6 1:00 pm	Robert Brown	12-6-16 12:00pm	on ice
Relinquished by (signature)	**Date/Time**	**Received by (signature)**	**Date/Time**	**Condition**
Robert Brown	12-6-16 1:44 pm			
Relinquished by (signature)	**Date/Time**	**Received by (signature)**	**Date/Time**	**Condition at Lab Receipt**
		[signature]	12/6/16 1344	Good Cooler/Ice/Intact

Email Invoice? Y **Email Results?** Y **Turnaround Request:** Standard x Priority ☐
Email: Kelly.henshaw@winchesterva.gov **Email:** robert.brown@winchesterva.gov **Due Date:**

GREENWAY ENGINEERING USE ONLY indicated by GRAY AREAS.
Below measurements are QC measurements out-of-hold in the lab, do not report.

Greenway Sample ID	Sample Time	Container Type	COMP	GRAB	Preservation	pH SU	Temp. °C	TRC mg/L	Analysis Requested (circle)
16120606 04A	1135	2L plastic		X	<6C	X	6.3	X	(TSS)
		500 mL plastic (a/w)		X	H2SO4 to pH<2, <6C				TKN, Nitrate+Nitrite, Total N, Total Phosphorus as P
		2x 250 mL amber glass		X	<6C	X		X	TPH-DRO
		3x 40 mL amber glass vial		X	HCl to pH<2, <6C	X		X	TPH-GRO

Observations and Comments:

Samples Received in cooler on ice? (Y) N **Type of Ice** (circle) (Wet) (Blue) None **All temps <6C?:** Y (N) (If no, see below).
If samples are not <6C, were samples delivered immediately after collection and had the cooling process began? (Y) N n/a
Were samples collected in correct type of sampling container? (Y) N **Were the containers Greenway-provided?** (Y) N
Short hold-time analysis? (≤72 hour) Y (N) **Samples rec'd in hold?** (Y) N **Properly preserved?** (Y) N **Circle N here:** Y (N)
Sufficient volume & intact? (Y) N **COC complete?** (Y) N **Bottle times match COC times?** (Y) N **Final review login/labels?** (Y) N
Final review Initial: [initials]

Disposition Site:	Disposition No.:	Method of Disposition/Date:
Performed by:		Date:

*** Condition: please note conditions of sample when received (i.e. on ice, from fridge). Other applicable conditions may be noted as well **

16120606

LABORATORY CHAIN-OF-CUSTODY RECORD RP16121421 1

GREENWAY ENVIRONMENTAL LABORATORY

Job ID:16120606

City of Winchester Engineering Departme

151 Windy Hill Lane. Winchester, VA 22602 Phone: (540) 662-418

Owner Name and Address of Sampling Site City of Winchester Engineering Department 301 Cork Street Winchester, VA 22601 **Billing/Mailing Address (if different)** 15 N. Cameron St. Winchester, VA 22601 **Contact Phone:** Reports: Robert Brown 540-667-2376 Invoices: Kelly Henshaw: 540-667-1815 **Identifying No.(s)** VPDES: VAN/VAG: Other (list):	**Sampling Date:** 12-6-16 **Grab:** **Sampler** (print) Robert B Lay **Sampler** (signature) Robert B Lay	**Sampling Time(s)** **Grab:** 11:15 **Sample Source** (Outfall 001, Final Eff., etc.) Outfall 001 OT-11 **Type** (WW, SW, GW, PW, STW, S) STW = Stormwater **Regulatory Agency** ☒ NPDES ☐ DEQ ☐ DCLS/ODW ☐ None ☐ Other (list):

Field Data (temp, pH, dissolved oxygen, TRC, etc.) (optional – for client convenience only)

Relinquished by Sampler	Date/Time	Received by (signature)	Date/Time	Condition
Robert B Lay	12-6-16 12:00 pm	Robert Brown	12-6-16 12:00pm	On ice
Relinquished by (signature)	**Date/Time**	**Received by** (signature)	**Date/Time**	**Condition**
Robert Brown	12-6-16 1:44 pm			
Relinquished by (signature)	**Date/Time**	**Received by** (signature)	**Date/Time**	**Condition at Lab Receipt**
		[illegible]	12/6/16 1344	Good Cooler Iced

Email Invoice? Y **Email Results?** Y **Turnaround Request:** Standard X Priority ☐
Email: Kelly.henshaw@winchesterva.gov **Email:** robert.brown@winchesterva.gov **Due Date:**

GREENWAY ENGINEERING USE ONLY indicated by GRAY AREAS.
Below measurements are QC measurements out-of-hold in the lab, do not report.

Greenway Sample ID	Sample Time	Container Type	COMP	GRAB	Preservation	pH SU	Temp. °C	TRC mg/L	Analysis Requested (circle)
16120606-01A	1115	2L plastic		X	<6C	X	5.6	X	(TSS)
		500 mL plastic (a/w)		X	H2SO4 to pH<2, <6C				TKN, Nitrate+Nitrite, Total N, Total Phosphorus as P
		2x 250 mL amber glass		X	<6C	X		X	TPH-DRO
		3x 40 mL amber glass vial		X	HCl to pH<2, <6C	X		X	TPH-GRO

Observations and Comments:

Samples Received in cooler on ice? Y / N **Type of Ice** (circle): (Wet) Blue None **All temps <6C?** (Y) N **(If no, see below).**
If samples are not <6C, were samples delivered immediately after collection and had the cooling process began? Y N (n/a)
Were samples collected in correct type of sampling container? (Y) N **Were the containers Greenway-provided?** (Y) N
Short hold-time analysis? (<72 hour) Y (N) **Samples rec'd in hold?** (Y) N **Properly preserved?** (Y) N **Circle N here:** Y (N)
Sufficient volume & intact? (Y) N **COC complete?** (Y) N **Bottle times match COC times?** (Y) N **Final review login/labels?** (Y) N
Final review Initial: CM

Disposition Site:	Disposition No.:	Method of Disposition/Date:
Performed by:		Date:

*** **Condition:** please note conditions of sample when received (i.e. on ice, from fridge). Other applicable conditions may be noted as well.**

16120606 **LABORATORY CHAIN-OF-**

OT-34 Grab 12... RP16121421 1 of 1

Station:
BottleID: 16120606-02A
Client Na: City of Winchester Engineering
Collected: 12/06/2016 11:15
Rcvd: 12/06/2016 13:44
Test: Total Suspended Solids (TSS)

GREENWAY ENVIRONMENTAL LABORATORY

151 Windy Hill Lane. Winchester, VA 22602 Phone: (540) 662-4185

Owner Name and Address of Sampling Site City of Winchester Engineering Department 301 Cork Street Winchester, VA 22601 **Billing/Mailing Address (if different)** 15 N. Cameron St. Winchester, VA 22601 **Contact Phone:** Reports: Robert Brown 540-667-2376 Invoices: Kelly Henshaw: 540-667-1815 **Identifying No.(s)** VPDES: VAN/VAG: Other (list):	**Sampling Date:** 12/6/16 Grab: **Sampler (print)** Robert Brown **Sampler (signature)** Robert Brown	**Sampling Time(s)** 11:15 am Grab: **Sample Source** (Outfall 001, Final Eff., etc.) ~~Outfall 001~~ OT-34 **Type** (WW, SW, GW, PW, STW, S) STW = Stormwater **Regulatory Agency** ☒ NPDES ☐ DEQ ☐ DCLS/ODW ☐ None ☐ Other (list):

Field Data (temp, pH, dissolved oxygen, TRC, etc.) (optional – for client convenience only)

Relinquished by Sampler	Date/Time	Received by (signature)	Date/Time	Condition
Robert Brown	11-6-16 1:44 pm			
Relinquished by (signature)	**Date/Time**	**Received by (signature)**	**Date/Time**	**Condition**
Relinquished by (signature)	**Date/Time**	**Received by (signature)**	**Date/Time**	**Condition at Lab Receipt**
		[signature]	11/6/16 1344	Good. Cooler / ice / in ...

Email Invoice? Y **Email:** Kelly.henshaw@winchesterva.gov

Email Results? Y **Email:** robert.brown@winchesterva.gov

Turnaround Request: Standard X Priority ☐ **Due Date:**

GREENWAY ENGINEERING USE ONLY indicated by GRAY AREAS.
Below measurements are QC measurements out-of-hold in the lab, do not report.

Greenway Sample ID	Sample Time	Container Type	COMP	GRAB	Preservation	pH SU	Temp. °C	TRC mg/L	Analysis Requested (circle)
16120606-02A	1115	2L plastic		X	<6C	X	7.2	X	(TSS)
		500 mL plastic (a/w)		X	H2SO4 to pH<2, <6C				TKN, Nitrate+Nitrite, Total N, Total Phosphorus as P
		2x 250 mL amber glass		X	<6C	X		X	TPH-DRO
		3x 40 mL amber glass vial		X	HCl to pH<2, <6C	X		X	TPH-GRO

Observations and Comments:

Samples Received in cooler on ice? (Y) N Type of Ice (circle): (Wet) (Blue) None All temps <6C?: Y (N) (If no, see below).
If samples are not <6C, were samples delivered immediately after collection and had the cooling process began? (Y) N n/a
Were samples collected in correct type of sampling container? (Y) N Were the containers Greenway-provided? (Y) N
Short hold-time analysis? (≤72 hour) (Y) (N) Samples rec'd in hold? (Y) N Properly preserved? (Y) N Circle N here: Y (N)
Sufficient volume & intact? (Y) N COC complete? (Y) N Bottle times match COC times? (Y) N Final review login/labels? (Y) N
Final review Initial: [initials]

Disposition Site:	**Disposition No.:**	**Method of Disposition/Date:**
Performed by:		**Date:**

*** Condition: please note conditions of sample when received (i.e. on ice, from fridge). Other applicable conditions may be noted as well.**

16120606 **LABORATORY CHAIN-OF-CUSTODY RECORD** RP16121421 1 4

OT-42 Grab 120616

GREENWAY ENVIRONMENTAL LABORATORY

151 Windy Hill Lane. Winchester, VA 22602 Phone: (540) 662-4185

Owner Name and Address of Sampling Site City of Winchester Engineering Department 301 Cork Street Winchester, VA 22601 **Billing/Mailing Address (if different)** 15 N. Cameron St. Winchester, VA 22601 **Contact Phone:** Reports: Robert Brown 540-667-2376 Invoices: Kelly Henshaw: 540-667-1815 **Identifying No.(s)** VPDES: VAN/VAG: Other (list):	**Sampling Date:** 12-6-1 Grab: **Sampler** (print) Ernest Rose Jr **Sampler** (signature) [signature]	Grab: **Sample Source** (Outfall 001, Final Eff., etc.) ~~Outfall 001~~ OT-42 **Type** (WW, SW, GW, PW, STW, S) STW = Stormwater **Regulatory Agency** ☒ NPDES ☐ DEQ ☐ DCLS/ODW ☐ None ☐ Other (list):

Field Data (temp, pH, dissolved oxygen, TRC, etc.) (optional – for client convenience only)

Relinquished by Sampler	Date/Time	Received by (signature)	Date/Time	Condition
[signature]	12-6-16 11:34 am	Robert Brown	12-6-16 11:34 am	On ice
Relinquished by (signature)	**Date/Time**	**Received by** (signature)	**Date/Time**	**Condition**
Robert Brown	12-6-16 1:44 pm			
Relinquished by (signature)	**Date/Time**	**Received by** (signature)	**Date/Time**	**Condition at Lab Receipt**
		[signature]	12/6/16 1344	Good. Cooler Ice/Ice

Email Invoice? Y **Email Results?** Y **Turnaround Request:** Standard X Priority ☐

Email: Kelly.henshaw@winchesterva.gov **Email:** robert.brown@winchesterva.gov **Due Date:**

GREENWAY ENGINEERING USE ONLY indicated by GRAY AREAS.
Below measurements are QC measurements out-of-hold in the lab, do not report.

Greenway Sample ID	Sample Time	Container Type	COMP	GRAB	Preservation	pH SU	Temp. °C	TRC mg/L	Analysis Requested (circle)
16120606.034	1115	2L plastic		X	<6C	X	5.4	X	(TSS)
		500 mL plastic (a/w)		X	H2SO4 to pH<2, <6C				TKN, Nitrate+Nitrite, Total N, Total Phosphorus as P
		2x 250 mL amber glass		X	<6C	X		X	TPH-DRO
		3x 40 mL amber glass vial		X	HCl to pH<2, <6C	X		X	TPH-GRO

Observations and Comments:

Samples Received in cooler on ice? (Y) N **Type of Ice** (circle): (Wet) Blue None **All temps <6C?** (Y) N (If no, see below).
If samples are not <6C, were samples delivered immediately after collection and had the cooling process began? Y N (n/a)
Were samples collected in correct type of sampling container? (Y) N **Were the containers Greenway-provided?** (Y) N
Short hold-time analysis? (≤72 hour) Y (N) **Samples rec'd in hold?** (Y) N **Properly preserved?** (Y) N **Circle N here:** Y (N)
Sufficient volume & intact? (Y) N **COC complete?** (Y) N **Bottle times match COC times?** (Y) N **Final review login/labels?** (Y) N
Final review Initial: [initials]

Disposition Site:	Disposition No.:	Method of Disposition/Date:
Performed by:		Date:

*** Condition: please note conditions of sample when received (i.e. on ice, from fridge). Other applicable conditions may be noted as well.**

RP17062822

GREENWAY
ENVIRONMENTAL
LABORATORY

151 Windy Hill Lane, Winchester, Virginia 22602 | (540) 662-4185 | www.greenwayeng.com | akaval@greenwayeng.com

SAMPLE SUMMARY

Client Project ID :
Stormwater Outfall 001

Report To : Client Name: City of Winchester Engineering Department Attn: Robert Brown
Client Address: 301 Cork Street P.O.#.:
City, State, Zip: Winchester, VA, 22601

The laboratory has analyzed the following samples:

Client Sample ID	Matrix	Sample ID	Collection D/T	Received D/T	Collected by
Outfall 001 Grab 060517	Storm Water	17060505.01	06/05/2017 13:15	6/5/2017 15:45	Robert A. Brown
OT-11 Grab 060517	Storm Water	17060505.02	06/05/2017 14:00	6/5/2017 15:45	Russel B Layman JR

This Laboratory is NELAP accredited.
I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.

VELAP ID# 460028

RP17062822

GREENWAY ENVIRONMENTAL LABORATORY

151 Windy Hill Lane, Winchester, Virginia 22602 | (540) 662-4185 | www.greenwayeng.com | akaval@greenwayeng.com

TERM AND QUALIFIER DEFINITION

General Term Definition	
Conc.	Concentration
DF	Dilution Factor - the factor applied to the reported data due to sample preparation, dilution, or moisture content
ND	Non Detect - Not Detected at or above adjusted reporting limit
J	Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit
RL	adjusted Reporting Limit (QL – Quantification Limit)
MDL	adjusted Method Detection Limit (LOD – Limit of Detection)
RegLimit	Regulatory Limit
mg/l	Milligrams per Liter/ppm
mg/kg	Milligrams per Kilogram
ppm	Parts per Million
µg/L	Micrograms per Liter/ppb
µg/g	Micrograms per Gram
ppb	Parts per Billion
gr/gal	Grains per Gallon
SU	Standard Units
CCU	Cobalt Color Units
NTU	Nephelometric Turbidity Units
µS/cm	Microsiemens per cm at 25C
P/A	Presence/Absence
MPN	Most Probable Number
RB	Reagent Blank
MB	Method Blank
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LFM	Laboratory Fortified Matrix (MS – Matrix Spike)
LFMD	Laboratory Fortified Matrix Duplicate (MSD – Matrix Spike Duplicate)
DUP	Sample Duplicate
RPD	Relative Percent Difference
%Rec	Percent Recovery

Qualifier Definition

This Laboratory is NELAP accredited.

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.

VELAP ID# 460028

RP17062822

GREENWAY
ENVIRONMENTAL
LABORATORY

151 Windy Hill Lane, Winchester, Virginia 22602 | (540) 662-4185 | www.greenwayeng.com | akaval@greenwayeng.com

CERTIFICATE OF ANALYSIS

Client Name:	City of Winchester Engineering Department	Attn:	Robert Brown
Project ID:	Stormwater Outfall 001	Date:	06/28/2017 03:26 PM

Job ID :	17060505	Sample Matrix:	Storm Water
Client Sample ID:	Outfall 001 Grab 060517	Date Collected:	06/05/2017
Job Sample ID:	17060505.01	Time Collected:	13:15
Other Information:	Outfall 001	Site Address:	301 Cork Street Winchester, VA 22601

Conclusion:

Test Method	Parameter/Test Description	Result	Units	RL	DF	MDL	Q	Date/Time Prepared	Date/Time Analyzed	Analyst
SM 2540D-2011	Total Suspended Solids (TSS)									
	TSS	64.3	mg/L	3.0	3			06/08/2017 17:31	06/09/2017 16:58	TDH

This Laboratory is NELAP accredited.

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.

VELAP ID# 460028

RP17062822

GREENWAY ENVIRONMENTAL LABORATORY

151 Windy Hill Lane, Winchester, Virginia 22602 | (540) 662-4185 | www.greenwayeng.com | akaval@greenwayeng.com

CERTIFICATE OF ANALYSIS

Client Name:	City of Winchester Engineering Department	Attn:	Robert Brown
Project ID:	Stormwater Outfall 001	Date:	06/28/2017 03:26 PM

Job ID :	17060505	Sample Matrix:	Storm Water
Client Sample ID:	OT-11 Grab 060517	Date Collected:	06/05/2017
Job Sample ID:	17060505.02	Time Collected:	14:00
Other Information:	OT-11	Site Address:	301 Cork Street Winchester, VA 22601

Conclusion:

Test Method	Parameter/Test Description	Result	Units	RL	DF	MDL	Q	Date/Time Prepared	Date/Time Analyzed	Analyst
SM 2540D-2011	Total Suspended Solids (TSS)									
	TSS	< 1.0	mg/L	1.0	1			06/08/2017 17:31	06/09/2017 16:42	TDH

This Laboratory is NELAP accredited.

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.

VELAP ID# 460028

RP17062822

GREENWAY ENVIRONMENTAL LABORATORY

151 Windy Hill Lane, Winchester, Virginia 22602 | (540) 662-4185 | www.greenwayeng.com | akaval@greenwayeng.com

QUALITY CONTROL DATA

Analysis : Total Suspended Solids (TSS) **Method :** SM 2540D-2011 **Matrix:** Storm Water

QC Batch ID : Qb17060805 **Created Date :** 06/08/2017 **Created By :** thammack

Samples in This QC Batch : 17060505.01,02

Sample Preparation PB17060802 SM 2540D-2011 thammack

QC Type: Method Blank

	Parameter	CAS	Result	Units	DF	RL	SDL	Qual
Method Blank	TSS		<1.0	mg/L	1	1.0		
Method Blank 2	TSS		<1.0	mg/L	1	1.0		

QC Type: Duplicate

	QC Sample ID	Parameter	Result	QC Sample Result	Units	RPD	RPD CtrlLimit	Qual
Dup	17060602.01	TSS	18.8	17.6	mg/L	6.6	20	
Dup2	17060504.01	TSS	55.0	61.0	mg/L	-10.3	20	
Dup3	17060505.01	TSS	64.3	68.3	mg/L	-6.0	20	

QC Type: LCS/LCSD

	Parameter	LCS Spk Amt	LCS Result	LCS % Rec	LCSD Spk Amt	LCSD Result	LCS % Rec	RPD	RPD CtrlLimit	% Rec CtrlLimit	Qual
LCS	TSS	100	106	106	100	98.0	98	-7.8	20	80-120	
LCS2	TSS	100	98.0	98	100	98.0	98	0.0		80-120	

Refer to the Definition page for terms.

This Laboratory is NELAP accredited.

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.

VELAP ID# 460028

RP17062822

GREENWAY ENVIRONMENTAL LABORATORY

151 Windy Hill Lane, Winchester, Virginia 22602 | (540) 662-4185 | www.greenwayeng.com | akaval@greenwayeng.com

SAMPLE CONDITION CHECKLIST

Client Name : City of Winchester Engineering Department		**Contact :**	Robert Brown
Client Address : 301 Cork Street		**Contact Phone :**	540-667-2376
JobID : 17060505	**Date Received :** 06/05/2017	**Time Received :**	03:45 PM
Temperature :	**Sample pH :**		
ThermometerID : IR CC1	**pHPaperID :**		

Comments : Include actions taken to resolve discrepancies/problem:

	Check Points	Yes	No	N/A
1	Sample(s) received in laboratory in a cooler with ice.	✔		
2	All temperatures <6C on receipt (<10C for bacteriological) if no, the answer to Questions #3 and #4 must be "YES" in order for the sample to be considered properly preserved).	✔		
3	Cooling began immediately (within 15 minutes) after collection.	✔		
4	Samples received on the same day as sample collection.	✔		
5	Ice surrounding all samples in cooler.	✔		
6	COC form contains sampler(s) signature(s) and is properly relinquished by sampler(s) and courier(s).	✔		
7	COC form contains date and time of sample collection.	✔		
8	Sample containers arrived intact.	✔		
9	Samples were received in Greenway-provided containers.	✔		
10	Sample(s) were received in appropriate containers.	✔		
11	Sample(s) were properly preserved (includes thermal preservation).	✔		
12	All samples were properly labeled on receipt (distinguishable).	✔		
13	Sampling dates and times on bottles match COC.	✔		
14	Bottle count on COC matches number of bottles received.	✔		
15	Sample amount is sufficient for analyses requested	✔		
16	Samples received within the hold time.	✔		

CheckIn By : Taylor Hammack CheckIn Date : 06/05/2017

This Laboratory is NELAP accredited.

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.

VELAP ID# 460028

17060505

LABORATORY CHAIN-OF-CI

pg 1 of 2

Job ID:1706 RP17062822 2

City of Winchester Engineering Departme

GREENWAY ENVIRONMENTAL LABORATORY

151 Windy Hill Lane. Winchester, VA 22602 Phone: (540) 662-4185

Owner Name and Address of Sampling Site City of Winchester Engineering Department 301 Cork Street Winchester, VA 22601 **Billing/Mailing Address (if different)** 15 N. Cameron St. Winchester, VA 22601 **Contact Phone:** Reports: Robert Brown 540-667-2376 Invoices: Kelly Henshaw: 540-667-1815 **Identifying No.(s)** VPDES: VAN/VAG: Other (list):	**Sampling Date:** 6/5/17 Grab: **Sampler** (print) Robert Brown **Sampler** (signature) Robert Brown	**Sampling Time(s)** Grab: 1:15 pm **Sample Source** (Outfall 001, Final Eff., etc.) Outfall 001 **Type** (WW, SW, GW, PW, STW, S) STW = Stormwater **Regulatory Agency** ☒ NPDES ☐ DEQ ☐ DCLS/ODW ☐ None ☐ Other (list):

Field Data (temp, pH, dissolved oxygen, TRC, etc.) (optional – for client convenience only)

Relinquished by Sampler	Date/Time	Received by (signature)	Date/Time	Condition
Robert Brown	6/5 3:45			
Relinquished by (signature)	**Date/Time**	**Received by** (signature)	**Date/Time**	**Condition**
Relinquished by (signature)	**Date/Time**	**Received by** (signature)	**Date/Time**	**Condition at Lab Receipt**
			6/5/17 1545	good cooler/ice/intact

Email Invoice? Y **Email Results?** Y **Turnaround Request:** Standard X Priority ☐
Email: Kelly.henshaw@winchesterva.gov **Email:** robert.brown@winchesterva.gov **Due Date:**

GREENWAY ENGINEERING USE ONLY indicated by GRAY AREAS.
Below measurements are QC measurements out-of-hold in the lab, do not report.

Greenway Sample ID	Sample Time	Container Type	COMP	GRAB	Preservation	pH SU	Temp. °C	TRC mg/L	Analysis Requested (circle)
17060505 01A		2L plastic		X	<6C	X	11.6	X	TSS
		500 mL plastic (a/w)		X	H2SO4 to pH<2, <6C				TKN, Nitrate+Nitrite, Total N, Total Phosphorus as P
01B		2x 250 mL amber glass		X	<6C	X	11.2	X	TPH-DRO
01C		3x 40 mL amber glass vial		X	HCl to pH<2, <6C	X	6.6 8.7 8.2 8.0	X	TPH-GRO

Observations and Comments:

Samples Received in cooler on ice? (Y) N **Type of Ice** (circle): (Wet) Blue None **All temps <6C?:** Y (N) **(If no, see below).**
If samples are not <6C, were samples delivered immediately after collection and had the cooling process began? (Y) N n/a
Were samples collected in correct type of sampling container? (Y) N **Were the containers Greenway-provided?** (Y) N
Short hold-time analysis? (<72 hour) Y (N) **Samples rec'd in hold?** (Y) N **Properly preserved?** (Y) N **Circle N here:** Y (N)
Sufficient volume & intact? (Y) N **COC complete?** (Y) N **Bottle times match COC times?** (Y) N **Final review login/labels?** (Y) N
Final review Initial: HLH

Disposition Site:	Disposition No.:	Method of Disposition/Date:
Performed by:		Date:

*** **Condition:** please note conditions of sample when received (i.e. on ice, from fridge). Other applicable conditions may be noted as well.**

17060505

LABORATORY CHAIN-OF-CU[illegible] RP17062822 2

GREENWAY ENVIRONMENTAL LABORATORY

STW OT-11 Grab 06

Station:
BottleID: 17060505 (2 A
Client Na: City of Winchester Engineering
Collected: 06/05/2017 14:00
Rcvd: 06/05/2017 15:45
Test: Total Suspended Solids (TSS)

151 Windy Hill Lane. Winchester, VA 22602 Phone: (540) 662-4185

Owner Name and Address of Sampling Site City of Winchester Engineering Department 301 Cork Street Winchester, VA 22601 **Billing/Mailing Address (if different)** 15 N. Cameron St. Winchester, VA 22601 **Contact Phone:** Reports: Robert Brown 540-667-2376 Invoices: Kelly Henshaw: 540-667-1815 **Identifying No.(s)** VPDES: VAN/VAG: Other (list):	**Sampling Date:** Grab: 6/5/17 **Sampler** (print) Russell B Layman Jr. **Sampler** (signature)	**Sampling Time(s)** Grab: 2:00pm **Sample Source** (Outfall 001, Final Eff., etc.) ~~Outfall 001~~ OT-11 **Type** (WW, SW, GW, PW, STW, S) STW = Stormwater **Regulatory Agency** ☒ NPDES ☐ DEQ ☐ DCLS/ODW ☐ None ☐ Other (list):

Field Data (temp, pH, dissolved oxygen, TRC, etc.) (optional – for client convenience only)

Relinquished by Sampler	Date/Time	Received by (signature)	Date/Time	Condition
	6/5 2:15pm	Robert Brown	6/5 2:15	on ice
Relinquished by (signature)	**Date/Time**	**Received by** (signature)	**Date/Time**	**Condition**
Robert Brown	6/5 3:15			
Relinquished by (signature)	**Date/Time**	**Received by** (signature)	**Date/Time**	**Condition at Lab Receipt**
			6-5-17 1545	good cooler/ice/intact

Email Invoice? Y **Email Results?** Y **Turnaround Request:** Standard x Priority ☐
Email: Kelly.henshaw@winchesterva.gov **Email:** robert.brown@winchesterva.gov **Due Date:**

GREENWAY ENGINEERING USE ONLY indicated by GRAY AREAS.
Below measurements are QC measurements out-of-hold in the lab, do not report.

Greenway Sample ID	Sample Time	Container Type	COMP	GRAB	Preservation	pH SU	Temp. °C	TRC mg/L	Analysis Requested (circle)
17060505 02A		2L plastic		X	<6C	X	3.9 4.4 4.5	X	TSS
		500 mL plastic (a/w)		X	H2SO4 to pH<2, <6C				TKN, Nitrate+Nitrite, Total N, Total Phosphorus as P
		2x 250 mL amber glass		X	<6C	X		X	TPH-DRO
		3x 40 mL amber glass vial		X	HCl to pH<2, <6C	X		X	TPH-GRO

Observations and Comments:

Samples Received in cooler on ice? (Y) N **Type of Ice (circle):** (Wet) Blue None **All temps <6C?** (Y) N **(If no, see below).**
If samples are not <6C, were samples delivered immediately after collection and had the cooling process began? Y N (n/a)
Were samples collected in correct type of sampling container? (Y) N **Were the containers Greenway-provided?** (Y) N
Short hold-time analysis? (<72 hour) Y (N) **Samples rec'd in hold?** (Y) N **Properly preserved?** (Y) N **Circle N here:** Y N
Sufficient volume & intact? (Y) N **COC complete?** (Y) N **Bottle times match COC times?** (Y) N **Final review login/labels?** (Y) N
Final review Initial: TAH

Disposition Site:	Disposition No.:	Method of Disposition/Date:
Performed by:		Date:

*** **Condition:** please note conditions of sample when received (i.e. on ice, from fridge). Other applicable conditions may be noted as well.**

June 12, 2017

Andrea R. Kaval
Greenway Engineering
151 Windy Hill Lane
Winchester, VA 22602

RE: Project: City of Winc Eng 060517
Pace Project No.: 92343464

Dear Andrea Kaval:
Enclosed are the analytical results for sample(s) received by the laboratory on June 08, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Matthew Brainard
matthew.brainard@pacelabs.com
(704)875-9092
Project Manager

Enclosures

CERTIFICATIONS

Project: City of Winc Eng 060517
Pace Project No.: 92343464

Charlotte Certification IDs
9800 Kincey Ave. Ste 100, Huntersville, NC 28078
North Carolina Drinking Water Certification #: 37706
North Carolina Field Services Certification #: 5342
North Carolina Wastewater Certification #: 12
South Carolina Certification #: 99006001
Florida/NELAP Certification #: E87627
Kentucky UST Certification #: 84
Virginia/VELAP Certification #: 460221

SAMPLE SUMMARY

Project: City of Winc Eng 060517
Pace Project No.: 92343464

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92343464001	17060505.01B (Outfall 001)	Water	06/05/17 13:15	06/08/17 09:27
92343464002	17060505.01C (Outfall 001)	Water	06/05/17 13:15	06/08/17 09:27

SAMPLE ANALYTE COUNT

Project: City of Winc Eng 060517
Pace Project No.: 92343464

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92343464001	**17060505.01B (Outfall 001)**	EPA 8015 Modified	PKS	2	PASI-C
92343464002	**17060505.01C (Outfall 001)**	EPA 5030/8015 Mod.	TSM	2	PASI-C

ANALYTICAL RESULTS

Project: City of Winc Eng 060517
Pace Project No.: 92343464

Sample: 17060505.01B (Outfall 001) **Lab ID: 92343464001** Collected: 06/05/17 13:15 Received: 06/08/17 09:27 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS THC-Diesel	Analytical Method: EPA 8015 Modified Preparation Method: EPA 3510								
Diesel Range Organics(C10-C28)	ND	mg/L	0.50	0.10	1	06/09/17 08:11	06/09/17 19:03		
Surrogates									
n-Pentacosane (S)	53	%	48-110		1	06/09/17 08:11	06/09/17 19:03	629-99-2	

ANALYTICAL RESULTS

Project: City of Winc Eng 060517
Pace Project No.: 92343464

Sample: 17060505.01C (Outfall 001) **Lab ID: 92343464002** Collected: 06/05/17 13:15 Received: 06/08/17 09:27 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Gasoline Range Organics	Analytical Method: EPA 5030/8015 Mod.								
Gas Range Organics (C6-C10)	**0.027J**	mg/L	0.080	0.016	1		06/10/17 04:20		B
Surrogates									
4-Bromofluorobenzene (S)	100	%	70-145		1		06/10/17 04:20	460-00-4	

QUALITY CONTROL DATA

Project: City of Winc Eng 060517
Pace Project No.: 92343464

QC Batch: 364205 | Analysis Method: EPA 5030/8015 Mod.
QC Batch Method: EPA 5030/8015 Mod | Analysis Description: Gasoline Range Organics
Associated Lab Samples: 92343464002

METHOD BLANK: 2019361 Matrix: Water
Associated Lab Samples: 92343464002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Gas Range Organics (C6-C10)	mg/L	0.028J	0.080	0.016	06/10/17 01:57	
4-Bromofluorobenzene (S)	%	100	70-145		06/10/17 01:57	

LABORATORY CONTROL SAMPLE: 2019362

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Gas Range Organics (C6-C10)	mg/L	1	0.79	79	70-150	
4-Bromofluorobenzene (S)	%			98	70-145	

MATRIX SPIKE SAMPLE: 2019363

Parameter	Units	92343402001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Gas Range Organics (C6-C10)	mg/L	ND	1	0.82	81	70-150	
4-Bromofluorobenzene (S)	%				107	70-145	

SAMPLE DUPLICATE: 2020431

Parameter	Units	92343430003 Result	Dup Result	RPD	Max RPD	Qualifiers
Gas Range Organics (C6-C10)	mg/L	0.024J	0.018J		30	
4-Bromofluorobenzene (S)	%	98	96	2		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: City of Winc Eng 060517
Pace Project No.: 92343464

QC Batch: 364118
QC Batch Method: EPA 3510
Analysis Method: EPA 8015 Modified
Analysis Description: 8015 GCS
Associated Lab Samples: 92343464001

METHOD BLANK: 2018935 Matrix: Water
Associated Lab Samples: 92343464001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Diesel Range Organics(C10-C28)	mg/L	ND	0.50	0.10	06/09/17 15:30	
n-Pentacosane (S)	%	68	48-110		06/09/17 15:30	

LABORATORY CONTROL SAMPLE: 2018936

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Diesel Range Organics(C10-C28)	mg/L	10	5.1	51	41-114	
n-Pentacosane (S)	%			77	48-110	

MATRIX SPIKE SAMPLE: 2018937

Parameter	Units	35316189001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Diesel Range Organics(C10-C28)	mg/L	0.10U	10	4.7	46	41-114	
n-Pentacosane (S)	%				73	48-110	

SAMPLE DUPLICATE: 2019682

Parameter	Units	35316189002 Result	Dup Result	RPD	Max RPD	Qualifiers
Diesel Range Organics(C10-C28)	mg/L	2.6	1.9	30	30	
n-Pentacosane (S)	%	74	61	18		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

QUALIFIERS

Project: City of Winc Eng 060517
Pace Project No.: 92343464

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

Acid preservation may not be appropriate for 2 Chloroethylvinyl ether.

A separate vial preserved to a pH of 4-5 is recommended in SW846 Chapter 4 for the analysis of Acrolein and Acrylonitrile by EPA Method 8260.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-C Pace Analytical Services - Charlotte

ANALYTE QUALIFIERS

B Analyte was detected in the associated method blank.

Pace A
98(RP17062822 .C 00
Huntersville, NC 28078
(704)875-9092

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: City of Winc Eng 060517
Pace Project No.: 92343464

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92343464001	**17060505.01B (Outfall 001)**	EPA 3510	364118	EPA 8015 Modified	364232
92343464002	**17060505.01C (Outfall 001)**	EPA 5030/8015 Mod.	364205		

17060505 ace Analytical

Document Name: Sample Condition Upon Receipt(SCUR)	Document Revised: Sept. 21, Page 1 of 2
Document No.: F-CAR-CS-033-Rev.01	Issuing Authority: Pace Quality Office

RP17062822

Laboratory receiving samples:
Asheville ☐ Eden ☐ Greenwood ☐ Huntersville ☑ Raleigh ☐ Mechanicsville ☐

Sample Condition Upon Receipt

Client Name: Greenaccy

Project # **WO# : 92343464**

92343464

Courier: ☐ Commercial ☑ Fed Ex ☑ Pace ☐ UPS ☐ USPS ☐ Other:____ ☐ Client

Custody Seal Present? ☐ Yes ☑ No Seals Intact? ☐ Yes ☐ No

Date/Initials Person Examining Contents: MM 5/

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other:____

Thermometer: ☐ IR Gun ID: T1603

Type of Ice: ☑ Wet ☐ Blue ☐ None ☑ Samples on ice, cooling process has begun

Correction Factor: Cooler Temp Corrected (°C): 3.0

Biological Tissue Frozen? ☐ Yes ☐ No ☑ N/A

Temp should be above freezing to 6°C

USDA Regulated Soil (☑ N/A, water sample)

Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

				Comments/Discrepancy:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	2.
Short Hold Time Analysis (<72 hr.)?	☐ Yes	☑ No	☐ N/A	3.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	4.
Sufficient Volume?	☑ Yes	☐ No	☐ N/A	5.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	6.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	7.
Samples Field Filtered?	☐ Yes	☐ No	☑ N/A	8. Note if sediment is visible in the dissolved container
Sample Labels Match COC?	☑ Yes	☐ No	☐ N/A	9.
-Includes Date/Time/ID/Analysis Matrix:	WT			
Headspace in VOA Vials (>5-6mm)?	☐ Yes	☑ No	☐ N/A	10.
Trip Blank Present?	☐ Yes	☐ No	☑ N/A	11.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☐ N/A	

CLIENT NOTIFICATION/RESOLUTION

Field Data Required? ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Sample Discrepancy: _____

Project Manager SCURF Review: _____ Date: 5/15/17

Project Manager SRF Review: _____ Date: 5/16/17

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. Out of hold, incorrect preservative, out of temp, incorrect containers)

17060505

Pace Analytical

Document Name: Sample Condition Upon Receipt(SCUR)	Document Revised: Sept. 21, 2 Page 2 of 2
Document No.: F-CAR-CS-033-Rev.01	Issuing Authority: Pace Quality Office

RP17062822

*Check mark top half of box if pH and/or dechlorination is verified and within the acceptance range for preservation samples.

**Bottom half of box is to list number of bottles

Project # WO#:92343464

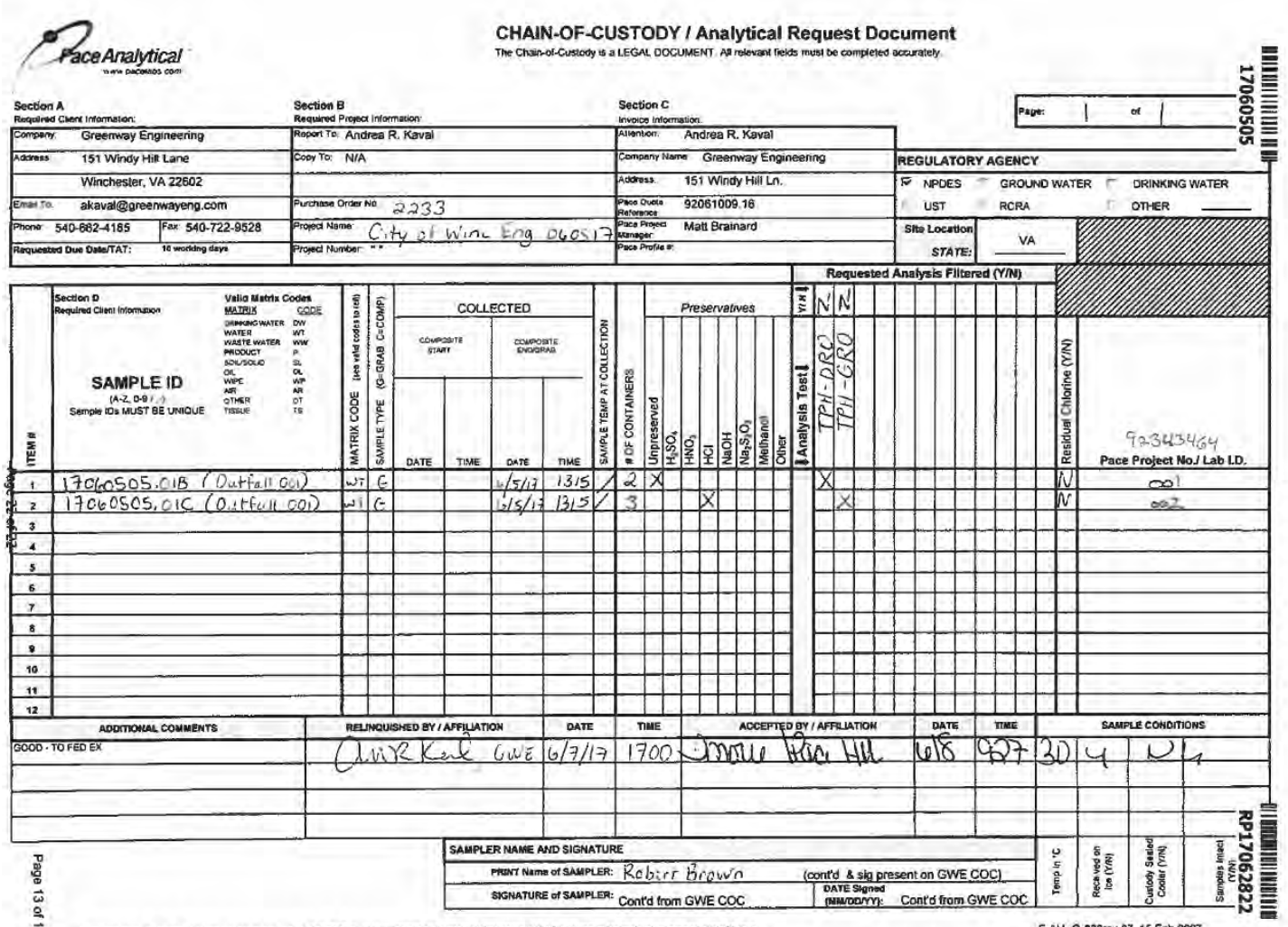
PM: MNB Due Date: 06/22/17

CLIENT: 92-Grnwy Eng

Item#	BP4U-125 mL Plastic Unpreserved (N/A) (Cl-)	BP3U-250 mL Plastic Unpreserved (N/A)	BP2U-500 mL Plastic Unpreserved (N/A)	BP1U-1 liter Plastic Unpreserved (N/A)	BP3S-250 mL Plastic H2SO4 (pH < 2) (Cl-)	BP3N-250 mL plastic HNO3 (pH < 2)	BP3Z-250 mL Plastic ZN Acetate & NaOH (>9)	BP3C-250 mL Plastic NaOH (pH > 12) (Cl-)	WGFU-Wide-mouthed Glass jar Unpreserved	AG1U-1 liter Amber Unpreserved (N/A) (Cl-)	AG1H-1 liter Amber HCl (pH < 2)	AG3U-250 mL Amber Unpreserved (N/A) (Cl-)	AG1S-1 liter Amber H2SO4 (pH < 2)	AG3S-250 mL Amber H2SO4 (pH < 2)	AG3A(DG3A)-250 mL Amber NH4Cl (N/A)(Cl-)	DG9H-40 mL VOA HCl (N/A)	VG9T-40 mL VOA Na2S2O3 (N/A)	VG9U-40 mL VOA Unp (N/A)	DG9P-40 mL VOA H3PO4 (N/A)	VOAK (6 vials per kit)-5035 kit (N/A)	V/GK (3 vials per kit)-VPH/Gas kit (N/A)	SP5T-125 mL Sterile Plastic (N/A – lab)	SPZT-250 mL Sterile Plastic (N/A – lab)		BP3A-250 mL Plastic (NH2)2SO4 (9.3-9.7)	Cubitainer	VSGU-20 mL Scintillation vials (N/A)	GN
1												2																	
2																3													
3																													
4																													
5																													
6																													
7																													
8																													
9																													
10																													
11																													
12																													

pH Adjustment Log for Preserved Samples

Sample ID	Type of Preservative	pH upon receipt	Date preservation adjusted	Time preservation adjusted	Amount of Preservative added	Lot #



Pace Analytical
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

17060505

Page: 1 of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Greenway Engineering	Report To:	Andrea R. Kaval	Attention:	Andrea R. Kaval
Address:	151 Windy Hill Lane	Copy To:	N/A	Company Name:	Greenway Engineering
	Winchester, VA 22602			Address:	151 Windy Hill Ln.
Email To:	akaval@greenwayeng.com	Purchase Order No:	2233	Pace Quote Reference:	92061009.16
Phone:	540-662-4185 Fax: 540-722-9528	Project Name:	City of Winc Eng 060517	Pace Project Manager:	Matt Brainard
Requested Due Date/TAT:	10 working days	Project Number:	**	Pace Profile #:	

REGULATORY AGENCY

☑ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: VA

Requested Analysis Filtered (Y/N)

ITEM #	Section D Required Client Information — SAMPLE ID (A-Z, 0-9 / , -) Sample IDs MUST BE UNIQUE	Valid Matrix Codes: MATRIX / CODE — DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test ↓	TPH-DRO	TPH-GRO	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																				Y/N	N	N		92343464
1	17060505.01B (Outfall 001)		WT	G			6/5/17	1315	✓	2	X										X		N	001
2	17060505.01C (Outfall 001)		WT	G			6/5/17	1315	✓	3				X							X		N	002
3																								
4																								
5																								
6																								
7																								
8																								
9																								
10																								
11																								
12																								

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
GOOD - TO FED EX	Robert Brown GWE	6/7/17	1700	[illegible] Pace Hill	6/8	927	3.0	4	Y	4

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Robert Brown (cont'd & sig present on GWE COC)

SIGNATURE of SAMPLER: Cont'd from GWE COC DATE Signed (MM/DD/YY): Cont'd from GWE COC

RP17062822

Page 13 of 13

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev 07, 15-Feb-2007

Monday, June 5, 2017

Daily Weekly Monthly Custom

	Actual	Average	Record
Temperature			
Mean Temperature	64 °F	-	
Max Temperature	69 °F	76 °F	91 °F (2002)
Min Temperature	59 °F	56 °F	44 °F (1990)
Degree Days			
Heating Degree Days	1		
Growing Degree Days	14 (Base 50)		
Moisture			
Dew Point	61 °F		
Average Humidity	82		
Maximum Humidity	94		
Minimum Humidity	68		
Precipitation			
Precipitation	0.07 in	-	- ()
Sea Level Pressure			
Sea Level Pressure	29.75 in		
Wind			
Wind Speed	2 mph (SW)		
Max Wind Speed	9 mph		
Max Gust Speed	16 mph		
Visibility	10 miles		
Events	Rain		

Averages and records for this station are not official NWS values.

10:15 AM	69.8 °F	62.6 °F	78%	29.78 in	10.0 mi	WSW	6.9 mph	-	N/A		Mostly Cloudy
10:35 AM	69.8 °F	62.6 °F	78%	29.77 in	10.0 mi	WSW	5.8 mph	-	N/A		Mostly Cloudy
10:55 AM	69.8 °F	62.6 °F	78%	29.77 in	10.0 mi	SW	5.8 mph	-	N/A		Overcast
11:15 AM	69.8 °F	62.6 °F	78%	29.79 in	10.0 mi	SW	8.1 mph	-	N/A		Mostly Cloudy
11:35 AM	69.8 °F	64.4 °F	83%	29.79 in	10.0 mi	West	4.6 mph	-	N/A		Drizzle
11:55 AM	69.8 °F	64.4 °F	83%	29.80 in	7.0 mi	West	5.8 mph	-	N/A	Rain	Rain
12:15 PM	68.0 °F	64.4 °F	88%	29.80 in	5.0 mi	West	4.6 mph	-	0.02 in	Rain	Rain
12:35 PM	68.0 °F	64.4 °F	88%	29.80 in	7.0 mi	WSW	3.5 mph	-	0.04 in	Rain	Rain
12:55 PM	68.0 °F	64.4 °F	88%	29.80 in	7.0 mi	West	4.6 mph	-	0.06 in	Rain	Light Rain
1:15 PM	68.0 °F	62.6 °F	83%	29.80 in	7.0 mi	NNW	3.5 mph	-	0.01 in	Rain	Light Rain
1:35 PM	68.0 °F	62.6 °F	83%	29.79 in	10.0 mi	NW	3.5 mph	-	0.01 in	Rain	Light Rain
1:55 PM	68.0 °F	62.6 °F	83%	29.78 in	10.0 mi	Calm	Calm	-	0.01 in		Mostly Cloudy
2:15 PM	68.0 °F	60.8 °F	78%	29.77 in	10.0 mi	Calm	Calm	-	N/A		Overcast
2:35 PM	68.0 °F	60.8 °F	78%	29.77 in	10.0 mi	Calm	Calm	-	N/A		Scattered Clouds
2:55 PM	69.8 °F	59.0 °F	68%	29.75 in	10.0 mi	Calm	Calm	-	N/A		Scattered Clouds
3:15 PM	69.8 °F	60.8 °F	73%	29.73 in	10.0 mi	South	4.6 mph	-	N/A		Clear
3:35 PM	69.8 °F	60.8 °F	73%	29.73 in	10.0 mi	Calm	Calm	-	N/A		Scattered Clouds
3:55 PM	69.8 °F	60.8 °F	73%	29.73 in	10.0 mi	SW	4.6 mph	-	N/A		Scattered Clouds
4:15 PM	69.8 °F	60.8 °F	73%	29.73 in	10.0 mi	Calm	Calm	-	N/A		Scattered Clouds

Daily Weather History & Observations

2017	Temp. (°F)			Dew Point (°F)			Humidity (%)			Sea Level Press. (in)			Visibility (mi)			Wind (mph)			Precip. (in)	Events
Jun	high	avg	low	high	avg	low	high	avg	low	high	avg	low	high	avg	low	high	avg	high	sum	
4	86	70	53	63	53	46	82	58	33	30.05	29.94	29.82	10	10	10	12	4	16	0.00	
5	69	64	59	64	61	55	94	82	68	29.83	29.75	29.66	10	10	5	9	2	16	0.07	Rain
6	71	61	51	63	51	46	100	84	41	29.88	29.79	29.71	10	10	5	20	7	25	0.00	
7	66	56	46	55	52	46	100	83	60	30.06	29.97	29.87	10	10	5	7	2	-	0.80	Rain
8	59	56	46	52	48	45	100	71	49	30.06	29.98	29.85	10	8	0	6	1	-	0.80	Fog
9	78	66	53	52	50	46	88	58	34	29.98	29.88	29.82	10	10	10	16	5	22	0.00	
10	84	70	57	61	55	50	82	57	37	30.08	30.03	29.98	10	10	10	9	4	-	0.00	

Daily Weather History & Observations

2017	Temp. (°F)			Dew Point (°F)			Humidity (%)			Sea Level Press. (in)			Visibility (mi)			Wind (mph)			Precip. (in)	Events
May	high	avg	low	high	avg	low	high	avg	low	high	avg	low	high	avg	low	high	avg	high	sum	
28	69	63	57	63	60	57	100	91	68	29.92	29.86	29.82	10	6	0	13	2	16	0.06	Fog , Rain
29	77	68	60	64	59	54	100	78	44	30.02	29.90	29.80	10	7	0	14	3	20	0.02	Fog , Rain
30	77	66	55	64	50	35	100	65	61	30.07	30.02	29.94	10	10	5	16	4	21	0.00	Thunderstorm
31	75	68	59	61	55	48	94	66	32	30.06	30.01	29.95	10	10	7	13	3	17	0.00	
2017	Temp. (°F)			Dew Point (°F)			Humidity (%)			Sea Level Press. (in)			Visibility (mi)			Wind (mph)			Precip. (in)	Events
Jun	high	avg	low	high	avg	low	high	avg	low	high	avg	low	high	avg	low	high	avg	high	sum	
1	78	66	53	54	49	43	88	65	32	30.06	30.02	29.98	10	10	10	17	6	25	0.00	Thunderstorm
2	77	64	51	52	46	39	82	53	26	30.07	30.04	30.02	10	10	7	16	5	37	0.00	
3	80	68	57	54	46	43	72	48	28	30.06	30.02	29.99	10	10	10	21	8	28	0.00	

RP17070431

GREENWAY
ENVIRONMENTAL
LABORATORY

151 Windy Hill Lane, Winchester, Virginia 22602 | (540) 662-4185 | www.greenwayeng.com | akaval@greenwayeng.com

SAMPLE SUMMARY

Client Project ID :
Stormwater Outfall 001

Report To : Client Name: City of Winchester Engineering Department Attn: Robert Brown
Client Address: 301 Cork Street P.O.#.:
City, State, Zip: Winchester, VA, 22601

The laboratory has analyzed the following samples:

Client Sample ID	Matrix	Sample ID	Collection D/T	Received D/T	Collected by
OT-54 Grab 061917	Storm Water	17061908.01	06/19/2017 13:20	6/19/2017 14:55	Russel B Layman JR
OT-34 Grab 061917	Storm Water	17061908.02	06/19/2017 13:20	6/19/2017 14:55	Robert A. Brown
OT- 42 Grab 061917	Storm Water	17061908.03	06/19/2017 13:40	6/19/2017 14:55	Robert A. Brown

This Laboratory is NELAP accredited.
I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.

VELAP ID# 460028

RP17070431

GREENWAY
ENVIRONMENTAL
LABORATORY

151 Windy Hill Lane, Winchester, Virginia 22602 | (540) 662-4185 | www.greenwayeng.com | akaval@greenwayeng.com

TERM AND QUALIFIER DEFINITION

General Term Definition	
Conc.	Concentration
DF	Dilution Factor - the factor applied to the reported data due to sample preparation, dilution, or moisture content
ND	Non Detect - Not Detected at or above adjusted reporting limit
J	Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit
RL	adjusted Reporting Limit (QL – Quantification Limit)
MDL	adjusted Method Detection Limit (LOD – Limit of Detection)
RegLimit	Regulatory Limit
mg/l	Milligrams per Liter/ppm
mg/kg	Milligrams per Kilogram
ppm	Parts per Million
µg/L	Micrograms per Liter/ppb
µg/g	Micrograms per Gram
ppb	Parts per Billion
gr/gal	Grains per Gallon
SU	Standard Units
CCU	Cobalt Color Units
NTU	Nephelometric Turbidity Units
µS/cm	Microsiemens per cm at 25C
P/A	Presence/Absence
MPN	Most Probable Number
RB	Reagent Blank
MB	Method Blank
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LFM	Laboratory Fortified Matrix (MS – Matrix Spike)
LFMD	Laboratory Fortified Matrix Duplicate (MSD – Matrix Spike Duplicate)
DUP	Sample Duplicate
RPD	Relative Percent Difference
%Rec	Percent Recovery

Qualifier Definition

This Laboratory is NELAP accredited.

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.

VELAP ID# 460028

RP17070431

GREENWAY
ENVIRONMENTAL
LABORATORY

151 Windy Hill Lane, Winchester, Virginia 22602 | (540) 662-4185 | www.greenwayeng.com | akaval@greenwayeng.com

CERTIFICATE OF ANALYSIS

Client Name:	City of Winchester Engineering Department	Attn:	Robert Brown
Project ID:	Stormwater Outfall 001	Date:	07/04/2017 03:32 PM

Job ID :	17061908	Sample Matrix:	Storm Water
Client Sample ID:	OT-54 Grab 061917	Date Collected:	06/19/2017
Job Sample ID:	17061908.01	Time Collected:	13:20
Other Information:	OT-54	Site Address:	301 Cork Street Winchester, VA 22601

Conclusion:

Test Method	Parameter/Test Description	Result	Units	RL	DF	MDL	Q	Date/Time Prepared	Date/Time Analyzed	Analyst
SM 2540D-2011	Total Suspended Solids (TSS)									
	TSS	5.8	mg/L	2.0	2			06/21/2017 14:30	06/22/2017 10:48	SDP

This Laboratory is NELAP accredited.

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.

VELAP ID# 460028

RP17070431

GREENWAY
ENVIRONMENTAL
LABORATORY

151 Windy Hill Lane, Winchester, Virginia 22602 | (540) 662-4185 | www.greenwayeng.com | akaval@greenwayeng.com

CERTIFICATE OF ANALYSIS

Client Name:	City of Winchester Engineering Department	Attn:	Robert Brown
Project ID:	Stormwater Outfall 001	Date:	07/04/2017 03:32 PM

Job ID :	17061908	Sample Matrix:	Storm Water
Client Sample ID:	OT-34 Grab 061917	Date Collected:	06/19/2017
Job Sample ID:	17061908.02	Time Collected:	13:20
Other Information:	OT-34	Site Address:	301 Cork Street Winchester, VA 22601

Conclusion:

Test Method	Parameter/Test Description	Result	Units	RL	DF	MDL	Q	Date/Time Prepared	Date/Time Analyzed	Analyst
SM 2540D-2011	Total Suspended Solids (TSS)									
	TSS	584	mg/L	20.0	20			06/21/2017 14:30	06/22/2017 10:52	SDP

This Laboratory is NELAP accredited.

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.

VELAP ID# 460028

RP17070431

GREENWAY
ENVIRONMENTAL
LABORATORY

151 Windy Hill Lane, Winchester, Virginia 22602 | (540) 662-4185 | www.greenwayeng.com | akaval@greenwayeng.com

CERTIFICATE OF ANALYSIS

Client Name:	City of Winchester Engineering Department	Attn:	Robert Brown
Project ID:	Stormwater Outfall 001	Date:	07/04/2017 03:32 PM

Job ID :	17061908	Sample Matrix:	Storm Water
Client Sample ID:	OT- 42 Grab 061917	Date Collected:	06/19/2017
Job Sample ID:	17061908.03	Time Collected:	13:40
Other Information:	OT-42	Site Address:	301 Cork Street Winchester, VA 22601

Conclusion:

Test Method	Parameter/Test Description	Result	Units	RL	DF	MDL	Q	Date/Time Prepared	Date/Time Analyzed	Analyst
SM 2540D-2011	Total Suspended Solids (TSS)									
	TSS	53.6	mg/L	4.0	4			06/21/2017 14:30	06/22/2017 10:50	SDP

This Laboratory is NELAP accredited.

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.

VELAP ID# 460028

RP17070431

GREENWAY ENVIRONMENTAL LABORATORY

151 Windy Hill Lane, Winchester, Virginia 22602 | (540) 662-4185 | www.greenwayeng.com | akaval@greenwayeng.com

QUALITY CONTROL DATA

Analysis : Total Suspended Solids (TSS) **Method :** SM 2540D-2011 **Matrix:** Storm Water

QC Batch ID : Qb17062106 **Created Date :** 06/21/2017 **Created By :** SDavis

Samples in This QC Batch : 17061908.01,02,03

Sample Preparation PB17062104 SM 2540D-2011 SDavis

QC Type: Method Blank

	Parameter	CAS	Result	Units	DF	RL	SDL	Qual
Method Blank	TSS		<1.0	mg/L	1	1.0		

QC Type: Duplicate

	QC Sample ID	Parameter	Result	QC Sample Result	Units	RPD	RPD CtrlLimit	Qual
Dup	17061908.03	TSS	53.6	54.8	mg/L	-2.2	20	

QC Type: LCS/LCSD

	Parameter	LCS Spk Amt	LCS Result	LCS % Rec	LCSD Spk Amt	LCSD Result	LCS % Rec	RPD	RPD CtrlLimit	% Rec CtrlLimit	Qual
LCS	TSS	100	100	100	100	98.0	98	-2.0	20	80-120	

Refer to the Definition page for terms.

This Laboratory is NELAP accredited.

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.

VELAP ID# 460028

RP17070431

GREENWAY
ENVIRONMENTAL
LABORATORY

151 Windy Hill Lane, Winchester, Virginia 22602 | (540) 662-4185 | www.greenwayeng.com | akaval@greenwayeng.com

SAMPLE CONDITION CHECKLIST

Client Name : City of Winchester Engineering Department		**Contact :**	Robert Brown
Client Address : 301 Cork Street		**Contact Phone :**	540-667-2376
JobID : 17061908	**Date Received :** 06/19/2017	**Time Received :**	02:55 PM
Temperature :	**Sample pH :**		
ThermometerID : IR-CC-1	**pHPaperID :**		

Comments : Include actions taken to resolve discrepancies/problem:

	Check Points	Yes	No	N/A
1	Sample(s) received in laboratory in a cooler with ice.	✔		
2	All temperatures <6C on receipt (<10C for bacteriological) if no, the answer to Questions #3 and #4 must be "YES" in order for the sample to be considered properly preserved).	✔		
3	Cooling began immediately (within 15 minutes) after collection.	✔		
4	Samples received on the same day as sample collection.	✔		
5	Ice surrounding all samples in cooler.	✔		
6	COC form contains sampler(s) signature(s) and is properly relinquished by sampler(s) and courier(s).	✔		
7	COC form contains date and time of sample collection.	✔		
8	Sample containers arrived intact.	✔		
9	Samples were received in Greenway-provided containers.	✔		
10	Sample(s) were received in appropriate containers.	✔		
11	Sample(s) were properly preserved (includes thermal preservation).	✔		
12	All samples were properly labeled on receipt (distinguishable).	✔		
13	Sampling dates and times on bottles match COC.	✔		
14	Bottle count on COC matches number of bottles received.	✔		
15	Sample amount is sufficient for analyses requested	✔		
16	Samples received within the hold time.	✔		

CheckIn By : Kristen Muller CheckIn Date : 06/19/2017

This Laboratory is NELAP accredited.

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.

VELAP ID# 460028

17061908 **LABORATORY CHAIN-OF-CUSTODY RECORD** RR[illegible]31 f3

GREENWAY ENVIRONMENTAL LABORATORY

Job ID:17061908

City of Winchester Engineering Departme

151 Windy Hill Lane. Winchester, VA 22602 Phone: (540) 662-4185

Owner Name and Address of Sampling Site	Sampling Date: 6/19/17	Sampling Time(s)
City of Winchester Engineering Department 301 Cork Street Winchester, VA 22601 Billing/Mailing Address (if different) 15 N. Cameron St. Winchester, VA 22601 Contact Phone: Reports: Robert Brown 540-667-2376 Invoices: Kelly Henshaw: 540-667-1815 Identifying No.(s) VPDES: VAN/VAG: Other (list):	Grab:	Grab: 1:20 pm
	Sampler (print) Russell Layman	Sample Source (Outfall 001, Final Eff., etc.) ~~Outfall 001~~ ~~OT-42~~ OT-54
	Sampler (signature)	Type (WW, SW, GW, PW, STW, S) STW = Stormwater
		Regulatory Agency ☒ NPDES ☐ DEQ ☐ DCLS/ODW ☐ None ☐ Other (list):

Field Data (temp, pH, dissolved oxygen, TRC, etc.) (optional – for client convenience only)

Relinquished by Sampler	Date/Time	Received by (signature)	Date/Time	Condition
Russell Layman	1:35 6/19/17	Robert Brown	6/19 1:35	on ice
Relinquished by (signature)	**Date/Time**	**Received by** (signature)	**Date/Time**	**Condition**
Robert Brown	6/19 / 2:55			
Relinquished by (signature)	**Date/Time**	**Received by** (signature)	**Date/Time**	**Condition at Lab Receipt**
		[illegible]	6/19/17 1455	good condition/cold/intact

Email Invoice? Y Email Results? Y Turnaround Request: Standard x Priority ☐
Email: Kelly.henshaw@winchesterva.gov Email: robert.brown@winchesterva.gov Due Date:

GREENWAY ENGINEERING USE ONLY indicated by GRAY AREAS.
Below measurements are QC measurements out-of-hold in the lab, do not report.

Greenway Sample ID	Sample Time	Container Type	COMP	GRAB	Preservation	pH SU	Temp. °C	TRC mg/L	Analysis Requested (circle)
17061908.01A		2L plastic 1L ran 06/20/17		X	<6C	X	1.1	X	(TSS)
		500 mL plastic (a/w)		X	H2SO4 to pH<2, <6C				TKN, Nitrate+Nitrite, Total N, Total Phosphorus as P
		2x 250 mL amber glass		X	<6C	X		X	TPH-DRO
		3x 40 mL amber glass vial		X	HCl to pH<2, <6C	X		X	TPH-GRO

Observations and Comments:

Samples Received in cooler on ice? (Y) N Type of Ice (circle): (Wet) Blue None All temps <6C?: (Y) N (If no, see below).
If samples are not <6C, were samples delivered immediately after collection and had the cooling process began? Y N (n/a)
Were samples collected in correct type of sampling container? (Y) N Were the containers Greenway-provided? (Y) N
Short hold-time analysis? (<72 hour) Y (N) Samples rec'd in hold? (Y) N Properly preserved? (Y) N Circle N here: (Y) (N)
Sufficient volume & intact? (Y) N COC complete? (Y) N Bottle times match COC times? (Y) N Final review login/labels? (Y) N
Final review Initial: KMH

Disposition Site:	Disposition No.:	Method of Disposition/Date:
Performed by:		Date:

*** Condition: please note conditions of sample when received (i.e. on ice, from fridge). Other applicable conditions may be noted as well.**

17061908

LABORATORY CHAIN-OF-CUSTODY RECORD

RRRFT0R0P0131

OT-34 Grab 061917

StationID: ...
BottleID: 17061908-12 A
Client Name: City of Winchester Engineering
Collected: 06/19/2017 13:20
Rcvd: 06/19/2017 14:55
Test: Total Suspended Solids (TSS)

GREENWAY ENVIRONMENTAL LABORATORY

151 Windy Hill Lane. Winchester, VA 22602 Phone: (540) 662-4185

Owner Name and Address of Sampling Site City of Winchester Engineering Department 301 Cork Street Winchester, VA 22601 **Billing/Mailing Address (if different)** 15 N. Cameron St. Winchester, VA 22601 **Contact Phone:** Reports: Robert Brown 540-667-2376 Invoices: Kelly Henshaw: 540-667-1815 **Identifying No.(s)** VPDES: VAN/VAG: Other (list):	**Sampling Date:** Grab: 6/19/17 **Sampler (print)** Robert Brown **Sampler (signature)** [signature]	**Sampling Time(s)** Grab: 1:20 p **Sample Source** (Outfall 001, Final Eff., etc.) ~~Outfall 001~~ OT-34 **Type** (WW, SW, GW, PW, STW, S) STW = Stormwater **Regulatory Agency** ☒ NPDES ☐ DEQ ☐ DCLS/ODW ☐ None ☐ Other (list):

Field Data (temp, pH, dissolved oxygen, TRC, etc.) (optional – for client convenience only)

Relinquished by Sampler	Date/Time	Received by (signature)	Date/Time	Condition
[signature]	6-19 / 2:55			
Relinquished by (signature)	**Date/Time**	**Received by (signature)**	**Date/Time**	**Condition**
Relinquished by (signature)	**Date/Time**	**Received by (signature)**	**Date/Time**	**Condition at Lab Receipt**
		[signature]	6/19: 2/1455	Good cool, diuel intact

Email Invoice? Y **Email:** Kelly.henshaw@winchesterva.gov

Email Results? Y **Email:** robert.brown@winchesterva.gov

Turnaround Request: Standard x Priority ☐ **Due Date:**

GREENWAY ENGINEERING USE ONLY indicated by GRAY AREAS.
Below measurements are QC measurements out-of-hold in the lab, do not report.

Greenway Sample ID	Sample Time	Container Type	COMP	GRAB	Preservation	pH SU	Temp. °C	TRC mg/L	Analysis Requested (circle)
17061908.01A		~~2L~~ plastic 1L ar 6/20/17		x	<6C	x	2.1	x	(TSS)
		500 mL plastic (a/w)		x	H2SO4 to pH<2, <6C				TKN, Nitrate+Nitrite, Total N, Total Phosphorus as P
		2x 250 mL amber glass		x	<6C	x		x	TPH-DRO
		3x 40 mL amber glass vial		x	HCl to pH<2, <6C	x		x	TPH-GRO

Observations and Comments:

Samples Received in cooler on ice? (Y) N Type of Ice (circle): (Wet) Blue None All temps <6C?: (Y) N (If no, see below).
If samples are not <6C, were samples delivered immediately after collection and had the cooling process began? Y N (n/a)
Were samples collected in correct type of sampling container? (Y) N Were the containers Greenway-provided? (Y) N
Short hold-time analysis? (≤72 hour) Y (N) Samples rec'd in hold? (Y) N Properly preserved? (Y) N Circle N here: Y (N)
Sufficient volume & intact? (Y) N COC complete? (Y) N Bottle times match COC times? (Y) N Final review login/labels? (Y) N
Final review Initial: KMm

Disposition Site:	Disposition No.:	Method of Disposition/Date:
Performed by:		Date:

*** Condition: please note conditions of sample when received (i.e. on ice, from fridge). Other applicable conditions may be noted as well.***

17061908

LABORATORY CHAIN-OF-C

OT- 42 Grat RR

Station:
BottleID: 17061908 13 A
Client No: City of Winchester Engineering
Collected: 06/19/2017 13:40
Rcvd: 06/19/2017 14:55
Test: Total Suspended Solids (TSS)

GREENWAY ENVIRONMENTAL LABORATORY

151 Windy Hill Lane. Winchester, VA 22602 Phone: (540) 662-4185

Owner Name and Address of Sampling Site	Sampling Date:	Sampling Time(s)
City of Winchester Engineering Department 301 Cork Street Winchester, VA 22601	Grab: 6/19/17	Grab: 1:40 P
Billing/Mailing Address (if different) 15 N. Cameron St. Winchester, VA 22601	Sampler (print) Robert Brown	Sample Source (Outfall 001, Final Eff., etc.) ~~Outfall 001~~ OT-42
Contact Phone: Reports: Robert Brown 540-667-2376 Invoices: Kelly Henshaw: 540-667-1815		Type (WW, SW, GW, PW, STW, S) STW = Stormwater
Identifying No.(s) VPDES: VAN/VAG: Other (list):	Sampler (signature) Robert Brown	Regulatory Agency ☒ NPDES ☐ DEQ ☐ DCLS/ODW ☐ None ☐ Other (list):

Field Data (temp, pH, dissolved oxygen, TRC, etc.) (optional – for client convenience only)

Relinquished by Sampler	Date/Time	Received by (signature)	Date/Time	Condition
Robert Brown	6-19/2:55			
Relinquished by (signature)	Date/Time	Received by (signature)	Date/Time	Condition
Relinquished by (signature)	Date/Time	Received by (signature)	Date/Time	Condition at Lab Receipt
		[signature]	6/19/17/1455	good cooler/ice/intact

Email Invoice? Y **Email Results?** Y **Turnaround Request:** Standard x Priority ☐
Email: Kelly.henshaw@winchesterva.gov **Email:** robert.brown@winchesterva.gov **Due Date:**

GREENWAY ENGINEERING USE ONLY indicated by GRAY AREAS.
Below measurements are QC measurements out-of-hold in the lab, do not report.

Greenway Sample ID	Sample Time	Container Type	COMP	GRAB	Preservation	pH SU	Temp. °C	TRC mg/L	Analysis Requested (circle)
17061908-03A		~~2L~~ plastic 1L on 6/20/17		X	<6C	X	0.6	X	(TSS)
		500 mL plastic (a/w)		X	H2SO4 to pH<2, <6C				TKN, Nitrate+Nitrite, Total N, Total Phosphorus as P
		2x 250 mL amber glass		X	<6C	X		X	TPH-DRO
		3x 40 mL amber glass vial		X	HCl to pH<2, <6C	X		X	TPH-GRO

Observations and Comments:

Samples Received in cooler on ice? (Y) N **Type of Ice (circle):** (Wet) Blue None **All temps <6C?** (Y) N (If no, see below).
If samples are not <6C, were samples delivered immediately after collection and had the cooling process began? Y N (n/a)
Were samples collected in correct type of sampling container? (Y) N **Were the containers Greenway-provided?** (Y) N
Short hold-time analysis? (<72 hour) Y (N) **Samples rec'd in hold?** (Y) N **Properly preserved?** (Y) N **Circle N here:** Y (N)
Sufficient volume & intact? (Y) N **COC complete?** (Y) N **Bottle times match COC times?** (Y) N **Final review login/labels?** (Y) N
Final review Initial: KMM

Disposition Site:	Disposition No.:	Method of Disposition/Date:
Performed by:		Date:

*** Condition: please note conditions of sample when received (i.e. on ice, from fridge). Other applicable conditions may be noted as well **

Winchester, VA

Winchester Regional

2:51 PM EDT on July 07, 2017 (GMT -0400)

Weather History for KOKV - June, 2017

June

19

2017

View

Monday, June 19, 2017

Daily Weekly Monthly Custom

	Actual	Average	Record
Temperature			
Mean Temperature	76 °F	-	
Max Temperature	84 °F	81 °F	94 °F (1984)
Min Temperature	69 °F	61 °F	48 °F (1999)
Cooling Degree Days	12		
Growing Degree Days	26 (Base 50)		
Moisture			
Dew Point	67 °F		
Average Humidity	77		
Maximum Humidity	94		
Minimum Humidity	58		
Precipitation			
Precipitation	0.74 in		0
Sea Level Pressure			

	Actual	Average	Record
Sea Level Pressure	29.85 In		
Wind			
Wind Speed	6 mph (SW)		
Max Wind Speed	14 mph		
Max Gust Speed	26 mph		
Visibility	10 miles		
Events	Rain , Thunderstorm		

Averages and records for this station are not official NWS values.

T = Trace of Precipitation, MM = Missing Value Source: NWS Daily Summary

10:15 AM	80.6 °F	83.2 °F	68.0 °F	65%	29.86 in	10.0 mi	SSW	13.8 mph	20.7 mph	N/A		Mostly Cloudy
10:35 AM	82.4 °F	85.4 °F	68.0 °F	62%	29.84 in	10.0 mi	SSW	8.1 mph	16.1 mph	N/A		Overcast
10:55 AM	84.2 °F	87.3 °F	68.0 °F	58%	29.84 in	10.0 mi	SSW	9.2 mph	-	N/A		Scattered Clouds
11:15 AM	82.4 °F	85.4 °F	68.0 °F	62%	29.84 in	10.0 mi	SSW	5.8 mph	-	N/A		Mostly Cloudy
11:35 AM	84.2 °F	87.3 °F	68.0 °F	58%	29.83 in	10.0 mi	SSW	10.4 mph	-	N/A		Mostly Cloudy
11:55 AM	84.2 °F	87.3 °F	68.0 °F	58%	29.83 in	10.0 mi	SSW	10.4 mph	16.1 mph	N/A		Overcast
12:15 PM	82.4 °F	85.4 °F	68.0 °F	62%	29.83 in	10.0 mi	SSW	11.5 mph	17.3 mph	N/A		Overcast
12:35 PM	80.6 °F	83.2 °F	68.0 °F	65%	29.82 in	10.0 mi	WNW	12.7 mph	17.3 mph	N/A		Overcast
12:55 PM	84.2 °F	87.3 °F	68.0 °F	58%	29.80 in	10.0 mi	South	11.5 mph	18.4 mph	N/A		Mostly Cloudy
1:15 PM	69.8 °F		68.0 °F	94%	29.83 in	1.5 mi	West	12.7 mph	26.5 mph	0.30 in	Rain , Thunderstorm	Heavy Thunderstorms and Rain
1:35 PM	69.8 °F	-	68.0 °F	94%	29.80 in	2.5 mi	West	8.1 mph	-	0.57 in	Rain , Thunderstorm	Heavy Thunderstorms and Rain
1:55 PM	69.8 °F	-	68.0 °F	94%	29.83 in	4.0 mi	SSW	6.9 mph	-	0.70 in	Rain , Thunderstorm	Rain
2:15 PM	71.6 °F		68.0 °F	88%	29.82 in	10.0 mi	WSW	6.9 mph	-	0.03 in	Rain , Thunderstorm	Thunderstorms and Rain
2:35 PM	73.4 °F	-	69.8 °F	88%	29.81 in	10.0 mi	SW	4.6 mph	-	0.04 in	Thunderstorm	Overcast
2:55 PM	73.4 °F		69.8 °F	88%	29.82 in	10.0 mi	South	4.6 mph	-	0.04 in		Overcast
3:15 PM	73.4 °F	-	69.8 °F	88%	29.83 in	10.0 mi	Calm	Calm	-	N/A	Thunderstorm	Overcast
3:35 PM	73.4 °F	-	69.8 °F	88%	29.83 in	10.0 mi	SSW	3.5 mph	-	N/A		Overcast
3:55 PM	73.4 °F	-	69.8 °F	88%	29.83 in	10.0 mi	SSW	3.5 mph	-	N/A		Overcast
4:15 PM	75.2 °F	-	69.8 °F	83%	29.84 in	10.0 mi	SSW	3.5 mph	-	N/A		Overcast
4:35 PM	73.4 °F	-	69.8 °F	88%	29.85 in	10.0 mi	SSW	4.6 mph	-	N/A		Mostly Cloudy
4:55 PM	73.4 °F	-	69.8 °F	88%	29.85 in	10.0 mi	SW	5.8 mph	-	N/A	Rain	Light Rain
5:15 PM	73.4 °F	-	69.8 °F	88%	29.86 in	10.0 mi	SW	3.5 mph		N/A	Thunderstorm	Mostly Cloudy
5:35 PM	77.0 °F	-	69.8 °F	78%	29.85 in	10.0 mi	WSW	5.8 mph	-	N/A		Overcast

Daily Weather History & Observations

2017	Temp. (°F)			Dew Point (°F)			Humidity (%)			Sea Level Press. (in)			Visibility (mi)			Wind (mph)			Precip. (in)	Events
Jun	high	avg	low	high	avg	low	High	avg	low	high	avg	low	high	avg	low	high	avg	high	sum	
1	78	66	53	54	45	43	88	55	32	30.06	30.02	29.98	10	10	10	17	6	25	0.00	Thunderstorm
2	77	64	51	52	46	39	82	63	26	30.07	30.04	30.02	10	10	7	16	5	37	0.00	
3	80	68	57	54	46	43	72	49	28	30.06	30.02	29.99	10	10	10	21	6	28	0.00	
4	86	70	53	63	53	46	82	58	33	30.06	29.94	29.82	10	10	10	12	4	18	0.00	
5	89	84	59	64	61	55	94	62	66	29.83	29.75	29.68	10	10	5	9	2	16	0.07	Rain
6	71	61	51	63	61	46	100	64	41	29.86	29.79	29.71	10	10	5	20	7	25	0.00	
7	66	56	46	56	52	46	100	83	60	30.06	29.97	29.87	10	10	5	7	2	-	0.00	Rain
8	69	56	46	52	48	45	100	71	40	30.06	29.96	29.85	10	5	0	6	1	-	0.06	Fog
9	76	66	53	52	50	46	88	56	34	29.98	29.88	29.82	10	10	10	16	5	22	0.00	
10	84	70	57	61	55	50	82	57	37	30.08	30.03	29.98	10	10	10	9	4	-	0.00	
11	87	76	64	63	60	57	78	57	38	30.15	30.11	30.08	10	10	10	12	5	18	0.00	
12	87	74	62	64	61	59	94	62	38	30.16	30.09	30.02	10	10	10	9	3	17	0.00	
13	91	80	69	66	64	61	78	61	38	30.05	30.00	29.92	10	10	10	9	4	-	0.00	Thunderstorm
14	86	76	64	66	65	63	94	72	51	30.03	29.98	29.93	10	10	7	10	3	-	0.00	Thunderstorm
15	82	73	64	68	65	61	100	77	61	30.00	29.96	29.89	10	9	1	14	4	20	0.00	Rain
16	80	74	68	70	67	63	100	85	65	29.92	29.91	29.88	10	9	4	12	5	-	0.05	Rain Thunderstorm
17	86	75	64	70	67	64	100	82	55	29.93	29.88	29.84	10	7	0	16	3	20	0.00	Fog
18	80	78	68	70	68	64	100	72	49	29.88	29.83	29.77	10	10	10	17	6	24	0.00	
19	84	76	69	70	67	61	94	77	58	29.94	29.85	29.80	10	10	2	14	6	25	0.74	Rain , Thunderstorm
20	82	72	60	64	55	48	94	57	30	30.02	29.99	29.94	10	10	10	18	8	28	0.00	Rain
21	86	72	59	63	56	54	88	61	37	30.01	29.98	29.95	10	10	10	16	5	23	0.00	
22	82	72	62	72	66	61	94	72	57	30.04	30.00	29.95	10	10	10	10	3	-	0.00	
23	86	77	68	72	68	64	100	75	58	29.96	29.80	29.69	10	10	7	17	7	28	0.07	Rain
24	80	74	68	70	60	54	100	62	39	30.01	29.85	29.82	10	10	3	21	8	28	0.33	Rain
25	80	70	60	59	51	43	94	63	29	30.05	30.04	30.00	10	10	10	17	5	22	0.00	
26	78	66	53	52	47	43	82	51	32	30.11	30.06	30.00	10	10	10	13	5	17	0.00	
27	77	66	53	52	47	41	77	52	29	30.12	30.04	30.01	10	10	10	17	5	25	0.00	
28	77	62	46	54	48	43	100	60	32	30.22	30.16	30.12	10	10	10	9	2	-	0.00	
29	86	72	59	63	57	52	77	58	40	30.15	30.10	30.03	10	10	7	15	5	18	0.00	
30	89	79	69	68	64	61	83	61	40	30.05	30.00	29.93	10	10	10	18	7	24	0.00	

Coliscan Easygel Data Form

Sample Site #:	Sample Date:	Sample Time:	Rain Past 48 Hours (Inches)[1]	Incubator Time In:	Incubator Temp In: [2]	Incubator Time Out:	Incubator Temp Out:	Sample Volume (ml) [3]	# *E. coli* Colonies (dark blue to royal purple) [4]	Total E. coli Count (CFU/100 ml) [5]	Comments:
OT-42	12/6/2016	11:15 AM	0	12:30 PM	95 F	1:30 PM	95 F	5	8	160	
OT-34	12/6/2016	11:15 AM	0	12:30 PM	95 F	1:30 PM	95 F	5	34	680	
OT-54	12/6/2016	11:15 AM	0	12:30 PM	95 F	1:30 PM	95 F	5	0	0	
OT-11	12/6/2016	11:15 AM	0	12:30 PM	95 F	1:30 PM	95 F	5	0	0	
OT-42	6/19/2017	1:40 PM	0	2:30 PM	95 F	2:30 PM	95 F	5	19	380	
OT-34	6/19/2017	1:20 PM	0	2:30 PM	95 F	2:30 PM	95 F	5	TNTC	-	
OT-54	6/19/2017	1:20 PM	0	2:30 PM	95 F	2:30 PM	95 F	5	12	240	
OT-11	6/5/2017	2:00 PM	0	3:30 PM	95 F	3:30 PM	95 F	5	0	0	

Notes:

[1] See http://w1.weather.gov/data/obhistory/KOKV.html.

[2] Ideal incubation temperature is 37.5 C.

[3] Between 1.0 - 5.0 ml

[4] Colonies to be counted per Coliscan Easygel instructions provided in Attachment 1 to the WQMP

[5] To calculate the number of E. coli colonies: (# E. coli colonies/ml sample size) x 100

RP18080704

GREENWAY
ENVIRONMENTAL
LABORATORY

151 Windy Hill Lane, Winchester, Virginia 22602 | (540) 662-4185 | www.greenwayeng.com | akaval@greenwayeng.com

SAMPLE SUMMARY

Client Project ID :
Stormwater Outfall 001

Report To : Client Name: City of Winchester Engineering Department Attn: Kelly Henshaw
Client Address: 301 Cork Street P.O.#.:
City, State, Zip: Winchester, VA, 22601

The laboratory has analyzed the following samples:

Client Sample ID	Matrix	Sample ID	Collection D/T	Received D/T	Collected by
OT-34 GRAB 073018	Storm Water	18073009.01	07/30/2018 13:43	7/30/2018 14:48	Hong Lim
OT-42 GRAB 073018	Storm Water	18073009.02	07/30/2018 13:52	7/30/2018 14:48	Hong Lim
OT-54 GRAB 073018	Storm Water	18073009.03	07/30/2018 13:58	7/30/2018 14:48	Hong Lim
OT-11 GRAB 073018	Storm Water	18073009.04	07/30/2018 14:09	7/30/2018 14:48	Hong Lim

This Laboratory is NELAP accredited.
I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.

VELAP ID# 460028

RP18080704

GREENWAY
ENVIRONMENTAL
LABORATORY

151 Windy Hill Lane, Winchester, Virginia 22602 | (540) 662-4185 | www.greenwayeng.com | akaval@greenwayeng.com

TERM AND QUALIFIER DEFINITION

General Term Definition	
Conc.	Concentration
DF	Dilution Factor - the factor applied to the reported data due to sample preparation, dilution, or moisture content
ND	Non Detect - Not Detected at or above adjusted reporting limit
J	Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit
RL	adjusted Reporting Limit (QL – Quantification Limit)
MDL	adjusted Method Detection Limit (LOD – Limit of Detection)
RegLimit	Regulatory Limit
mg/l	Milligrams per Liter/ppm
mg/kg	Milligrams per Kilogram
ppm	Parts per Million
µg/L	Micrograms per Liter/ppb
µg/g	Micrograms per Gram
ppb	Parts per Billion
gr/gal	Grains per Gallon
SU	Standard Units
CCU	Cobalt Color Units
NTU	Nephelometric Turbidity Units
µS/cm	Microsiemens per cm at 25C
P/A	Presence/Absence
MPN	Most Probable Number
RB	Reagent Blank
MB	Method Blank
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LFM	Laboratory Fortified Matrix (MS – Matrix Spike)
LFMD	Laboratory Fortified Matrix Duplicate (MSD – Matrix Spike Duplicate)
DUP	Sample Duplicate
RPD	Relative Percent Difference
%Rec	Percent Recovery

Qualifier Definition

This Laboratory is NELAP accredited.

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.

VELAP ID# 460028

RP18080704

GREENWAY
ENVIRONMENTAL
LABORATORY

151 Windy Hill Lane, Winchester, Virginia 22602 | (540) 662-4185 | www.greenwayeng.com | akaval@greenwayeng.com

CERTIFICATE OF ANALYSIS

Client Name:	City of Winchester Engineering Department	Attn:	Kelly Henshaw
Project ID:	Stormwater Outfall 001	Date:	08/07/2018 05:41 PM

Job ID :	18073009	Sample Matrix:	Storm Water
Client Sample ID:	OT-34 GRAB 073018	Date Collected:	07/30/2018
Job Sample ID:	18073009.01	Time Collected:	13:43
Other Information:	OT-34	Site Address:	301 Cork Street Winchester, VA 22601

Conclusion:

Test Method	Parameter/Test Description	Result	Units	RL	DF	MDL	Q	Date/Time Prepared	Date/Time Analyzed	Analyst
SM 2540D-2011	Total Suspended Solids (TSS)									
	TSS	212	mg/L	5.0	5			08/01/2018 16:24	08/02/2018 11:54	knc

This Laboratory is NELAP accredited.

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.

VELAP ID# 460028

RP18080704

GREENWAY
ENVIRONMENTAL
LABORATORY

151 Windy Hill Lane, Winchester, Virginia 22602 | (540) 662-4185 | www.greenwayeng.com | akaval@greenwayeng.com

CERTIFICATE OF ANALYSIS

Client Name:	City of Winchester Engineering Department	Attn:	Kelly Henshaw
Project ID:	Stormwater Outfall 001	Date:	08/07/2018 05:41 PM

Job ID :	18073009	Sample Matrix:	Storm Water
Client Sample ID:	OT-42 GRAB 073018	Date Collected:	07/30/2018
Job Sample ID:	18073009.02	Time Collected:	13:52
Other Information:	OT-42	Site Address:	301 Cork Street Winchester, VA 22601

Conclusion:

Test Method	Parameter/Test Description	Result	Units	RL	DF	MDL	Q	Date/Time Prepared	Date/Time Analyzed	Analyst
SM 2540D-2011	Total Suspended Solids (TSS)									
	TSS	25.2	mg/L	2.0	2			08/01/2018 16:24	08/02/2018 11:56	knc

This Laboratory is NELAP accredited.

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.

VELAP ID# 460028

RP18080704

GREENWAY
ENVIRONMENTAL
LABORATORY

151 Windy Hill Lane, Winchester, Virginia 22602 | (540) 662-4185 | www.greenwayeng.com | akaval@greenwayeng.com

CERTIFICATE OF ANALYSIS

Client Name:	City of Winchester Engineering Department	Attn:	Kelly Henshaw
Project ID:	Stormwater Outfall 001	Date:	08/07/2018 05:41 PM

Job ID :	18073009	Sample Matrix:	Storm Water
Client Sample ID:	OT-54 GRAB 073018	Date Collected:	07/30/2018
Job Sample ID:	18073009.03	Time Collected:	13:58
Other Information:	OT-54	Site Address:	301 Cork Street Winchester, VA 22601

Conclusion:

Test Method	Parameter/Test Description	Result	Units	RL	DF	MDL	Q	Date/Time Prepared	Date/Time Analyzed	Analyst
SM 2540D-2011	Total Suspended Solids (TSS)									
	TSS	2.8	mg/L	1.0	1			08/01/2018 16:24	08/02/2018 11:57	knc

This Laboratory is NELAP accredited.

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.

VELAP ID# 460028

RP18080704

GREENWAY ENVIRONMENTAL LABORATORY

151 Windy Hill Lane, Winchester, Virginia 22602 | (540) 662-4185 | www.greenwayeng.com | akaval@greenwayeng.com

CERTIFICATE OF ANALYSIS

Client Name:	City of Winchester Engineering Department	Attn:	Kelly Henshaw
Project ID:	Stormwater Outfall 001	Date:	08/07/2018 05:41 PM

Job ID :	18073009	Sample Matrix:	Storm Water
Client Sample ID:	OT-11 GRAB 073018	Date Collected:	07/30/2018
Job Sample ID:	18073009.04	Time Collected:	14:09
Other Information:	OT-11	Site Address:	301 Cork Street Winchester, VA 22601

Conclusion:

Test Method	Parameter/Test Description	Result	Units	RL	DF	MDL	Q	Date/Time Prepared	Date/Time Analyzed	Analyst
SM 2540D-2011	Total Suspended Solids (TSS)									
	TSS	123	mg/L	4.0	4			08/01/2018 16:24	08/02/2018 11:57	knc

This Laboratory is NELAP accredited.

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.

VELAP ID# 460028

RP18080704

GREENWAY
ENVIRONMENTAL
LABORATORY

151 Windy Hill Lane, Winchester, Virginia 22602 | (540) 662-4185 | www.greenwayeng.com | akaval@greenwayeng.com

QUALITY CONTROL DATA

Analysis : Total Suspended Solids (TSS) **Method :** SM 2540D-2011 **Matrix:** Storm Water

QC Batch ID : Qb18080102 **Created Date :** 08/01/2018 **Created By :** kcoffey

Samples in This QC Batch : 18073009.01,02,03,04

Sample Preparation	PB18080103	SM 2540D-2011	kcoffey

QC Type: Method Blank

	Parameter	CAS	Result	Units	DF	RL	SDL	Qual
Method Blank	TSS		<1.0	mg/L	1	1.0		

QC Type: Duplicate

	QC Sample ID	Parameter	Result	QC Sample Result	Units	RPD	RPD CtrlLimit	Qual
Dup2	18073009.04	TSS	123	122	mg/L	1	20	
Dup	18073009.01	TSS	212	224	mg/L	-6	20	

QC Type: LCS/LCSD

	Parameter	LCS Spk Amt	LCS Result	LCS % Rec	LCSD Spk Amt	LCSD Result	LCS % Rec	RPD	RPD CtrlLimit	% Rec CtrlLimit	Qual
LCS	TSS	100	102	102	100	100	100	-2	20	80-120	

Refer to the Definition page for terms.

This Laboratory is NELAP accredited.

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.

VELAP ID# 460028

RP18080704

GREENWAY
ENVIRONMENTAL
LABORATORY

151 Windy Hill Lane, Winchester, Virginia 22602 | (540) 662-4185 | www.greenwayeng.com | akaval@greenwayeng.com

SAMPLE CONDITION CHECKLIST

Client Name : City of Winchester Engineering Department		**Contact :**	Kelly Henshaw
Client Address : 301 Cork Street		**Contact Phone :**	540-667-1815
JobID : 18073009	**Date Received :** 07/30/2018	**Time Received :**	02:48 PM
Temperature :	**Sample pH :**		
ThermometerID : FLUKE 561	**pHPaperID :** A-STAR		

Comments : Include actions taken to resolve discrepancies/problem:

Only one ice pack between 2 samples, not completely surrounded by ice. tdh 7/30/18

	Check Points	Yes	No	N/A
1	Sample(s) received in laboratory in a cooler with ice.	✔		
2	All temperatures <6C on receipt (<10C for bacteriological) if no, the answer to Questions #3 and #4 must be "YES" in order for the sample to be considered properly preserved).		✔	
3	Cooling began immediately (within 15 minutes) after collection.	✔		
4	Samples received on the same day as sample collection.	✔		
5	Ice surrounding all samples in cooler.		✔	
6	COC form contains sampler(s) signature(s) and is properly relinquished by sampler(s) and courier(s).	✔		
7	COC form contains date and time of sample collection.	✔		
8	Sample containers arrived intact.	✔		
9	Samples were received in Greenway-provided containers.	✔		
10	Sample(s) were received in appropriate containers.	✔		
11	Sample(s) were properly preserved (includes thermal preservation).	✔		
12	All samples were properly labeled on receipt (distinguishable).	✔		
13	Sampling dates and times on bottles match COC.	✔		
14	Bottle count on COC matches number of bottles received.	✔		
15	Sample amount is sufficient for analyses requested	✔		
16	Samples received within the hold time.	✔		

CheckIn By : Taylor Hammack CheckIn Date : 07/30/2018

This Laboratory is NELAP accredited.

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.

VELAP ID# 460028

18073009

LABORATORY CHAIN-OF-CUSTODY RECORD

RP18080704 4

Job ID:18073009

City of Winchester Engineering Departme

GREENWAY ENVIRONMENTAL LABORATORY

151 Windy Hill Lane. Winchester, VA 22602 Phone: (540) 662-4185

Owner Name and Address of Sampling Site City of Winchester Engineering Department 301 Cork Street Winchester, VA 22601	**Sampling Date:** 07/30/18 Grab:	**Sampling Time(s)** 1:43pm, 1:52pm, 1:58pm, 2:09pm Grab:
Billing/Mailing Address (if different) 15 N. Cameron St. Winchester, VA 22601 **Contact Phone:** Reports: Hong Lim 540-667-2376 Invoices: Kelly Henshaw: 540-667-1815 **Identifying No.(s)** VPDES: VAN/VAG: Other (list): VAR040053	**Sampler (print)** Hongmyung Lim Richard Price **Sampler (signature)** [signature]	**Sample Source** (Outfall 001, Final Eff., etc.) OT-34, OT-42, OT-54, OT-11 **Type** (WW, SW, GW, PW, STW, S) STW = Stormwater **Regulatory Agency** ☒ NPDES ☐ DEQ ☐ DCLS/ODW ☐ None ☐ Other (list):

Field Data (temp, pH, dissolved oxygen, TRC, etc.) (optional – for client convenience only)

Relinquished by Sampler	Date/Time	Received by (signature)	Date/Time	Condition
[signature]	07/30/18 2:45			
Relinquished by (signature)	**Date/Time**	**Received by (signature)**	**Date/Time**	**Condition**
Relinquished by (signature)	**Date/Time**	**Received by (signature)**	**Date/Time**	**Condition at Lab Receipt**
		[signature]	7/30/18 1448	good - labels intact

Email Invoice? Y **Email Results?** Y **Turnaround Request:** Standard x Priority ☐

Email: Hong.Lim@winchesterva.gov **Email:** robert.brown@winchesterva.gov **Due Date:**

GREENWAY ENGINEERING USE ONLY indicated by GRAY AREAS.
Below measurements are QC measurements out-of-hold in the lab, do not report.

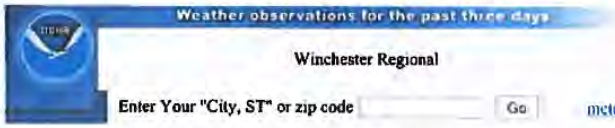
Greenway Sample ID 18073009	Sample Time	City of Winch ID	Container Type	GRAB	Preservation	pH SU	Temp. °C	TRC mg/L	Analysis Requested (circle)
01A	1:43pm	OT-34	1L plastic	X	<4C	X	20.5	X	TSS
02A	1:52pm	OT-42	1L plastic	X	<4C	X	21.7	X	TSS
03A	1:58pm	OT-54	1L plastic	X	<4C	X	22.1	X	TSS
04A	2:09pm	OT-11	1L plastic	X	<4C	X	15.7	X	TSS

Observations and Comments: One ice fault between 2 samples, not completely surrounded by ice 7/30/18

Samples Received in cooler on ice? (Y) N Type of Ice (circle): Wet (Blue) None All temps <6C?: Y (N) (If no, see below).
If samples are not <6C, were samples delivered immediately after collection and had the cooling process began? (Y) N n/a
Were samples collected in correct type of sampling container? (Y) N Were the containers Greenway-provided? (Y) N
Short hold-time analysis? (≤72 hour) Y (N) Samples rec'd in hold? (Y) N Properly preserved? (Y) N Circle N here: Y (N)
Sufficient volume & intact? (Y) N COC complete? (Y) N Bottle times match COC times? (Y) N Final review login/labels? (Y) N
Final review Initial: [initials]

Disposition Site:	Disposition No.:	Method of Disposition/Date:
Performed by:		Date:

Condition: please note conditions of sample when received (i.e. on ice, from fridge). Other applicable conditions may be noted as well.



Date	Time (edt)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Temperature (°F) Air	Dwpt	6 hour Max.	Min.	Relative Humidity	Wind Chill (°F)	Heat Index (°F)	Pressure altimeter (in)	sea level (mb)	Precipitation (in.) 1 hr	3 hr	6 hr
30	16:15	Calm	10.00	Light Rain	BKN026 BKN070 OVC080	64	63			94%	NA	NA	30.14	NA	0.01		
30	15:55	Calm	5.00	Rain	SCT050 BKN070 OVC080	64	63			94%	NA	NA	30.13	NA	0.43		
30	15:35	SE 8	1.50	Heavy Rain	SCT017 BKN041 OVC055	64	63			94%	NA	NA	30.13	NA	0.33		
30	15:15	NW 3 G 20	4.00	Heavy Rain	SCT017 BKN029 OVC047	66	63			88%	NA	NA	30.14	NA	0.08		
30	14:55	S 3	10.00	Overcast	SCT015 BKN048 OVC070	68	64			88%	NA	NA	30.12	NA			
30	14:35	SE 9	10.00	Overcast	BKN013 BKN020 OVC070	68	66			94%	NA	NA	30.11	NA			
30	14:15	SE 13	7.00	Drizzle	SCT011 BKN017 OVC044	70	66			88%	NA	NA	30.10	NA			
30	13:55	SE 7	4.00	Rain	SCT017 BKN043 OVC075	70	68			94%	NA	NA	30.10	NA	0.21		
30	13:35	S 5	5.00	Light Rain	SCT015 BKN030 OVC075	70	68			94%	NA	NA	30.10	NA	0.21		
30	13:15	S 15 G 18	5.00	Heavy Rain	SCT014 BKN024 OVC036	73	68			83%	NA	NA	30.11	NA	0.06		
30	12:55	SE 7	10.00	Overcast	BKN025 BKN033 OVC044	75	68			78%	NA	NA	30.10	NA			
30	12:35	SE 9	10.00	Overcast	SCT027 BKN033 OVC044	77	68			74%	NA	79	30.11	NA			
30	12:15	SE 12 G 18	10.00	Mostly Cloudy	SCT024 SCT030 BKN035	77	64			65%	NA	79	30.11	NA			
30	11:55	SE 10	10.00	Partly Cloudy	SCT021 SCT027 SCT070	77	66			69%	NA	79	30.11	NA			
30	11:35	E 7	10.00	Mostly Cloudy		75	68			78%	NA	NA	30.12	NA			

				SCT017 SCT022 BKN070								
30 11:15	E 6	10.00	Mostly Cloudy	SCT015 SCT020 BKN070	73	68	83%	NA	NA	30.12	NA
30 10:55	E 3	10.00	Partly Cloudy	SCT015 SCT070	73	68	83%	NA	NA	30.13	NA
30 10:35	E 6	10.00	Fair	CLR	72	66	83%	NA	NA	30.13	NA
30 10:15	NE 3	10.00	Partly Cloudy	SCT110	70	66	88%	NA	NA	30.13	NA
30 09:55	E 3	10.00	Mostly Cloudy	SCT060 BKN110	70	64	83%	NA	NA	30.13	NA
30 09:35	NE 3	10.00	Overcast	SCT060 OVC110	70	64	83%	NA	NA	30.14	NA
30 09:15	Calm	10.00	Mostly Cloudy	SCT060 BKN110	68	64	88%	NA	NA	30.13	NA
30 08:55	Calm	10.00	Partly Cloudy	SCT060 SCT090 SCT110	68	64	88%	NA	NA	30.13	NA
30 08:35	Calm	10.00	Partly Cloudy	SCT090	68	64	88%	NA	NA	30.13	NA
30 08:15	NE 3	10.00	Mostly Cloudy	BKN090	68	64	88%	NA	NA	30.13	NA
30 07:55	Calm	10.00	Mostly Cloudy	BKN090	66	64	94%	NA	NA	30.13	NA
30 07:35	Calm	10.00	Mostly Cloudy	BKN090 BKN120	66	63	88%	NA	NA	30.13	NA
30 07:15	Calm	10.00	Mostly Cloudy	SCT090 BKN120	64	63	94%	NA	NA	30.13	NA
30 06:55	Calm	10.00	Mostly Cloudy	SCT100 BKN120	64	63	94%	NA	NA	30.13	NA
30 06:35	Calm	10.00	Overcast	OVC090	64	63	94%	NA	NA	30.13	NA
30 06:15	Calm	10.00	Overcast	OVC090	64	63	94%	NA	NA	30.13	NA
30 05:55	Calm	10.00	Overcast	SCT028 SCT075 OVC100	64	63	94%	NA	NA	30.13	NA
30 05:35	Calm	10.00	Overcast	OVC100	64	63	94%	NA	NA	30.13	NA
30 05:15	Calm	10.00	Mostly Cloudy	BKN100 BKN120	64	63	94%	NA	NA	30.13	NA
30 04:55	Calm	10.00	Mostly Cloudy	SCT030 SCT050 BKN100	64	63	94%	NA	NA	30.13	NA
30 04:35	Calm	10.00	Mostly Cloudy	SCT028 SCT034 BKN050	64	63	94%	NA	NA	30.14	NA
30 04:15	Calm	10.00	Fair	CLR	64	63	94%	NA	NA	30.15	NA
30 03:55	Calm	10.00	Partly Cloudy	SCT110	64	63	94%	NA	NA	30.13	NA
30 03:35	Calm	10.00	Partly Cloudy	SCT110	63	63	100%	NA	NA	30.14	NA
30 03:15	Calm	10.00	Partly Cloudy	SCT100	63	63	100%	NA	NA	30.15	NA
30 02:55	Calm	10.00	Partly Cloudy	SCT100	64	63	94%	NA	NA	30.15	NA
30 02:35	Calm	10.00	Fair	CLR	64	63	94%	NA	NA	30.14	NA
30 02:15	Calm	10.00	Fair	CLR	64	63	94%	NA	NA	30.14	NA

30 01:55	Calm	10.00	Fair	CLR	63	63	100%	NA	NA	30.13	NA
30 01:35	Calm	10.00	Partly Cloudy	SCT095	64	63	94%	NA	NA	30.14	NA
30 01:15	SE 3	10.00	Mostly Cloudy	BKN095	68	64	88%	NA	NA	30.14	NA
30 00:55	Calm	10.00	Mostly Cloudy	BKN095	66	63	88%	NA	NA	30.15	NA
30 00:35	Calm	10.00	Partly Cloudy	SCT095	64	63	94%	NA	NA	30.15	NA
30 00:15	Calm	10.00	Partly Cloudy	SCT095	70	63	78%	NA	NA	30.15	NA
29 23:55	Calm	10.00	Partly Cloudy	SCT085	66	64	94%	NA	NA	30.16	NA
29 23:35	Calm	10.00	Mostly Cloudy	SCT075 BKN085	68	64	88%	NA	NA	30.16	NA
29 23:15	Calm	10.00	Overcast	OVC075	68	64	88%	NA	NA	30.16	NA
29 22:55	Calm	10.00	Mostly Cloudy	BKN090	68	64	88%	NA	NA	30.16	NA
29 22:35	Calm	10.00	Partly Cloudy	SCT090	68	64	88%	NA	NA	30.16	NA
29 22:15	SE 3	10.00	Partly Cloudy	SCT085	70	64	83%	NA	NA	30.15	NA
29 21:55	SE 3	10.00	Mostly Cloudy	BKN085	70	64	83%	NA	NA	30.15	NA
29 21:35	Calm	10.00	Overcast	OVC085	70	66	88%	NA	NA	30.13	NA
29 21:15	Calm	10.00	Mostly Cloudy	BKN085	70	66	88%	NA	NA	30.13	NA
29 20:55	Calm	10.00	Mostly Cloudy	BKN085	70	64	83%	NA	NA	30.13	NA
29 20:35	Calm	10.00	Mostly Cloudy	BKN085	73	64	74%	NA	NA	30.13	NA
29 20:15	E 3	10.00	Overcast	OVC085	73	64	74%	NA	NA	30.13	NA
29 19:55	E 3	10.00	Overcast	OVC075	75	64	69%	NA	NA	30.13	NA
29 19:35	E 5	10.00	Mostly Cloudy	BKN075 BKN090	75	64	69%	NA	NA	30.13	NA
29 19:15	E 5	10.00	Partly Cloudy	SCT075 SCT100	77	63	61%	NA	79	30.12	NA
29 18:55	E 5	10.00	Mostly Cloudy	SCT075 BKN100	77	63	61%	NA	79	30.12	NA
29 18:35	E 3	10.00	Overcast	BKN080 OVC110	77	63	61%	NA	79	30.12	NA
29 18:15	E 6	10.00	Overcast	OVC080	77	63	61%	NA	79	30.12	NA
29 17:55	SE 6	10.00	Overcast	OVC090	77	63	61%	NA	79	30.12	NA
29 17:35	SE 3	10.00	Mostly Cloudy	BKN090	79	63	58%	NA	81	30.13	NA
29 17:15	SE 5	10.00	Partly Cloudy	SCT050 SCT055	79	61	54%	NA	80	30.13	NA
29 16:55	SE 6	10.00	Partly Cloudy	SCT048	79	63	58%	NA	81	30.13	NA
29 16:35	E 6	10.00	Partly Cloudy	SCT046	81	61	51%	NA	82	30.12	NA
29 16:15	E 6	10.00	Mostly Cloudy	BKN046 BKN090	81	63	54%	NA	82	30.12	NA
29 15:55	Calm	10.00	Mostly Cloudy	SCT048 SCT070 BKN090	79	61	54%	NA	80	30.13	NA
29 15:35	Calm	10.00	Mostly Cloudy		79	61	54%	NA	80	30.14	NA

					SCT060 BKN070 BKN080								
29 15:15	SE 3	10.00	Mostly Cloudy		SCT048 BKN060 BKN070	79	61	54%	NA	80	30.14	NA
29 14:55	S 6	10.00	Partly Cloudy		SCT050	81	61	51%	NA	82	30.14	NA
29 14:35	E 3	10.00	Partly Cloudy		SCT060 SCT065	79	59	51%	NA	80	30.14	NA
29 14:15	E 5	10.00	Partly Cloudy		SCT050 SCT060	79	61	54%	NA	80	30.15	NA
29 13:55	Calm	10.00	Partly Cloudy		SCT046 SCT080	77	61	57%	NA	79	30.15	NA
29 13:35	Calm	10.00	Partly Cloudy		SCT046 SCT075	77	59	54%	NA	79	30.15	NA
29 13:15	W 3	10.00	Overcast		SCT042 BKN050 OVC075	77	61	57%	NA	79	30.16	NA
29 12:55	Calm	10.00	Overcast		OVC038	77	61	57%	NA	79	30.16	NA
29 12:35	S 3	10.00	Overcast		BKN038 BKN045 OVC070	77	61	57%	NA	79	30.16	NA
29 12:15	N 3	10.00	Overcast		SCT036 BKN045 OVC070	75	61	61%	NA	NA	30.16	NA
29 11:55	NE 3	10.00	Partly Cloudy		SCT034	75	61	61%	NA	NA	30.16	NA
29 11:35	E 3	10.00	Partly Cloudy		SCT034	73	61	65%	NA	NA	30.17	NA
29 11:15	Calm	10.00	Fair		CLR	73	61	65%	NA	NA	30.17	NA
29 10:55	SE 3	10.00	Fair		CLR	73	61	65%	NA	NA	30.17	NA
29 10:35	Calm	10.00	Fair		CLR	73	61	65%	NA	NA	30.17	NA
29 10:15	Calm	10.00	Partly Cloudy		SCT075	72	61	69%	NA	NA	30.18	NA
29 09:55	Calm	10.00	Partly Cloudy		SCT075	70	61	73%	NA	NA	30.18	NA
29 09:35	Calm	10.00	Mostly Cloudy		BKN075	70	61	73%	NA	NA	30.18	NA
29 09:15	S 3	10.00	Mostly Cloudy		BKN075	68	61	78%	NA	NA	30.18	NA
29 08:55	Calm	10.00	Partly Cloudy		SCT075	68	61	78%	NA	NA	30.17	NA
29 08:35	SE 3	10.00	Fair		CLR	66	61	83%	NA	NA	30.17	NA
29 08:15	SE 3	10.00	Fair		CLR	64	61	88%	NA	NA	30.17	NA
29 07:55	Calm	10.00	Fair		CLR	64	61	88%	NA	NA	30.17	NA
29 07:35	Calm	10.00	Fair		CLR	63	61	94%	NA	NA	30.17	NA
29 07:15	Calm	10.00	Fair		CLR	61	59	94%	NA	NA	30.17	NA
29 06:55	Calm	10.00	Partly Cloudy		SCT080	59	59	100%	NA	NA	30.17	NA
29 06:35	Calm	10.00	Partly Cloudy		SCT080	59	59	100%	NA	NA	30.17	NA
29 06:15	Calm	10.00	Fair		CLR	59	59	100%	NA	NA	30.17	NA
29 05:55	Calm	10.00	Fair		CLR	59	59	100%	NA	NA	30.16	NA
29 05:35	Calm	10.00	Fair		CLR	59	59	100%	NA	NA	30.15	NA
29 05:15	Calm	10.00	Fair		CLR	59	59	100%	NA	NA	30.15	NA
29 04:55	Calm	10.00	Fair		CLR	61	59	94%	NA	NA	30.15	NA
29 04:35	NW 3	10.00	Fair		CLR	61	59	94%	NA	NA	30.15	NA

29	04:15	Calm	10.00	Fair	CLR	59	59	100%	NA	NA	30.15	NA
29	03:55	Calm	10.00	Fair	CLR	59	59	100%	NA	NA	30.15	NA
29	03:35	Calm	10.00	Fair	CLR	61	59	94%	NA	NA	30.15	NA
29	03:15	Calm	10.00	Fair	CLR	61	59	94%	NA	NA	30.15	NA
29	02:55	SE 3	10.00	Fair	CLR	61	59	94%	NA	NA	30.15	NA
29	02:35	Calm	10.00	Fair	CLR	63	59	88%	NA	NA	30.14	NA
29	02:15	Calm	10.00	Fair	CLR	63	59	88%	NA	NA	30.14	NA
29	01:55	Calm	10.00	Partly Cloudy	SCT085	63	59	88%	NA	NA	30.13	NA
29	01:35	Calm	10.00	Fair	CLR	63	59	88%	NA	NA	30.13	NA
29	01:15	Calm	10.00	Fair	CLR	64	59	83%	NA	NA	30.13	NA
29	00:55	Calm	10.00	Fair	CLR	63	59	88%	NA	NA	30.13	NA
29	00:35	Calm	10.00	Fair	CLR	63	59	88%	NA	NA	30.12	NA
29	00:15	Calm	10.00	Fair	CLR	68	59	73%	NA	NA	30.12	NA
28	23:55	NW 5	10.00	Fair	CLR	66	59	78%	NA	NA	30.12	NA
28	23:35	NW 3	10.00	Fair	CLR	68	59	73%	NA	NA	30.12	NA
28	23:15	NW 3	10.00	Fair	CLR	68	61	78%	NA	NA	30.11	NA
28	22:55	NW 5	10.00	Fair	CLR	66	61	83%	NA	NA	30.12	NA
28	22:35	NW 6	10.00	Fair	CLR	66	61	83%	NA	NA	30.11	NA
28	22:15	NW 5	10.00	Fair	CLR	68	61	78%	NA	NA	30.11	NA
28	21:55	NW 3	10.00	Fair	CLR	68	61	78%	NA	NA	30.10	NA
28	21:35	Calm	10.00	Fair	CLR	68	61	78%	NA	NA	30.09	NA
28	21:15	Calm	10.00	Partly Cloudy	SCT065	68	61	78%	NA	NA	30.09	NA
28	20:55	NW 5	10.00	Fair	CLR	70	59	69%	NA	NA	30.08	NA
28	20:35	NW 5	10.00	Fair	CLR	72	59	65%	NA	NA	30.08	NA
28	20:15	NW 5	10.00	Fair	CLR	72	61	69%	NA	NA	30.07	NA
28	19:55	Calm	10.00	Fair	CLR	73	61	65%	NA	NA	30.08	NA
28	19:35	Calm	10.00	Fair	CLR	73	59	61%	NA	NA	30.07	NA
28	19:15	NW 3	10.00	Fair	CLR	73	59	61%	NA	NA	30.07	NA
28	18:55	N 3	10.00	Partly Cloudy	SCT060	77	59	54%	NA	79	30.06	NA
28	18:35	NW 7	10.00	Fair	CLR	79	57	48%	NA	80	30.06	NA
28	18:15	N 6	10.00	Partly Cloudy	SCT060 SCT085	79	59	51%	NA	80	30.05	NA
28	17:55	N 3	10.00	Partly Cloudy	SCT060	81	59	48%	NA	81	30.05	NA
28	17:35	NW 8	10.00	Partly Cloudy	SCT060	79	59	51%	NA	80	30.06	NA
28	17:15	W 10	10.00	Fair	CLR	81	57	45%	NA	81	30.05	NA
28	16:55	NW 10	10.00	Partly Cloudy	SCT070	81	59	48%	NA	81	30.05	NA
28	16:35	N 6	10.00	Fair	CLR	81	57	45%	NA	81	30.05	NA
28	16:15	NW 8	10.00	Fair	CLR	81	57	45%	NA	81	30.05	NA
28	15:55	N 7	10.00	Partly Cloudy	SCT075	81	57	45%	NA	81	30.05	NA
28	15:35	NW 7	10.00	Partly Cloudy	SCT075	81	55	42%	NA	81	30.06	NA
28	15:15	W 10	10.00	Partly Cloudy	SCT075	79	59	51%	NA	80	30.06	NA
28	14:55	NW 12	10.00	Mostly Cloudy	SCT060 BKN075	79	59	51%	NA	80	30.07	NA
28	14:35	NW 12 G 17	10.00	Mostly Cloudy	BKN060	79	59	51%	NA	80	30.07	NA

28	14:15	NW 13 G 17	10.00	Partly Cloudy	SCT050	79	59	51%	NA	80	30.07	NA
28	13:55	W 8	10.00	Partly Cloudy	SCT050 SCT065	79	59	51%	NA	80	30.07	NA
28	13:35	NW 9	10.00	Partly Cloudy	SCT049 SCT065	79	59	51%	NA	80	30.07	NA
28	13:15	W 14	10.00	Partly Cloudy	SCT049	79	59	51%	NA	80	30.07	NA
28	12:55	NW 12	10.00	Partly Cloudy	SCT050	79	59	51%	NA	80	30.08	NA
28	12:35	NW 8	10.00	Partly Cloudy	SCT050	77	59	54%	NA	79	30.08	NA
28	12:15	W 14 G 20	10.00	Partly Cloudy	SCT045	79	59	51%	NA	80	30.10	NA
28	11:55	W 14	10.00	Partly Cloudy	SCT047	77	59	54%	NA	79	30.09	NA
28	11:35	NW 10	10.00	Partly Cloudy	SCT045	77	61	57%	NA	79	30.10	NA
28	11:15	NW 8	10.00	Fair	CLR	77	61	57%	NA	79	30.09	NA
28	10:55	W 10	10.00	Fair	CLR	75	61	61%	NA	NA	30.09	NA
28	10:35	NW 6	10.00	Fair	CLR	75	61	61%	NA	NA	30.09	NA
28	10:15	NW 9	10.00	Fair	CLR	73	61	65%	NA	NA	30.08	NA
28	09:55	NW 7	10.00	Fair	CLR	73	61	65%	NA	NA	30.08	NA
28	09:35	NW 8	10.00	Fair	CLR	73	61	65%	NA	NA	30.08	NA
28	09:15	NW 8	10.00	Fair	CLR	73	61	65%	NA	NA	30.08	NA
28	08:55	NW 6	10.00	Fair	CLR	72	61	69%	NA	NA	30.08	NA
28	08:35	NW 9	10.00	Fair	CLR	72	61	69%	NA	NA	30.08	NA
28	08:15	NW 6	10.00	Fair	CLR	72	63	73%	NA	NA	30.08	NA
28	07:55	Calm	10.00	Fair	CLR	68	66	94%	NA	NA	30.07	NA
28	07:35	Calm	10.00	Fair	CLR	68	64	88%	NA	NA	30.06	NA
28	07:15	Calm	10.00	Partly Cloudy	SCT050	66	64	94%	NA	NA	30.05	NA
28	06:55	Calm	10.00	Overcast	OVC050	66	64	94%	NA	NA	30.05	NA
28	06:35	Calm	10.00	Overcast	OVC050	64	64	100%	NA	NA	30.05	NA
28	06:15	Calm	7.00	Overcast	OVC055	64	64	100%	NA	NA	30.05	NA
28	05:55	Calm	10.00	Overcast	BKN055 OVC110	64	64	100%	NA	NA	30.04	NA
28	05:35	Calm	10.00	Overcast	OVC110	64	64	100%	NA	NA	30.03	NA
28	05:15	Calm	10.00	Overcast	OVC120	66	64	94%	NA	NA	30.03	NA
28	04:55	Calm	10.00	Overcast	OVC120	66	64	94%	NA	NA	30.03	NA
28	04:35	SE 3	7.00	Overcast	SCT060 OVC110	66	64	94%	NA	NA	30.03	NA
28	04:15	W 3	10.00	Mostly Cloudy	SCT060 BKN120	68	64	88%	NA	NA	30.03	NA
28	03:55	Calm	10.00	Overcast	OVC060	68	66	94%	NA	NA	30.03	NA
28	03:35	SW 5	10.00	Overcast	BKN060 OVC120	68	66	94%	NA	NA	30.04	NA
28	03:15	Calm	10.00	Overcast	OVC110	68	66	94%	NA	NA	30.04	NA
28	02:55	Calm	10.00	Overcast	OVC120	68	66	94%	NA	NA	30.03	NA
28	02:35	Calm	10.00	Overcast	OVC110	68	66	94%	NA	NA	30.04	NA
28	02:15	Calm	10.00	Overcast		68	66	94%	NA	NA	30.04	NA

					SCT080 SCT100 OVC110											
28	01:55	Calm	10.00	Overcast	OVC090	68	66		94%	NA	NA	30.05	NA			
28	01:35	Calm	10.00	Overcast	OVC090	68	66		94%	NA	NA	30.05	NA			
28	01:15	W 3	10.00	Overcast	OVC090	68	66		94%	NA	NA	30.05	NA			
28	00:55	Calm	7.00	Overcast	SCT075 OVC090	66	64		94%	NA	NA	30.05	NA			
28	00:35	Calm	10.00	Mostly Cloudy	BKN080	66	64		94%	NA	NA	30.05	NA			
28	00:15	Calm	10.00	Partly Cloudy	SCT065	66	64		94%	NA	NA	30.05	NA			
28	00:00	Calm	10.00	Mostly Cloudy	BKN065 BKN085	68	64		88%	NA	NA	30.05	NA			
27	23:35	Calm	10.00	Overcast	OVC065	66	64		94%	NA	NA	30.05	NA			
27	23:15	Calm	10.00	Partly Cloudy	SCT065	64	64		100%	NA	NA	30.05	NA			
27	22:55	Calm	7.00	Partly Cloudy	SCT100	64	64		100%	NA	NA	30.05	NA			
27	22:35	Calm	10.00	Partly Cloudy	SCT100	64	64		100%	NA	NA	30.04	NA			
27	22:15	Calm	10.00	Fair	CLR	66	64		94%	NA	NA	30.04	NA			
27	21:55	Calm	10.00	Fair	CLR	66	64		94%	NA	NA	30.04	NA			
27	21:35	Calm	10.00	Fair	CLR	66	64		94%	NA	NA	30.03	NA			
27	21:15	Calm	10.00	Fair	CLR	66	64		94%	NA	NA	30.02	NA			
27	20:55	Calm	10.00	Fair	CLR	68	64		88%	NA	NA	30.02	NA			
27	20:35	Calm	10.00	Fair	CLR	68	64		88%	NA	NA	30.02	NA			
27	20:15	NW 3	10.00	Fair	CLR	70	66		88%	NA	NA	30.02	NA			
27	19:55	Calm	10.00	Fair	CLR	70	66		88%	NA	NA	30.02	NA			
27	19:35	Calm	10.00	Partly Cloudy	SCT060 SCT120	72	66		83%	NA	NA	30.02	NA			
27	19:15	NW 3	10.00	Mostly Cloudy	BKN060 BKN070 BKN120	73	64		74%	NA	NA	30.01	NA			
27	18:55	Calm	10.00	Mostly Cloudy	BKN060	73	64		74%	NA	NA	30.01	NA			
27	18:35	Calm	10.00	Overcast	BKN070 OVC080	73	66		78%	NA	NA	30.02	NA			
27	18:15	E 5	10.00	Partly Cloudy	SCT070 SCT085	73	66		78%	NA	NA	30.01	NA			
27	17:55	E 3	10.00	Partly Cloudy	SCT110	73	64		74%	NA	NA	30.00	NA			
27	17:35	E 6	10.00	Partly Cloudy	SCT110	72	68		88%	NA	NA	30.01	NA			
27	17:15	E 12	10.00	Partly Cloudy	SCT011 SCT120	72	68		88%	NA	NA	30.02	NA			
27	16:55	Calm	10.00	Thunderstorm in Vicinity	SCT038 SCT065 BKN120	70	68		94%	NA	NA	30.00	NA	0.02		
27	16:35	NW 8 G 16	10.00	Thunderstorm Light Rain in Vicinity	SCT060 SCT075 BKN110	68	66		94%	NA	NA	29.99	NA	0.02		

Date	Time (edt)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Air	Dwpt	Max. 6 hour	Min. 6 hour	Relative Humidity	Wind Chill (°F)	Heat Index (°F)	altimeter (in.)	sea level (mb)	1 hr	3 hr	6 hr
						Temperature (°F)							Pressure		Precipitation (in.)		

National Weather Service
Southern Region Headquarters
Fort Worth, Texas
Disclaimer

Back to previous page

Last Modified: Febuary, 7 2012
Privacy Policy

Coliscan Easygel Data Form

Sample Site #:	Sample Date:	Sample Time:	Rain Past 48 Hours (Inches)[1]	Incubator Time In:	Incubator Temp In: [2]	Incubator Time Out:	Incubator Temp Out:	Sample Volume (ml) [3]	# *E. coli* Colonies (dark blue to royal purple) [4]	Total E. coli Count (CFU/100 ml) [5]	Comments:
OT-42	7/30/2018	1:52 PM	0	2:30 PM	95 F	2:30 PM	95 F	4	TNTC	-	
OT-34	7/30/2018	1:43 PM	0	2:30 PM	95 F	2:30 PM	95 F	4	TNTC	-	
OT-54	7/30/2018	1:58 PM	0	2:30 PM	95 F	2:30 PM	95 F	4	22	550	
OT-11	7/30/2018	2:10 PM	0	3:30 PM	95 F	3:30 PM	95 F	4	18	450	
OT-42	1/24/2019		0	2:30 PM	95 F	12:10PM	95 F	3	14	467	
OT-34	1/24/2019		0	2:30 PM	95 F	12:10PM	95 F	3	0	0	
OT-54	1/24/2019		0	2:30 PM	95 F	12:10PM	95 F	3	19	633	
OT-11	1/24/2019		0	3:30 PM	95 F	12:10PM	95 F	3	7	233	

Notes:

[1] See http://w1.weather.gov/data/obhistory/KOKV.html.

[2] Ideal incubation temperature is 37.5 C.

[3] Between 1.0 - 5.0 ml

[4] Colonies to be counted per Coliscan Easygel instructions provided in Attachment 1 to the WQMP

[5] To calculate the number of E. coli colonies: (# E. coli colonies/ml sample size) x 100