CITY OF GREENSBORO AMENDED SPECIAL ORDER BY CONSENT
EMC SOC WQ S19-010 YEAR TWO REPORT: May 1, 2022 – April 30, 2023
Submitted June 13, 2023

The original Special Order by Consent ("SOC") between the City of Greensboro ("City") and the Environmental Management Commission ("EMC") was signed in March 2021 with an effective date of May 1, 2021. "The initial and primary goal of this SOC is that the City's T. Z. Osborne Water Reclamation Facility ("TZO") effluent discharge "will not cause concentrations of 1,4-dioxane in downstream drinking water supplies to exceed the EPA health advisory concentration of 35 µg/l." The original 2-Year SOC included: a comprehensive source study, a public awareness program, continued collaboration/oversight of indirect sources of 1,4-dioxane, TZO effluent Compliance Values (Year One: 45 µg/l, Year Two 33 µg/l), annual reports, and civil penalties for noncompliance with SOC requirements. The North Carolina Department of Environmental Quality, Division of Water Resources ("Department", "DWR") is responsible for oversight of the SOC.

In response to an SOC Legal Challenge filed in April 2021, and the resulting Settlement Agreement, an amended SOC was signed on November 22, 2021 with an effective date of December 1, 2021. The Amended 36-month SOC between the City and NCDEQ included: lower Compliance Values (Year One 35 µg/l, Year Two 31.5 µg/l, Year Three 23 µg/l), higher stipulated penalties for Compliance Value exceedances, direct sampling of all SIUs, and increased monitoring/reporting for certain sites.

Special Order by Consent ("SOC") Year Two Report Table of Contents:

INTRODUCTION AND SUMMARY

The focus of the original SOC Sampling Plan (approved by NCDEQ on May 26, 2021) was to collect, compile, and evaluate 1,4-dioxane data in order to: determine sector contributions from domestic, commercial, drinking water; determine landfill contribution; revisit insignificant trunklines from the City's 2015 study; calculate a mass-balance; and, revisit TZO internal wastestreams and North Buffalo Transfer Pump Station.

The Year Two Sampling Plan included TZO Influent, TZO Effluent, direct sampling of 28 SIUs (32 locations, each sampled twice), Jordan Lake (Haw River Arm) and the Pittsboro Drinking Water intake. Frequencies are listed in the table below.

SP #	Sampling Location	Grab/ Composite	Split Samples?	Minimum Sampling Frequency/ Specific Times
1	TZO INF***	COMP	No	1 daily composite every week
3C	TZO EFF Composite	Weekly Comp	No	Weekly Volumetric (Retain for NCDEQ)
3G	TZO EFF Grab***	G	YES	Weekly
27-58	SIU Composites***	C	No	Quarter #1 and Quarter #2
25	HR Arm Jordan Lake***	Grab (by Meritech)	No	Twice/Month If accessible (weather, COVID)
26	Pittsboro DW Intake***	COMP (by Town)	No	1 composite every week

The City of Greensboro also voluntarily continued sampling the locations below along with 5 Domestic samples during SOC Year Two.

SP #	Sampling Location	Grab/Composite
2	NB INF (Transfer Line)	COMP
7	IND 1 Patton	COMP
BP	Bryan Park	COMP
20	DW 3 PTRWA	Grab
23	GSO Landfill	COMP
	Pittsboro Finished DW	Grab (by Town)
	Receiving Streams (Old 70 and Hwy 61)	Grab

The Amended 36-month SOC between the City and NCDEQ includes: a comprehensive source study, a public awareness program, continued collaboration/oversight of indirect sources of 1,4-dioxane, TZO effluent compliance values, annual reports, and civil penalties for noncompliance with SOC requirements.

During SOC Year, the City collected over 606 samples and the commercial laboratory 1,4-dioxane testing costs alone for Year Two exceeded $70,794.

- BACKGROUND INFORMATION

Background: Greensboro TZO Facility Information:

The City of Greensboro currently has one wastewater treatment plant, the T. Z. Osborne Water Reclamation Facility, located in McLeansville NC. The North Buffalo WWTP [NPDES NC0024325] was decommissioned in October 2017. All wastewater is treated at TZO and the North Buffalo site is now a flow transfer pump station. Flow from the North Buffalo transfer station enters after the TZO influent sampling point, so samples and transfer station flows are still taken at the North Buffalo Influent in order to accurately determine loading to the TZO facility. The influent NB/TZO flow weighted averages are submitted as the TZO influent values on the TZO eDMRs.

T. Z. Osborne Water Reclamation Facility Information	
NPDES Permit NC0047384 (Administratively Extended by NCDEQ)	Issued July 1, 2014 Expired June 30, 2019
Design Capacity:	56 Million Gallons Per Day
Detention Time @ 56MGD	~ 32 hours
Service Area:	Entire City of Greensboro; parts of Guilford County ~1650 miles of wastewater collection system lines 108,971 connections (~9688 non-domestic)
Number of SIUs:	28 (20 Categorical; 8 SIU due to flow only)
Average Effluent Flow CY 2022:	32.55 MGD
Receiving Waters:	South Buffalo Creek (WS-V/NSW) → Buffalo Creek → Reedy Fork Creek → Haw River → Jordan Lake → Cape Fear River
% Effluent at 7Q10 Flow:	97.6% [calculated by NCDEQ]

TZO includes the following wastewater treatment process train:

influent wastewater receiving station
mechanical bar screens
influent wet well pumps
optional 8.0 MG flow equalization tanks (2 tanks: 3.5 and 4.5 MGD)
optional equalization tank at North Buffalo Transfer station (3.0 MGD)
aerated grit tanks
air scrubbing system for odor control
phosphorus removal by chemical addition and precipitation
primary clarifiers
5-stage Biological Nutrient Removal (BNR) activated sludge process
secondary clarifiers
tertiary filters (cloth media filters)
disinfection with sodium hypochlorite
dechlorination with sodium bisulfite
reaeration cascade and flow measurement

The following solids treatment and disposal train is located at TZO:

sludge receiving/blending tanks
gravity sludge thickeners
thickened sludge holding tanks
Centrifuges
(2) fluidized bed incinerators
ash clarifier
ash press
incinerator ash disposal at dedicated municipal landfill site

Background: 1,4-dioxane Sampling and Analytical Method

EPA Method 624.1 (40 CFR Part 136 wastewater method) was used for all aqueous 1,4-dioxane samples in Year Two.

Although EPA Method 624.1 indicates a grab sample should be collected, 1,4-dioxane is not volatile, and concentrations in composite samples are expected to be stable. Composite samplers were used extensively in the SOC Sampling Plan in order to gather comprehensive information on the contributions from the various sectors. It would have been virtually impossible to track discharges, identify sources, and determine actual loadings from grab sample results.

The City used two commercial laboratories certified by NCDEQ to conduct 1,4-dioxane analyses: Meritech Inc. and Pace Laboratories. Both labs were used for 1,4-dioxane eDMR split analyses and both were used in the initial 2015 study. The Practical Quantitation Level (PQL) or Reporting Level (RL) for the 2 certified laboratories are as follows: Meritech <1 µg/l and Pace <2 µg/l. Note: PQLs indicated are based on assumption that no dilution of the sample was needed due to elevated concentrations, matrix interference, or to prevent damage to lab equipment. If a sample requires dilution, the PQL would be adjusted accordingly. Some elevated PQLs were reported by the commercial laboratories during the Year Two sampling, particularly from industrial discharges, which are more likely to cause/create matrix interferences.

- REQUIRED INFORMATION FROM SOC SECTION 2(d)(9):

i. Summary of the City's oversight activities [outlined in 2(d)(1), 2(d)(4) and 2(d)(7)]

1. Continue investigating industrial sources and engage with sources not defined as SIUs than have 1,4-dioxane concentrations above 31.5 µg/l to reduce or eliminate 1,4-dioxane discharges.
2. On January 21, 2022, a draft of the City's Contaminants of Emerging Concern (CEC) Policy and proposed Enforcement Response Plan (ERP) modifications was sent to all SIUs and permitted IUs. The CEC Policy became effective February 1, 2022 and was provided to each SIU and IU along with a Local Pollutant Allocation Document (LPAD) for 1,4-dioxane. This is a Daily Maximum mass-based allocation specific to each SIU/IU. For any facility with multiple regulated discharge pipes, the allocation is based on the total combined discharge of process wastewater from the facility. The document requires that at no point shall the combined discharge from ALL permitted pipes exceed the mass-based allocation. Enforcement for exceedance(s) of this CEC LPAD are based solely on the loading from each SIU/IU and is NOT contingent upon an exceedance of the T.Z. Osborne effluent daily maximum SOC compliance value for 1,4-dioxane.
3. The City's Enforcement Response Plan was updated to incorporate enforcement remedies for any SIU/IU that exceeds its LPAD for 1,4-dioxane. The modified ERP was submitted to NCDEQ Pretreatment Unit on March 1, 2022 for review and approval. To date, approval is still pending.
4. The Pretreatment Coordinator and the Pretreatment Laboratory Specialist conducted the required 3 inspections at the 9 SIUs with at least one sample over 100 µg/l from Year One. Two additional SIUs with at least one sample over 31.5 µg/l have submitted a "Source Investigation, Evaluation and Survey" to the Industrial Waste Section.

ii. Public education outreach plan update [outlined in 2(c)(5)].

The City is committed to keeping the public, individual, commercial and industrial users of the Greensboro wastewater system, NCDEQ, and downstream drinking water utilities informed about the activities associated with the Special Order by Consent and 1,4-dioxane.

This plan was developed to meet the requirements of the Special Order by Consent ("SOC") between the North Carolina Environmental Management Commission and the City of Greensboro ("City") with applicability toward individual, commercial and industrial users of City Water Resources Department services. In summary, this plan will educate the public on understanding risks, products that contain a significant level of 1,4-dioxane, raw materials that may contribute to 1,4-dioxane creation, and ways the public can help reduce and/or eliminate their contribution of 1,4-dioxane to the City's wastewater system.

Year One Outreach Activities:

The City's first priority was to make all relevant information regarding the SOC readily available to the public, including sampling data, Quarterly Meeting notes, and other related documents.

Prior to eDMR submittal deadlines, the following data is provided via email to over 70 individuals (currently 17 from NCDEQ, 12 downstream drinking water utilities, and other interested parties): T.Z. Osborne effluent eDMR data, Pittsboro Drinking Water Plant data, and receiving stream data from 2 locations. Data spreadsheets from each of the emails are also posted/updated on the City of Greensboro website. This voluntary effort ensures all interested parties have direct communication from the City concerning recent 1,4-dioxane data.

The City of Greensboro 2021 Annual Sewer Report, required by NCDEQ, included a section devoted to 1,4-dioxane and the Special Order by Consent, including links to the City's 1,4-dioxane website updates. The report was submitted to NCDEQ on March 1, 2022, was posted on the City website, and copies of the report are available to residents at several Water Resources Department locations.

The following information/ documents were posted on the City of Greensboro website during Year One to inform the general public and other interested parties:

- Original Special Order by Consent (effective May 1, 2021)
- Original SOC Sampling Plan (dated 5-26-2021)
- SOC Settlement Agreement (dated 11-22-2021)
- Amended Special Order by Consent (effective 12-1-2021)
- Amended SOC Sampling Plan (dated 12-1-2021)
- City/NCDEQ SOC Quarterly Meeting Summaries posted after review and approval by DWR staff:
  - 1st Quarterly Meeting held: May 19, 2021
  - 2nd Quarterly Meeting held: September 8, 2021
  - 3rd Quarterly Meeting held: November 23, 2021
  - 4th Quarterly Meeting held: February 16, 2022
- City of Greensboro SIU Wastewater Discharge Permit Application, SIU Permit Application Instructions (including site-specific 1,4-dioxane requirements)
- T. Z. Osborne electronic Discharge Monitoring Reports/eDMR (from Jan 2021 to present)
- T. Z. Osborne Results from 2019 NCDEQ Study: 1,4-dioxane and PFAS data
- Source Investigation, Evaluation, and Survey Document for Industrial Users
- City of Greensboro Contaminants of Emerging Concern (CEC) Policy (dated 2-1-2022)
- 5-Day Reports for SOC Compliance Value Exceedance Events
  - June 30, 2021
  - November 3, 2021
  - April 5, 2022

Year Two Outreach Activities:

The above website and email activities from Year One continued in Year Two.

The priority for Year Two was to educate the public on the calculated risks associated with 1,4-dioxane, products that contain a significant level of 1,4-dioxane, and raw materials that may contribute to 1,4-dioxane creation during chemical reactions. The City will develop and implement a public awareness campaign using public access television and multimedia outlets.

The Greensboro Public Access Television Station (GTN) was utilized to further inform our customers, commercial, industrial and domestic, about 1,4-dioxane and the City's continued efforts to address this contaminant of emerging concern. The campaign includes three Public Service Announcements (PSA)/Commercials, targeting commercial, industrial, and domestic customer groups. Production of this campaign started in the fall of 2022 and the PSAs are now available on GTN, the City YouTube channel, and the City website.

In addition to the GTN public awareness campaign, the City Industrial Waste staff provided a detailed update on the 1,4-dioxane SOC and related activities as part of its annual Industry Day meeting. The Industry Day meeting is a mandatory meeting with all Greensboro Significant Industrial Users and permitted Industrial Users. This meeting was held at the Greensboro Coliseum on April 27, 2023 with 62 members of the industrial community in attendance. We also offered a tour of the TZO Facility and had 12 attendees.

City of Greensboro Industrial Waste and Laboratory staff have presented information to various technical and professional organizations concerning the SOC and the City's approach to 1,4-dioxane source identification, investigation, and reduction. These include: a joint Greensboro/NCDEQ presentation at the annual North Carolina Pretreatment Consortium conference in September 2022, a presentation at the Upper Piedmont Emerging Contaminant (UPEC) Group meeting in March 2023, and a presentation at the Local Emergency Planning Committee ("LEPC") meeting on June 9, 2022.

City/NCDEQ SOC Quarterly Meeting Summaries were posted after review and approval by DWR staff:

- 1st Quarterly Meeting held: June 1, 2022
- 2nd Quarterly Meeting held: September 14, 2022
- 3rd Quarterly Meeting held: January 12, 2023
- 4th Quarterly Meeting held: February 15, 2023

Year Three Outreach Activities:

The above website and email activities from Year Two will continue in Year Three.

The City is researching 1,4-dioxane risk assessment and will provide that information on the City website. Updates on 1,4-dioxane activities and TZO performance will again be a topic at the 2024 Annual Industry Day. The Public Service Announcements will be moved to the Water Resources main page as well as sent out to social media sites.

iii. 1,4-dioxane mass balance [outlined in 2(d)(8)].
See Separate Attachment #1

iv. A table of all monitoring results for 1,4-dioxane collected during the SOC Year Two.

The SOC Year Two Sampling Plan and SOC Year Two Data (May 1, 2022 – April 30, 2023) supporting the following tables/summaries are included in this submittal as Appendices A through G:

Background information on data, data review, and calculations for the following summaries:

- Sample counts herein record split samples as a separate result and separate sample
- In calculating averages, BDL values were used directly (rather than ½ detect or zero), as long as the PQL reported was <1 or <2. In instances of elevated PQLs, only the range of the results has been reported in the summaries.
- Neither of the commercial laboratories used by the City for 1,4-dioxane analyses have the analytical capacity to conduct “Rush” (24-hour) analyses on all samples, so as of the date of this report, only the TZO effluent eDMR sample is being sent for rush analysis. Additional sites are sent for rush analyses in response to any Compliance Value Exceedance.

1. SOC Year Two Sampling Plan Required Sites: City of Greensboro Sampling/Analyses

SP#	Sampling Site & Sample Type		1,4-Dioxane µg/l: #Samples, Average, Range			Description
1	TZO Influent	C	52	3.81 µg/l	1.07 – 12.28	TZO NPDES Influent Sampler [Data in Appendix B]
3C	TZO EFF Composite	Weekly Comp	52	**	**	Weekly Volumetric (Retained for NCDEQ)
3G	TZO Effluent	G	104	2.96 µg/l	1.5 – 8.91 µg/l	eDMR Grab for compliance [Data in Appendix C]
25	Haw River Arm Jordan Lake	G	24	1.06 µg/l	< 1.0 – 1.99 µg/l	Below Pittsboro intake [Data in Appendix D]
26	Pittsboro Raw Water Intake	C	45	1.8 µg/l	< 1.0 – 25.7 µg/l	1st drinking water intake below TZO [Data in Appendix E]
	Pittsboro Raw Water Intake	G	5	1.3 µg/l	< 1.0 µg/l – 2.2 µg/l	
27-58	SIU Composites (table below)	C	67	Table on page 11 - 12		

The TZO Influent (SP#1) and North Buffalo Influent (SP#2) 24-hour composite samples were used to investigate any correlation between the trunkline monitoring samples and trunkline surveillance samples. In addition, the results and corresponding flows will be used in mass-balance calculations. The TZO Influent sample is analyzed weekly to track 1,4-dioxane concentrations entering the TZO facility.

**The TZO effluent weekly composite sample (SP#3C) is the volumetric composite the City agreed to collect and retain for potential use by NCDEQ. The samples are retained until TZO eDMR grab sample results for the week are received. If the eDMR grab sample for the week is in compliance, the weekly composite is discarded. If the eDMR grab sample for the week is not in compliance, the weekly composite is sent for rush analysis to confirm elevated levels in the TZO influent.

**The City had no exceedances of the Year Two compliance value, therefore, none of the retained samples were analyzed.

TZO effluent grab samples (SP#3G) are collected weekly (per SOC requirement) and results are reported on the TZO eDMR submitted to NCDEQ. All grab TZO effluent samples are split and sent to 2 different commercial laboratories for analysis. The split sample results are averaged to obtain the eDMR value, that is then compared to the applicable SOC daily maximum Compliance Value. There were no daily maximum exceedances recorded during Year Two.

SP#25 is a grab sample taken from the Haw River Arm of Jordan Lake at DEQ Site CPF055C. The sample is collected by Meritech Laboratory, is below the Pittsboro Drinking Water Intake, and will be used to provide data for downstream utilities and to monitor the goal of the SOC. Note: This site includes discharges from several other municipal WWTPs.

SP#26 is the Town of Pittsboro Haw River Drinking Water Plant Intake. Weekly composite and/or grab samples are collected by Pittsboro staff, couriered by the commercial laboratory, with "Rush" results reported to both Pittsboro and the City. Greensboro covers the cost of all of these analyses. Additional sampling is conducted immediately after a TZO compliance Value Exceedance. Note: This site includes discharges from other municipal WWTPs. Rush results allow the Town of Pittsboro to respond quickly in making treatment decisions in mitigating elevated 1,4-dioxane concentrations.

2. SOC Direct SIU Sampling Sites 27–58: City of Greensboro Sampling/Analyses [Data in Appendix F]
   Data collected by City (2 consecutive quarters May-July 2022, August-October 2022)

SP#	SIU, Sample Type, # Samples			1,4-Dioxane µg/l SOC Year Two: 2 Qtrs	Trunkline	Industry Description
27	Aramark	C	2	<2, <10	Arlington	Industrial Laundry
28	Chemol	C	2	60, 990	Arlington	Organic Chemical Manufacturing
29	Ecolab	C	2	<1000, <50	Airport	Soap & Detergent Manufacturing
30	Elastic Fabrics	C	2	8.9, <50	Patton	Textile Manufacturing
31	Evonik 01	C	2	<20, 18.5	Arlington	Polymer & Surfactant Manufacturing
32	Evonik 02	C	2	<20, 48.5	Arlington	Polymer & Surfactant Manufacturing
33	Express Container	C	2	3.5, 42.5	Airport	Transportation Equipment Cleaning
34	GILBARCO	C	2	<2, <2	Radar Road	Metal Finishing
35	GSO Industrial Platers 01	C	2	<2, <2	North Buffalo	Job Shop Electroplater (<10,000 gpd)
36	GSO Industrial Platers 02	C	2	<2, <2	Patton	Job Shop Electroplater (<10,000 gpd)
37	HAECO	C	2	<2, <1	Radar Road	Metal Finishing
38	IQE	C	2	<2, <1	Airport	Electrical & Electronic Components
39	ITG (Lorillard)	C	2	<2, <2	North Buffalo	Tobacco Products Manufacturing
40	Lanxess (Hallstar as of 10/1/2022)	C	2	<10, <100	Patton	Organic Chemical Manufacturing
41	Machine Specialties	C	2	<2, <1	Whitsett	Metal Finishing
42	Procter & Gamble BS 01	C	3	<2, <2, <50	Reedy Fork	Pharmaceutical Manufacturing
43	Procter & Gamble BS 02	C	3	<2, <2, <50	Reedy Fork	Pharmaceutical Manufacturing

SP#	SIU, Sample Type, # Samples			1,4-Dioxane µg/l SOC Year Two: 2 Qtrs	Trunkline	Industry Description
44	Procter & Gamble Swing	C	3	<20, <2, <10	Airport	Pharmaceutical Manufacturing
45	Parker Metal Finishing	C	2	<2, <1	Arlington	Job Shop Electroplater (<10,000 gpd)
46	Piedmont Plating	C	2	<2, <10	Direct to TZO	Metal Finishing
47	Precision Fabrics	C	2	57, <50	Patton	Textile Manufacturing
48	PRECOR	C	2	<20, <10	Whitsett	Metal Finishing
49	QORVO	C	2	<2, <1	Airport	Electrical & Electronic Components
50	Qualicaps	C	2	<2, <20	Whitsett	Gelatin Capsule Manufacturing
51	Shamrock BS 01 (PT system)	C	2	30.3, 129	Reedy Fork	Centralized Waste Treatment
52	Shamrock BS 02	C	3	159, 143, 463	Reedy Fork	Centralized Waste Treatment
53	Shamrock Patton	C	3	31.8, 63, <10	Patton	Transportation Equipment Cleaning
54	Solenis	C	2	<100, 16.2	Arlington	Polymer & Chemical Manufacturing
55	Triad Anodizing 02	C	---	CLOSED	North Buffalo	Job Shop Electroplater (<10,000 gpd)
56	United Metal	C	2	<10, <10	Arlington	Metal Finishing
57	Vertellus	C	2	<20, 326	Patton	Organic Chemical Manufacturing
58	ZINK	C	2	<2, <10	Whitsett	Thermal Imaging Product Mfg

SIU Sampling Points 27 through 58 were added to the SOC Sampling Plan in September 2021 and are in the Amended Sampling Plan dated December 2, 2021. The first round of sampling was completed May 1, 2022 through June 30, 2022 and the second quarter SIU sampling for Year Two was conducted August 1, 2022 through October 31, 2022. The results of the City of Greensboro's sampling for Year Two are summarized in the table above and in yellow on the attachment. Any data in orange on the Appendix F is SIU self-monitoring data.

When sampling detected 1,4-dioxane at concentrations >31.5 µg/l, the SIU was required to complete a "City of Greensboro 1,4-Dioxane Source Investigation, Evaluation, and Survey". This required the following actions by the SIU:

- Conduct Safety Data Sheet survey of raw materials
- Review chemistry of any product wastestreams
- Investigate production records/internal wastestreams
- Identify potential significant sources of 1,4-dioxane
- Prepare response for City to use in evaluating next steps

The City identified 2 SIUs during Year Two with discharge concentrations of 1,4-dioxane >31.5 µg/l. The summary of SIU self-monitoring results (orange) is provided in Appendix F with the City of Greensboro data (yellow).

As required by the SOC, the following industries (identified in Year One as having 1,4-dioxane concentrations above 100 µg/l) were inspected 3 times during SOC Year Two:

1. Chemol
2. Ecolab/Kay Chemical
3. Elastic Fabrics of America
4. Evonik Superabsorbers (Pipe 02)
5. Hallstar/Lanxess
6. Precision Fabrics
7. Shamrock Environmental – Brown Summit (Pipe 01)
8. Shamrock Environmental – Brown Summit (Pipe 02)
9. Vertellus

The following industries were identified during Year Two as having 1,4-dioxane concentrations above 31.5 µg/l:

1. Shamrock Environmental – Patton Ave.
    a. July 14, 2022 = 63.0 µg/l
    b. Source Investigation, Evaluation, and Survey submitted, received by IWS on 9/8/2022
2. Express Container Services
    a. August 1-3, 2022 = 42.5 µg/l
    b. Source Investigation, Evaluation, and Survey submitted, received by IWS on 9/26/2022

Based on evaluation of the facilities' loading to TZ Osborne and the compliance status of TZ Osborne during the time these facilities were sampled, no further action has been required of those facilities.

The City's continuation of 24/7 trunkline monitoring, coupled with daily SIU self-monitoring sampling required of the Patton Trunkline dischargers led to the detection of an additional significant contributor of 1,4-dioxane during SOC Year Two. The facility was an OCPSF SIU and has batch discharges. The facility was owned by Lanxess at the time of the initial significant contributor determination, but was purchased by Hallstar Greensboro, LLC ("Hallstar") on October 1, 2022. Please see Section v. for further explanation (p. 21).

Other valuable information obtained from Year Two sampling –

- All Electroplating (40 CFR 413) and Metal Finishing (40 CFR 433) facility wastestreams were essentially BDL on all samples
- Aside from the Centralized Waste Treatment (CWT) facility (40 CFR 437), the Organic Chemicals, Plastics, and Synthetic Fibers ("OCPSF") manufacturing facilities (40 CFR 414), had the highest discharge concentrations.
- Despite extensive efforts by commercial laboratories, several discharges/wastestreams consistently had matrix interferences resulting in elevated PQLs. The elevated PQLs often rendered the data useless for the purposes of the investigative efforts and the SOC.
- At times, 1,4-dioxane concentrations exceeding 3 µg/L have been recorded on South Buffalo creek Old 70 bridge samples. This site is <u>above</u> the TZO discharge point).

Voluntary Sampling for SOC Year Two – North Buffalo Influent (Transfer Line) (Appendix B)

SP#	Industrial Trunkline & Sample Type		1,4-Dioxane µg/l: #Samples, Results, Average			Description
2	North Buffalo Influent	C	3	< 2, < 2, < 2	< 2	NB NPDES Influent Sampler

The North Buffalo Influent (SP#2) 24-hour composite samples were analyzed for background data purposes. In addition, the results and corresponding flows will be used in mass-balance calculations. All samples on the North Buffalo trunkline were <2 µg/l in Year One and Year Two.

Voluntary Sampling for SOC Year Two – Trunklines (Appendix B)

SP#	Industrial Trunkline & Sample Type		1,4-Dioxane µg/l: #Samples, Results, Average			Description
7	IND TL 1: Patton	C	52	1.62 – 27.3 (range)	3.58	Includes 6 SIUs
8	IND TL 2: Arlington	C	2	7.2, <2	4.6	Includes 6 SIUs
9	IND TL 3: Reedy Fork	C	2	120, 186	153	Includes 4 SIUs
10	IND TL 4: Airport	C	2	<2, <2	<2	Includes 5 SIUs
11	IND TL 5: Whitsett	C	2	<2 , <2	<2	Includes 4 SIUs
12	IND TL 6: North Buffalo	C	2	<2, <2	<2	Includes 3 SIUs
12A	IND TL 7: Radar Road	C	2	2.1, <2	2.1	Includes 2 SIUs
	Bryan Park MH 16066	C	5	979, 977, 508, 447, 1390	860	Includes 1 SIU

SP#s 7-12A include discharges from Significant Industrial Users (SIUs), as indicated in the table above, as well as smaller industrial users. As defined by EPA, SIUs include those industrial facilities that discharge 25,000 gpd, or more, of process wastewater as well as SIUs subject to Federal Categorical Pretreatment Standards, who may or may not meet the EPA flow criteria. The total flow permitted to SIUs in Greensboro is 3.5 MGD (from February 2022 HWA submittal). Because one SIU discharges directly to TZO, the total of SIUs in chart above does not correspond to total number of permitted SIUs.

Sampling at these sites served/serves two primary purposes:

1. To conduct source identification sampling; and
2. To generate mass-balance data for the industrial sector (required in SOC Year Two Report).

Sites 7, 9 and Bryan Park (manhole 16066) were sampled weekly but not all are sent for analysis. The City of Greensboro sends the Patton sample for analysis weekly.

The City's response to trunkline surveillance concentrations takes into consideration the % flow contribution of each trunkline to the TZO plant. The flow contributions are as follows: Patton - 35%, Arlington - 4%, Airport - 12.5% (included in Patton), Reedy Fork - 4.2% (includes Bryan Park manhole), North Buffalo – 40%.

Voluntary Sampling for SOC Year Two – Domestic/Commercial (Appendix B)

SP#	Domestic/Commercial Trunkline & Sample Type		1,4-Dioxane µg/l: #Samples, Results, Average			Description
13	Dom/Com TL 1: Wesley Long	C	2	<2, <2	<2	Hospital and commercial
14	Dom/Com TL 2: A&T University	C	2	<2, <2	<2	University and commercial
15	Dom/Com TL 3: Bessemer	C	2	<2, <1	1.5	Commercial
16	Dom TL 4: Willoughby Blvd	C	2	<2, <2	<2	Domestic only
17A	Dom TL 5: Shelby Dr. (MH36276)	C	2	<2, <1	1.5	Domestic/Industrial

SPs #13-17 are considered uncontrollable/uncontrolled sources and used to determine typical concentrations of 1,4-dioxane in various commercial and domestic/residential areas. Loadings will be used in mass-balance and HWA uncontrollable/uncontrolled calculations.

SPs #13-15 are commercial while SPs #16-17 are considered domestic wastewater. The majority of the flow (90%) to TZO is considered uncontrollable/uncontrolled.

Shelby Drive was split into SP 17 and 17A when the City realized the initial sampling point contained the Airport trunkline and domestic discharge. The original Shelby domestic manhole was MH36216. Water Reclamation and Engineering staff reviewed the maps in GIS and the domestic site was moved to MH29176 (17A) and separated from industrial flow.

Although these sites showed no contribution significant enough to cause a Year One or Year Two SOC exceedance at TZO, the domestic/commercial concentrations must be included in mass balance calculations, and taken into consideration for any final NPDES limit Greensboro may receive. Research conducted in New York indicates 1,4-dioxane can be found in a variety of personal care products, including baby products, shampoos, detergents and body washes, and could be the source of the small concentrations the City found in this sector.

https://www.citizenscampaign.org/whats-new-at-cce/2019/4/2/environmental-group-says-65-of-80-household-products-containnbsp14-dioxane

Voluntary Sampling for SOC Year Two – PTRWA Drinking Water (Appendix B)

SP#	Drinking Water Site & Sample Type		1,4-Dioxane µg/l: #Samples, Range, Average			Description
20	Drinking Water 3: PTRWA	G	6	< 1 – 2.63	1.55	Randleman Lake – 6.9 MGD

The City of Greensboro has five drinking water sources that ultimately discharge to the TZO facility. In CY 2022, the five drinking water sources provided an average of 34.8 MGD to City water customers. Two of the drinking water facilities are wholly owned/operated by the City of Greensboro (Mitchell, Townsend) and Greensboro is a partner (53%) in the Piedmont Triad Regional Water Authority (PTRWA) that owns/operates the Randleman Lake facility. Greensboro also contracts to purchase finished drinking water daily from two other municipalities, Burlington and Reidsville.

PTRWA sampling was continued in SOC Year Two since it was the only drinking water source with 1,4-dioxane detectable values in SOC Year One. All other sources were BDL. Sampling site #20 (PTRWA) is a voluntary sampling site.

PTRWA contributes ~20% of Greensboro's drinking water to customers daily. The other four drinking water sources have approximate daily contributions as follows: Lake Townsend 51%, Mitchell 20%, City of Burlington 6%, and Reidsville 3%.

The pretreatment program would consider drinking water sources as uncontrolled/uncontrollable. Loading from the drinking water sector is an important calculation and were used in mass-balance calculations. In addition, the drinking water loading will be important in headworks analysis calculations, and future discussions of the TZO facility long term-achievable effluent concentrations.

Voluntary Sampling for SOC Year Two – Landfill Leachate (Appendix B)

SP#	Other Sites & Sample Type		1,4-Dioxane µg/l: #Samples, Range, Average			Description
23	Landfill Leachate	G	6	22.9 – 120	67.1	City of Greensboro Landfill

The City owns the Greensboro White Street landfill (SP#23), an active Municipal Solid Waste (MSW) landfill that originally opened in the 1940s. The landfill consists of three units: Phase I, an unlined pre-regulated unit that closed in 1978; Phase II (ID No. ES-2), an unlined regulated unit that closed in 1998 but has an active construction and demolition debris (C&D) landfill operating on top of the closed landfill; and Phase III, a regulated Subtitle-D lined unit. Phase III stopped accepting MSW in 2006, but remains an active landfill that is currently permitted to accept less than 8,000 tons of waste, specifically sewage sludge incineration ash from the TZO facility. The landfill also has an active composting operation. Leachate from Phase III is collected and pumped to two 300,000 gallon above ground storage/equalization tanks that allow for the restricted discharge of the collected leachate (less than <25,000 gpd) to the TZO facility.

Voluntary Sampling for SOC Year Two – Creeks/Surface Water/Receiving Stream (Appendix G)

Note: Creeks are listed in geographic order from TZO effluent discharge outfall location

SP#	Creek Sites & Sample Type		1,4-Dioxane µg/l: # Samples, Range		Description
+	Old 70 Bridge	G	51	< 1.0 – 3.34	South Buffalo Creek above TZO
+	Highway 61 Bridge	G	54	< 1 – 6.22	Reedy Fork Creek before confluence with Haw (only TZO)
+	Highway 62 Bridge	G	4	1.36, 2.22, 1.76, <1	Haw River (includes discharges from other WWTPs)

The City is attempting to obtain as much information as possible concerning impact to downstream utilities, including flow times between the TZO outfall and the Town of Pittsboro Haw River Drinking Water Intake.

For this reason, sampling began at South Buffalo Creek above TZO (Old 70 Bridge) in February 2022. It should be noted that there were detections in several samples from the Old 70 Bridge site, which is *above/upstream* the TZO effluent outfall.

Along with that sample, laboratory staff began collecting Reedy Fork Creek, before confluence with the Haw River (Hwy 61 Bridge), to help monitor downstream concentrations and impacts. Highway 61 is an extra sample collected by the City on a weekly basis and *only includes* the TZO effluent discharge.

Although there were no SOC Year Two Compliance Value exceedances, Highway 62 was sampled after the discharge from Hallstar in October 2022.

Voluntary Sampling for SOC Year Two – Town of Pittsboro Finished Drinking Water (Appendix E)

SP#	Creek Sites & Sample Type		1,4-Dioxane µg/l: # Samples, Range		Description
+	Pittsboro Finished Drinking Water	G or C	49	< 1.0 – 16.1	Grab or Composite sample taken by Pittsboro staff

Samples from this site were collected by Pittsboro water plant staff, couriered by the commercial laboratory, with results reported to both Pittsboro and the City. Greensboro covers the cost of all of these analyses and the sampling is conducted at this site on a weekly or bi-weekly basis (dependent on sampling staff by Pittsboro). The 16.1 µg/l value is related to the Hallstar industrial discharge in October 2022 (Refer to Page 21).

v. SOC Compliance Value Exceedances in Year Two

The TZO facility did not have any exceedances during SOC Year Two.

Due to an increase in TZ Osborne's effluent average concentration for October 25, 2022 (8.91 µg/l), a further investigation was conducted. The Patton 10/21-24/22 Surveillance trunkline sample was sent for rush analysis and the result received on 10/27/22 was 27.3 µg/l. Industries on the Patton Surveillance trunkline were asked to submit weekly composite sample for 10/16-22/22 for 1,4-dioxane analysis and report results to IWS immediately upon receipt.

The City was in contact with NCDEQ and the Town of Pittsboro during this time, sharing results and regularly updating the email we send to NCDEQ, downstream utilities and other stakeholder contacts. Town of Pittsboro emailed Elijah Williams, Greensboro Water Reclamation Manager, regarding concerns about elevated TZO Effluent result and was provided with a summary of IWS actions to date in response to the elevated results and course of action to follow.

On 11/3/22, the City received Hallstar Greensboro, LLC's (Hallstar) 10/16-22/2022 weekly composite result (23,300 µg/l). Hallstar requested a meeting with IWS staff when results were submitted. Hallstar was instructed to submit their corresponding daily composites for analysis. Hallstar purchased Lanxess on October 1, 2022. Hallstar attempted to manufacture a product and capture all of the process wastewater for offsite disposal. Lanxess had previously committed to cease manufacturing the product (Uniplex 809 and 810).

The City held on-going conversations regarding the exceedance of the Contaminant of Emerging Concern (CEC) Local Pollutant Allocation Document (LAPD) with Hallstar. On February 14, 2023 we issued a Notice of Violation and a Notice of Significant Noncompliance, per the City of Greensboro Enforcement Response Plan (ERP), for failure to notify the City of process changes or increase in pollutant discharge per Section V- Part 21 of its SIU Permit P025; and violation of Section V- Part 13 of SIU Permit P025 - Duty to Mitigate – Prevention of Adverse Impact. Hallstar was assessed a civil penalty of $23,700.00 which was paid on March 20, 2023. NCDEQ requires that all instances of SNC be published on or before March 1 for the previous calendar year. To meet this requirement, the public notice was published in the February 24, 2023 edition of the Greensboro News & Record.

Hallstar has agreed to cease production of any product that could produce 1,4-dioxane. On April 25, 2023 Hallstar completed training with their staff to reiterate their diligence to remaining in compliance with their permit and protection of the environment. The training session was required as a condition of the NOV issued by the City.

As a result of the November 2021 event, 5 Patton Trunkline SIUs with a result >15 µg/l were required to begin collecting and retaining daily and weekly composite samples and have the weekly composite analyzed once per month. This sampling continues to the present.

Attachment #1: TZO Mass Balance

Data Appendices:

Appendix A: Year Two SOC Sampling Plan
Appendix B: 1,4-Dioxane Data Sampling Plan Sites #1-24 (as required by Year Two Sampling Plan) (3G is separate)
Appendix C: 1,4-Dioxane Data Sampling Plan Site #3G
Appendix D: 1,4-Dioxane Data Sampling Plan Site #25
Appendix E: 1,4-Dioxane Data Sampling Plan Site #26 (and other Pittsboro Water Plant sites)
Appendix F: 1,4-Dioxane Data Sampling Plan Sites #27-58 SIUs (City/SIU Self-Monitoring)
Appendix G: 1,4-Dioxane Data Surface Water Samples (not in Sampling Plan)

Related SOC documents with additional detailed information have been previously submitted to NCDEQ and are available on the City of Greensboro website, including current Amended SOC document, Amended SOC Sampling Plan, Quarterly Meeting Notes, etc.

https://www.greensboro-nc.gov/departments/water-resources/wastewater-system/1-4-dioxane-updates

City of Greensboro T. Z. Osborne 1,4-Dioxane Mass-Balance
SOC Year Two Report – Attachment #1 June 13, 2023

Since 1,4-dioxane is not removed by conventional wastewater treatment processes, source identification and source reduction have always been the focus of the City's efforts to reduce TZO effluent concentrations. The mass balance results quantify the previous 1,4-dioxane reductions achieved and provide guidance for future priorities.

During the initial sampling phase of the City's 2015 1,4-Dioxane Study, the TZO sand filter effluent composite samples averaged 126 µg/l.

- During SOC Year One, the TZO effluent (52 eDMR grab samples) averaged 32.7 µg/l, a 74% reduction. When the three Compliance Value exceedances are removed from the SOC Year One data set, the TZO effluent (eDMR grab samples) averaged 4.99 µg/l, a 96% reduction from 2015 effluent concentrations.
- During SOC Year Two the TZO effluent (52 eDMR samples) averaged 2.96 µg/l, a 98% reduction from the 2015 levels.

Since 2015, the City has identified two significant industrial sources of 1,4-dioxane. The first SIU, identified in 2016, has since installed a multi-million dollar pretreatment system to reduce 1,4-dioxane. The second SIU, identified in 2022, has ceased manufacture of a multi-million dollar product line at the Greensboro facility in order to reduce 1,4-dioxane discharges to the TZO facility. *In both cases, the source reduction measures by the SIUs were conducted voluntarily.*

Mass Balance Background Information

- The City of Greensboro entered into a Special Order by Consent ("SOC") with the North Carolina Environmental Management Commission ("EMC") to address the levels of 1,4-dioxane in the T. Z. Osborne Wastewater Treatment Facility ("TZO"). This mass-balance ("MB") submittal is required by EMC SOC WQ S19-010 Part 2.(d)(8) as follows:

  "Calculate a T Z. Osborne WWTP effluent 1,4-dioxane mass balance using all data (industrial, domestic, commercial, drinking water, and collection system data) and submit to the Department in the Year Two Report."

- The City of Greensboro ("City") is not aware of any other POTW in North Carolina that has conducted sector sampling/analyses in order to calculate a mass-balance for a Contaminant of Emerging Concern ("CEC"). Thus, the Greensboro Industrial Waste Section developed a Greensboro-specific format for the TZO MB.

- Composite samples were used extensively in the SOC Sampling Plan in order to gather comprehensive information on the contributions from the various sectors. It would have been virtually impossible to track discharges, identify sources, and determine actual loadings using only grab sample results.

- Laboratory Methods for 1,4-Dioxane SOC
  - EPA Method 624.1 (from 40 CFR Part 136 wastewater methods) was used for all aqueous 1,4-dioxane samples. Although EPA Method 624.1 indicates a grab sample should be collected, 1,4-dioxane is not volatile, and concentrations in composite samples are expected to be stable.
  - City Water Supply provided some results that were analyzed by EPA Method 522 (drinking water) with a Practical Quantification Level (PQL") of 0.2 µg/l.
  - EPA Method 8270C SIM (Solid Waste Method) was used for the following sites due to high solids concentrations: aeration tank, dewatered sludge cake, incinerator scrubber/centrate, and domestic septage. The solid waste method PQL is 3 µg/L.
  - The City used two commercial laboratories certified by the State of North Carolina to conduct 1,4-dioxane analyses by EPA Method 624.1. Pace reported a PQL of 2 µg/L and Meritech reported a PQL of 1 µg/L with PQLs based on the assumption that no dilution of the sample was needed due to elevated concentrations, matrix interference, or to prevent damage to laboratory equipment.
  - High PQLs (up to 2000 µg/L) were reported for some of the industrial user samples due to matrix interference and/or elevated concentrations.

Initial City of Greensboro 1,4-Dioxane Study in 2015

Results from the EPA Third Unregulated Contaminant Monitoring Rule (UCMR3) conducted from 2013-2015, brought increased concern about 1,4-dioxane levels in the Cape Fear River Basin. In March 2015, the City voluntarily developed a 1,4-dioxane source identification and reduction plan to address elevated levels of 1,4-dioxane found below the TZO effluent discharge.

Greensboro had a unique situation at that time, with two interconnected wastewater treatment facilities (North Buffalo and T. Z. Osborne). However, initial trunkline collection system monitoring eliminated the North Buffalo facility as the source, so the focus moved to the TZO wastewater collection system lines.

Within six months, TZO collection system trunkline monitoring identified a Centralized Waste Treatment SIU, as a significant source of 1,4-dioxane. Meetings were held with the company and they agreed to *voluntarily* address the discharge of 1,4-dioxane from their facility, initially through client profile analyses and turning away all clients with elevated concentrations. The early source identification and reduction efforts by the SIU resulted in a 50% reduction of the TZO effluent concentrations, as compared to levels of 1,4-dioxane measured at the beginning of the study.

The 2015 study indicated 1,4-dioxane:

- Could be successfully measured in composite wastewater samples using the EPA solid waste method
  - Since there was no EPA approved wastewater analytical method in 2015, the City followed NCDEQ's lead and used the EPA solid waste method for all study samples. After EPA approval of method 624.1 in 2017, the City conducted split sample comparisons for the 2 methods and found them comparable.
- Is not removed by conventional wastewater activated sludge treatment processes
  - Hydraulically paired TZO influent and TZO effluent sampling/analyses showed essentially no removal through the TZO treatment facility.
- Does not partition into sludge
  - Activated sludge and dewatered sludge samples were analyzed
  - Sludge results indicated 1,4-dioxane does not partition to the sludge, further confirming no removal by conventional wastewater treatment processes.
- Does not volatilize
  - Hydraulically paired TZO influent and effluent samples showed no removal
- Did not impact TZO Whole Effluent Toxicity ("WET") results
  - TZO passed all 8 chronic WET tests conducted during the study (CY 2015-CY 2016) using 90% TZO effluent.
  - Since 2015, TZO has passed 36 of 37 quarterly WET tests, with 35 of the 36 passing not only at the required 90% effluent, but also using 100% effluent. The one WET failure (2021) was caused by elevated ammonia-nitrogen levels.
- Was significantly reduced through the voluntary efforts of a single significant source

SOC Compliance Summary - TZO Effluent eDMR data

SOC Year One: May 1, 2021 through April 30, 2022

Year One Compliance Values: 45 µg/L from 5-1-2021 to 11-30-2021; 35 µg/L effective 12-1-2021

SOC Year One: Number of TZO Effluent eDMR Grab Samples = 53 Number of Analyses = 106 (53 of 53 samples were duplicated)			
Average (in µg/L)	Maximum (in µg/L)	Minimum (in µg/L)	Median (in µg/L)
32.73	823	1.54	4.18
Below Detection Limit ("BDL") values recorded as actual PQL for calculating averages			

- Year One Compliance Value Exceedances

There were three Compliance Value Exceedances in SOC Year One:
615 µg/L (June 30, 2021), 823 µg/L (November 3, 2021), and 47.1 µg/L (April 5, 2022).

If the three exceedance values are removed from the Year One data set, the TZO Effluent eDMR average is 4.99 µg/L as indicated below:

SOC Year One: 3 Compliance Value Exceedance Samples Removed from Data Set			
Average (in µg/L)	Maximum (in µg/L)	Minimum (in µg/L)	Median (in µg/L)
4.99	20	1.54	3.82
Below Detection Limit ("BDL") values recorded as actual PQL for calculating averages			

A second significant source (intermittent) of 1,4-dioxane was identified in SOC Year One during investigation of the November 3, 2021 and April 5, 2022 exceedances. The OCPSF SIU was identified through 24/7 trunkline surveillance monitoring and SIU self-monitoring conducted over a six-month period. At the conclusion of SIU's "1,4-Dioxane Source Investigation, Evaluation, and Survey", the SIU voluntarily agreed to permanently cease production of two products found to inadvertently create 1,4-dioxane during the chemical manufacturing process.

SOC Year Two: May 2, 2022 through April 30, 2023
Year Two Compliance Value = 31.5 µg/L

SOC Year Two: Number of TZO Effluent eDMR Grab Samples = 52 Number of Analyses = 104 (52 of 52 samples were duplicated)			
Average (in µg/L)	Maximum (in µg/L)	Minimum (in µg/L)	Median (in µg/L)
2.96	8.91	1.50	2.66
Below Detection Limit ("BDL") values recorded as actual PQL for calculating averages.			

- SOC Year Two Compliance Value Exceedances

There were no Compliance Value Exceedances in SOC Year Two.

Mass Balance Data, Decisions, and Explanations

- TZO Effluent Flow Used in MB
  - TZO flow reported on eDMRs is measured at the effluent Parshall flume
  - CY 2021 = 33.4 MGD, CY 2022 = 32.6 MGD ***Averaged for MB = 33.0 MGD***
  - The TZO effluent includes flow from the TZO influent line and the North Buffalo influent transfer line, with approximately 60% from the TZO line.
- SIU Flows Used in MB 1,4-dioxane loading calculations
  - Flows recorded for the date of direct City SIU sampling or SIU self-monitoring were used to determine average SIU loading
- Uncontrollable/Uncontrolled Flow Determination for MB
  - SIU actual flow data from the TZO Headworks Analysis submitted to NCDEQ in February 2022 was used (1.9499 MGD). The City has not received a response to the HWA as of the date of this report.
  - 33.0 MGD – 1.98499 MGD = **31.0 MGD uncontrollable/uncontrolled Flow**
- Hydraulically paired influent and effluent sampling/analyses conducted during the 2015 study indicated there is essentially no 1,4-dioxane removal by conventional activated sludge wastewater treatment processes. Thus:
  - Removal efficiencies were not calculated or considered in this MB.

- Comparison of recent SOC unpaired TZO Influent (composite) and TZO effluent (grab) concentrations confirm no 1,4-dioxane removal at TZO.
- See MB Spreadsheets #4 and #5

Comparison of TZO Influent and Effluent 1,4-Dioxane (in µg/L)					
Weekly Samples	SOC Year One			SOC Year Two	
	TZO Inf	TZO Eff		TZO Inf	TZO Eff
Average	24.2	32.7		3.81	2.96

- TZO Detention Time and SIU Flow Times to TZO
  - The current TZO detention time is approximately 32 hours (at 33 MGD)
  - An SIU flow time study was conducted during the SOC and indicated that SIU flow times to TZO range from 1.8 hours to 27.7 hours.
- Below Detection Limit ("BDL") Values
  - PQL values were used for below detection level ("BDL") results ≤ 100 µg/L.
  - BDL results >100 µg/L were not included in average calculations
- Direct SIU Sampling Data Exclusion
  - SIU results associated with the 3 TZO Compliance Value exceedances were removed from the MB data set for certain calculations
  - SIU results with PQLs >100 µg/L were removed from the MB data set for certain calculations
- A review of SOC sampling plan sample types was crucial in correlating MB results

Grab Samples	Composite Samples
TZO Effluent for eDMR	TZO Influent (24-Hour)
Surface Water	NB Influent (24-Hour)
Greensboro Drinking Water (5 sources)	SIU Effluents (24-72 hour)
Landfill Leachate (from EQ tank)	Collection System Trunklines (24-96 hour)
Town of Pittsboro Finished Water	Town of Pittsboro Intake (24 hour+)

Individual Sector Contributions

- *Background Information*
  - As of 2022, the City of Greensboro Water Resources Department had 108,891 metered accounts: 99,283 of which are residential customers, leaving 9,688 commercial/industrial accounts.
  - TZO average effluent flow was 33.0 MGD for CY2021-CY2022 and the actual average daily flow from all Greensboro SIUs was 1.984 MGD (from 2022 HWA submittal), resulting in an uncontrollable/uncontrolled flow of 31.0 MGD.
  - The uncontrollable/uncontrolled flow includes domestic connections (~99,283) as well as commercial connections (~9,688), but does not include permitted flows from SIUs.

- *Domestic contributions*
  The average concentration of composite samples taken from two only domestic SOC sampling sites (SP#16 Willoughby Boulevard, SP#17 Shelby Drive) was 1.67 µg/L. The calculated uncontrollable/uncontrolled flow in this MB submittal is 31.0 MGD.

- *Commercial contributions*
  SOC sampling plan sites (SP#13, SP#14, SP#15) for this sector included various commercial and non-domestic discharges, including a hospital, university, elementary school, shopping mall, restaurants, etc. The average concentration from these sites was 1.61 µg/L. The calculated uncontrollable/ uncontrolled flow in this MB submittal is 31.0 MGD.

- *Domestic/Commercial Loading Calculation*
  There was no way to accurately separate collection system flows for domestic and commercial discharges, so the two data sets were averaged, resulting in a domestic/ commercial concentration of 1.64 µg/L and loading of 0.4240 pounds per day of 1,4-dioxane, using the uncontrollable/uncontrolled flow of 31.0 MGD.

- *Drinking water contributions*
  The City of Greensboro has five drinking water sources with a combined average flow of 34.8 MGD. Data from the five Greensboro drinking water sources indicates that only PTRWA (Randleman Lake) finished water had detectable concentrations of 1,4-dioxane. The highest value detected from grab samples taken at the PTRWA interconnect with the City of Greensboro was 3.0 µg/L (sample from City Water Supply sampling). The average of all 26 samples was 1.5 µg/L. The PTRWA water plant provides ~20% of the Greensboro drinking water, with an estimated daily flow of 6.9 MGD. Potential sources of 1,4-dioxane contamination in Randleman Lake include: old Seaboard Chemical site, old High Point landfill site, and the City of High Point Eastside WWTP that discharges directly to the lake.

Total Q = 34.8 MGD	Lake Townsend	Mitchell	PTRWA Randleman Lake	City of Burlington	City of Reidsville
Percent Q	51%	20%	20%	6%	3%
MGD	17.7	6.9	6.9	2.1	1.0
1,4-Dioxane	< 1 µg/L	< 1 µg/L	1.5 µg/L	< 1 µg/L	< 1 µg/L
Pounds/day	<0.1476	<0.0575	0.0863	<0.0175	<0.0083

- *Significant Industrial User ("SIU") contributions*

  The City of Greensboro has 28 SIUs with a total of 32 discharge/sampling locations. The average SIU flow is 1.985 MGD (from the Feb 2022 HWA submittal), which is 6.0% of the average TZO effluent flow of 33.0 MGD. Industrial contributions by permitted SIUs were determined by direct sampling of SIUs (24-72 hour composites from City and SIU self-monitoring) and flow measurements taken on corresponding sampling days. The results from the MB calculations were as follows:
  - SIU Flow = 1.947 MGD
  - Total SIU loading = 1.1409 pounds/day of 1,4-dioxane (equals 4.15 µg/l at TZO effluent flow of 33 MGD).
  - See Mass Balance Spreadsheet #1.

  During SOC Year Two sampling by the City, only 4 of the 32 SIU sites had a 1,4-dioxane concentration >100 µg/l. In addition, 14 of the 32 sites recorded BDL values of ≤10 µg/l on both quarterly samples.

- *Landfill*

  The City of Greensboro landfill discharges leachate to the TZO facility. Data from the landfill discharge indicates that the facility is a minor contributor of 1,4-dioxane. The highest value from the leachate samples was 120 µg/l and the average was 67.2 µg/l. The flow from the landfill is less than 25,000 gpd. The City Landfill has been added to the NCDEQ Mass-Balance spreadsheet as well as MB Spreadsheet #1. The MB calculations used a flow of 0.024 MGD along with the average concentration of 0.0672 µg/l resulting in 1,4-dioxane loading of 0.0134 pounds/day. See Mass Balance Spreadsheets #1 and #3.

Individual Sector Loadings Summary

Sector Averages	Flow (in MGD)	1,4-Dioxane µg/l	Pounds per day
Uncontrollable/Uncontrolled (combined domestic/commercial sampling)	31.0	1.64	0.4240
SIUs (Sum of All SIU Average Loading)	1.947	---	1.1409
City Landfill	0.024	67.2	0.0134
TOTALS	**33.0**		**1.5783**
0.2752 pounds = 1 µg/l 1,4-dioxane at TZO			
	1.5783 pounds = 5.74 ug/l at TZO EFF		
Drinking Water (PTRWA)	6.9	1.5	0.0863
Note: PTRWA drinking water is included indirectly in the loading calculations above.			

Mass Balance Spreadsheets

- *MB Spreadsheet #1 – SIU Average Loading Summary*
  - SIU average flows taken from 1,4-dioxane Sampling Dates
  - TZO Effluent Flow = 33.0 MGD (Average of CY2021 and CY2022)
    - 1 µg/l 1,4-dioxane at TZO effluent = 0.2752 pounds
  - SIU 1,4-dioxane µg/l = Avg. of all sample results with following exceptions
    - Actual PQL values used for BDL values ≤100 µg/l
    - Elevated PQL values >100 µg/l were removed from data set
    - Average µg/l is overestimation for SIUs with any elevated PQLs
  - City landfill added to bottom of spreadsheet
  - SIU loading = 1.1409 pounds = 4.15 µg/l at TZO effluent
  - Landfill loading = 0.0134 pounds = 0.048 µg/l at TZO effluent

- *MB Spreadsheet #2 – SIU EFF Concentrations to = 1 µg/l 1,4-dioxane @TZO EFF*
  - Although the SOC language is strictly concentration (µg/l) driven throughout, the City determined the focal point for source identification and targeted source reduction efforts must be mass (pounds) in order to address flow. This mass-based spreadsheet can be used to prioritize pretreatment resources.
  - SIU average flows from 2022 HWA Submittal Mass Balance Worksheet
  - TZO Effluent Flow = 33.0 MGD (Average of CY2021 and CY2022)
    - 1 µg/l 1,4-dioxane at TZO effluent = 0.2752 pounds
  - City Landfill added to bottom of spreadsheet
  - SIU Concentrations to = 1 µg/l @ TZO EFF range from 85 µg/l to 185,554 µg/l

- *MB Spreadsheet #3 – NCDEQ 1,4-Dioxane Mass Balance Spreadsheet*
  - SIU average flows from 2022 HWA Submittal Mass Balance Worksheet
  - TZO Effluent Flow = 33.0 MGD (Average of CY2021 and CY2022)
  - TZO Influent 1,4-dioxane concentration = 7.03 µg/l
    - TZO Influent samples were 24-hour composites
    - TZO INF data set: 5-1-2021 through 4-30-2023 (SOC Years 1 & 2)
    - Actual Influent PQL value used for seven BDL results
    - 3 Influent values >60 µg/l removed from data set
  - SIU 1,4-dioxane µg/l = Avg. of all sample results with following exceptions
    - Actual PQL values used for BDL values ≤100 µg/l
    - Elevated PQL values >100 µg/l were removed from data set
    - Average µg/l is overestimation for SIUs with any elevated PQLs
  - Uncontrollable/Uncontrolled Flow = 31.0 MGD
  - Uncontrollable/Uncontrolled 1,4-dioxane MB calculation = 2.2 µg/l
  - Uncontrollable/Uncontrolled samples average for 1,4-dioxane = 1.64 µg/l
  - EPA has not published 1,4-dioxane domestic/commercial Literature Values

- *MB Spreadsheet #4 – SOC Year One TZO Influent and Effluent comparison*
  - PQL value used for all Influent and Effluent BDL results (including splits)
  - Effluent eDMR samples are split and sent to 2 different commercial laboratories. The 2 values are averaged for the final result.
  - TZO INF is 24-hour composite sample, dated per last sample aliquot
  - TZO EFF is grab sample collected same day composite finished
  - Influent and effluent are not hydraulically paired

- *MB Spreadsheet #5 – SOC Year Two TZO Influent and Effluent comparison*
  - PQL value used for all Influent and Effluent BDL results (including splits)
  - Effluent eDMR samples are split and sent to 2 different commercial laboratories. The 2 values are averaged for the final result.
  - TZO INF is 24-hour composite sample, dated per last sample aliquot
  - TZO EFF is grab sample collected same day composite finished
  - Influent and effluent are not hydraulically paired

SIU Average Loading for 1,4-Dioxane Mass Balance (MB Spreadsheet #1)								
# SIU	City of Greensboro Significant Industrial User	SIU FLOWS From Sample Dates Avg Flow in gal/day	From Sample Dates Avg Flow in MGD	Factor	SIU Samples Avg ug/L	SIU Samples Avg mg/L	Average SIU Loading in pounds/day	ug/L @ TZO EFF
1	Aramark	117,448	0.11745	8.34	4.0	0.004	0.0039	0.014237
2	Chemol	33,965	0.03397	8.34	531	0.531	0.1504	0.546567
3	ECOLAB	47,518	0.04752	8.34	186	0.186	0.0737	0.267848
4	Elastic Fabrics	191,875	0.19188	8.34	36.4	0.0364	0.0582	0.211659
5	Evonik -01	24,930	0.02493	8.34	10.6	0.0106	0.0022	0.008008
	Evonik -02	68,994	0.06899	8.34	49	0.049	0.0282	0.102453
6	Express Container Services	17,421	0.01742	8.34	19	0.019	0.0028	0.010031
7	Gilbarco	9,578	0.00958	8.34	2.0	0.002	0.0002	0.000581
8	GSO Industrial Platers -01	2,754	0.00275	8.34	1.9	0.0019	0.00004	0.000159
	GSO Industrial Platers -02	5,405	0.00541	8.34	1.8	0.0018	0.0001	0.000295
9	HAECO	930	0.00093	8.34	1.5	0.0015	0.000012	0.000042
10	IQE	1,459	0.00146	8.34	1.5	0.0015	0.00002	0.000066
11	ITG Brands	145,673	0.14567	8.34	1.9	0.00186	0.0023	0.008211
12	Lanxess	63,748	0.06375	8.34	78	0.078	0.0415	0.150688
13	Machine Specialties	5,180	0.00518	8.34	1.5	0.0015	0.0001	0.000235
14	Procter & Gamble Brown Summit 01	396,015	0.39602	8.34	7.1	0.0071	0.0234	0.085209
	Procter & Gamble Brown Summit 02	45,141	0.04514	8.34	8.3	0.0083	0.0031	0.011409
15	Procter & Gamble Swing Road	51,521	0.05152	8.34	7.0	0.0070	0.0030	0.010898
16	Parker Metal	7,673	0.00767	8.34	1.5	0.0015	0.0001	0.000349
17	Piedmont Plating	28,664	0.02866	8.34	16	0.016	0.0038	0.013899
18	Precision Fabrics	100,262	0.10026	8.34	83	0.083	0.0694	0.252192
19	Precor	4,873	0.00487	8.34	8.5	0.0085	0.0003	0.001255
20	Qorvo	105,917	0.10592	8.34	1.4	0.0014	0.0012	0.004494
21	Qualicaps	35,153	0.03515	8.34	8.5	0.0085	0.0025	0.009055
22	Shamrock Env. - Brown Summit 01	54,577	0.05458	8.34	297	0.297	0.1352	0.491229
	Shamrock Env. - Brown Summit 02	119,864	0.11986	8.34	337	0.337	0.3369	1.224155
23	Shamrock Environmental - Patton	31,235	0.03124	8.34	36.6	0.0366	0.0095	0.034598
24	Solenis	35,810	0.03581	8.34	39.6	0.0396	0.0118	0.042975
25	Triad Anodizing 02 (closed in 2022)	1,474	0.00147	8.34	2.0	0.002	0.00002	0.000089
26	United Metal	5,141	0.00514	8.34	18.3	0.0183	0.0008	0.002851
27	Vertellus	92,544	0.09254	8.34	222	0.222	0.1713	0.622614
28	Zink Holdings	94,738	0.09474	8.34	6.0	0.006	0.0047	0.017226
		1,947,480	**1.94748**				**1.1409**	**4.15**
GLF	City of Greensboro Landfill	24,000	0.02400	8.34		0.0671	0.0134	
							1.1543	**4.19**
	Calculation: 1 ug/l at TZO EFF = 0.001 * 8.34 * 33.0 MGD = 0.2752 pounds 1,4-dioxane							

1,4-Dioxane SIU Concentrations to Equal 1 ug/L at T. Z. Osborne (MB Spreadsheet #2)						
# SIU	City of Greensboro Significant Industrial User	SIU FLOWS from 2022 HWA Avg Flow in gal/day	SIU FLOWS from 2022 HWA Avg Flow in MGD	Factor	Pounds/day For TZO Eff = 1 ug/l (using 33 MGD)	SIU Eff ug/l to = 0.2752 Pounds
1	Aramark	128,230	0.12823	8.34	0.2752	257
2	Chemol	30,705	0.03071	8.34	0.2752	1,075
3	ECOLAB	48,122	0.04812	8.34	0.2752	686
4	Elastic Fabrics	159,507	0.15951	8.34	0.2752	207
5	Evonik -01	25,741	0.02574	8.34	0.2752	1,282
	Evonik -02	66,907	0.06691	8.34	0.2752	493
6	Express Container Services	15,081	0.01508	8.34	0.2752	2,188
7	Gilbarco	7,988	0.00799	8.34	0.2752	4,131
8	GSO Industrial Platers -01	2,830	0.00283	8.34	0.2752	11,660
	GSO Industrial Platers -02	5,364	0.00536	8.34	0.2752	6,152
9	HAECO	178	0.00018	8.34	0.2752	185,554
10	IQE	1,123	0.00112	8.34	0.2752	29,383
11	ITG Brands	141,618	0.14162	8.34	0.2752	233
12	Lanxess	67,103	0.06710	8.34	0.2752	492
13	Machine Specialties	4,920	0.00492	8.34	0.2752	6,706
14	Procter & Gamble BS -01	389,504	0.38950	8.34	0.2752	85
	Procter & Gamble BS -02	44,999	0.04500	8.34	0.2752	733
15	Procter & Gamble Swing Road	60,001	0.06000	8.34	0.2752	550
16	Parker Metal	7,416	0.00742	8.34	0.2752	4,450
17	Piedmont Plating	20,018	0.02002	8.34	0.2752	1,648
18	Precision Fabrics	125,612	0.12561	8.34	0.2752	263
19	Precor	5,525	0.00553	8.34	0.2752	5,972
20	Qorvo	108,959	0.10896	8.34	0.2752	303
21	Qualicaps	40,267	0.04027	8.34	0.2752	819
22	Shamrock Env. - Brown Summit 01	61,389	0.06139	8.34	0.2752	538
	Shamrock Env. - Brown Summit 02	145,339	0.14534	8.34	0.2752	227
23	Shamrock Environmental - Patton	34,068	0.03407	8.34	0.2752	969
24	Solenis	41,513	0.04151	8.34	0.2752	795
25	Triad Anodizing 02 (closed in 2022)	1,414	0.00141	8.34	0.2752	23,336
26	United Metal	3,525	0.00352	8.34	0.2752	9,361
27	Vertellus	94,840	0.09484	8.34	0.2752	348
28	Zink Holdings	95,184	0.09518	8.34	0.2752	347
	TOTAL SIU ACTUAL FLOW (MGD)	**1,984,988**	**1.98499**			
GLF	City of Greensboro Landfill	24,000	0.02400	8.34	0.2752	1,375
	Calculation: 1 ug/l at TZO EFF = 0.001 mg/l * 8.34 * 33.0 MGD = 0.2752 pounds of 1,4-dioxane					

2023 MB			FLOW		1,4-DIOXANE	
IUP	INDUSTRY	Industry	Average Discharge		Average Discharge	
Count	NAMES (please list alphabetically)	Permit/Pipe number	MGD	gal/day	Conc. mg/l	**Load lbs/day**
1	**Aramark**	P051/01	0.12823	128,230	0.004	0.0043
2	**Chemol**	P049/01	0.03071	30,705	0.531	0.1360
3	**Ecolab**	P078/01	0.04812	48,122	0.186	0.0746
4	**Elastic Fabrics of America**	P003/01	0.15951	159,507	0.0364	0.0484
5	**Evonik I**	P021/01	0.02574	25,741	0.0106	0.0023
	Evonik II	P021/02	0.06691	66,907	0.049	0.0273
6	**Express Container Services**	P069/01	0.01508	15,081	0.019	0.0024
7	**Gilbarco**	P033/01	0.00799	7,988	0.002	0.0001
8	**Greensboro Ind. Platers I**	P020/01	0.00283	2,830	0.0019	0.00004
	Greensboro Ind. Platers II	P020/02	0.00536	5,364	0.0018	0.0001
9	**HAECO (Timco) I**	P048/01	0.00018	178	0.0015	0.000002
10	**Imperial Tobacco Group**	P004/01	0.14162	141,618	0.00186	0.0022
11	**IQE**	P077/01	0.00112	1,123	0.0015	0.00001
12	**Lanxess**	P025/01	0.0671	67,103	0.078	0.0437
13	**Machine Specialties**	P070/01	0.00492	4,920	0.0015	0.0001
14	**Parker Metal**	P028/01	0.00742	7,416	0.0015	0.0001
15	**Piedmont Plating**	P075/01	0.02002	20,018	0.016	0.0027
16	**Precision Fabrics**	P011/01	0.12561	125,612	0.083	0.0870
17	**Precor**	P076/01	0.00553	5,525	0.0085	0.0004
18	**Procter & Gamble Swing**	P005/01	0.0600	60,001	0.007	0.0035
19	**Procter & Gamble BS-01**	P031/01	0.3895	389,504	0.0071	0.0231
	Procter & Gamble BS-02	P031/02	0.045	44,999	0.0083	0.0031
20	**Qorvo**	P073/01	0.10896	108,959	0.0014	0.0013
21	**Qualicaps**	P055/01	0.04027	40,267	0.0085	0.0029
22	**Shamrock Environ. BS-01**	P065-01	0.06139	61,389	0.297	0.1521
	Shamrock Environ. BS-02	P065-02	0.14534	145,339	0.337	0.4085
23	**Shamrock Environ. Patton**	P068/01	0.03407	34,068	0.0366	0.0104
24	**Solenis**	P074/01	0.04151	41,513	0.0396	0.0137
25	**Triad Anodizing I (closed)**	P029/01	0			
	Triad Anodizing II (closed 2022)	P029/02	0.00141	1,414	0.002	0.00002
26	**United Metal**	P040/01	0.00353	3,525	0.0183	0.0005
27	**Vertellus**	P002/01	0.09484	94,840	0.222	0.1756
28	**Zink Holding**	P043/01	0.09518	95,184	0.006	0.0048
GLF	**City Landfil**	GLF	0.024	24,000	0.067	0.0134
	Sum of Industrial Loading (lbs/day) =>		2.0090	2008990		**1.2444**

2023 1,4-DIOXANE MASS BALANCE

	MGD	gal/day	mg/l	lbs/day
Avg Influent loading (lbs/day) =>	**33.0**	33,000,000	0.00703	**1.9348**
Uncontrollable Load from Mass Bal (lbs/day) =>	**31.0**			**0.6904**
Uncontrollable Concen. from Mass Bal (mg/L) =>			**0.0027**	
Uncont. from Uncont. Sampling (mg/L & lbs/day) =>			**0.0017**	**0.4394**
Uncontrollable Concen. From Literature (mg/L) =>			**N/A**	
Uncontrollable conc. to be used in HWA (mg/L) =>				

Spreadsheet Instructions:
1) Applicable Values should be entered in the Heavy Bordered cells. Rest of worksheet is protected, password is "2".
2) Formulas are discussed in the Comprehensive Guidance, Chapter 5, Section E, page 5.

Choose "Uncontrollable Concentration to be used in HWA" (row 55) from Uncontrollable Concentration From "Mass

2023 1,4-dioxane MB NOTES

TZO Flow Avg of CY2021 and CY2022
SIU Avg Flows from 2022 HWA Submittal
Uncontrollable ug/l = Avg of domestic and commercial samples
SIU Avg ug/l from SOC direct SIU sampling data
Influent ug/l from weekly 24-hour TZO Influent composite
NB Influent samples all BDL AT PQL 2.0 - ASSUMED ZERO

TZO 1,4-DIOXANE INF & EFF SOC YEAR ONE (MB Spreadsheet #4)								
		SP Site 1				SP Site 3G		SP Site 3G
Sample Date		TZO INF ug/l		Sample Date		TZO EFF ug/l		TZO EFF ug/l
51 samples	<	24 Hr COMP		53 samples	<	GRAB-eDMR		GRAB-eDMR
5/5/2021		4.82		5/5/2021		4.71		4.71
5/12/2021		16.3		5/12/2021		6.86		6.86
5/19/2021		14.9		5/19/2021		11.0		11.0
5/26/2021		14.3		5/26/2021		7.76		7.76
6/2/2021		2.91		6/2/2021		2.73		2.73
6/9/2021		51.0		6/9/2021		20.4		20.4
6/16/2021		14.6		6/16/2021		4.18		4.18
6/23/2021		14.8		6/23/2021		3.93		3.93
6/30/2021		90.9		6/30/2021		615		
7/7/2021		18.0		7/7/2021		9.8		9.8
7/14/2021		13.7		7/14/2021		4.84		4.84
7/21/2021		19.4		7/21/2021		5.12		5.12
7/28/2021		25.3		7/28/2021		8.23		8.23
8/4/2021		33.5		8/4/2021		10.1		10.1
8/11/2021		23.6		8/11/2021		6.62		6.62
8/18/2021		13.6		8/18/2021		5.12		5.12
8/25/2021		12.9		8/25/2021		5.42		5.42
9/1/2021		13.5		9/1/2021		5.28		5.28
9/8/2021		3.73		9/8/2021		1.95		1.95
9/15/2021		12.4		9/15/2021		4.52		4.52
9/22/2021		15.0		9/22/2021		7.17		7.17
9/29/2021		9.88		9/29/2021		3.38		3.38
10/6/2021		13.4		10/6/2021		4.5		4.5
10/13/2021		22.9		10/13/2021		5.73		5.73
10/20/2021		9.47		10/20/2021		3.69		3.69
10/28/2021		65.1		10/28/2021		4.27		4.27
11/3/2021		580		11/3/2021		823		
11/8/2021				11/8/2021		12.45		12.45
11/17/2021		15.2		11/17/2021		2.97		2.97
11/24/2021		3.72		11/24/2021		4.85		4.85
11/30/2021		2.84		11/30/2021		1.96		1.96
12/7/2021		3.10		12/7/2021		2.92		2.92
12/14/2021		4.11		12/14/2021		1.98		1.98
12/21/2021		7.73		12/21/2021		2.59		2.59
12/28/2021		3.13		12/28/2021		1.56		1.56
1/4/2022		2.55		1/4/2022		1.54		1.54
1/11/2022		3.20		1/11/2022		3.03		3.03
1/19/2022		6.39		1/19/2022		2.93		2.93
1/25/2022		4.37		1/25/2022		2.73		2.73
2/1/2022		2.84		2/1/2022		1.92		1.92
2/8/2022		2.14		2/8/2022		2.58		2.58
2/15/2022		5.29		2/15/2022		4.51		4.51
2/22/2022		2.62		2/22/2022		2.70		2.70
3/1/2022		2.64		3/1/2022		2.44		2.44
3/8/2022		3.28		3/8/2022		2.20		2.20
3/15/2022		3.32		3/15/2022		1.97		1.97
3/22/2022		1.55		3/22/2022		2.43		2.43
3/29/2022		3.42		3/29/2022		2.29		2.29
4/5/2022		7.78		4/5/2022		47.1		
				4/6/2022		19.3		19.3
4/12/2022		3.38		4/12/2022		2.52		2.52
4/19/2022		4.50		4/19/2022		2.45		2.45
4/26/2022		5.30		4/26/2022		3.72		3.72
AVERAGE		24.20		AVERAGE		32.73		4.99
Maximum		580		Maximum		823		20
Minimum		1.55		Minimum		1.54		1.54
Median		7.78		Median		4.18		3.82
								3 CV Exceedances
								Removed

TZO 1,4-DIOXANE INF & EFF SOC YEAR TWO (MB Spreadsheet #5)						
		Site 1				Site 3G
Sample Date		TZO INF		Sample Date		TZO EFF
52 samples	<	24 Hr COMP		52 samples	<	GRAB-eDMR
5/3/2022		3.60		5/3/2022		3.36
5/10/2022		2.80		5/10/2022		2.76
5/17/2022	<	2.00		5/17/2022		1.96
5/24/2022	<	2.00		5/24/2022		1.89
5/31/2022		3.00		5/31/2022		2.0
6/7/2022		2.70		6/7/2022		4.25
6/14/2022		2.90		6/14/2022		4.03
6/21/2022	<	2.00		6/21/2022		1.66
6/28/2022		2.80		6/28/2022		2.58
7/5/2022	<	2.00		7/5/2022		1.91
7/12/2022	<	2.00		7/12/2022		1.68
7/19/2022	<	2.00		7/19/2022		1.72
7/26/2022	<	2.00		7/26/2022		1.83
8/2/2022		2.70		8/2/2022		2.41
8/9/2022		7.26		8/9/2022		1.81
8/16/2022		2.98		8/16/2022		1.83
8/23/2022		2.54		8/23/2022		1.64
8/30/2022		3.50		8/30/2022		1.72
9/6/2022		1.07		9/6/2022		3.32
9/13/2022		3.10		9/13/2022		2.69
9/19/2022		2.74		9/20/2022		4.28
9/27/2022		3.28		9/27/2022		2.47
10/4/2022		3.10		10/4/2022		3.92
10/11/2022		4.08		10/11/2022		3.42
10/18/2022		3.66		10/18/2022		3.01
10/25/2022		12.3		10/25/2022		8.91
11/1/2022		11.7		11/1/2022		3.49
11/8/2022		5.86		11/8/2022		2.62
11/15/2022		2.14		11/15/2022		4.17
11/22/2022		6.34		11/22/2022		2.28
11/29/2022		2.00		11/29/2022		1.5
12/6/2023		6.20		12/6/2022		6.8
12/13/2022		2.74		12/13/2022		4.06
12/20/2022		4.98		12/20/2022		4.71
12/28/2023		6.10		12/28/2022		2.02
1/3/2023		4.92		1/3/2023		3.32
1/10/2023		4.28		1/10/2023		2.79
1/17/2023		4.80		1/17/2023		3.48
1/24/2023		3.24		1/24/2023		2.45
1/31/2023		2.12		1/31/2023		2.06
2/7/2023		4.44		2/7/2023		2.69
2/14/2023		4.92		2/14/2023		2.31
2/21/2023		1.65		2/21/2023		2.84
2/28/2023		4.80		2/28/2023		4.53
3/7/2023		4.98		3/7/2023		4.14
3/14/2023		3.18		3/14/2023		2.76
3/21/2023		3.20		3/21/2023		2.62
3/28/2023		4.68		3/28/2023		2.42
4/4/2023		4.68		4/4/2023		3.01
4/11/2023		2.54		4/11/2023		1.54
4/18/2023		3.42		4/18/2023		1.93
4/25/2023		3.88		4/25/2023		4.48
AVERAGE		3.81		AVERAGE		2.96
Maximum		12.3		Maximum		8.91
Minimum		1.07		Minimum		1.50
Median		3.19		Median		2.66

VI. SOC SAMPLING PLAN FOR YEAR TWO **May 1, 2022 to April 30, 2023**

SP #	Sampling Location	Grab (G) Composite (C)	Split Samples?	Minimum Sampling Frequency/ Specific Times	Comments
***Samples Required by SOC in Year Two					
1	TZO INF***	COMP	No	1 daily composite every week	Settlement agreement/website
3G	TZO EFF Grab***	G	YES	Weekly	For eDMR reporting/website
27-58	SIU Composites***	C	No	Quarter #1 and Quarter #2	From Settlement Agreement
25	HR Arm Jordan Lake***	Grab (by Meritech)	No	Twice/Month If accessible (weather, COVID)	Settlement Agreement/website
26	Pittsboro DW Intake***	COMP (by Town)	No	1 composite every week	Settlement Agreement/website Note: Includes all Upper Haw River NPDES dischargers
Remove Triad Anodizing 02 (SP #55) from SIU list after closure inspection					

SP #	Sampling Location	Grab (G) Composite (C)	Split Samples?	Comments
Samples Collected by City of Greensboro in Year Two Voluntarily				
2	NB INF (Transfer Line)	COMP	No	
3C	TZO EFF Composite	Weekly Comp	No	Retain samples for NCDEQ
7	IND 1 Patton	COMP	No	Tracking in case of high event
BP	Bryan Park	COMP	No	Tracking in case of high event
20	DW 3 PTRWA	Grab	No	Use Meritech for lower PQL
23	GSO Landfill	COMP	No	
	Pittsboro Finished DW	Grab	No	Tracking
	Receiving Streams (Old 70 and Hwy 61)	Grab	No	Tracking in case of high event

CITY OF GREENSBORO 1-4 DIOXANE YEAR TWO SPECIAL ORDER BY CONSENT (SP Sites 1-24)

SOC YEAR DATE's	TZO INF 24 comp	N.B. INF 24 Comp	TZO Aeration Tanks	TZO Sludge Cake	Scrubber Bldg.	Patton Trunk	Arlington Trunk	Reedy Fork Trunk	Bryan Park MH 16066	Indus. #4 Airport	Indus. #5 Whitsett	Indus. #6 N.B. Trunk	Indus. #7 Radar Rd (Gilbarco, Haeco)	Wesley Long	A&T University	Bessemer Elementary School	Willoughby Boulevard	Shelby Drive	DW : Townsend	DW : Mitchell	DW : PTRWA	D. W. Burlington	D. W. Reidsville	Landfill Leachate	Septage
	1	2	4	5	6	7	8	9		10	11	12	12A	13	14	15	16	17A	18	19	20	21	22	23	24
(ug/l) unless marked other >	TZO Reclamation Sites					TZO Collection Sys. Industrial								TZO Collection Sys. Domestic/Commercial					Drinking Water Sources					Other	
QUARTER ONE MAY,JUN,JUL																									
5/2/2022						6.4																			
5/3/2022	3.6																								
5/9/2022						2.8																			
5/10/2022	2.8	< 2.0																							
5/16/2022						< 2																			
5/17/2022	< 2											< 2		< 2.0											
5/23/2022						3.7															2 / <1			68.2 / 69.9	
5/24/2022	< 2																								
5/27 - 5/30/22						< 2																			
5/31/2022	3																								
6/6/2022						3	7.2	120	979	< 2	< 2		2.1								< 1				
6/7/2022	2.7	< 2.0																							
6/8 - 6/9/22															< 2.0										
6/13/2022						< 2																			
6/14/2022	2.9																								
6/21/2022	< 2																								
6/24/2022						2.2											< 2.0								
6/28/2022	2.8																								
7/5/2022	< 2					2.8																			
7/6/2022																< 2									
7/11/2022						3.4															< 2				
7/12/2022	< 2																								
7/19/2022	< 2					< 2																			
7/26/2022	2.4					< 2																			
7/28/2022																		< 2.0							
QUARTER TWO AUG,SEPT,OCT														*Domestic sampling ending 10-31-22*											
8/1/2022						5.6																			
8/2/2022	2.7																								
8/5 - 8/8/22						3.58																			
8/9/2022	7.26																								
8/16/2022	2.98					2.18									< 2.0										
8/13 - 8/22/22						< 2																			
8/23/2022	2.54																								
8/30/2022	3.5																								
8/26 - 8/29/22						< 2																			
9/6/2022	1.07					1.62																			
9/9 - 9/12/2022						2.66																			
9/13/2022	3.1																								
9/12 - 9/16/22							< 2			< 2															
9/16 - 9/19/22						< 2		186	977		< 2	< 2	< 2												
9/19/2022	2.74	< 2																			< 1			120	
9/20/2022																									
9/22/2022																									
9/23 - 9/26/22						< 2.0								< 2.0											
9/27/2022	3.28																								
9/27 - 9/29/22																	< 2.0								
9/30 - 10/3						< 2.0																			
10/4/2022	3.1															< 1.0		< 1.0							
10/4 - 10/6/22																									
10/7 - 10/10/22						< 2.0																			
10/11/2022	4.08																								
10/14 - 10/17/22						< 2.0																			
10/18/2022	3.66																								
10/21 - 10/24/22						27.3			508																
10/25/2022	12.28																								
10/28 - 10/31/22						4.06																			
QUARTER THREE NOV,DEC,JAN																									
10/30 - 11/1/22	11.7																								
11/4 - 11/7/22						2.46																			
11/7 - 11/8/22	5.86																								
11/10 - 11/14/22						9.08																			
11/14 - 11/15/22	2.14																								
11/18 - 11/21/22						< 2.0																			
11/21 - 11/22/22	6.34																								
11/28 - 12/2/22						3.22																			
11/28 - 11/29/22	2																								
12/2 - 12/5/2022						2.72			447																
12/5 -12/6/22	6.2																								
12/5 - 12/9/22									1390																
12/9 - 12/12/22						3.04																			
12/12/2022																					<2.0/1.65			89.9/91.5	
12/12 - 12/13/22	2.74																								
12/16 - 12/19/22						4.06																			
12/20/2022	2.94																								

12/28/2022	6.1					3.62																							
1/3/2023	4.92																												
1/6 - 1/9/23 **C**						2.32																							
1/10/2023	4.28																												
1/9 - 1/13/23 **C**																													
1/13 - 1/17/23						3.5																							
1/17/2023	4.8																												
1/20 - 1/23/23 **C**						3.82																							
1/23 - 1/27/23																													
1/24/2023	3.24																												
1/27 - 1/30/23						4.58																							
1/31/2023	2.12																												
1/30 - 2/3/23																													
QUARTER FOUR **FEB,MAR,APR**																													
2/3 - 2/6/23						4.9																							
2/7/2023	4.44																												
2/6 - 2/10/23					<	2																							
2/14/2023	4.92																												
2/17 - 2/20/23						3.28																							
2/21/2023	1.65																												
2/24 - 2/27/23						2.82																							
2/28/2023	4.8																												
3/7/2023	4.98																												
3/10 - 3/13/23					<	2																							
3/14/2023	3.18																												
3/17 - 3/20/23						3.14																							
3/21/2023	3.2																												
3/24 - 3/27/23						2.64																							
3/28/2023	4.68																												
3/27 - 4/3/23						2.3																							
4/7 - 4/10/23						2.02																							
4/4/2023	4.68																												
4/11/2023	2.54																												
4/12/2023																												51.2	
4/14 - 4/17/23						2.08																							
4/17/2023																										2.63		48.6	
4/18/2023	3.42	*Meritech sample went out rush Pace SIM equip down*																											
4/21 - 4/24/23						2.4																							
4/25/2023	3.88																												
4/28 - 5/1/23					<	2																							
4/28/2023																												22.9	
YEAR TWO	**TZO INF**	**N.B.INF**	**TZO AERATION**	**TZO CAKE**	**SCRUBBER**	**PATTON**	**ARLINGTON**	**REEDY FORK**	**BRYAN PK.**	**AIRPORT**	**WHITSETT**	**N.B.INF**	**RadarRd**	**WESLEY LONG**	**A & T UNIV**	**BESSEMER**	**WILLOUGHBY**	**SHELBY**	**TOWNSEND**	**MITCHELL**	**PTRWA**	**BURLINGTON**	**REIDSVILLE**	**LEACHATE**	**SEPTAGE**

City of Greensboro NPDES eDMR/SOC Self-Monitoring: T. Z. Osborne WWTP Effluent 1,4-Dioxane Grab Sample Data (in ug/l or parts per billion) SOC Site #3G						
Special Order by Consent (EMC SOC WQ S19-010) YEAR TWO						
Week	**Sample Date**	**eDMR Report Value**	**<**	**Lab #1 (Pace)**	**<**	**Lab #2 (Meritech)**
53	**5/3/2022**	**3.36**		3.1		3.61
54	**5/10/2022**	**2.76**		2.7		2.82
55	**5/17/2022**	**1.96**		2.0		1.91
56	**5/24/2022**	**1.89**	<	2.0		1.78
57	**5/31/2022**	**2.00**	<	2.0		1.99
58	**6/7/2022**	**4.25**		5.1		3.39
59	**6/14/2022**	**4.03**		4.7		3.36
60	**6/21/2022**	**1.66**	<	2.0		1.32
61	**6/28/2022**	**2.58**		2.7		2.45
62	**7/5/2022**	**1.91**		2.2		1.62
63	**7/12/2022**	**1.68**	<	2.0		1.35
64	**7/19/2022**	**1.72**	<	2.0		1.43
65	**7/26/2022**	**1.83**	<	2.0		1.65
66	**8/2/2022**	**2.41**		2.8		2.02
67	**8/9/2022**	**1.81**	<	2.0		1.62
68	**8/16/2022**	**1.83**	<	2.0		1.65
69	**8/23/2022**	**1.64**	<	2.0		1.27
70	**8/30/2022**	**1.72**	<	2.0		1.43
71	**9/6/2022**	**3.32**		3.8		2.83
72	**9/13/2022**	**2.69**		3.0		2.38
73	**9/20/2022**	**4.28**		4.2		4.35
74	**9/27/2022**	**2.47**		3.0		1.94
75	**10/4/2022**	**3.92**		4.0		3.83
76	**10/11/2022**	**3.42**		2.9		3.93
77	**10/18/2022**	**3.01**		3.2		2.82
78	**10/25/2022**	**8.91**		8.4		9.42
79	**11/1/2022**	**3.49**		3.4		3.57
80	**11/8/2022**	**2.62**		3.0		2.23
81	**11/15/2022**	**4.17**		4.9		3.44
82	**11/22/2022**	**2.28**		2.9		1.65
83	**11/29/2022**	**1.50**	<	2.0	<	1.00
84	**12/6/2022**	**6.80**		7.8		5.79
85	**12/13/2022**	**4.06**		4.4		3.71
86	**12/20/2022**	**4.71**		4.6		4.81
87	**12/28/2022**	**2.02**	<	2.0		2.03
88	**1/3/2023**	**3.32**		3.7		2.93
89	**1/10/2023**	**2.79**		2.8		2.78
90	**1/17/2023**	**3.48**		3.4		3.55
91	**1/24/2023**	**2.45**		2.6		2.29
92	**1/31/2023**	**2.06**	<	2.0		2.12
93	**2/7/2023**	**2.69**		2.4		2.98
94	**2/14/2023**	**2.31**		2.4		2.21
95	**2/21/2023**	**2.84**		2.8		2.88
96	**2/28/2023**	**4.53**		4.6		4.46
97	**3/7/2023**	**4.14**		3.9		4.37
98	**3/14/2023**	**2.76**		3.0		2.51
99	**3/21/2023**	**2.62**		2.8		2.44
100	**3/28/2023**	**2.42**		2.8		2.03
101	**4/4/2023**	**3.01**		2.7		3.32
102	**4/11/2023**	**1.54**	<	2.0		1.07
103	**4/18/2023**	**1.93**	<	2.0		1.86
104	**4/25/2023**	**4.48**		4.8		4.15
	*** Did not Meet QA/QC and was not used in eDMR average*					
	^Laboratory data not yet received by City of Greensboro at time of submittal					
	Pace and Meritech are both State-certified to analyze wastewater samples for 1,4-dioxane using EPA approved method 624.1					
	Pace Laboratory PQL = 2.0 ug/l; Meritech Laboratory PQL = 1.0 ug/l					
	eDMR = Discharge Monitoring Report submitted monthly to NCDEQ					
	SOC Year One Compliance Value = 45 ug/l effective 5-1-2021 through 11-30-2021					
	SOC Year One Compliance Value = 35 ug/l effective 12-1-2021					
	SOC Year Two Compliance Value = 31.5 ug/l effective 5-1-2022					
	SOC Year Three Compliance Value = 23 ug/l effective 5-1-2023					

City of Greensboro 1,4-Dioxane Study at NCDEQ Sampling Site CPF055C				
SOC Year Two - Site #25				
Semi-monthly sampling and analyses conducted by state-certified commercial contract laboratory				
EPA Approved Method 624.1 used for grab sample analyses (from 40 CFR Part 136)				
Sample Date		**1,4-Dioxane in ug/l (ppb)**		**Comments**
5/16/2022		<	1.00	
5/31/2022		<	1.00	
6/14/2022		<	1.00	
6/27/2022		<	1.00	
7/11/2022		<	1.00	
7/27/2022		<	1.00	
8/9/2022		<	1.00	
8/29/2022		<	1.00	
9/12/2022		<	1.00	
9/28/2022		<	1.00	
10/10/2022		<	1.00	
10/24/2022			1.29	
11/7/2022		<	1.00	
11/21/2022			1.99	
12/5/2022			1.26	
12/19/2022		<	1.00	
1/9/2023		<	1.00	
1/30/2023		<	1.00	
2/13/2023		<	1.00	
2/27/2023		<	1.00	
3/8/2023		<	1.00	
3/27/2023		<	1.00	
4/10/2023		<	1.00	
4/24/2023		<	1.00	
Sampling site is below Pittsboro in upper Haw River Arm of Jordan Lake				
Note: Sampling site includes all upper Haw River NPDES dischargers				

Town of Pittsboro 1,4-Dioxane Data (in ug/l) [SOC YEAR TWO]						
	SOC Sampling Plan Site #26				City Extra Analyses (Not in Sampling Plan)	
DATE	<	Haw River "Raw" Intake Composite	<	Haw River "Raw" Intake Grab	<	Finished Water Grab or Composite
4/25-5/2, 2022	<	1.0				
5/4/2022					<	1.0
5/2-7, 2022	<	1.0				
5/11/2022					<	1.0
5/7-18, 2022	<	1.0				
5/18/2022					<	1.0
5/18-25, 2022	<	1.0				
5/25/2022					<	1.0
5/25-31, 2022	<	1.0				
6/1/2022					<	1.0
6/1-5, 2022	<	1.0				
6/8/2022					<	1.0
6/6-6/15, 2022	<	1.0				
6/15/2022					<	1.0
6/16-20, 2022	<	1.0				
6/22/2022						1.34
6/21-26, 2022		1.5				
6/29/2022					<	1.0
6/27-7/1, 2022	<	1.0				
7/2-6, 2022	<	1.0				
7/6/2022					<	1.0
7/7-11, 2022	<	1.0				
7/13/2022					<	1.0
7/12-20, 2022	<	1.0				
7/20/2022						1.1
7/17-21, 2022	<	1.0				
7/22-26, 2022	<	1.0				
7/27/2022					<	1.0
7/30-8/3, 2022	<	1.0				
8/3/2022					<	1.0
8/3-7, 2022	<	1.0				
8/10/2022					<	1.0
8/8-16/2022	<	1.0				
8/17/2022					<	1.0
8/17-22/2022		1.20				
8/24/2022						1.67
8/23-27/2022	<	1.0				
8/31/2022					<	1.0
8/28-9/3/2022	<	1.0				
9/7/2022					<	1.0
9/7-12/2022		1.24				
9/14/2022					<	1.0
9/13-18/2022	<	1.0				
9/21/2022					<	1.0
9/19-28/2022	<	1.0				
9/28/2022					<	1.0
10/5/2022					<	1.0
10/12/2022			<	1.0	<	1.0
10/19/2022				1.1	<	1.0
10/19-23/22		2.17				
10/26/2022						2.76
10/23-29, 2022		1.89				
10/23-30, 2022		2.05				
11/2/2022						1.86
10/31-11/3, 2022		25.7				
11/9/2022						16.1
11/9-14/2022		3.76				
11/16/2022						3.13
11/15-19/2022	<	1.0				
11/22/2022						1.30
11/20-24/2022	<	1.0				

DIOXANE SAMPLING : INDUSTRIES (2nd Yr: Compliance Value = 31.5ug/l)

POTW samples | IU samples | 6/13/2023

DATE		Aramark	Chemol	Ecolab	Elastic Fabrics	Evonik -01	Evonik -02	Express Container	Gilbarco	Greensboro Ind Pltr - 01	Greensboro Ind Pltr - 02	Haeco	IQE	ITG Brands	Lanxess / HALLSTAR	Machine Specialties	Parker Metal	Piedmont Platers	Precision Fabrics	Precor	P & G swing	P & G BS - 01	P & G BS -02	Qorvo	Qualicaps	Shamrock P065-01	Shamrock P065-02	Shamrock P068 Patton	Solenis	Triad Anodizing	United Metal	Vertellus	Zink
SOC Sites #27-58		27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	45	46	47	48	44	42	43	49	50	51	52	53	54	55	56	57	58
(ug/l)	Have Samples	P051	P049	P078	P003	P021-01	P021-02	P069	P033	P020-01	P021-02	P048	P077	P004	P025	P070	P028	P075	P011	P076	P005	P031-01	P031-02	P073	P055	P065-01	P065-02	P068	P074	P029-02	P040	P002	P043
5/3 - 5/4/22													< 2.0																				
5/5 - 5/6/22					< 50																							6.8			< 10		
5/6 - 5/7/22					< 50																												
5/10/22					< 50												< 2.0																
5/10 - 5/11/22					< 50											< 2																	
5/11 - 5/12/22					< 50																	< 2	< 2	< 2									
5/14 - 5/21/22				< 50																													
5/1 - 5/16/22															< 10																		
5/17 - 5/18/22														< 2.0						< 20.0													
5/19/2022									< 2.0	< 2.0	< 2.0							< 2.0									**367**	31.8					
5/20/2022																											**196**						
5/24 - 5/26/22																										15.1	**159**						< 2.0
5/31 - 6/1/22					8.9														**57**													
6/1 - 6/7/22															< 10																		
6/2/2022												< 2.0																					
6/3/2022								3.5																									
5/30 - 6/4/22																			< 50														
6/6/2022																												3.1					
6/6 - 6/7/22				< 1000											< 10.0																		
6/8/2022			60																														
6/5 - 6/11/22																																199	
6/14 - 6/18/22					< 50																												
6/24/2022																					< 20.0												
6/19 - 6/27/22				< 50																													
6/27 - 7/3/22																																	
7/5/2022																												2.9					
7/6/2022																									< 2.0								
7/7/2022		< 2																															
7/11 - 7/15/22					< 50																												
7/14/2022																										30.3	143	63					
7/16 - 7/23/22				< 50																													
7/18/2022																					< 2.0	< 2.0	< 2.0										
7/21/2022						< 20	< 20																										
7/22/2022																															< 20		
7/29/2022																													<100.0				
8/1 - 8/3/22								42.5																									
8/1 - 8/7/22																																	
8/2 - 8/4/22																					< 10												
8/9 - 8/11/22														< 2.0	< 100																		
8/8/2022															< 100													< 2					
8/7 - 8/13/22																																125	
8/17 - 8/18/22																																	
8/20 - 8/27/22				< 100																													
8/21 - 8/22/22																						< 50	< 50										
8/21 - 8/26/22																			< 50														
8/23 - 8/25/22				< 50																													
8/30/2022																< 1.0																	
9/1 - 9/2/22													< 1.0																				
9/8/2022																															< 10		
9/4 - 9/10/22																																390	
9/6 - 9/11/22																																	
9/10 - 9/17/22				65.5																													
9/12/2022																												34.90					
9/13/2022																				< 10				< 1									
9/15/2022																			< 50														
9/16/2022					< 50																												
9/19/2022								<20.0																									
9/20/2022								<20.0																									
9/20 -9/22/2022		< 10	**990**							< 2.0	< 2.0																						
9/23/2022												< 1.0																					
9/25 - 9/30/22																			< 50														
9/26/2022																	< 1.0																
9/28/2022									< 2.0																								
10/4/2022																		< 10															
10/6/2022																										129	463	< 10					
10/1 - 10/8/22				< 50																													
10/10 - 10/16/22																																	
10/11/2022															< 10																		
10/17 - 10/20/22																																326	
10/17 - 10/22/22																																330	
10/20 - 10/21/22						18.50	48.5																						16.20				
10/16 - 10/22/22			559												**23300**																		
10/16/2022			**2920**																														
10/17/2022			1220												< 20													53.80				< 50		
10/18/2022			537												157																	< 50		
10/19/2022															< 20																	< 50		
10/20/2022															**26700**																	**786**		
10/21/2022															< 20																	103		
10/23- 10/29/22															619																	< 50		
10/25 - 10/27/22																									< 20								< 10
10/28/2022																																	
10/23 - 10/28/22																			< 50														
10/30 - 11/5/22															54.9																		
11/7/2022								22.9																									
11/8/2022								<20.0																									
11/15/2022																												< 20					
11/27 - 12/3/22																			88														

12/5 - 12/10														145																		
12/6/2022																																
12/12/2022																											<100					
12/12 - 12/17/22														<50																		
12/19 - 12/26/22														<50																		
12/27 - 1/2/23														<100																		
1/3 - 1/10/23														<100																		
1/11 - 1/16/23														<100																		
1/16 - 1/17/23			<200																													
1/15 - 1/22/23			**2390**																													
1/17 - 1/23/23														<100																		
1/17 - 1/18/23			535																													
1/18 -1 /19/23			120																													
1/19 - 1/26/23																											90.5					
1/19 - 1/20/23			<100																													
1/20 - 1/21/23			113																													
1/21 - 1/22/23			<100																													
1/25 - 1/31/23														<100																		
1/31 - 2-3-23														182																		
2/5 - 2/11/23			102																													
2/7 - 2/13/23														<100																		
2/13 - 2/19/23																											<100					
2/14 - 2/20/23														<40																		
2/19 - 2/25/23																																
2/22 - 2/27/23														<100																		
2/28 - 3/5/23														<100																		
3/5 -3/12/23			<100																													
3/6 - 3/12/23																											<40					
3/8 - 3/13/23														<100				100														
3/14 - 3/20/23														<100																		
3/21 - 3/27/23														<100																		
4/1 - 4/7/23																															230	
4/2 - 4/9/23			<100																													
4/3 - 4/9/23																											<40					
4/11 - 4/17/23														<100																		
4/19 - 4/25/23														<100																		
4/26 - 4/30/23														<100																		
4/27/2023							44.9																									
Yr Two Summary																																
INDUSTRIES :	Aramark	Chemol	Ecolab	Elastic Fabrics	Evonik-01	Evonik-02	Express Container	Gilbarco	GSO Plt. -01	GSO Plt.-02	Haeco	IQE	ITG Brands	Lanxess	Machine Specialties	Parker Metal	Piedmont Plating	Precision Fabrics	Precor	P & G Swing	P&G BS-01	P&G BS-02	Qorvo	Qualicaps	Shamrock BS-01	Shamrock BS-02	Shamrock Patton	Solenis	Triad Anod.	United Metal	Vertellus	Zink

Greensboro 1,4-Dioxane Receiving Stream Monitoring (in ug/l or ppb) - SOC YEAR TWO					
Sample Date		South Buffalo Creek at		Reedy Fork Creek at	COMMENTS
	<	Old 70 Highway Bridge	<	Highway 61 Bridge	Creeks in geographic order (voluntary creek sampling survey)
5/5/2022	<	2.0	<	2.0	
5/11/2022	<	2.0	<	2.0	
5/19/2022	<	2.0	<	2.0	
5/26/2022	<	2.0	<	2.0	
6/2/2022	<	2.0	<	2.0	
6/9/2022	<	2.0		2.4	
6/16/2022		3.0		2.5	
6/23/2022	<	2.0	<	2.0	
6/30/2022	<	2.0	<	2.0	
7/7/2022	<	2.0	<	2.0	
7/14/2022	<	2.0	<	2.0	
7/21/2022	<	2.0	<	2.0	
7/28/2022	<	2.0	<	2.0	
8/4/2022		1.67		2.33	
8/11/2022	<	1.0		1.06	
8/18/2022	<	1.0		1.72	
8/25/2022	<	1.0	<	1.0	
9/1/2022	<	1.0		1.70	
9/8/2022	<	1.0	<	1.0	
9/16/2022	<	1.0		1.97	
9/22/2022		1.04		1.20	
9/29/2022		3.34		1.84	
10/6/2022		1.21		2.76	
10/13/2022		1.81		2.62	
10/20/2022	<	1.00		2.44	
10/27/2022		1.96		6.22	
11/3/2022	<	1.00		2.54	
11/4/2022				3.11	Haw River @Highway 62 = 1.36 ug/l
11/8/2022					Haw River @Highway 62 = 2.22 ug/l
11/9/2022				1.89	Haw River @Highway 62 = 1.76 ug/l
11/16/2022	<	1.00	<	1.00	Haw River @Highway 62 = < 1.0 ug/l
11/17/2022	<	1.00	<	1.00	
11/22/2022	<	1.00		1.67	
12/1/2022	<	1.00		1.18	
12/8/2022	<	1.00		1.70	
12/9/2022				1.83	
12/15/2022	<	1.00		1.07	
12/29/2022		1.97		1.32	
1/5/2023	<	1.00		1.89	
1/11/2023	<	1.00		1.71	
1/19/2023		2.31		1.11	
1/26/2023	<	1.00	<	1.00	
2/2/2023		1.02		1.32	
2/9/2023		1.90		1.53	
2/16/2023		1.57		1.59	
2/23/2023		2.27		2.44	
3/2/2023	<	1.00		1.12	
3/9/2023		2.07		1.32	
3/16/2023		1.60	<	1.00	
2/23/2023		2.15		1.34	
3/30/2023		1.73		1.71	
4/6/2023		2.23		2.13	
4/13/2023		1.63	<	1.00	
4/20/2023		2.43		1.59	
4/28/2023	<	1.00	<	1.00	
		Grab Sample Location		Grab Sample Location	
		ABOVE TZO EFF		BELOW TZO EFF	
				Before Confluence	
				With Haw River	