



Connecticut Department of
 Energy & Environmental Protection
 Bureau of Materials Management & Compliance Assurance
 Water Permitting & Enforcement Division

MS4 Annual Report Transmittal Form

For the General Permit to Discharge Stormwater
 from Small Municipal Separate Storm Sewer
 Systems (MS4)

Print or type unless otherwise noted. You must submit the Annual
 Report and the fee along with this completed form.

CPPU USE ONLY	
App #:	_____
Doc #:	_____
Check #:	_____
Program: Stormwater Permits	

Part I: Annual Report General Information

1. Reporting Period (Calendar Year): <u>2016</u>	
2. Provide the registration number for the existing general permit registration: <u>GSM000090</u>	
3. Registrant Type (check one):	Fees
<input type="checkbox"/> state institution/agency	\$375.00 [713]
<input type="checkbox"/> federal institution/agency	\$375.00 [713]
<input checked="" type="checkbox"/> municipality	\$187.50 [713]
4. Municipality name or Municipality name where institution is located: <u>Town of Farmington</u>	
The annual report will not be processed without the fee. The fee shall be non-refundable and shall be paid by check or money order to the Department of Energy and Environmental Protection or by such other method as the commissioner may allow.	

Part II: Registrant Information

1. Registrant (Name of Municipality or State or Federal Institution/Agency): <u>Town of Farmington</u>	
Mailing Address: <u>1 Monteith Drive</u>	
City/Town: <u>Farmington</u>	State: <u>CT</u> Zip Code: <u>06032</u>
Business Phone: <u>860-675-2305</u>	ext.:
Contact Person: <u>Russell M. Arnold, Jr., P.E.</u>	Phone: <u>860-675-2305</u> ext.
*E-mail: <u>arnoldr@farmington-ct.org</u>	
*By providing this e-mail address you are agreeing to receive official correspondence from DEEP, at this electronic address, concerning the subject registration. Please remember to check your security settings to be sure you can receive e-mails from "ct.gov" addresses. Also, please notify DEEP if your e-mail address changes.	

Part II: Registrant Information (continued)

2. Billing contact, if different than the registrant.

Name:

Mailing Address:

City/Town:

State:

Zip Code:

Business Phone:

ext.:

Contact Person:

Phone:

ext.

E-mail:

3. Primary contact for departmental correspondence and inquiries, if different than the registrant.

Name:

Mailing Address:

City/Town:

State:

Zip Code:

Business Phone:

ext.:

Contact Person:

Phone:

ext.

*E-mail:

*By providing this e-mail address you are agreeing to receive official correspondence from DEEP, at this electronic address, concerning the subject registration. Please remember to check your security settings to be sure you can receive e-mails from "ct.gov" addresses. Also, please notify DEEP if your e-mail address changes.

4. Engineer(s) or other consultant(s) employed or retained to assist in preparing the annual report.

Check here if additional sheets are necessary, and label and attach them to this sheet.

Name:

Mailing Address:

City/Town:

State:

Zip Code:

Business Phone:

ext.:

Contact Person:

Phone:

ext.

E-mail:

Service Provided:

5. Check here if there are adjacent towns or other entities with which implementation of the Stormwater Management Plan is coordinated for a portion of the subject MS4. If so, provide the names of such towns or entities: _____

Part III: Annual Report Checklist

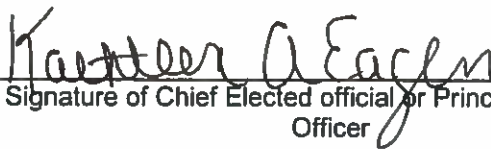



The Annual Report must be submitted in hard copy format with this transmittal form and also must be submitted electronically to the address indicated at the end of this form.

Check the boxes confirming that, at a minimum, the following are included in the Annual Report submitted with this transmittal form.

1. A written discussion of the status of compliance with each of the six Minimum Control Measures required by the MS4 General Permit, including, but not limited to:
 - a listing and brief description of all BMPs that were implemented during the reporting year either as one-time events or ongoing activities, including as appropriate, the location of each BMP (address and latitude/longitude), and the party responsible for implementation;
 - a listing of BMPs that were not completed as scheduled or that were discontinued, a discussion of the circumstances and reasons for non-implementation, a modified implementation schedule and, if necessary, a modified or alternate BMP to replace the BMP not implemented including the rationale for such modified or alternate BMP;
 - a discussion of any new or modified BMPs to be implemented in the coming year, including a description of the BMP, the reason or rationale for adding or modifying the BMP, the timeline for implementation, the measurable goal for the BMP, the party responsible for implementation and, where appropriate, the location of each BMP (address and latitude/longitude);
 - a discussion of the progress and status of the MS4's IDDE program (see Section 6(a)(3) of the MS4 General Permit) including, mapping, implementation of an ordinance or other regulatory mechanism to prohibit non-stormwater discharges, illicit discharge tracking activities, IDDE field monitoring results, number and type of illicit discharges detected, and number of illicit discharges eliminated;
 - a discussion of measures in the Stormwater Management Plan (Plan) for the control of discharges to impaired waters (see Section 6(k) of the MS4 General Permit) including a list of BMPs that are targeted for such discharges, progress in implementing these measures, any evaluation of the effectiveness of these measures in meeting the goals of the Plan's impaired waters program, and any new or modified BMPs to be added to the Plan to improve its effectiveness;
 - a discussion of the MS4's stormwater monitoring program describing the status of monitoring for the reporting period with a summary of the findings, any significant observations regarding the results, any actions taken in response to the monitoring results and any modifications to the Plan made as a result of the monitoring results, and;
 - a discussion of any changes to personnel responsible for the Plan or BMP implementation.
2. All monitoring data collected and analyzed pursuant to Section 6(h) of the MS4 General Permit.
3. **Annual Report Availability:** At least thirty (30) days prior to submission of the Annual Report to the DEEP, pursuant to Section 4(d) of the MS4 General Permit, each permittee shall make available for public review and comment a draft copy of the complete Annual Report. Comments on the Annual Report may be made to the permittee and are *not* submitted to the DEEP. Reasonable efforts to inform the public of this document shall be undertaken by the permittee. Such draft copies shall be made available electronically on the permittee's website for public inspection and copying, consistent with the federal and state Freedom of Information Acts, and shall be made available, at a minimum, at one of the following locations: the permittee's main office or other designated municipal or institution office, a local library or other central publicly available location. Following submission of the Annual Report to the DEEP, a copy of the final report shall be made available for public inspection during regular business hours.

Part IV: Registrant Certification

The registrant *and* the individual(s) responsible for actually preparing the annual report must sign this part. [If the registrant is the preparer, please mark N/A in the spaces provided for the preparer.]

<p>"I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that based on reasonable investigation, including my inquiry of the individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief.</p> <p>I certify that this annual report transmittal is on complete and accurate forms as prescribed by the commissioner without alteration of the text.</p> <p>I understand that a false statement in the submitted information may be punishable as a criminal offense, in accordance with section 22a-6 of the General Statutes, pursuant to section 53a-157b of the General Statutes, and in accordance with any other applicable statute."</p> <p>I also certify that the signature of the registrant, or a duly authorized representative, being submitted herewith complies with section 22a-430-3(b)(2)(B) of the Regulations of Connecticut State Agencies.</p>	
	
Signature of Chief Elected official or Principal Executive Officer	Date
Kathleen A. Eagen	Town Manager
Printed Name of Chief Elected official or Principal Executive Officer	Title (if applicable)
	
Signature of Preparer (if different than above)	Date
Russell M. Arnold, Jr., P.E.	Director/Town Engineer
Name of Preparer (print or type)	Title (if applicable)

Note: Please submit this completed Transmittal Form, Fee, and the Annual Report to:

CENTRAL PERMIT PROCESSING UNIT
DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION
79 ELM STREET
HARTFORD, CT 06106-5127

Please *also* submit the Annual Report electronically to the following address: DEEP.StormwaterStaff@ct.gov

INCORPORATED 1645



December 28, 2016

State of Connecticut
Department of Environmental Protection
Bureau of Water Management
79 Elm Street
Hartford, CT 06106-5127
Attn: Stormwater Permit Coordinator

RE: Annual Report on Municipal Storm Sewers for 2016
Town of Farmington

Sir or Madame:

Enclosed with this letter, we are transmitting the Annual Report on Municipal Storm Sewers covering our activities performed during the calendar year 2016 as required under subsection 6(i)(2) of the *General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4 General Permit)*. As noted previously, I am currently the primary contact for departmental correspondence and inquires. The stormwater monitoring data and sample locations for 2016 have been obtained based on the alternative sampling plan that the Commissioner approved in February 2007, the results of which can be found in Attachment A.

I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that a false statement made in this document or its attachments may be punishable as a criminal offense, in accordance with Section 22a-6 of the Connecticut General Statutes, pursuant to Section 53a-157b of the Connecticut General Statutes, and in accordance with any other applicable statute.

Sincerely,

Russell M. Arnold, Jr., P.E.
Director/Town Engineer
Department of Public Works
Town of Farmington

enclosures





2016 ANNUAL REPORT

Municipal Separate Storm Sewer System

FARMINGTON, CT

Prepared by

**TOWN OF FARMINGTON
DEPARTMENT OF PUBLIC WORKS
Engineering Division
1 Monteith Drive
Farmington, CT 06032
(860.675.2305)**

December 2016

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ATTACHMENT A – Stormwater Monitoring Report Forms and Laboratory Data Results

ATTACHMENT B – Monitoring Site Location Mapping

ATTACHMENT C - Sample Storm Drainage Operation and Maintenance Plans

1. PURPOSE AND SCOPE

This Annual Report is required by subsection 6(i)(2) of the *General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4 General Permit)*. The *MS4 General Permit* was issued by the Connecticut Department of Energy and Environmental Protection (CTDEEP) on January 9, 2004 and it is applicable to storm sewer facilities owned or operated by the Town of Farmington. The permit was extended “as-is” until June 30, 2017. The municipal storm sewer facilities owned by the Town of Farmington were registered by the filing of Part A and Part B of the required registration forms. This report is the vehicle by which the Town of Farmington is required to annually report to the CTDEEP Stormwater Permit Coordinator on the status of compliance with the *MS4 General Permit* and to submit the stormwater monitoring data collected and analyzed during the year.

The Stormwater Monitoring Report Forms and Tunxis Laboratories LLC data results can be found in Attachment A. The mapping of the locations where the stormwater discharge samples were collected can be found in Attachment B.

The Town of Farmington alternative sampling plan that was filed as part of the 2006 Annual Report was approved by the Department of Environmental Protection Stormwater Permit Coordinator on February 27, 2007.

The certification required under subsection 7(e) of the *MS4 General Permit* is presented in Section 3 of this report.

2. BEST MANAGEMENT PRACTICES

2.1 Public Education

The Town of Farmington publishes a bi-annual newsletter entitled “Farmington Town Letter”, which is distributed to all postal customers, i.e., residences and businesses with mailing addresses within the Town. It is also posted on the Town’s website. The articles published in the newsletter during 2016 were notifications and general information for the public.

The April issue included notices for “Pitch In at the Town-Wide Clean-Up” and a “Household Hazardous Waste Collection” both held on April 30, 2016. These two events are further detailed in Section 2.2. The Newsletter also included information on purchasing composting bins through Enviro World and the Town of Farmington. The second issue was published in the Fall/Winter, which included a notice for a “Bulky Waste Collection” the week of October 17 2016. It also included information regarding where unacceptable items such as paint, batteries, hazardous waste, and electronics can be recycled, proper disposal of Fats/Oils/Grease (FOG), and the maintenance of a year-round “Med-Return” drug collection box located in the lobby of the Police Department.

In addition to the *Farmington Town Letter*, the Town has a Green Efforts Committee that is tasked with promoting the value and protection of wetlands, the environment, natural resources, energy efficiency, clean energy sources, stormwater, and recycling. The Committee consists of residents, students, Town staff, Board of Education members, as well as Town Council members, tasked with 1) Increasing public awareness and municipal participation in “green” efforts including energy conservation, renewable resources, recycling, and other environmentally friendly practices, 2) Establish a leadership role in the community in promoting environmentally friendly practices in town, 3) Explore ways to fund “green” initiatives, 4) Participate in the Connecticut Clean Energy Fund’s 20% x 2010 Clean Energy campaign and serve as the Energy Task Force as required for participation in the Environmental Protection Agency’s (New England) Community Energy Challenge, 5) To make recommendations to the Town Council and Board of Education for cost effective ways to reduce the Town’s reliance on traditional energy resources, and 6) Find ways to facilitate private initiatives. In 2017 the Town of Farmington will be rolling out a new website and additional information will be posted to the webpage bringing awareness to the effects of stormwater pollution.

The Town of Farmington Board of Education provides science education for students from Elementary School through High School, studying many aspects related to environmental problems, weather, and interactions between land and water. Elementary students observe

weather patterns, collect and analyze data, and collaborate to make decisions. In addition, students learn about organisms, study models of land and water habitats, and what plants and animals are needed to survive. The Middle School students are taught how landforms are the result of the interaction of constructive and destructive forces over time, and how science and technology affect the quality of our lives. High School students learn the science behind environmental problems and issues facing society.

The Farmington River Watershed Association (FRWA) is a non-profit organization that provides information and programs to educate the public regarding the importance of the Farmington River Watershed and how it plays a vital role to our drinking water supply.

As a member Town, we provide financial funding to the FRWA to assist with their education efforts, programs, and studies of the watershed. The FRWA provides education on how to reduce contamination to the watershed, programs including cleanup days and educational seminars such as Green Lawn/Natural Lawn Care and Stormwater Management, and studies such as water quality and aquatic sampling to measure the state of the river and any changes to the quality and function of the river. The FRWA is also in the process of developing a Watershed Based Plan for the Pequabuck River, which Farmington also contributes to through a large watershed.

Contact continues to be maintained with other organizations involved with the Town's stormwater program. These include the Department of Energy and Environmental Protection (CTDEEP), the Department of Transportation (CTDOT), the Pequabuck River Watershed Association, and the University of Connecticut education program known as the Nonpoint Education for Municipal Officials program.

2.2 Public Participation

The Town of Farmington has collaborated with other local non-profit organizations in an attempt to involve the public in environmentally friendly projects. While the events were planned to perform certain tasks, one of the key goals was to involve the public to educate them of the surrounding environment and the possible negative effects of their everyday lifestyles. It is the hope of these organizations that the public becomes aware of the environment and works to change their ways and encourage them to educate their friends and families.

On April 30, 2016 the Town of Farmington Green Efforts Committee sponsored a "Pitch In at the Town-Wide Clean-Up" day. The event is sponsored each year by local organizations and businesses in an effort to clean many areas around Town, promote the importance of protecting the environment, and educate the public of the importance of being environmentally conscience.

Organizations including local school groups, Cub Scouts, Civic Organizations, families, and businesses took part in the Annual Heaviest Haul Competition. Awards were presented to School/Youth Groups, individual families, businesses and civic organizations for the most trash collected. A total of 5,000 pounds of garbage was collected by volunteers who picked up trash and litter from throughout the Town. As noted above, the public was made aware of these activities through the “Farmington Town Letter”, Town of Farmington website, several Farmington Patch online newspaper articles, the Town’s Everbridge notification system, and notices distributed to school age children. The Everbridge system provides an opportunity for residents and business owners to voluntarily take part in an email distribution list to be notified of emergencies as well as local community and government issues and events.

Also on May 30, 2016, the Town of Farmington Conservation Commission and Green Efforts Committee held a “Household Hazardous Waste Collection” day. The event was coordinated through a coalition of Towns from Farmington, Simsbury, Avon, Canton, and Granby. The event included electronics & oil recycling in addition to household hazardous waste collection. The event resulted in the collection of waste from 499 Farmington households (714 total households from surrounding towns), and collected 60cy of electronics, 500gal of waste oil, and 1,803lbs of batteries. The public was made aware of these activities through the “Farmington Town Letter”, Town of Farmington website, several Farmington Patch online newspaper articles, as well as through the Town’s Everbridge notification system.

On September 24, 2016 the FRWA and several local Businesses sponsored a Farmington River Clean-Up Day. This effort involved the public in cleaning up the banks of the Farmington River. The events are usually attended by adults, youth organizations, and school children which helps educate them about the effects of pollution and the importance of the keeping the environment clean

2.3 Illicit Discharge Detection & Elimination

The mapping of municipal storm sewer outfalls within the Town of Farmington has been completed, and continues to be updated as necessary. The Town of Farmington continues to map all known public, institutional and private storm sewers and outfalls as they are installed or modified. This mapping is used to assist with determining any non-point or point source discharges that directly affect surface water quality and discharges conveyed by storm sewers or other types of stormwater conveyance. The Town relies heavily on the use of the State Building Code and the Town Planning review process to establish and enforce a required local review and approval of new storm sewer connections to municipal, institutional, private and state-owned storm sewers, and the construction of new privately owned storm sewer outfalls.

In addition, Town Engineering Staff are responsible for “markouts” through the “Call Before You Dig” (CBYD) program. Prior to any excavation, Contractors are required to call the CBYD Call Center, with a description of the type of work and location. Our Engineering Staff is responsible to markout the locations of all existing storm and sanitary sewers. As part of the markouts, should any of the proposed work involve connections to the storm and/or sanitary systems, the Contractors are contacted to verify the types of connection are legal as well as the appropriate permits have been obtained.

Sampling results are also reviewed to determine the potential for illicit discharges. Should any sampling produce abnormal results, additional sampling and/or inspection is performed to determine the potential origin of the problem.

An Illicit Discharge and Connection Ordinance was approved by the Farmington Town Council, on July 12, 2011. The Ordinance was approved as part of a Public Hearing that was held to review and discuss the proposed ordinance. The ordinance was developed to forbid illicit discharges or connections, and gives the Town authority to inspect any possible illicit discharge or connections, and allows for the Town to issue citations and fines if deemed necessary.

2.4 Construction Site Runoff

Article IV, Section 11, of the Farmington Regulations for Zoning, requires the submission and approval of an erosion and sediment control plan whenever more than one half acre of land will be disturbed. The regulations also reference the *Connecticut Guidelines for Soil Erosion and Sediment Control*, as amended. In addition, the regulations establish enforceable performance standards for construction activities that do not require the submission of an erosion and sediment control plan, including projects disturbing less than one half acre of land. These regulatory requirements continue to be regularly monitored and strictly enforced.

On November 26, 2007 the Town had updated the Farmington Inland Wetland and Watercourse Agency regulations that now require all landowners to obtain a permit for activities listed in Section 2.1 of the permit, conducted within 150ft of a designated wetland or watercourse.

In 2012 the Town of Farmington’s combined Plan & Zoning/Inland Wetlands & Watercourse Commission, was separated into two commissions, the “Town Plan and Zoning Commission” and the “Conservation and Inland Wetlands Commission” (CIWC). The CIWC is responsible for promoting the development and conservation of natural and water resources. The Commission is also responsible for reviewing applications involving activities within wetlands or watercourses, and activities conducted within 150ft of a designated wetland or watercourse. The Commission also reviews land use applications to provide advisory recommendations to the

Town Plan and Zoning Commission on environmental and conservation related elements of these applications. The Commission is also responsible for the permitting of all regulated activities conducted upon or upland of an inland wetland or watercourse within the Town of Farmington, as those terms are defined in the Inland Wetlands and Watercourses Act of the State of Connecticut and in the Farmington Regulations for Inland Wetlands.

In conjunction with Town Plan and Zoning Commission and CIWC applications, the Public Works Department reviews plans for conformance with local regulations. The Engineering Division of the Public Works Department reviews applications for erosion control measures, On-Site Waste Control, and stormwater design. Plans were also reviewed for methods of Low Impact Development Practices and conformance with the CTDEEP Stormwater Quality Manual. Methods such as infiltration, deep sumps, hoods, ponds, and Oil/Particle Separators are utilized as practical, to ensure the water quality and recharge volumes are achieved. Applicants are notified of potential permits that need to be obtained such as the CTDEEP “General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities”.

As a condition of the issuance of all new construction permit applications, the following Public Works Divisions (Planning, Engineering, and Building), are required to sign off on all new construction permits. As a condition of this signoff, building permits are not issued until the required permits have been obtained, erosion control measures are installed, inspected, and approved by the Town’s Planning Division. A list of permits is maintained, and regular inspections are made throughout construction and prior to storm events. Developers and/or Contractors are notified whether regular maintenance or additional improvements are required. In addition to these inspections, the Building Division works closely with the Planning Division to identify any concerns they may have observed during their inspections.

2.5 Post Construction Runoff Control

A post construction best management strategy has been developed and is being implemented for all new Town of Farmington Plan & Zoning Commission and CIWC approved construction projects. It is based on the enforcement of Section 25 of Article IV of the existing Farmington Regulations for Zoning. It has been determined that these regulations are sufficient and no revisions or new ordinances are planned.

Where post construction maintenance of storm sewer systems by private owner(s) is necessary, the Farmington Plan & Zoning Commission or CIWC requires the submission of Storm Drainage Operation and Maintenance Plans as a condition of the approval process, to ensure the systems function as designed indefinitely with respect to the stormwater flow and quality. In many cases, these programs are included in the Homeowners Association Documents and on approved plans.

A few sample Storm Drainage Operation and Maintenance Plans, typical of approved projects, have been included in Attachment C. The Town has also developed a “Declaration of Covenants for Maintenance of Storm and Surface Water Facility” document, which is signed by the Town and the property owners as part of the project approval process. The document requires the owners to maintain the stormwater management system as approved by the Town. It also grants the Town the right to access the property for inspection purposes, to insure that the system is being properly maintained and is continuing to perform in an adequate manner. Should the owners fail to maintain or correct any deficiencies, the Town is authorized to enter the property and make the required maintenance or improvements, and assess the property owner for all costs associated with the work. Prior to any larger repairs or re-construction of these improvements, the plans will be reviewed by Town staff, appropriate permits obtained, and the necessary erosion control installed.

In 2007 the Town of Farmington had created an Aquifer Protection Commission (APC). The Town Plan & Zoning Commission acts as the governing board for the APC. The CTDEEP is responsible for establishing critical water supply aquifers and to protect them from pollution by managing land use. Once these areas were designated by CTDEEP, the Town of Farmington through the APC adopted these critical areas, incorporated them into the Town Zoning Maps, and regulates them through the Towns Aquifer Protection Regulations. The APC is tasked with administering and enforcing these regulations. New regulated activities such as storage of hazardous materials, metal processing, repair and maintenance of internal combustion engines, and non-domestic waste water discharges to other than public sanitary sewers are all prohibited. Existing regulated activities can continue only if properly permitted or registered through the Town. As a condition of these approvals, owners/operators are required to adhere to particular Best Management Practices. The Town has been actively monitoring these uses and through the issuance of Notice of Violations can suspend or revoke registrations and permits. The CTDEEP and Town of Farmington have recently expanded the area to encompass additional well fields. The Town works closely with the Connecticut Water Company during the permitting review process for new construction, to ensure the Aquifers are being protected.

2.6 Good Housekeeping

Stormwater training of Town employees is through on-the-job instruction and training by supervisors, consultants, and through employee’s attending University of Connecticut Technology Transfer training programs. The primary focus of the training continues to be the cross training of existing employees within the divisions that make up the Department of Public Works, aimed at ensuring a broader understanding of the roles of each member of the staff assigned specific stormwater management responsibilities, and how those activities are

integrated to minimize the Town's impact to the environment and to meet the obligations of the stormwater general permit.

The practice of sweeping paved streets as soon as practical after snowmelt has been implemented. The Town had ceased the use of the typical sand/salt mixture as ice control during the 2006/2007 winter season, and now utilizes a commercially available treated salt for deicing operations. This operational change has significantly reduced the volume of sand that is collected by street sweeping and catch basin cleaning. The elimination of sand has also improved the environmental health of the small and medium sized streams and ponds within the Town of Farmington, which no longer develop abnormal bottom deposits that were typical when sand was utilized. CTDOT adopted a similar program in 2005 opting to use a liquid mixture in lieu of sand and salt. In addition to sweeping as soon as practical after the snowmelt, additional sweeping is performed in our downtown centers of Unionville and Farmington as needed. This is performed in conjunction with local planned events throughout the year. Additional sweeping is performed in areas of construction, as needed, by either Town or private forces depending on the construction responsibility.

Each year the Town employs a sub-contractor to clean a significant number of Town-Owned catch basins throughout Town. During the 2016-2017 FY, a total of 537 Town owned catch basin structures were cleaned. The evaluation and cleaning of stormwater structures and the evaluation and prioritization of the need to upgrade and repair stormwater structures, have always been routine activities within the Department of Public Works. These activities will be continued and the effectiveness of the effort can be expected to improve as a result of the focus created by the stormwater general permit and stormwater training. The elimination of the use of sand for skid control is a manifestation of this focus.

The Town has had a town-wide leaf collection program for many years. Leaves are picked up curbside by the Town in late fall, providing residents a minimum of two pickups. Some of the leaves are composted at the Town's composting facility, located at the former Tunxis Mead Landfill, where they are offered for free to Town residents. The remaining leaves are sent to a local company where the leaves are composted to create topsoil for sale to the public.

The Town is currently in the process of a \$57.5 million dollar upgrade to the Town of Farmington Water Pollution Control Facility. The Town currently serves the majority of homes and businesses in Farmington, as well as portions of Avon, Burlington, and Canton. The comprehensive upgrade will increase the facility's capacity for a useful life of 25 years, repair and replace the aging infrastructure, improve energy efficiency, and enable the Town to meet

current State of Connecticut DEEP requirements as they relate to public health and Farmington River water quality.

2.7 Monitoring

The monitoring of six stormwater outfalls was planned and completed during the fall of 2016. Due to the severe drought, the number of qualifying sampling events was minimal. The analytical results are presented on the laboratory examination reports and on the CTDEEP Stormwater Monitoring Report Forms contained in Attachment A. The sample site locations are identified on maps presented in Attachment B. The individual sample analysis results can be correlated with the mapped monitoring site locations by reference to the following table. The sampling data is presented in the same order as the site location identifiers listed below.

Sample R-39 10-26-16 (Lydia Way)

- Laboratory Number 16111528-001
- Repeat sampling from 2015
- Collects surface runoff from neighboring residential areas
- Discharges to the Farmington River Basin

Sample R-40 10-26-16 (New Britain Avenue)

- Laboratory Number 16111528-002
- New sampling location
- Collects surface runoff from neighboring residential and commercial areas.
- Discharges to the Farmington River Basin

Sample R-41 10-26-16 (Woodruff Road)

- Laboratory Number 16111528-003
- New sampling location
- Collects surface runoff from neighboring residential areas. Drains to Sample location R-42.
- Discharges to the Trout Brook Basin

Sample R-42 10-26-16 (Woodpond Road)

- Laboratory Number 16111528-004
- New sampling location
- Collects surface runoff from neighboring residential areas. Sample R-41 drains to this location.
- Discharges to the Trout Brook Basin

Sample R-43 10-26-16 (Woodpond Road)

- Laboratory Number 16111528-005

- New sampling location
- Collects surface runoff from neighboring residential areas
- Discharges to the Trout Brook Basin

Sample C-9 10-26-16 (New Britain Avenue)

- Laboratory Number 16111528-006
- New sampling location
- Collects surface runoff from neighboring residential and commercial areas
- Discharges to the Farmington River Basin

All six of the 2016 stormwater samples were collected during a rainstorm event that commenced during the 1100hr on the afternoon of November 15, 2016. The samples were collected from the identified outfalls between 1230hrs and 1340hrs, commencing after it was determined that sufficient flow would be discharging from the selected outfalls, based on data transmitted from a local rainfall monitoring station. The total rainfall produced by the storm was measured at 0.73 inches. The event was a qualifying event as the preceding rainfall event occurred on October 26, 2016.

The following is a summary of the test results for each of the six sample locations. The sample results were compared to the CTDEEP Water Quality Standards, as well as the benchmarks identified in the CTDEEP Industrial Stormwater Permit.

Outlet R-39 is a repeat sampling location from 2015, and is located in the catch basin at the south end of the cul-de-sac at Lydia Way. The drainage area is relatively small, and is comprised of Residential properties zoned R-20 (20,000 ft²). The catch basin is connected to a storm drainage system discharging to a retention basin that eventually flows into the Farmington River Basin. The storm drainage system was designed with offline infiltration systems along the route at each catch basin to collect the first one inch of rainfall. At the time of sampling, there was no flow at the outlet, and therefore sampling was conducted at the last catch basin in the system. Surface flow from the upland contributing catch basins was flowing into the catch basin sample location. The decision to resample this area was due to the 2015 sampling results indicating an elevated level of Oil & Grease. The 2016 results have indicated a significant reduction in Oil & Grease, which confirms our previous findings of a possible sampling anomaly. The area is serviced with both public water and sanitary sewer installed in conjunction with the development. The sampling results did not indicate any levels of concern. All sampling parameters were within conventional levels.

Outlet R-40 is a new sampling location that discharges to the Farmington River Basin along the north side of New Britain Avenue, to the rear of 107 and 115 New Britain Avenue. The drainage

area is comprised of Residential properties zoned R-9 (9,000 ft²) through R-30 (30,000 ft²), and includes properties zoned RDM (Residential Multi Family) and C1 (Commercial Zoning). The outlet discharges into a swale approximately 150lf from the Farmington River. Test results indicated a slightly elevated level of Escherichia Coliform, however nothing to be concerned about at this time. Since the entire drainage area is serviced with both public water and sanitary sewer, it is rather unlikely the coliform is attributed to a human component. As indicated earlier, this area has been experiencing a below average level of precipitation during the preceding months. The reduction in precipitation could have played a role in the elevated level of Escherichia Coliform. All other sampling parameters were within conventional levels.

Outlet R-41 is a new sampling location that discharges to the Trout Brook River Basin along the east side of Woodruff Road, south of 106 Woodruff Road. The drainage area is comprised of Residential properties zoned R-20 (20,000 ft²). The outlet discharges into a swale which meanders through private residential properties and discharges to outlet sampling location R-42. Test results indicated an elevated level of Escherichia Coliform. The entire drainage area is serviced with both individual private wells and sanitary sewer. The drainage area includes a large system of wetlands in and around the Route 9/Interstate 84 interchange, which could be a result of the elevated levels, however the Escherichia Coliform readings at outlet sampling location R-42 are well within allowable standards. Further testing may be required to determine if it was a possible sampling anomaly. All other sampling parameters were within conventional levels.

Outlet R-42 is a new sampling location that discharges to the Trout Brook River Basin along the east side of Woodpond Road, in front of 88 Woodpond Road. The drainage area is comprised of Residential properties zoned R-20 (20,000 ft²). The outlet discharges into a swale approximately 350lf from Woodridge Lake. Sampling outlet location R-41 drains to this location. The majority of the drainage area is serviced with both individual private wells and sanitary sewer. All sampling parameters were within conventional levels.

Outlet R-43 is a new sampling location that discharges to the Trout Brook River Basin along the east side of Woodpond Road, to the rear of 92 Woodpond Road. The drainage area is comprised of Residential properties zoned R-20 (20,000 ft²). The outlet discharges approximately 10lf from Woodridge Lake. Test results indicated an elevated level of Escherichia Coliform. The entire drainage area is serviced with both individual private wells and sanitary sewer. As indicated earlier, this area has been experiencing a below average level of precipitation during the preceding months. The lack of precipitation could have played a role in the elevated level of Escherichia Coliform, however further testing may be required to determine if it was a possible sampling anomaly. All other sampling parameters were within conventional levels.

Outlet C-9 is a new sampling location, and discharges to the Farmington River Basin, to the rear of 15 New Britain Avenue. The drainage area is comprised of mostly Commercial Properties with large impervious areas and very little “green space”. The drainage discharges approximately 50 feet upland of the Farmington River. The sampling results did not indicate any levels of concern. All sampling parameters were within conventional levels. The area is serviced with both public water and sanitary sewer.

The Town is currently reviewing the possibility of follow-up testing the sample locations with elevated levels of Escherichia Coliform (R-41, R-42, and R-43), to narrow down whether the cause could be human or animal based. The Town has been working closely with the Woodpond Homeowners Association regarding the quality of water entering Woodridge Lake. The Association has been working with their own consultants to develop a maintenance plan for the Lake area. The Town will review the sampling as well as potential additional future sampling of this area with the Association to develop a remediation plan if feasible.

3. CERTIFICATION

I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that a false statement made in this document or its attachments may be punishable as a criminal offense, in accordance with Section 22a-6 of the Connecticut General Statutes, pursuant to Section 53a-157b of the Connecticut General Statutes, and in accordance with any other applicable statute.

A handwritten signature in blue ink, appearing to read "Russell M. Arnold, Jr.", with a stylized flourish at the end.

Russell M. Arnold, Jr., P.E.
Director/Town Engineer
Department of Public Works

ATTACHMENT A
Stormwater Monitoring Report Forms
and
Laboratory Data Results



**General Permit for the Discharge of Stormwater from Small
Municipal Separate Storm Sewer Systems**

Stormwater Monitoring Report Form

PERMITTEE INFORMATION

Town: _____ Town of Farmington

Mailing Address: 1 Monteith Drive, Farmington CT 06032

Contact Person: Russell M. Arnold, Jr. P.E. Title: DPW Director Phone: 860-675-2305

Permit Registration #GSM000090

SAMPLING INFORMATION

Discharge Location (Lat/Long or other description): (2016) R39: Lat 41-45-51.11, Long 72-53-16.51

Sample taken from CB at the south end of the cul-de-sac, prior to the outlet

Please circle the appropriate area description: Industrial, Commercial, or Residential

Receiving Water (name, basin): Farmington River, 4300-00-4+R14

Time of Start of Discharge: 1100hrs

Date/Time Collected: November 15, 2016/1340hrs Water Temperature: 50°F

Person Collecting Sample: Bruce Cyr

Storm Magnitude (inches): 0.73 Storm Duration (hours): 8 (approx)

Date of Previous Storm Event: October 26, 2016

MONITORING RESULTS

Parameter	Method	Results (units)	Laboratory
Sample pH	SM19 4500H+B	6.95	Tunxis Laboratories #16111528-001
Rain pH	SM19 4500H+B	5.57	Tunxis Laboratories #16111528-001
Hardness	SM 2340 B	12.7 mg/L CaO3	Tunxis Laboratories #16111528-001
Conductivity	SM 2510B	41 micromhos/cm	Tunxis Laboratories #16111528-001
Oil & Grease	EPA 1664	2.4 mg/L	Tunxis Laboratories #16111528-001
COD	EPA 410.4	25 mg/L	Tunxis Laboratories #16111528-001
Turbidity	EPA 180.1	9.6 NTU	Tunxis Laboratories #16111528-001
TSS	SM19 2540D	9.5 mg/L	Tunxis Laboratories #16111528-001
TP	EPA 200.7	0.069 mg/L as P	Tunxis Laboratories #16111528-001
Ammonia	SM4500NH3D	<0.83 mg/L	Tunxis Laboratories #16111528-001
TKN	SM4500NH3D	1.6 mg/L	Tunxis Laboratories #16111528-001
NO ₃ +NO ₂	EPA 300.0	<0.46 mg/L	Tunxis Laboratories #16111528-001
E. coli	SM 92223 B	<50 per 100 mL	Tunxis Laboratories #16111528-001

STATEMENT OF ACKNOWLEDGMENT

I certify that the data reported on this document were prepared under my direction or supervision in accordance with the MS4 General Permit. The information submitted is, to the best of my knowledge and belief, true, accurate and complete.

Authorized Official: Russell M. Arnold, Jr., P.E., Director of Public Works/Town Engineer

Signature: _____ Date: December 28, 2016



General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems

Stormwater Monitoring Report Form

PERMITTEE INFORMATION

Town:	Town of Farmington
Mailing Address:	1 Monteith Drive, Farmington CT 06032
Contact Person:	Russell M. Arnold, Jr. P.E. Title: DPW Director Phone: 860-675-2305
Permit Registration #	GSM000090

SAMPLING INFORMATION

Discharge Location (Lat/Long or other description):	(2016) R40: Lat 41-45-16.82, Long 72-52-55.54		
Outlet pipe to the rear of	107/115 New Britain Avenue (UNVL)		
Please circle the appropriate area description: Industrial, Commercial, or	Residential		
Receiving Water (name, basin):	Farmington River, 4300-00-4+R16		
Time of Start of Discharge:	1100hrs		
Date/Time Collected:	November 15, 2016/1310hrs	Water Temperature:	50°F
Person Collecting Sample:	Bruce Cyr		
Storm Magnitude (inches):	0.73	Storm Duration (hours):	8 (approx)
Date of Previous Storm Event:	October 26, 2016		

MONITORING RESULTS

Parameter	Method	Results (units)	Laboratory
Sample pH	SM19 4500H+B	6.4	Tunxis Laboratories #16111528-002
Rain pH	SM19 4500H+B	5.57	Tunxis Laboratories #16111528-002
Hardness	SM 2340 B	6.9 mg/L CaO3	Tunxis Laboratories #16111528-002
Conductivity	SM 2510B	19 micromhos/cm	Tunxis Laboratories #16111528-002
Oil & Grease	EPA 1664	2.6 mg/L	Tunxis Laboratories #16111528-002
COD	EPA 410.4	67 mg/L	Tunxis Laboratories #16111528-002
Turbidity	EPA 180.1	30 NTU	Tunxis Laboratories #16111528-002
TSS	SM19 2540D	59 mg/L	Tunxis Laboratories #16111528-002
TP	EPA 200.7	0.249 mg/L as P	Tunxis Laboratories #16111528-002
Ammonia	SM4500NH3D	1.04 mg/L	Tunxis Laboratories #16111528-002
TKN	SM4500NH3D	2.7 mg/L	Tunxis Laboratories #16111528-002
NO ₃ +NO ₂	EPA 300.0	<0.46 mg/L	Tunxis Laboratories #16111528-002
E. coli	SM 92223 B	540 per 100 mL	Tunxis Laboratories #16111528-002

STATEMENT OF ACKNOWLEDGMENT

I certify that the data reported on this document were prepared under my direction or supervision in accordance with the MS4 General Permit. The information submitted is, to the best of my knowledge and belief, true, accurate and complete.	
Authorized Official:	Russell M. Arnold, Jr., P.E., Director of Public Works/Town Engineer
Signature:	Date: December 28, 2016



General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems

Stormwater Monitoring Report Form

PERMITTEE INFORMATION

Town:	Town of Farmington
Mailing Address:	1 Monteith Drive, Farmington CT 06032
Contact Person:	Russell M. Arnold, Jr. P.E. Title: DPW Director Phone: 860-675-2305
Permit Registration #	GSM000090

SAMPLING INFORMATION

Discharge Location (Lat/Long or other description):	(2016) R41: Lat 41-43-52.43, Long 72-46-07.50		
Outlet pipe on the east side of Woodruff Road, south of #106 Woodruff Road			
Please circle the appropriate area description: Industrial, Commercial, or	Residential		
Receiving Water (name, basin):	Trout Brook, 4403-01-1		
Time of Start of Discharge:	1100hrs		
Date/Time Collected:	November 15, 2016/1240hrs	Water Temperature:	50°F
Person Collecting Sample:	Bruce Cyr		
Storm Magnitude (inches):	0.73	Storm Duration (hours):	8 (approx)
Date of Previous Storm Event:	October 26, 2016		

MONITORING RESULTS

Parameter	Method	Results (units)	Laboratory
Sample pH	SM19 4500H+B	6.72	Tunxis Laboratories #16111528-003
Rain pH	SM19 4500H+B	5.57	Tunxis Laboratories #16111528-003
Hardness	SM 2340 B	17.8 mg/L CaO3	Tunxis Laboratories #16111528-003
Conductivity	SM 2510B	96 micromhos/cm	Tunxis Laboratories #16111528-003
Oil & Grease	EPA 1664	3.3 mg/L	Tunxis Laboratories #16111528-003
COD	EPA 410.4	45 mg/L	Tunxis Laboratories #16111528-003
Turbidity	EPA 180.1	15 NTU	Tunxis Laboratories #16111528-003
TSS	SM19 2540D	34 mg/L	Tunxis Laboratories #16111528-003
TP	EPA 200.7	0.170 mg/L as P	Tunxis Laboratories #16111528-003
Ammonia	SM4500NH3D	0.89 mg/L	Tunxis Laboratories #16111528-003
TKN	SM4500NH3D	1.7 mg/L	Tunxis Laboratories #16111528-003
NO ₃ +NO ₂	EPA 300.0	<0.46 mg/L	Tunxis Laboratories #16111528-003
E. coli	SM 92223 B	>121000 per 100 ml	Tunxis Laboratories #16111528-003

STATEMENT OF ACKNOWLEDGMENT

I certify that the data reported on this document were prepared under my direction or supervision in accordance with the MS4 General Permit. The information submitted is, to the best of my knowledge and belief, true, accurate and complete.	
Authorized Official:	Russell M. Arnold, Jr., P.E., Director of Public Works/Town Engineer
Signature:	Date: December 28, 2016



General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems

Stormwater Monitoring Report Form

PERMITTEE INFORMATION

Town: _____	Town of Farmington
Mailing Address: <u>1 Monteith Drive, Farmington CT 06032</u>	
Contact Person: <u>Russell M. Arnold, Jr. P.E.</u> Title: <u>DPW Director</u> Phone: <u>860-675-2305</u>	
Permit Registration # <u>GSM000090</u>	

SAMPLING INFORMATION

Discharge Location (Lat/Long or other description): <u>(2016) R42: Lat 41-43-56.54, Long 72-45-53.74</u>	
Outlet pipe along the east side of Woodpond Road in front of #88 Woodpond Road	
Please circle the appropriate area description: Industrial, Commercial, or <u>Residential</u>	
Receiving Water (name, basin): <u>Trout Brook, 4403-01-1</u>	
Time of Start of Discharge: <u>1100hrs</u>	
Date/Time Collected: <u>November 15, 2016/1230hrs</u>	Water Temperature: <u>50°F</u>
Person Collecting Sample: <u>Bruce Cyr</u>	
Storm Magnitude (inches): <u>0.73</u>	Storm Duration (hours): <u>8 (approx)</u>
Date of Previous Storm Event: <u>October 26, 2016</u>	

MONITORING RESULTS

Parameter	Method	Results (units)	Laboratory
Sample pH	SM19 4500H+B	6.31	Tunxis Laboratories #16111528-004
Rain pH	SM19 4500H+B	5.57	Tunxis Laboratories #16111528-004
Hardness	SM 2340 B	5.0 mg/L CaO3	Tunxis Laboratories #16111528-004
Conductivity	SM 2510B	30 micromhos/cm	Tunxis Laboratories #16111528-004
Oil & Grease	EPA 1664	2.0 mg/L	Tunxis Laboratories #16111528-004
COD	EPA 410.4	54 mg/L	Tunxis Laboratories #16111528-004
Turbidity	EPA 180.1	6.8 NTU	Tunxis Laboratories #16111528-004
TSS	SM19 2540D	10.5 mg/L	Tunxis Laboratories #16111528-004
TP	EPA 200.7	0.224 mg/L as P	Tunxis Laboratories #16111528-004
Ammonia	SM4500NH3D	<0.83 mg/L	Tunxis Laboratories #16111528-004
TKN	SM4500NH3D	2.6 mg/L	Tunxis Laboratories #16111528-004
NO ₃ +NO ₂	EPA 300.0	<0.46 mg/L	Tunxis Laboratories #16111528-004
E. coli	SM 92223 B	50 per 100 mL	Tunxis Laboratories #16111528-004

STATEMENT OF ACKNOWLEDGMENT

I certify that the data reported on this document were prepared under my direction or supervision in accordance with the MS4 General Permit. The information submitted is, to the best of my knowledge and belief, true, accurate and complete.	
Authorized Official: _____	Russell M. Arnold, Jr., P.E., Director of Public Works/Town Engineer
Signature: _____	Date: <u>December 28, 2016</u>



General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems

Stormwater Monitoring Report Form

PERMITTEE INFORMATION

Town:	Town of Farmington
Mailing Address:	1 Monteith Drive, Farmington CT 06032
Contact Person:	Russell M. Arnold, Jr. P.E. Title: DPW Director Phone: 860-675-2305
Permit Registration #	GSM000090

SAMPLING INFORMATION

Discharge Location (Lat/Long or other description):	(2016) R43: Lat 41-44-00.95, Long 72-45-55.35		
Outlet pipe along the east side of Woodpond Road to the rear of #92 Woodpond Road			
Please circle the appropriate area description: Industrial, Commercial, or Residential	Residential		
Receiving Water (name, basin):	Trout Brook, 4403-00-1-L1		
Time of Start of Discharge:	1100hrs		
Date/Time Collected:	November 15, 2016/1237hrs	Water Temperature:	50°F
Person Collecting Sample:	Bruce Cyr		
Storm Magnitude (inches):	0.73	Storm Duration (hours):	8 (approx)
Date of Previous Storm Event:	October 26, 2016		

MONITORING RESULTS

Parameter	Method	Results (units)	Laboratory
Sample pH	SM19 4500H+B	6.58	Tunxis Laboratories #16111528-005
Rain pH	SM19 4500H+B	5.57	Tunxis Laboratories #16111528-005
Hardness	SM 2340 B	10.7 mg/L CaO3	Tunxis Laboratories #16111528-005
Conductivity	SM 2510B	25 micromhos/cm	Tunxis Laboratories #16111528-005
Oil & Grease	EPA 1664	2.4 mg/L	Tunxis Laboratories #16111528-005
COD	EPA 410.4	67 mg/L	Tunxis Laboratories #16111528-005
Turbidity	EPA 180.1	6.5 NTU	Tunxis Laboratories #16111528-005
TSS	SM19 2540D	74.0 mg/L	Tunxis Laboratories #16111528-005
TP	EPA 200.7	0.292 mg/L as P	Tunxis Laboratories #16111528-005
Ammonia	SM4500NH3D	<0.83 mg/L	Tunxis Laboratories #16111528-005
TKN	SM4500NH3D	<1.3 mg/L	Tunxis Laboratories #16111528-005
NO ₃ +NO ₂	EPA 300.0	<0.46 mg/L	Tunxis Laboratories #16111528-005
E. coli	SM 92223 B	>121000 per 100 mL	Tunxis Laboratories #16111528-005

STATEMENT OF ACKNOWLEDGMENT

I certify that the data reported on this document were prepared under my direction or supervision in accordance with the MS4 General Permit. The information submitted is, to the best of my knowledge and belief, true, accurate and complete.	
Authorized Official:	Russell M. Arnold, Jr., P.E., Director of Public Works/Town Engineer
Signature:	Date: December 28, 2016



**General Permit for the Discharge of Stormwater from Small
Municipal Separate Storm Sewer Systems**

Stormwater Monitoring Report Form

PERMITTEE INFORMATION

Town: _____ Town of Farmington

Mailing Address: 1 Monteith Drive, Farmington CT 06032

Contact Person: Russell M. Arnold, Jr. P.E. Title: DPW Director Phone: 860-675-2305

Permit Registration #GSM000090

SAMPLING INFORMATION

Discharge Location (Lat/Long or other description): (2016) C9: Lat 41-45-19.72, Long 72-53-09.72

Outlet pipe to the rear of 15 New Britain Avenue (UNVL)

Please circle the appropriate area description: Industrial, Commercial, or Residential

Receiving Water (name, basin): Farmington River, 4300-00-4+R15

Time of Start of Discharge: 1100hrs

Date/Time Collected: November 15, 2016/1320hrs Water Temperature: 50°F

Person Collecting Sample: Bruce Cyr/Robert Wadowski

Storm Magnitude (inches): 0.73 Storm Duration (hours): 8 (approx)

Date of Previous Storm Event: October 26, 2016

MONITORING RESULTS

Parameter	Method	Results (units)	Laboratory
Sample pH	SM19 4500H+B	6.9	Tunxis Laboratories #16111528-006
Rain pH	SM19 4500H+B	5.57	Tunxis Laboratories #16111528-006
Hardness	SM 2340 B	15.1 mg/L CaO3	Tunxis Laboratories #16111528-006
Conductivity	SM 2510B	50 micromhos/cm	Tunxis Laboratories #16111528-006
Oil & Grease	EPA 1664	<2.1 mg/L	Tunxis Laboratories #16111528-006
COD	EPA 410.4	63 mg/L	Tunxis Laboratories #16111528-006
Turbidity	EPA 180.1	44 NTU	Tunxis Laboratories #16111528-006
TSS	SM19 2540D	48.0 mg/L	Tunxis Laboratories #16111528-006
TP	EPA 200.7	0.247 mg/L as P	Tunxis Laboratories #16111528-006
Ammonia	SM4500NH3D	<0.83 mg/L	Tunxis Laboratories #16111528-006
TKN	SM4500NH3D	2.0 mg/L	Tunxis Laboratories #16111528-006
NO ₃ +NO ₂	EPA 300.0	<0.46 mg/L	Tunxis Laboratories #16111528-006
E. coli	SM 92223 B	8400 MPN/100 mL	Tunxis Laboratories #16111528-006

STATEMENT OF ACKNOWLEDGMENT

I certify that the data reported on this document were prepared under my direction or supervision in accordance with the MS4 General Permit. The information submitted is, to the best of my knowledge and belief, true, accurate and complete.

Authorized Official: Russell M. Arnold, Jr., P.E., Director of Public Works/Town Engineer

Signature: Date: December 28, 2016

TUNXIS | Laboratories, LLC

100 Northwest Drive, Plainville, Connecticut 06082
(860) 793-8868 Fax: (860) 793-8867

Alan G. Jacobs - Director CT Laboratory ID No. PH-0513

REPORT ON LABORATORY EXAMINATIONS

To Client: Town of Farmington, Engineering
1 Monteith Drive
Farmington, CT 06032

Report No: 16111528
Report Date: Monday, November 28, 2016
ATTN: Bruce Cyr
Collected By: Bruce Cyr

Source: Town of Farmington, Farmington, CT

Lab#: 16111528-001 Sample ID: Stormwater Sample

Collect Date: 11/15/2016

Client Sample ID#: R39-11-15-16

Collect Time: 13:40

Sample Matrix: WasteWater

Received Date: 11/15/2016

Test	Result	Units	Analyst	Analysis Date	Analysis Method
Ammonia Nitrogen as N	< 0.83	mg/L	map	11/28/2016	SM 4500NH3D
Chemical Oxygen Demand	25	mg/L	jf	11/28/2016	EPA 410.4
E. Coli	< 50	mpn/100ml	jf	11/15/2016 5:54:00 PM	SM 9223B
Nitrate Nitrogen as N	< 0.46	mg/L	jf	11/16/2016	EPA 300.0
Nitrite Nitrogen as N	< 0.46	mg/L	jf	11/16/2016	EPA 300.0
pH	6.95	ph Units	jf	11/15/2016	SM 4500H+B
Specific Conductivity	41	umhos/cm	smm	11/16/2016	SM 2510B
Total Kjeldahl Nitrogen	1.6	mg/L	map	11/28/2016	SM 4500NH3D
Total Suspended Solids	9.5	mg/L	agj	11/16/2016	SM 2540D
Turbidity	9.6	NTU	jf	11/15/2016	EPA 180.1
Calcium	4.12	mg/L	jm	11/16/2016 1:31:48 PM	EPA 200.7
Hardness, Calculated	12.7	mg/L CaCO3	jm	11/16/2016 1:31:48 PM	SM 2340 B
Magnesium	0.53	mg/L	jm	11/16/2016 1:31:48 PM	EPA 200.7
Phosphorus, Total	0.069	mg/L as P	jm	11/16/2016 1:31:48 PM	EPA 200.7
Oil & Grease, Hexane Ext. Material	2.4	mg/L			EPA 1664

Lab#: 16111528-002 Sample ID: Stormwater Sample

Collect Date: 11/15/2016

Client Sample ID#: R40-11-15-16

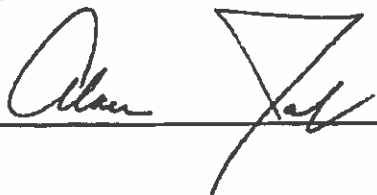
Collect Time: 13:10

Sample Matrix: WasteWater

Received Date: 11/15/2016

Test	Result	Units	Analyst	Analysis Date	Analysis Method
Ammonia Nitrogen as N	1.04	mg/L	map	11/28/2016	SM 4500NH3D
Chemical Oxygen Demand	67	mg/L	jf	11/28/2016	EPA 410.4
E. Coli	540	mpn/100ml	jf	11/15/2016 5:54:00 PM	SM 9223B
Nitrate Nitrogen as N	< 0.46	mg/L	jf	11/16/2016	EPA 300.0
Nitrite Nitrogen as N	< 0.46	mg/L	jf	11/16/2016	EPA 300.0
pH	6.40	ph Units	jf	11/15/2016	SM 4500H+B
Specific Conductivity	19	umhos/cm	smm	11/16/2016	SM 2510B
Total Kjeldahl Nitrogen	2.7	mg/L	map	11/28/2016	SM 4500NH3D
Total Suspended Solids	59.0	mg/L	agj	11/16/2016	SM 2540D
Turbidity	30	NTU	jf	11/15/2016	EPA 180.1
Calcium	1.79	mg/L	jm	11/16/2016 1:37:54 PM	EPA 200.7

The results recorded in this report relate only to the samples as received on the date and time noted.



Alan G. Jacobs

TUNXIS Laboratories, LLC

100 Northwest Drive, Plainville, Connecticut 06062
(860) 793-8868 Fax: (860) 793-8867

Alan G. Jacobs - Director CT Laboratory ID No. PH-0513

Lab#: 16111528-002 Sample ID: Stormwater Sample

Collect Date: 11/15/2016

Client Sample ID#: R40-11-15-16

Collect Time: 13:10

Sample Matrix: WasteWater

Received Date: 11/15/2016

Test	Result	Units	Analyst	Analysis Date	Analysis Method
Hardness, Calculated	6.9	mg/L CaCO ₃	jm	11/16/2016 1:37:54 PM	SM 2340 B
Magnesium	0.58	mg/L	jm	11/16/2016 1:37:54 PM	EPA 200.7
Phosphorus, Total	0.249	mg/L as P	jm	11/16/2016 1:37:54 PM	EPA 200.7
Oil & Grease, Hexane Ext. Material	2.6	mg/L			EPA 1664

Lab#: 16111528-003 Sample ID: Stormwater Sample

Collect Date: 11/15/2016

Client Sample ID#: R41-11-15-16

Collect Time: 12:40

Sample Matrix: WasteWater

Received Date: 11/15/2016

Test	Result	Units	Analyst	Analysis Date	Analysis Method
Ammonia Nitrogen as N	0.89	mg/L	map	11/28/2016	SM 4500NH3D
Chemical Oxygen Demand	45	mg/L	jf	11/28/2016	EPA 410.4
E. Coli	> 121,000.	mpn/100ml	jf	11/15/2016 5:54:00 PM	SM 9223B
Nitrate Nitrogen as N	< 0.46	mg/L	jf	11/16/2016	EPA 300.0
Nitrite Nitrogen as N	< 0.46	mg/L	jf	11/16/2016	EPA 300.0
pH	6.72	ph Units	jf	11/15/2016	SM 4500H+B
Specific Conductivity	96	umhos/cm	smm	11/16/2016	SM 2510B
Total Kjeldahl Nitrogen	1.7	mg/L	map	11/28/2016	SM 4500NH3D
Total Suspended Solids	34.0	mg/L	agj	11/16/2016	SM 2540D
Turbidity	15	NTU	jf	11/15/2016	EPA 180.1
Calcium	4.42	mg/L	jm	11/16/2016 1:43:59 PM	EPA 200.7
Hardness, Calculated	17.8	mg/L CaCO ₃	jm	11/16/2016 1:43:59 PM	SM 2340 B
Magnesium	1.60	mg/L	jm	11/16/2016 1:43:59 PM	EPA 200.7
Phosphorus, Total	0.170	mg/L as P	jm	11/16/2016 1:43:59 PM	EPA 200.7
Oil & Grease, Hexane Ext. Material	3.3	mg/L			EPA 1664

Lab#: 16111528-004 Sample ID: Stormwater Sample

Collect Date: 11/15/2016

Client Sample ID#: R42-11-15-16

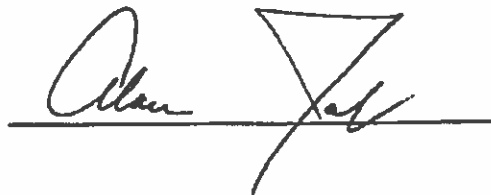
Collect Time: 12:30

Sample Matrix: WasteWater

Received Date: 11/15/2016

Test	Result	Units	Analyst	Analysis Date	Analysis Method
Ammonia Nitrogen as N	< 0.83	mg/L	map	11/28/2016	SM 4500NH3D
Chemical Oxygen Demand	54	mg/L	jf	11/28/2016	EPA 410.4
E. Coli	50	mpn/100ml	jf	11/15/2016 5:54:00 PM	SM 9223B
Nitrate Nitrogen as N	< 0.46	mg/L	jf	11/16/2016	EPA 300.0
Nitrite Nitrogen as N	< 0.46	mg/L	jf	11/16/2016	EPA 300.0
pH	6.31	ph Units	jf	11/15/2016	SM 4500H+B
Specific Conductivity	30	umhos/cm	smm	11/16/2016	SM 2510B
Total Kjeldahl Nitrogen	2.6	mg/L	map	11/28/2016	SM 4500NH3D
Total Suspended Solids	10.5	mg/L	agj	11/16/2016	SM 2540D

The results recorded in this report relate only to the samples as received on the date and time noted



TUNXIS Laboratories, LLC

100 Northwest Drive, Plainville, Connecticut 06062
(860) 793-8868 Fax: (860) 793-8867

Alan G. Jacobs - Director CT Laboratory ID No. PH-0513

Lab#: 16111528-004 Sample ID: Stormwater Sample

Collect Date: 11/15/2016

Client Sample ID#: R42-11-15-16

Collect Time: 12:30

Sample Matrix: WasteWater

Received Date: 11/15/2016

Test	Result	Units	Analyst	Analysis Date	Analysis Method
Turbidity	8.8	NTU	jf	11/15/2016	EPA 180.1
Calcium	1.34	mg/L	jm	11/16/2016 1:50:04 PM	EPA 200.7
Hardness, Calculated	5.0	mg/L CaCO ₃	jm	11/16/2016 1:50:04 PM	SM 2340 B
Magnesium	0.39	mg/L	jm	11/16/2016 1:50:04 PM	EPA 200.7
Phosphorus, Total	0.224	mg/L as P	jm	11/16/2016 1:50:04 PM	EPA 200.7
Oil & Grease, Hexane Ext. Material	2.0	mg/L			EPA 1664

Lab#: 16111528-005 Sample ID: Stormwater Sample

Collect Date: 11/15/2016

Client Sample ID#: R43-11-15-16

Collect Time: 12:37

Sample Matrix: WasteWater

Received Date: 11/15/2016

Test	Result	Units	Analyst	Analysis Date	Analysis Method
Ammonia Nitrogen as N	< 0.83	mg/L	map	11/28/2016	SM 4500NH3D
Chemical Oxygen Demand	67	mg/L	jf	11/28/2016	EPA 410.4
E. Coli	> 121,000.	mpn/100ml	jf	11/15/2016 5:54:00 PM	SM 9223B
Nitrate Nitrogen as N	< 0.46	mg/L	jf	11/16/2016	EPA 300.0
Nitrite Nitrogen as N	< 0.46	mg/L	jf	11/16/2016	EPA 300.0
pH	6.58	ph Units	jf	11/15/2016	SM 4500H+B
Specific Conductivity	25	umhos/cm	smm	11/16/2016	SM 2510B
Total Kjeldahl Nitrogen	< 1.3	mg/L	map	11/28/2016	SM 4500NH3D
Total Suspended Solids	74.0	mg/L	agj	11/16/2016	SM 2540D
Turbidity	6.5	NTU	jf	11/15/2016	EPA 180.1
Calcium	3.01	mg/L	jm	11/16/2016 2:25:25 PM	EPA 200.7
Hardness, Calculated	10.7	mg/L CaCO ₃	jm	11/16/2016 2:25:25 PM	SM 2340 B
Magnesium	0.73	mg/L	jm	11/16/2016 2:25:25 PM	EPA 200.7
Phosphorus, Total	0.292	mg/L as P	jm	11/16/2016 2:25:25 PM	EPA 200.7
Oil & Grease, Hexane Ext. Material	2.4	mg/L	smm	11/22/2016	EPA 1664

Lab#: 16111528-006 Sample ID: Stormwater Sample

Collect Date: 11/15/2016

Client Sample ID#: C9-11-15-16

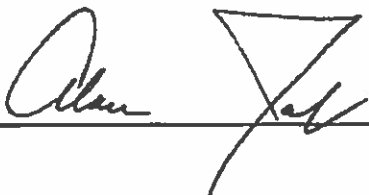
Collect Time: 13:20

Sample Matrix: WasteWater

Received Date: 11/15/2016

Test	Result	Units	Analyst	Analysis Date	Analysis Method
Ammonia Nitrogen as N	< 0.83	mg/L	map	11/28/2016	SM 4500NH3D
Chemical Oxygen Demand	63	mg/L	jf	11/28/2016	EPA 410.4
E. Coli	8400	mpn/100ml	jf	11/15/2016 5:54:00 PM	SM 9223B
Nitrate Nitrogen as N	< 0.46	mg/L	jf	11/16/2016	EPA 300.0
Nitrite Nitrogen as N	< 0.46	mg/L	jf	11/16/2016	EPA 300.0
pH	6.90	ph Units	jf	11/15/2016	SM 4500H+B
Specific Conductivity	50	umhos/cm	smm	11/16/2016	SM 2510B

The results recorded in this report relate only to the samples as received on the date and time noted.



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Alan G. Jacobs - Director CT Laboratory ID No. PH-0513

Lab#: 16111528-006

Sample ID: Stormwater Sample

Collect Date: 11/15/2016

Client Sample ID#: C9-11-15-16

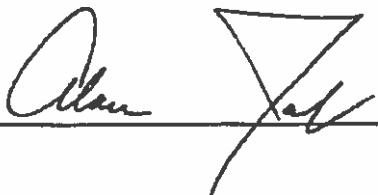
Collect Time: 13:20

Sample Matrix: WasteWater

Received Date: 11/15/2016

Test	Result	Units	Analyst	Analysis Date	Analysis Method
Total Kjeldahl Nitrogen	2.0	mg/L	map	11/28/2016	SM 4500NH3D
Total Suspended Solids	48.0	mg/L	agj	11/21/2016	SM 2540D
Turbidity	44	NTU	jf	11/15/2016	EPA 180.1
Calcium	4.58	mg/L	jm	11/16/2016 2:31:32 PM	EPA 200.7
Hardness, Calculated	15.1	mg/L CaCO3	jm	11/16/2016 2:31:32 PM	SM 2340 B
Magnesium	0.84	mg/L	jm	11/16/2016 2:31:32 PM	EPA 200.7
Phosphorus, Total	0.247	mg/L as P	jm	11/16/2016 2:31:32 PM	EPA 200.7
Oil & Grease, Hexane Ext. Material	< 2.1	mg/L	smm	11/22/2016	EPA 1664

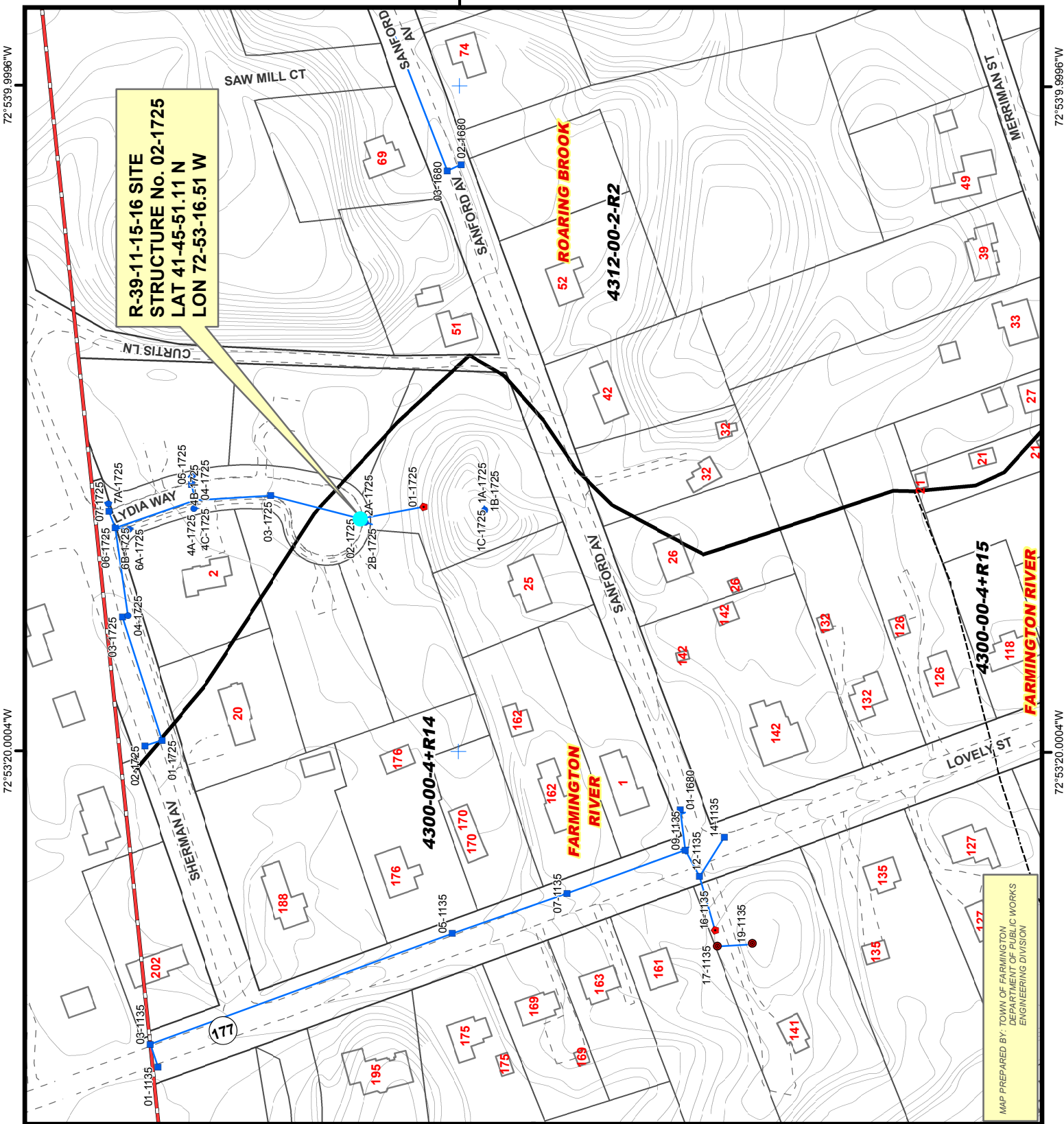
The results recorded in this report relate only to the samples as received on the date and time noted.



Alan G. Jacobs

ATTACHMENT B

Monitoring Site Location Mapping

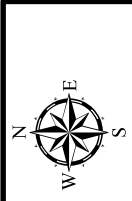


72°53'20.0004"W

72°53'9.9996"W

72°53'20.0004"W

72°53'9.9996"W



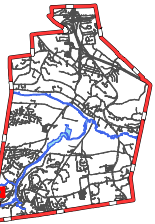
**TOWN OF FARMINGTON
DRAINAGE OUTFALL
SAMPLING SITE
R-39-11-15-16
STRUCTURE No.
02-1725**

Sampling site
R-39-11-15-16
was taken from
catch basin south
end of cul-de-sac
prior to outlet
Structure No.02-1725

DATUM REFERENCE: NAD 1927



LOCATION MAP



LEGEND

STRUCTURE TYPE

- ▲ FLARED END
- PIPE END
- END WALL
- CATCH BASIN
- MANHOLE
- STORM LINE
- TOWN LINE

DRAINAGE BASINS (DEP Line)

DRAINAGE BASIN CLASSIFICATION

- 1 MAJOR
- 2 REGIONAL
- 3 SUBREGIONAL
- 4 LOCAL
- 5 STREAM REACH
- 6 LAKE IMPOUNDMENT
- 7 STREAM DIVERSION
- WATERWAY
- WATERBODY

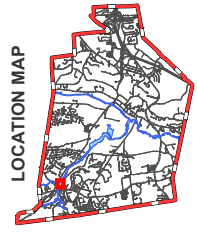
41°45'50.0004"N

41°45'50.0004"N

**TOWN OF FARMINGTON
DRAINAGE OUTFALL
SAMPLING SITE
R-40 11-15-16
STRUCTURE No. H-1320**

Sampling site R-40-11-15-16 was taken from the outlet pipe to the rear of 107/115 New Britain Ave. Structure No.H-1320

DATUM REFERENCE: NAD 1927



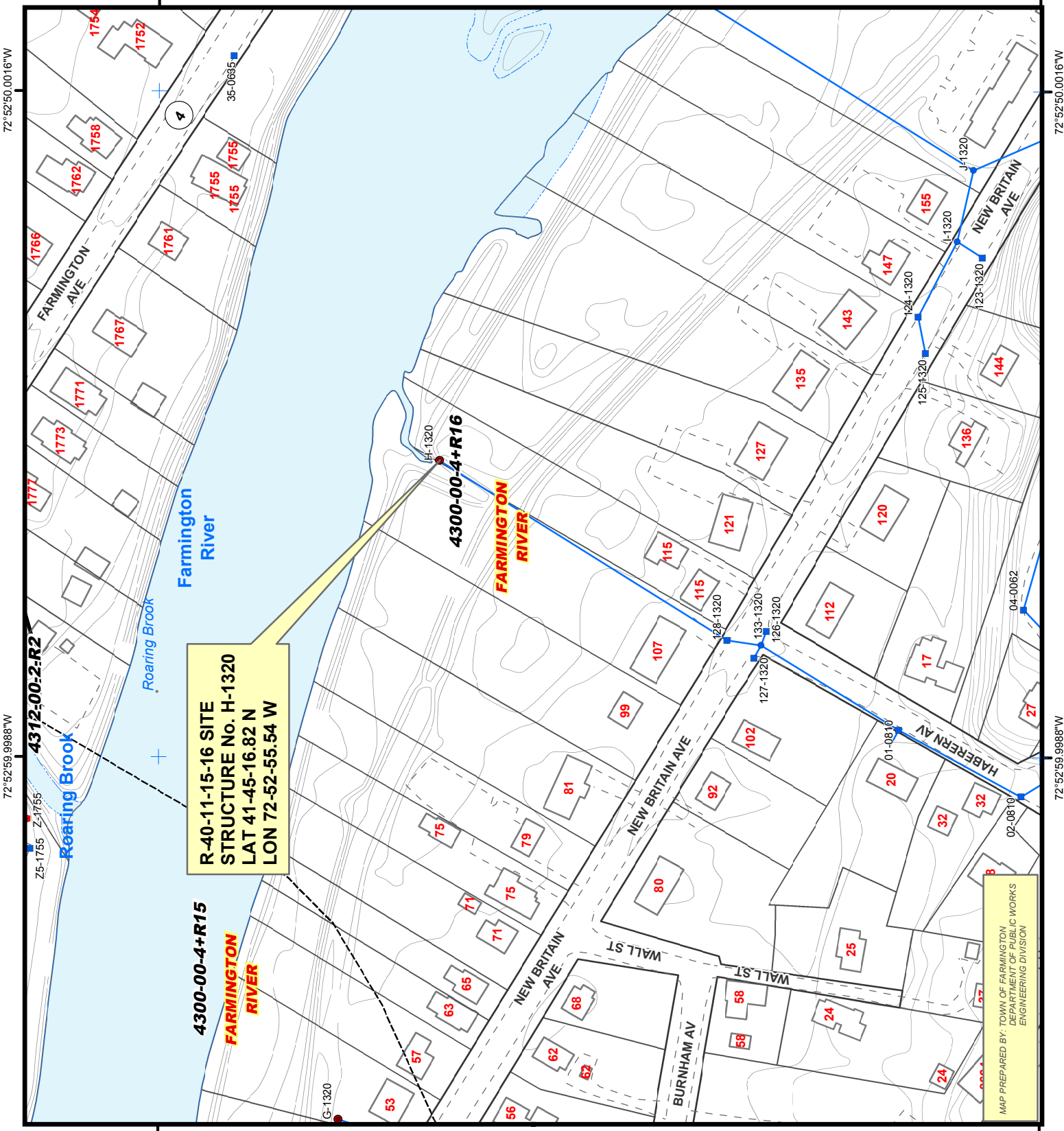
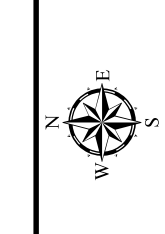
LEGEND

STRUCTURE TYPE

- FLARED END
- PIPE END
- END WALL
- CATCH BASIN
- MANHOLE
- STORM LINE
- TOWN LINE

DRAINAGE BASIN (DEP Line)

- 1 MAJOR
- 2 REGIONAL
- 3 SUBREGIONAL
- 4 LOCAL
- 5 STREAM REACH
- 6 LAKE IMPOUNDMENT
- 7 STREAM DIVERSION
- WATERWAY
- WATERBODY



**R-40-11-15-16 SITE
STRUCTURE No. H-1320
LAT 41-45-16.82 N
LON 72-52-55.54 W**

MAP PREPARED BY: TOWN OF FARMINGTON
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

72°52'50.0016"W 41°45'20.0016"N

72°52'50.0016"W

72°52'50.0016"W

72°52'59.9988"W

72°52'59.9988"W

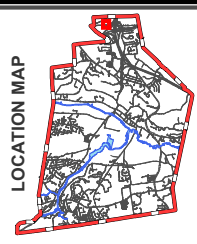
41°45'20.0016"N

41°45'10.008"N

**TOWN OF FARMINGTON
DRAINAGE OUTFALL
SAMPLING SITE
R-41-11-15-16
STRUCTURE No.
J-2240**

Sampling site
R-41-11-15-16
was taken from the
outlet pipe on the
east side of
Woodruff Road
Structure No. J-2240

DATUM REFERENCE: NAD 1927



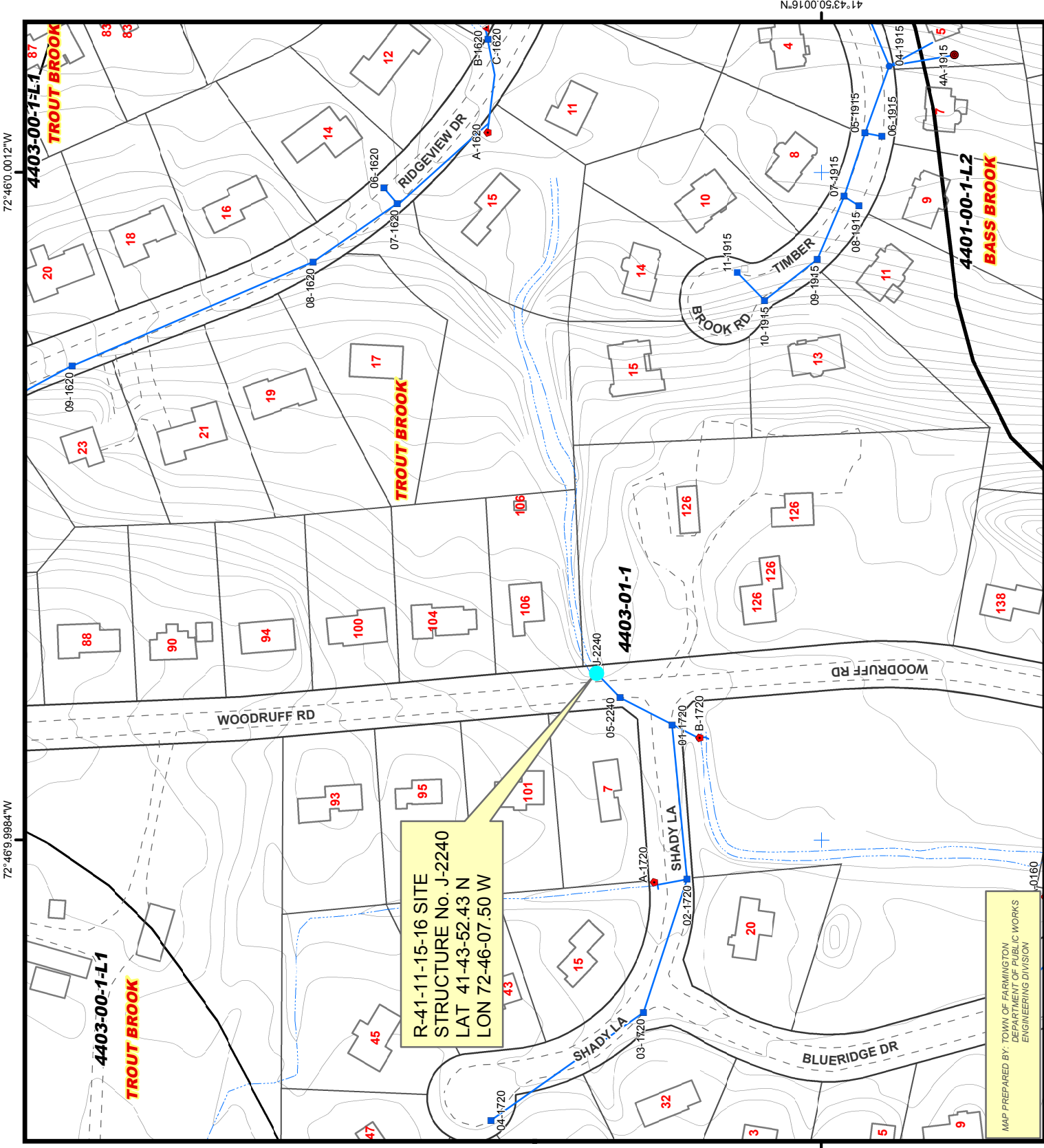
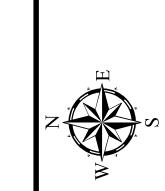
LEGEND

STRUCTURE TYPE

- ▲ FLARED END
- PIPE END
- END WALL
- CATCH BASIN
- MANHOLE
- STORM LINE
- TOWN LINE

DRAINAGE BASINS (DEP Line)

- 1 MAJOR
- 2 REGIONAL
- 3 SUBREGIONAL
- 4 LOCAL
- 5 STREAM REACH
- 6 LAKE IMPOUNDMENT
- 7 STREAM DIVERSION
- WATERWAY
- WATERBODY



72°46'00.0012"W

72°46'00.0012"W

72°46'9.9984"W

72°46'9.9984"W

41°43'50.0016"N

41°43'50.0016"N

MAP PREPARED BY: TOWN OF FARMINGTON
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

72°45'50.0004"W

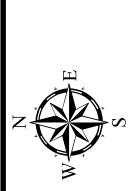
72°46'0.0012"W

41°43'59.9988"N

41°43'59.9988"N

72°45'50.0004"W

72°46'0.0012"W



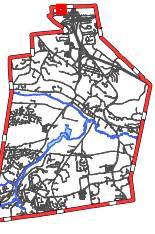
**TOWN OF FARMINGTON
DRAINAGE OUTFALL
SAMPLING SITE
R-42-11-15-16
STRUCTURE No. 3A-2235**

Sampling site
R-42-11-15-16
pipe on the east side of
Woodpond Rd in front
of #88 Woodpond Rd
Structure No.3a-2235

DATUM REFERENCE: NAD 1927

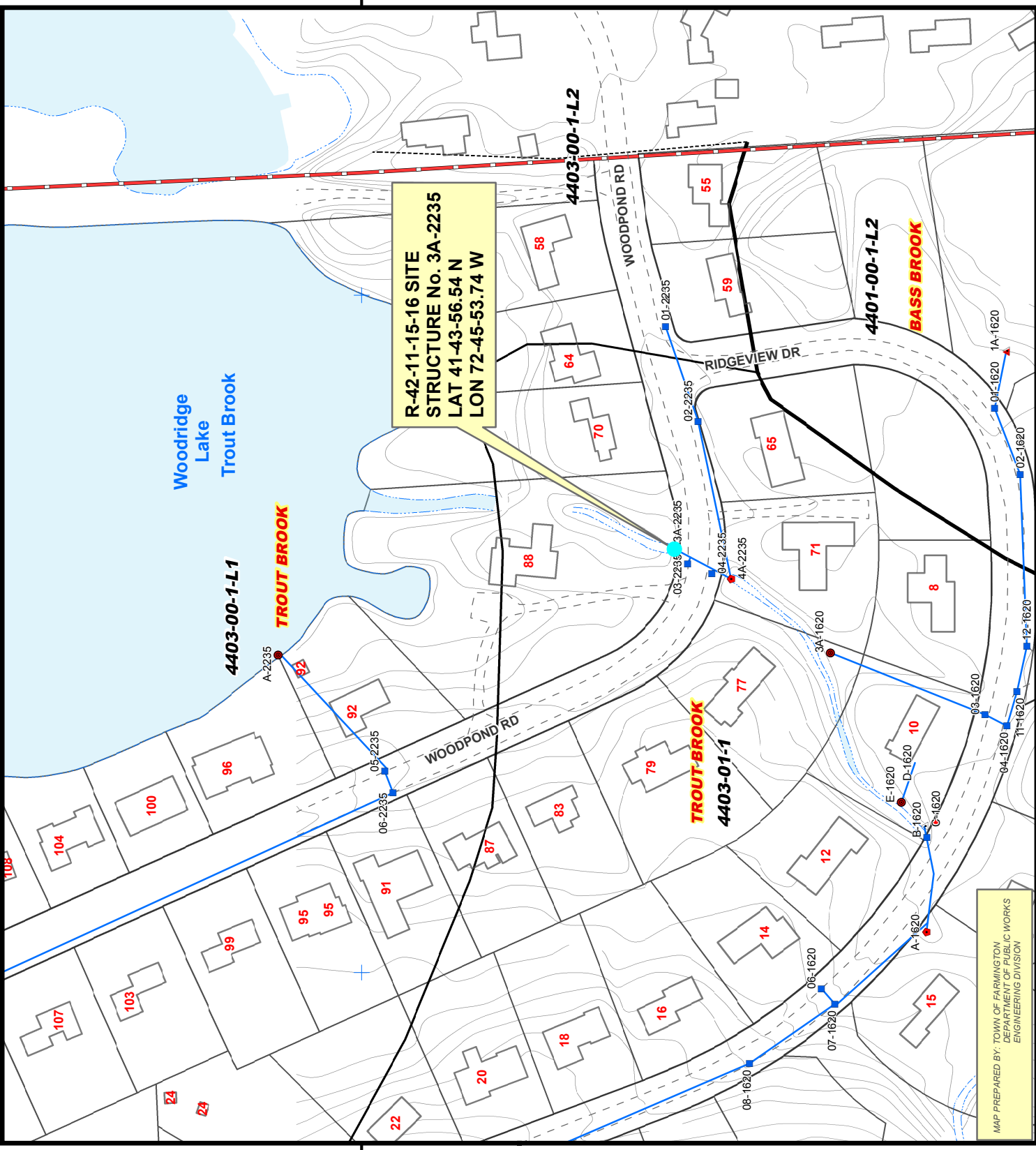


LOCATION MAP



LEGEND

STRUCTURE TYPE	
	FLARED END
	PIPE END
	END WALL
	CATCH BASIN
	MANHOLE
	STORM LINE
	TOWN LINE
DRAINAGE BASINS (DEP Line)	
DRAINAGE BASIN CLASSIFICATION	
	1 MAJOR
	2 REGIONAL
	3 SUBREGIONAL
	4 LOCAL
	5 STREAM REACH
	6 LAKE IMPOUNDMENT
	7 STREAM DIVERSION
	WATERWAY
	WATERBODY



MAP PREPARED BY: TOWN OF FARMINGTON
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

72°45'50.0004"W

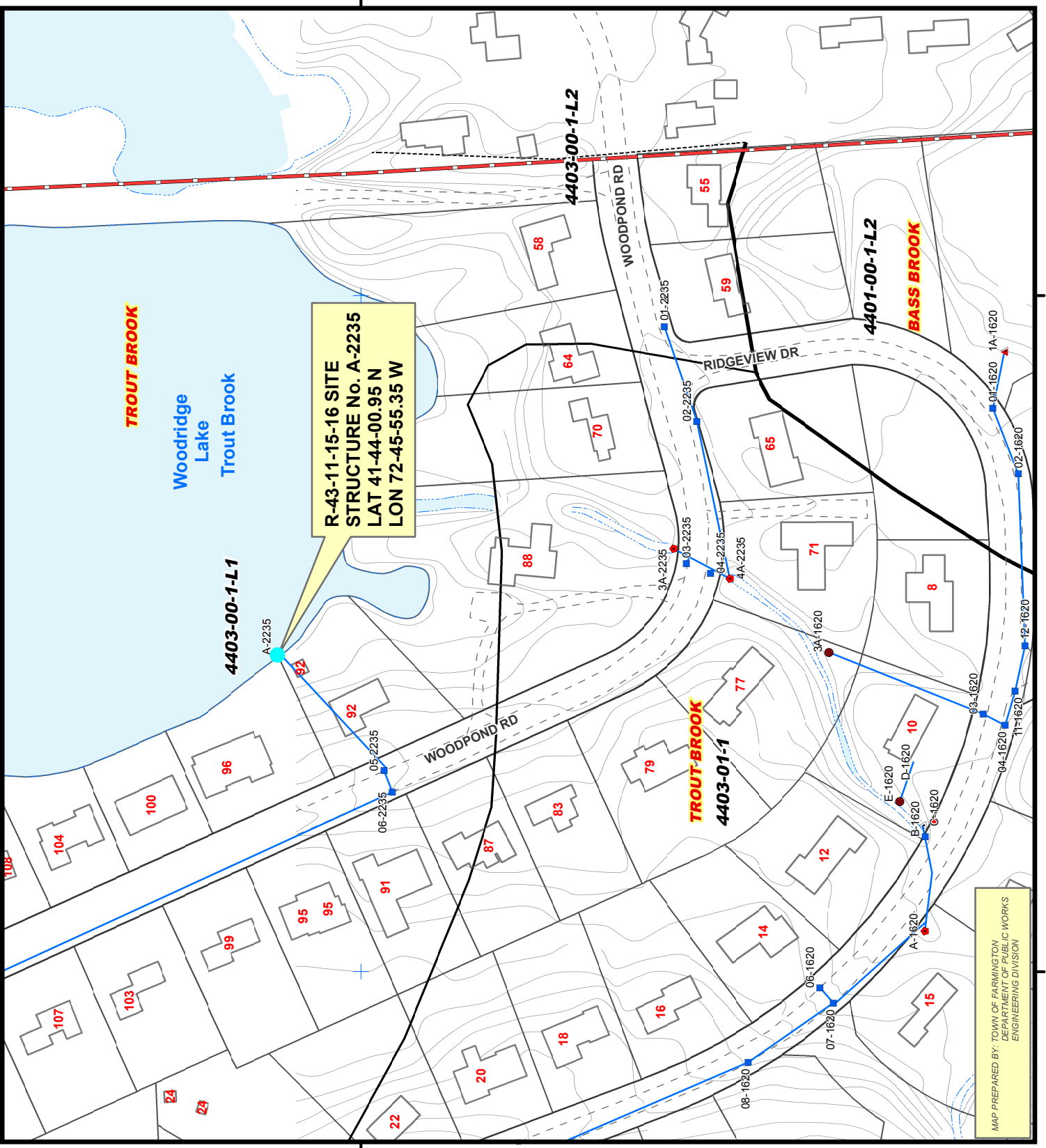
72°46'0.0012"W

41°43'59.9988"N

41°43'59.9988"N

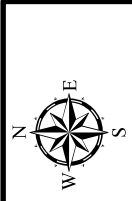
72°45'50.0004"W

72°46'0.0012"W



R-43-11-15-16 SITE
STRUCTURE No. A-2235
LAT 41-44-00.95 N
LON 72-45-55.35 W

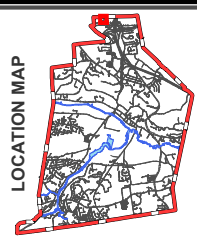
MAP PREPARED BY: TOWN OF FARMINGTON
 DEPARTMENT OF PUBLIC WORKS
 ENGINEERING DIVISION



TOWN OF FARMINGTON
DRAINAGE OUTFALL
SAMPLING SITE
R-43-11-15-16
STRUCTURE No. A-2235

Sampling site
 R-43-11-15-16
 pipe on the east side of
 Woodpond Rd in rear
 of #92 Woodpond Rd
 Structure No. A-2235

DATUM REFERENCE: NAD 1927



LEGEND

STRUCTURE TYPE	DRAINAGE BASINS (DEP Line)
▲ FLARED END	1 MAJOR
● PIPE END	2 REGIONAL
● END WALL	3 SUBREGIONAL
● CATCH BASIN	4 LOCAL
● MANHOLE	5 STREAM REACH
— STORM LINE	6 LAKE IMPOUNDMENT
— TOWN LINE	7 STREAM DIVERSION
	— WATERWAY
	— WATERBODY



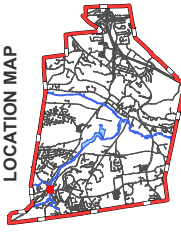
**TOWN OF FARMINGTON
DRAINAGE OUTFALL
SAMPLING SITE
C-9-11-15-16
STRUCTURE No. F-1320**

Sampling site C-9-11-15-16 was taken from outlet pipe in rear of #15 New Britain Ave. Structure No. F-1320

DATUM REFERENCE: NAD 1927



LOCATION MAP



LEGEND

STRUCTURE TYPE

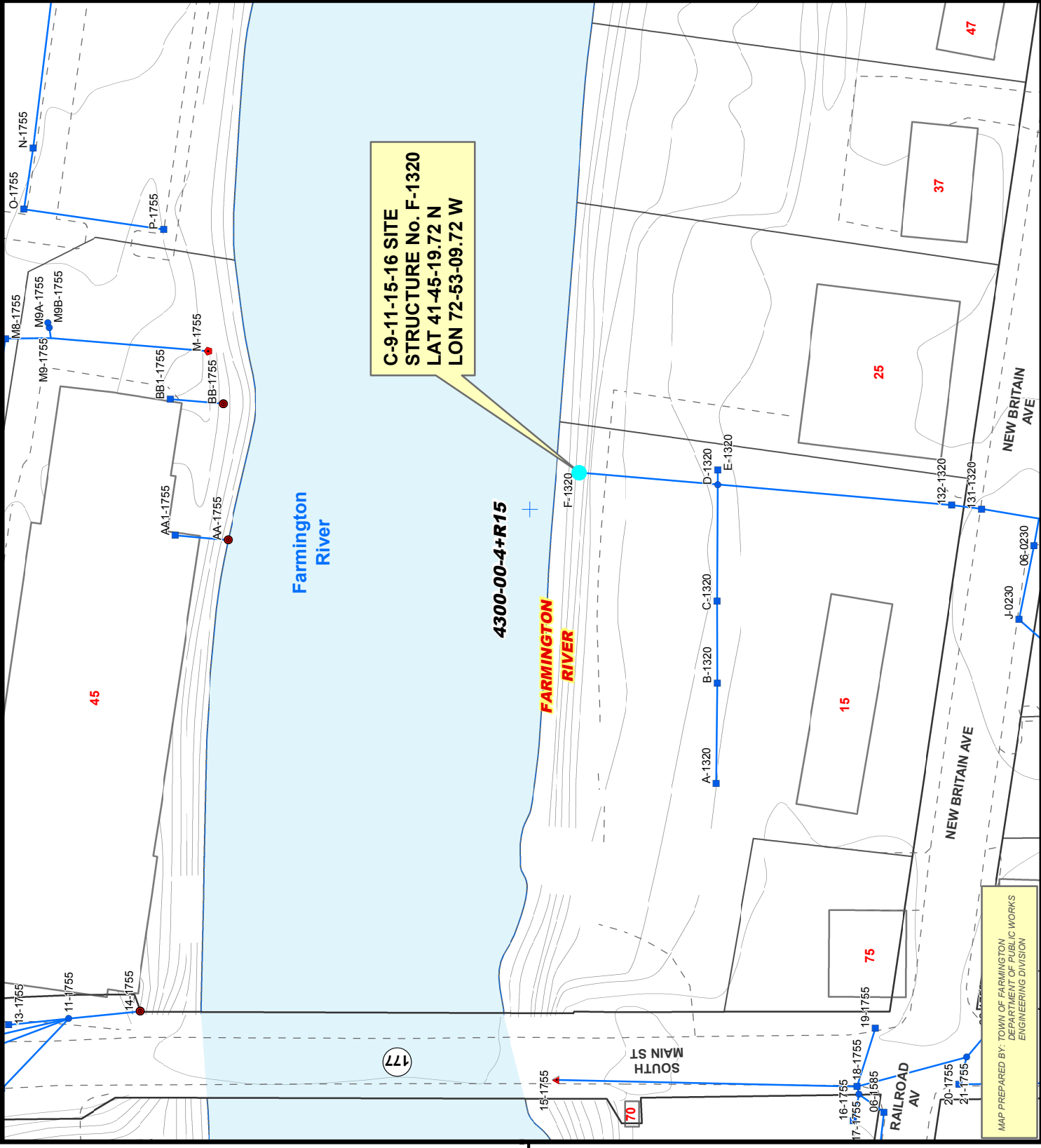
- ▲ FLARED END
- PIPE END
- END WALL
- CATCH BASIN
- MANHOLE
- STORM LINE
- TOWN LINE

DRAINAGE BASINS (DEP Line)

DRAINAGE BASIN CLASSIFICATION

- 1 MAJOR
- 2 REGIONAL
- 3 SUBREGIONAL
- 4 LOCAL
- 5 STREAM REACH
- 6 LAKE IMPOUNDMENT
- 7 STREAM DIVERSION
- WATERWAY
- WATERBODY

72°53'9.9971"W



**C-9-11-15-16 SITE
STRUCTURE No. F-1320
LAT 41-45-19.72 N
LON 72-53-09.72 W**

41°45'20.0016"N

MAP PREPARED BY: TOWN OF FARMINGTON
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

72°53'9.9971"W

ATTACHMENT C

Sample Storm Drainage Operation and Maintenance Plans



Integrated Pest Management Plan

**Medical Office Building
10 Birdseye Road
Farmington, Connecticut**

**August 22, 2016
MMI #3571-07**

OVERVIEW

Integrated pest management (IPM) utilizes an ecosystem approach to the maintenance of lawns, gardens, and landscape plantings. It involves an evaluation of the many factors influencing plant growth on a site and the relationships between them. These factors include climate, site orientation, soil conditions, water availability, insects, diseases, weeds, invasive species, animals, beneficial organisms, and cultural practices in the landscape design. The goal is to identify potential problems early and manage them using a variety of control strategies so that damage is limited to acceptable levels. This strategy is preferred over attempting to eliminate pests via indiscriminate use of broad-spectrum pesticides. In this way, environmental impacts to surface and groundwater resources as well as neighboring plant and animal communities are minimized. IPM can often reduce overall landscaping costs as well.

IPM is not solely reliant on the use of organic-based fertilizers and beneficial organisms to promote healthy plantings. When necessary, chemicals may be judiciously employed. Soil testing and the regular incorporation of organic matter into the soil should be standard practice to promote plant vigor. The decision to apply fertilizers (organic or inorganic) should be made based upon the soil fertility results. The use of broad-spectrum residual pesticides should be avoided because they remain effective in the environment for days, weeks, or months, impacting beneficial organisms as well as pests. Pesticides should be applied only as a last resort after cultural, physical, mechanical, and biological controls have failed to provide adequate protection. IPM encourages the consideration of the maintained landscape as part of the larger community ecosystem since the impact of site gardening and pest management decisions often extends far beyond the property lines.

The purpose of this IPM plan is to assist in the development of an environmentally sound landscape design and maintenance program for the property. This plan will evolve and become more detailed as the site design is finalized through the town's permitting process. The plan is flexible and should be evaluated from time to time as new techniques and materials become available. The Connecticut Agricultural Experimental Station, the University of Connecticut, and the Environmental Protection Agency are readily available and reliable resources for up-to-date pest and disease control strategies.

The responsibility for the execution of the IPM plan will be vested with the property owner. The owner should review the goals and methodologies of the plan with the licensed, contracted landscaper.

IPM PROGRAM

The primary objective of the IPM plan is to maintain the health of a diverse landscape so that plants resist pests and diseases and recuperate successfully from environmental stressors. To accomplish this, a variety of strategies is employed.

1) Choice of Plant Materials

One key to designing an attractive and low-maintenance landscape that will respond favorably to an IPM approach is to choose appropriate plant materials, which are as follows:

- A mix of hardy native and ornamental species and cultivars that are well adapted to site conditions
- Disease and pest resistant/tolerant
- Healthy at the time of planting
- Properly planted and maintained

2) Soil Fertility

Healthy plants adapted to their environments are naturally disease and pest resistant. Soil testing should be performed initially and every 2 to 3 years thereafter to determine the availability of nutrients, especially phosphorous and potassium, as well as pH. The application of fertilizer and lime/sulfur should be based upon the results. Best management practices for fertilizer use include the following:

- Apply nitrogen only when plants are actively growing.
- Return clippings to lawn areas to recycle nutrients.
- Use slow-release nitrogen fertilizers such as coated urea or an organic, soluble form of nitrogen such as fish emulsion.
- Delay fertilizing prior to heavy rains to prevent runoff.
- Use mulch and other organic materials around trees and shrubs to build better soil.
- Test the groundwater for leachate from fertilizer residuals.

3) Cultural Controls

Cultural controls negate or minimize occurrences of pests. Some examples include the following:

- Use disease-free specimens and seed.
- Optimize growing conditions to minimize stress on plants.

- Irrigate at the right time of day (normally early morning for lawns).
- Water deeply but not too often as determined by soil moisture.
- Annually apply mulch to conserve moisture, control weeds, and prevent soil erosion.
- Prune trees and shrubs properly to encourage air circulation.
- Practice good sanitation and the destruction of diseased and infested plant materials.

4) Monitoring for Pests and Disease

It is almost impossible to eliminate all pests from the landscape, so more modest goals are appropriate. Field scouting and insect trapping within the various landscape areas of the property should be conducted by trained professionals looking for evidence of pest outbreaks or disease.

These surveys should be part of the routine landscape maintenance program. Key issues are as follows:

- What pests are present and in what numbers and stages of development?
- What amount and type of damage are being caused or are threatened by pests?
- How much damage is tolerable?
- What is the history of previous infestations at the site? How were those infestations managed? What were the results?
- What natural enemies of the pests, such as parasites, predators, and diseases, are present that may control or limit damage?
- What pest management options are available? How do the advantages and disadvantages compare?

5) Pest Control Methods

Control methods are typically categorized as either nonchemical or chemical. Nonchemical approaches such as cultural controls (discussed earlier) are used to prevent infestations or to minimize their severity. Other nonchemical methods include the following:

- Physical controls

Physical controls utilize some component of the environment such as temperature, humidity, air circulation, or light to the detriment of pests.

- Mechanical controls

These include barriers that exclude pests or disrupt their life cycles. Such barriers include fencing, row covers, and plastic mulches. Other mechanical controls are plowing, discing, hoeing, and cultivating. For small areas, simply hosing or handpicking of pests will limit damage to tolerable levels.

- Biological controls

There are many living organisms that function as parasites, predators, or pathogens to help control pests. Some of these may occur naturally in the environment or may be deliberately introduced. Some spiders, wasps, beetles, lacewings, and fungi are important components of this checks-and-balances system. Their action is often sufficient to limit pest damage to below threshold levels. One of the goals of IPM is to discourage the overuse of pesticides to promote the beneficial action of these natural controls. The preservation of a diverse landscape encourages the activity of birds, frogs, and garden snakes that also prey on insect pests. Some pathogens have been commercially developed for use as biological insecticides. One example is the bacterium *Bacillus thuringiensis* (Bt), which is effective for controlling certain caterpillars and beetles. Other examples of biocontrols include beneficial nematodes and milky spore (also a *Bacillus*) for certain insect larvae (white grubs, sod webworm, and cutworm larvae) and chemical traps, which lure pests by mimicking pheromones.

When these methods fail to achieve an adequate level of control in a timely manner such that significant aesthetic or economic harm to the landscape is threatened, chemical control in an IPM program may be justified. However, there are many drawbacks to the use of chemical controls including pesticide resistance, toxicity to nontarget organisms, public health issues, and environmental concerns. As such, they are rightly chosen only as a last resort.

- Chemical controls

Pesticides are naturally occurring or synthetic chemicals that are used to destroy, repel, or otherwise reduce pest infestations. When judiciously selected and applied, they can provide many important benefits, such as the following:

- Pesticides are readily available and easy to use.
- Where resistance is not a problem, pesticides are generally highly effective for controlling pests.
- Pesticide treatments can be rapidly implemented as needed with minimal lag time.
- Pesticides can be used over large areas to control large populations of pests.
- Pesticide treatments are often cost effective, especially if the alternatives require large increases in human labor.
- No effective, reliable, nonchemical alternatives are available for many pests.

There are some naturally occurring chemicals that are effective as pesticides and are compatible with the concept of "organic gardening." These compounds tend to be less persistent in the environment and are less harmful to nontarget organisms. They include microbial insecticides; botanical pesticides; mineral-based pesticides; and certain oils, soaps, and detergents produced from petroleum distillates. These are readily available and will be utilized first, as practicable, when chemical control is selected.

Wherever possible, the material that is least toxic to humans and other nontarget organisms and is least likely to contaminate ground and surface waters will be used. Whenever a chemical control is needed, selection of the chemical should be consistent with the pesticide label and all state and federal laws and regulations. Additional considerations include the following:

- Accurate identification of the pest
- Effectiveness of the pesticide against the target organism
- Compatibility with the host plant
- Effects on beneficial organisms
- Degree of environmental and user safety
- Use pesticides to control rather than to eliminate pests.
- Spatially restrict treatment (spot treat) whenever possible.
- Properly calibrate treatment equipment.
- Comply with all notice requirements.
- Keep accurate records of treatments and results.

6) Storage, Use, and Disposal of Chemical Controls

All pesticides are toxic to some degree and pose a risk to the environment. When stored in bulk, this risk increases. Provisions for the safe storage, handling, use, and disposal of pesticides are an important aspect of this IPM program. Federal regulations (FIFRA, FFDCA) concerning registration and labeling of pesticides provide clear directions and warnings on each container. State regulations regarding noticing requirements provide additional safeguards for residents and neighbors.

It is anticipated that the IPM for the property will be administered by a professional landscape firm licensed by the state with adequate bonding and insurance. The ultimate responsibility for carrying out the IPM is vested with the Homeowners' Association.

- No bulk storage of pesticides will be allowed on the site.
- Pesticides will not be mixed near a wellhead (if applicable), within 100 feet of any wetland or watercourse, or in close proximity to any unprotected drainage structure.

- Pesticides will not be applied on windy days (over 10 mph).
- The licensed landscaper is responsible for removing all empty pesticide containers and any unused mixed pesticides from the site and for their safe and proper disposal under applicable local, state, and federal laws.

Much of the information and text contained herein was obtained from the following resources:

University of Connecticut IPM at www.hort.uconn.edu/ipm/
EPA: Office of Pesticide Programs, 401 M St., S.W., Washington D.C. 20460
EPA: Citizen's Guide to Pest Control and Pesticide Safety
National IPM Network at www.reeusda.gov/agsys/nipmn/
Connecticut Agricultural Experiment Station at www.caes.state.ct.us/
Audubon Cooperative Sanctuary System, Audubon International
National Pesticide Telecommunications Network 1-800-858-7378

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