New Jersey Department of Environmental Protection
Water Resources Management
Water Monitoring and Standards
Bureau of Freshwater and Biological Monitoring

Work/Quality Assurance Project Plan

Water Quality Monitoring Gap and Enhancement Project

2018-2020

Amendment

Water Quality Monitoring Gap and Enhancement Project

3/20/2019

Due to Bureau staff being necessary to complete other Bureau priorities, sampling at three of six locations cease at the end of March, 2019 rather than September, 2020 as stated in the QAPP.

Sampling will cease at the following three locations

01403300 Raritan River at Queens Bridge

BFBM000245 Shabakunk Creek Tributary

BFBM000290 Rahway River Tributary

Water Quality Monitoring Gap and Enhancement Project
Work/Quality Assurance Project Plan 2018-2020
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1.0 Project Name : Water Quality Monitoring Gap and Enhancement Project (WQMGE)

2.0 Project Requested by :
NJDEP, Bureau of Freshwater and Biological Monitoring

3.0 Date of Project :
October, 2018 - September, 2020

4.0 Project Fiscal Information: Job Number 35950000, Activity Code V38A

5.0 Project Officer :
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6.0 Quality Assurance Officer :
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7.0 Special Training Needs/Certification

All participants assigned to this project will be trained in the operation and use of all sampling equipment. The training will entail calibration methods, deployment techniques and data retrieval from the equipment. The Project Officer or designee will be responsible for any necessary training.

BFBM is certified by the Office of Quality Assurance (certified lab ID # 11896) for the following parameters during field work for this project: temperature, pH, conductance, dissolved oxygen (DO), turbidity.

8.0 Project Description :

8.1 Objective

The purpose of this project is to collect water quality monitoring data to address gaps and needed enhancements identified in the State's Long-Term Water Quality Monitoring Strategy such as

1. Obtain water quality data in tidally influenced freshwater. Identified as being a water quality monitoring gap as little recent data is being collected in tidally influenced surface waters.
2. Obtain more continuous monitoring data. Identified as a water quality monitoring gap as more continuous data is necessary to evaluate certain

surface water quality standards (e.g. dissolved oxygen and water temperature)

3. Investigate newer technology. Identified as a needed water quality monitoring enhancement to assess newer methods and technologies which may increase water quality knowledge and efficiency.
4. Investigate potential eco-regionally based reference locations. Identified as a gap, since there is a need for additional reference stations and those that better represent eco regions within the State.
5. Identify potential sources of water quality issues. Identified as a gap in terms of being able to monitor water quality at sites or in areas where water quality impairments are suspected.
6. Monitor the effectiveness of implemented best management practices. Identified as a gap, as this has not previously been a focus of water quality monitoring.
7. Conduct follow up monitoring for stations which original monitoring identified potential water quality issues (surface water and/or sediment). Identified as a gap as there is no current mechanism for follow up monitoring when water quality results are suspect or when conditions are presumed to have changed.
8. Conduct Monitoring to evaluate water quality impacts from short-term events such as spills.

8.2 Data Usage

Data usage will depend the data objective of specific sites. Data collected using established and approved equipment and protocols will be assessed according to the current Water Quality Assessment Methods Document providing the data collected meets the minimum assessment requirements. Data not meeting minimum requirements will be used to inform future monitoring efforts and practices. Data collected using experimental technologies will be used internally to evaluate and establish future monitoring protocols using those technologies.

8.3 Monitoring Design

Monitoring design (monitoring locations and parameters) will be specific to each monitoring location and the reasons for which they are being selected. Please see Attachment B (Detailed Monitoring Station and Parameter List) for list of the six stations, rationale and type of monitoring/parameters being investigated for the years 2018-2020. These sites will be monitored quarterly for two years for the parameters outlined in Attachment A. New locations may be added if additional data needs are identified.

8.4 Monitoring Methods/Frequency

8.4.1 Continuous Monitoring

Data loggers and sondes will be deployed according to the monitoring location requirements. See Attachment B (Detailed Monitoring Station and Parameter List).

Locating data loggers and sondes in free-flowing areas will ensure that data loggers record data which is representative in terms of stream flow (i.e. not in impounded areas or areas where flow is impeded by debris or adjacent structures). Data loggers will be secured to the stream bottom using stainless steel cable, the units positioned approximately six inches off the bottom. Units will also be placed in deeper areas of the stream, to reduce the possibility of the unit being frozen in ice.

8.4.2 Discrete Samples

The frequency for the collection of discrete samples will depend on the monitoring location selected. All analyze immediately parameters will be measured on site at the time of sample collection. See Attachment B (Detailed Monitoring Station and Parameter List).

9.0 Sampling Procedures

9.1 General Procedures: Sampling frequencies for specific parameters (nutrients, suspended solids, chloride, etc.) and field parameters are detailed in Attachment B. Discharge (flow) measurements at each non-tidal station will be taken during each sampling event by USGS or BFBM staff utilizing similar procedures. A full explanation of BFBM's procedures for discharge measurement can be found in Attachment D. At tidally impacted sites, monitoring will be at low, slack tide. Sample bottles for analytical parameters will be provided by the contracted New Jersey certified laboratory. Sample volume and container type will be as described in the respective laboratory's "Quality Manual" and/ or SOP, approved by the Office of Quality Assurance (OQA). This information is also included in Attachment B.

9.2 Cleaning Sample Equipment: Because the possibility of contamination of samples is great, all sampling devices used to collect water quality samples for the parameters listed will be cleaned as thoroughly as possible between each use using a 1% solution of lab detergent (Liquinox) and Deionized (PICO) water, followed by a thorough rinse with deionized (PICO) water. All equipment cleaning will be performed at BFBM's preparation laboratory. Metals samples will be

collected via a center of flow grab sample directly into a new one-use sample container, so no additional cleaning procedures are necessary.

9.3 Field Precautions for Invasives: To prevent the potential spread of nuisance or invasive organisms such as Didymosphenia sp. from stream to stream, all nets, waders, etc. will be decontaminated in the field between sites by spraying with a commercial antibacterial spray such as Fantastik Heavy Duty All Purpose Cleaner (active ingredients; dimethyl benzyl ammonium chlorides and ethylbenzyl ammonium chlorides) The use of felt-soled waders will also be avoided.

9.4 In-Stream Analytical Sampling Procedures and Parameters:
The collection of water quality samples will be accomplished using the Equal Width Increment (EWI) sampling method and a splitter churn to obtain cross sectional composite samples. Water column sample collection for metals will be center of flow grab samples. Samples will be collected as per "NJDEP Field Sampling Procedures Manual," August 2005 Section 6.8.2; the document available online at the NJDEP's webpage,
<http://www.state.nj.us/dep/srp/guidance/fspm/ >.
Field readings for analyze immediately parameters (dissolved oxygen, pH, specific conductance, water temperature, air temperature and turbidity) will be made at each site during each sampling event. The chemical and field parameters are listed Attachment B.
Discharge measurements will be made at each station (where applicable) during each sampling event using BFBM standard operating procedures (Attachment D) or United States Geological Survey procedures
http://training.usgs.gov/TEL/Nolan/SWProcedures/Index.html

9.5 Diurnal Dissolved Oxygen Procedures: In the event of diurnal monitoring, a minimum of two datasondes will be deployed during a given two-week period. Parameters recorded will be Temperature, Dissolved Oxygen, Dissolved Oxygen Saturation (%), pH, Turbidity and Specific Conductivity. Deployments will be throughout the growing season, when photosynthetic activity will likely affect parameters such as dissolved oxygen.

9.5.1 Deployment

Datasondes will be checked against another calibrated Datasonde unit or field meter at deployment for possible Drift. This duplicate analysis will be in a standard bucket filled with a grab sample of stream water. Compared values which differ by 10% or more may indicate a problem with the probe and will be identified in the data report. All values are to be recorded in the appropriate fields on the USGS Diurnal Water Quality Monitor form. The following steps will be performed.

- Place datasondes in the grab sample bucket.
- Wait for 5 minutes to elapse to allow sensors to equilibrate.
- Record readings from both units for Temperature (Temp), Specific Conductivity(SC), Dissolved Oxygen in mg/L (D.O.) Dissolved Oxygen saturation (D.O. %), pH and Turbidity (NTU)

9.5.2 Retrieval

Datasondes will be checked against another calibrated Datasonde unit or field meter at retrieval. This duplicate analysis will be done in a standard bucket filled with a grab sample of stream water. Compared values which differ by 10% or more may indicate a problem with the probe and will be identified in the data report. All values are to be recorded in the appropriate fields on the Diurnal Water Quality Monitor form. Follow the steps below

- Remove deployed unit from the water. **Do not** clean the probes of the deployed unit.
- Place datasondes in the grab sample bucket.
- Wait for 5 minutes to elapse to allow sensors to equilibrate.
- Record values from both units for Temp, SC, D.O. D.O. %, pH and NTU.
- Remove the datasondes. Clean/rinse the probe heads of the deployed unit with Deionized Lab Pure water.
- Place the cleaned deployed unit back in the bucket.
- Wait for 5 minutes to elapse to allow sensors to equilibrate.
- Record values from both units for Temp, SC, D.O., D.O.%, pH and NTU.

After measurement time has been achieved the datasondes will be retrieved and the data will be downloaded. Downloaded data will be screened for errors then exported into an excel spread sheet to be supplied to BEARS and the BFBM's data team.

All Datasondes used in the project will be calibrated according to manufacturer's specifications. Calibrations will be recorded for each parameter in a designated logbook. Collected data will be screened for errors and noted in the excel file particular to the site measured. Calibration metadata will be stored in a dedicated field book and held for QA purposes. Dataset verification and validation will be discussed in the *Data Validation* section of this document.

9.5.3 Non-Direct Measurement (Secondary Data)

Secondary data such as Calibration records, Weather, Site Location, Site Conditions and Issues will be recorded for each site prior to deployment and at retrieval. A digital picture of the location will be taken at deployment and retrieval. Field data will be recorded utilizing the USGS Diurnal Water Quality Monitor Field form.

9.5.4 Deployment Requirements

In order for a successful monitoring event, a protocol concerning deployment must be followed. The protocol is broken down into the following steps:

1. Deployment locations will be located with a global positioning system (GPS) if not placed at an established site with previous locational information.
2. Datasonde units must be completely submerged in flowing water in a consistently shaded area. Center flow channel stream placement is optimum.
3. Sensor cluster of the unit should be aimed downstream to prevent scouring of the probe heads.
4. All units must be secured via a cable and lock, affixed to a tree or similar fixture on the stream bank.
5. A site sketch of the unit's placement in a stream must be drawn for retrieval by other BFBM personnel if necessary.
6. Steps should be taken to conceal the unit should the location have foot traffic by non-DEP personnel to prevent tampering.

9.6 Continuous Temperature/Specific Conductance Monitoring Procedures

Temperature monitoring sensors are deployed at selected locations, secured by a stainless steel cable that is fixed to a large stationary object. Data loggers are weighted down with bricks or other weighted devices to prevent the sensor from floating to the top of the water column. The following deployment protocols need to be followed.

1. Sensors are deployed in flowing water in a consistently shaded region of the stream channel. Pools and riffles are to be avoided.
2. Sensors are checked against a certified NIST thermometer before deployment to ensure accuracy.
3. When a sensor is deployed, a temperature reading will be collected by a certified NIST thermomenter.to post check and correct the data for drift.

4. Should sensors be deployed longer than 3 months, temperature data must be downloaded from the unit and redeployed via Logger shuttle.
5. When sensors are removed from a stream, a temperature reading via a NIST certified thermometer will be taken and compared to sensor data for correction purposes.

10.0 Data Quality Requirements

10.1 Continuous Monitoring Parameters:

All measurements will be collected using YSI EXO, 6600, and 6920 series datasondes and Onset HOBO Data Loggers. Sensor specifications can be found in Attachment E.

All datasondes used will be inspected prior to deployment. Datasondes will be serviced, maintained and calibrated according to manufacturer's specifications. D.O. Sensor membranes (if applicable) will be inspected for bubbles or wrinkles and be replaced accordingly. pH sensor bulbs will be inspected for scratches and replaced if necessary. Specific Conductivity sensors will be inspected and cleared of any residue (if any). Turbidity sensors will be inspected, and wiper assembly verified as functional.

Calibration of the datasondes will take place 1 to 3 days in advance of the deployment. YSI 6600, 6920 and EXO series datasondes feature calibration checks to ensure sensors remain properly calibrated. Calibration issues or failures will be indicated by error messages in the software during calibration.

Dissolved Oxygen: Calibration of the Optical Dissolved Oxygen Sensor will be done using the 1-point air saturation method. This method utilizes a water bath containing oxygenated water. A period of 10 minutes shall elapse before calibration takes place to allow temperature and oxygen to equilibrate. The sensor is then calibrated to 100% saturation using the current barometric pressure. The rapid pulse DO sensors report a statistic (DO Charge) that indicates if the probe is operating successfully. Ranges below 25 or exceeding 75 indicate sensor failure. Dissolved oxygen will be checked against a Winkler titration before and after deployment. Differences greater than 0.3 mg/l will require recalibration.

pH: pH sensors will be calibrated via a three-point calibration check. The pH standards used will be 4,7 and 10. pH sensors will report 'Out of Range' errors should sensor output exceeds the normal range. Differences between the standard and measured reading +/- 0.1SU for pH will require recalibration.

Specific Conductivity: Specific Conductivity sensors will be calibrated via a one-point calibration check against a standard of 1.413 uS/cm. Conductivity sensors will report 'Out of Range' errors should sensor output exceeds the normal range. Differences between the standard and measured reading exceeding 1% will require recalibration.

Turbidity: Turbidity sensors will be calibrated via a two-point calibration check. The sensors will be calibrated against a 0 NTU solution and a 100 NTU solution. Turbidity sensors will report 'Out of Range' should the defined calibration range be exceeded. Differences between the standard and measured reading exceeding 2 NTU will require recalibration.

Temperature: Temperature will be checked against a NIST certified thermometer on a quarterly basis. Temperature differences between the standard and measured reading exceeding 0.1°C require recalibration.

10.2 Field Measurements of Analyze Immediately Parameters

The Bureau of Freshwater and Biological Monitoring is certified by DEP's Office of Quality Assurance for specific conductance, pH, dissolved oxygen, water temperature and turbidity measurements.
All pH meters, dissolved oxygen meters, conductivity meters and thermometers shall be operated and maintained according to the "Regulations Governing the Certification of Laboratories and Environmental Measurements", N.J.A.C. 7:18. BFBM is certified by the Office of Quality Assurance (certified lab ID # 11896) for all parameters listed below:

Temperature, pH, Conductance and DO are measured using a Hach model # HQ40D. The Hach HQ40D is a multi-parameter water quality system that combines temperature, pH, conductance, and luminescent dissolved oxygen (LDO) probes into one meter.
Temperature: The probe is calibrated with a NIST certified thermometer on a quarterly basis. Records of the calibration shall be maintained by the BFBM.
pH: The probe is calibrated on a daily basis per the manufacturer recommendations. The pH meter is calibrated each day of use, including calibration with two standard pH buffers bracketing the value to be measured. After calibration, a standard buffer with pH within the calibration range shall be measured without any control adjustments to check the calibration. When the pH meter is in use for longer than a 3-hour period, the pH of the third buffer shall be checked once every three hours. If the pH differs by more than 0.2 pH units from the standard buffer value, the meter shall be recalibrated. Records of all calibrations and calibration checks shall be maintained in the field log.
Conductance: The probe is calibrated daily per the manufacturer recommendations. The probe is calibrated each day of use with a certified

standard which corresponds to the expected range of the values to be measured. Records of all calibrations and calibration checks shall be maintained in the field log.
DO: A Winkler check is performed on a weekly basis and the meter (Hach HQ40D) is barometrically compensated and checked at each sampling site. Records of all calibrations and calibration checks shall be maintained in the field log.
Turbidity: HACH Model 2100P turbidimeter is calibrated once a month per manufacturer recommendations. The meter is then checked with certified standards for accuracy within the calibration range during each day of use. Records of all calibrations and calibration checks shall be maintained in the field log.

Other Parameters:
Barometer: Thommen TX Mechanical Barometer. Measured for LDO meter compensation only. Not used for project's data objectives.
Ambient Air Temperature: Measured for general information purposes only. Not used for project's data objectives.

Relevant Documents
Bureau of Water Monitoring Certified SOP, for field measurements and calibrations.
NJDEP Field Sampling Procedures Manual (2005).
NJAC 7:18 - Regulations Governing the Certification of Laboratories and Environmental Measurements.

10.3 Discrete Sample Collection

Discrete samples will be collected as per "NJDEP Field Sampling Procedures Manual," August 2005; the document available online at the NJDEP's webpage, <http://www.state.nj.us/dep/srp/guidance/fspm/ >. The chemical and field parameters that will be collected as part of this project are listed in Appendix A, Tables 4 and 5.

10.4 Laboratory Analysis

Analytical samples will be delivered to the NJ Dept. of Health (DOH certification # 11036) and testing will be done by a method for which the laboratory has certification. Quality control procedures (including required calibrations and quality control procedures required by regulation or by the method) shall be defined in the laboratory's Quality Manual (QM) or Standard Operating Procedures (SOPs). The QM and SOPs must be approved by the NJDEP Office of Quality Assurance (OQA).
The reporting levels listed in Attachment A. Table 6 are **required** for this project.

10.5 Sampling Locations:

Sampling locations will be established using an approved global positioning system (GPS) device (Trimble Geo Explorer 3 or newer model). Subsequently, all sampling locations will be verified by sampling staff during each sampling event using a GPS device. Photos and site sketches will be provided for each location.

10.6 Sample Containers:

Sample containers shall be dedicated, single-use. Sample containers shall be provided by the DOH certified laboratory.

10.7 Sample Retention:

All samples must be retained by the laboratory until such time that the BFBM approves the reported results or holding times expire.

10.8 Chain of Custody:

Chain of custody forms are required for all samples forwarded to a NJ certified laboratory for testing. Information to be recorded includes all information required by N.J.A.C. 7:18-5.6(d) and 8.5(c).

10.9 Resource Needs:

Approximately 1 FTEs will be required for this project.

11.0 Data Validation

The Project Officer and the Supervisor are responsible for and will perform all initial data validation. If apparent anomalous data is suspected the Project Officer and/or the Supervisor will review the sampling procedures with the field sampler to make sure the proper collection and preservation procedures were followed. Additionally, for nutrient parameters (particularly Ammonia, TKN, Nitrate + Nitrite and Phosphorus), the field sampler, Project Officer and/or the Supervisor may perform further water quality logic tests on the suspect data, as described in the U.S. Geological Survey Open File Report 02/383; 2003, entitled, *"Methods For Quality Assurance Review of Water Quality Data in New Jersey."* This includes dissolved sample results that are significantly higher (see document for additional details) than total results, results that are outside of expected ranges and other scenarios outlined in the document.

If the data is still suspect, the NJ certified laboratory will be contacted. An internal review of their laboratory procedures and/or calculations used in the analysis of the suspect sample, with special emphasis on transcription of data to assure that no transposition of figures occurred will be conducted. The NJ certified laboratory will be asked to check on equipment calibration. They may be further requested to reanalyze the retained portion of the sample. (Samples are to be retained by the laboratory for the duration of each analyte's respective holding time.) If no problems are found in the analytical laboratory procedures, the data may then be compared to any historical data that might have been collected at the same site prior to the most recent sampling event to see if similar anomalies might have been found previously. The suspect data may also be compared to literature values or standard analytical treatises to verify whether or not the results are within the limits of accuracy of the test method.

For continuous monitoring, once the data has been downloaded, it will be screened by the Project Officer. Usability of the dataset will be determined by checks for Drift, errors present (if any) and their extent. Datasondes or data loggers deployed in the field will be checked for Drift at both time of deployment and retrieval. This check will consist of using another datasonde or portable meter alongside the first and comparing readings between the two units

For the Drift check, the difference between the two units will be measured and checked against the following parameter criteria:

Parameter	Minimum	Maximum
Temperature	0.1° C	1.5° C
Specific Conductivity	1%	25%
pH	0.1	1.5
Dissolved Oxygen	0.3 mg/l	1.5 mg/l or 25%
Turbidity	2 NTU or 5%	25%

Should the difference found to be below the Minimum criteria threshold, then the data will be reported as is.

Should the difference fall between the Minimum and Maximum values, the data will then be reported with a qualifier modifying the value listed via a plus/minus percentage or unit(s).

Should the difference exceed the Maximum range, then the data for that parameter will be deleted. Reasons for any deletions will be added to the data record for future use. Once the comparison check is completed, the data will be screened for errors. Sources of errors can be attributed to the following:

1. Non-stream conditions readings (units exposed to air)
2. Hardware failure
3. Tampering by non-DEP personnel (causing erroneous stream readings)
4. Fouling.

Errors involving loss of data (i.e. out of water) will be truncated from the dataset. Errors that involved hardware failure and fouling will result in the truncation of data from the moment of failure to the point of normal operation (if any).

If no obvious problems are found after these reviews, the complete data set will be reported with the suspect data identified as such. The BFBM will then conduct its own review of the data, as it relates to the objectives(s) and data accuracy required in this project.

12.0 Data Storage

Continuous Data:

Continuous specific conductance data from data loggers will be stored in NJDEP's DWM&S Continuous Data Monitoring Program's website (http://njdep.rutgers.edu/continuous/). Graphical representations of the data will be stored internally in BFBM databases/spreadsheets.

Field and Laboratory Analyses

Analytical data for discrete samples submitted to laboratory and data from analyze immediately parameters will be entered into New Jersey's Water Quality Data Exchange (WQDE) and will be accessible through the USEPA, USGS and National Water Monitoring Council's Water Quality Portal by June of the following year it is received from the analytical laboratory. All raw data records shall be maintained for a period of no less than five years. See Attachment A for Data Management Information.

13.0 Performance System Audits

All NJ certified laboratories used are subject to audits and to the requirements of the OQA Laboratory Certification Program as well as internal performance evaluations. The OQA will be notified of field monitoring schedules for possible audits.

14.0 Data Reporting

Continuous Data

Continuous Data will be available through NJDEP's DWM&S Continuous Data Monitoring Program's website (http://njdep.rutgers.edu/continuous/) within 6 months of completion of the project.

Analytical Data

Data analyzed in the field and laboratory will be accessible through the USEPA, USGS and National Water Monitoring Council's Water Quality Portal.

15.0 Assessment, Oversight, and Response

The Project Officer will be responsible for the oversight of all activities relating to this project. The Project Officer will assess field collection functions and make corrections when necessary to maintain the data accuracy as defined in this plan. If any changes or modifications are made to this plan regarding data collection, as it relates to the objectives(s) and data accuracy required in this project, all original signees of the QAPP will be notified.

ATTACHMENT A:
DATA MANAGEMENT TABLES

For Data Management purposes, Water Chemistry is defined as parameters analyzed by a lab; Field measurements are defined as analyze immediately parameters.

Table 1. Monitoring Locations

Station ID(WQDE compliant and referenced)	Waterbody/Location	Latitude-dd	Longitude-dd	County	Site exists in WQDE already?	Location Type
BFBM000232	Doctor's Creek Tributary off Allentown-Lakewood Road	40.16869400000	-74.50352800000	Monmouth	YES	River/stream
AN0260	Mossmans Brook	41.10693400000	-74.43437800000	Passaic	YES	River/stream
01403300	Raritan River at Queens Bridge	40.55961300000	-74.52781100000	Somerset	YES	River/stream
BFBM000245	Shabakunk Creek Tributary	40.28934300000	-74.78434200000	Mercer	YES	River/stream
BFBM000256	Cruser Brook	40.45709000000	-74.68555400000	Somerset	YES	River/stream
BFBM000290	Rahway River Tributary	40.71064800000	-74.33975600000	Union	NO	River/stream

Table 2. Sample Types

STATION ID	Field Msr/Obs	Flow	Water Chemistry	Continuous Monitoring	Biological Sampling	Sediment Collection	Bacteria Collection	Habitat	Metrics	Indices
BFBM000232	YES	YES	YES	NO	NO	NO	NO	NO	NO	NO
AN0260	YES	YES	YES	NO	NO	NO	NO	NO	NO	NO
01403300	YES	YES	YES	NO	NO	NO	NO	NO	NO	NO
BFBM000245	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
BFBM000256	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
BFBM000290	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO

Table 3. Partner Information

STATION ID	Field Msr/Obs	Flow	Water Chemistry	Continuous Monitoring	Biological Sampling	Sediment Collection	Bacteria Collection
BFBM000232	DEP	DEP	DEP	No	No	No	No
AN0260	DEP	DEP	DEP	No	No	No	No
01403300	DEP	DEP	DEP	No	No	No	No
BFBM000245	DEP	DEP	DEP	DEP	No	No	No
BFBM000256	DEP	DEP	DEP	DEP	No	No	No
BFBM000290	DEP	DEP	DEP	DEP	No	No	No

Table 4. Field Parameters

Field Name	WQDE Name	Media	Units
DO	Dissolved oxygen (DO)	Water	mg/l
Water Temp	Temperature, Water	Water	deg C
Spec Cond	Specific conductance	Water	uS/cm
pH	pH	Water	None
Flow	Flow	Water	cfs
Barometric Pressure	Barometric Pressure	Air	mmHg
DO Sat	Dissolved oxygen saturation	Water	%
Temperature, air	Temperature, air	Air	deg C

Table 5. Laboratory Parameters

Analysis (lab name)	EPA Characteristic Name	Method Speciation Name	Result Sample Fraction	Result Measure Unit	Result Value Type	Sample Collection Type	Sample Collection Equipment	Alternate Name
NEW JERSEY DEPARTMENT OF	Alkalinity, total	as CaCO3	Total	mg/l	Actual	Grab	Water Sampler (Other)	
NEW JERSEY DEPARTMENT OF	Ammonia-nitrogen	as N	Dissolved	mg/l	Actual	Grab	Water Sampler (Other)	
NEW JERSEY DEPARTMENT OF	Calcium		Dissolved	mg/l	Actual	Grab	Water Sampler (Other)	
NEW JERSEY DEPARTMENT OF	Chloride		Dissolved	mg/l	Actual	Grab	Water Sampler (Other)	
NEW JERSEY DEPARTMENT OF	Organic carbon		Total	mg/l	Actual	Grab	Water Sampler (Other)	
NEW JERSEY DEPARTMENT OF	Organic carbon		Dissolved	mg/l	Actual	Grab	Water Sampler (Other)	
NEW JERSEY DEPARTMENT OF	Hardness, carbonate		Total	mg/l	Actual	Grab	Water Sampler (Other)	
NEW JERSEY DEPARTMENT OF	Chromium(VI)		Dissolved	ug/l	Actual	Grab	Water Sampler (Other)	
NEW JERSEY DEPARTMENT OF	Magnesium		Dissolved	mg/l	Actual	Grab	Water Sampler (Other)	
NEW JERSEY DEPARTMENT OF	Nitrogen, Nitrite (NO2) + Nitrate (NO3) as N	as N	Dissolved	mg/l	Actual	Grab	Water Sampler (Other)	
NEW JERSEY DEPARTMENT OF	Phosphorus	as P	Total	mg/l	Actual	Grab	Water Sampler (Other)	
NEW JERSEY DEPARTMENT OF	Phosphorus	as P	Dissolved	mg/l	Actual	Grab	Water Sampler (Other)	
NEW JERSEY DEPARTMENT OF	Potassium		Dissolved	mg/l	Actual	Grab	Water Sampler (Other)	
NEW JERSEY DEPARTMENT OF	Sodium		Dissolved	mg/l	Actual	Grab	Water Sampler (Other)	
NEW JERSEY DEPARTMENT OF	Sulfate		Dissolved	mg/l	Actual	Grab	Water Sampler (Other)	
NEW JERSEY DEPARTMENT OF	Total dissolved solids		Total	mg/l	Actual	Grab	Water Sampler (Other)	
NEW JERSEY DEPARTMENT OF	Kjeldahl nitrogen	as N	Total	mg/l	Actual	Grab	Water Sampler (Other)	
NEW JERSEY DEPARTMENT OF	Kjeldahl nitrogen	as N	Dissolved	mg/l	Actual	Grab	Water Sampler (Other)	
NEW JERSEY DEPARTMENT OF	Total suspended solids		Total	mg/l	Actual	Grab	Water Sampler (Other)	
NEW JERSEY DEPARTMENT OF	Aluminum		Total Recoverable	ug/l	Actual	Grab	Water Sampler (Other)	
NEW JERSEY DEPARTMENT OF	Arsenic		Total Recoverable	ug/l	Actual	Grab	Water Sampler (Other)	
NEW JERSEY DEPARTMENT OF	Cadmium		Total Recoverable	ug/l	Actual	Grab	Water Sampler (Other)	
NEW JERSEY DEPARTMENT OF	Chromium		Total Recoverable	ug/l	Actual	Grab	Water Sampler (Other)	
NEW JERSEY DEPARTMENT OF	Copper		Total Recoverable	ug/l	Actual	Grab	Water Sampler (Other)	
NEW JERSEY DEPARTMENT OF	Iron		Total Recoverable	ug/l	Actual	Grab	Water Sampler (Other)	
NEW JERSEY DEPARTMENT OF	Lead		Total Recoverable	ug/l	Actual	Grab	Water Sampler (Other)	
NEW JERSEY DEPARTMENT OF	Mercury		Total Recoverable	ng/l	Actual	Grab	Water Sampler (Other)	
NEW JERSEY DEPARTMENT OF	Nickel		Total Recoverable	ug/l	Actual	Grab	Water Sampler (Other)	
NEW JERSEY DEPARTMENT OF	Selenium		Total Recoverable	ug/l	Actual	Grab	Water Sampler (Other)	
NEW JERSEY DEPARTMENT OF	Zinc		Total Recoverable	ug/l	Actual	Grab	Water Sampler (Other)	

Table 6. Laboratory Analytical Methods and Detection Limits

Parameter	Laboratory	Lab Number	Method	Method ID Context	Lower Reporting Limit	units	Method Detection Limit	units	Upper Reporting Limit (MPN/100 ml)	units	Holding Time	Preservative
Alkalinity	NEW JERSEY DEPARTMENT OF HEALTH - 11036		2320-B	APHA	1	mg/l	1	mg/l			14 days	Ice to 4 deg C
Ammonia (Dissolved)	NEW JERSEY DEPARTMENT OF HEALTH - 11036		4500-NH3(H)	APHA	0.05	mg/l	0.006	mg/l			28 days	H2SO4 to ph < 2, Ice to 4 deg C
Calcium (Dissolved)	NEW JERSEY DEPARTMENT OF HEALTH - 11036		200.7(W)	USEPA	0.1	mg/l	0.007	mg/l			6 months	HNO3 to pH <2, Ice to 4 deg C
Chloride (Dissolved)	NEW JERSEY DEPARTMENT OF HEALTH - 11036		4500-CL(E)	APHA	2.5	mg/l	0.113	mg/l			28 days	Ice to 4 deg C
Organic Carbon (Total) (TOC)	NEW JERSEY DEPARTMENT OF HEALTH - 11036		5310-C	APHA	0.5	mg/l	0.058	mg/l			28 days	Ice to 4 deg C
Organic Carbon (Diss.) (DOC)	NEW JERSEY DEPARTMENT OF HEALTH - 11036		5310-C	APHA	0.5	mg/l	0.058	mg/l			28 days	Ice to 4 deg C
Hardness	NEW JERSEY DEPARTMENT OF HEALTH - 11036		200.7(W)	USEPA	0.662	mg/l	0.069	mg/l			6 months	HNO3 to pH <2, Ice to 4 deg C
Chromium, Hexavalent (Dissolved)	NEW JERSEY DEPARTMENT OF HEALTH - 11036		218.6	USEPA	0.1	ug/l	0.039	ug/l			28 days	, 5mls ammoniumhydroxide/ammonium sulfate:ice to 4 deg C
Magnesium (Dissolved)	NEW JERSEY DEPARTMENT OF HEALTH - 11036		200.7(W)	USEPA	0.1	mg/l	0.006	mg/l			6 months	HNO3 to pH <2, Ice to 4 deg C
Nitrite plus Nitrate (NO2-NO3) (Dissolved)	NEW JERSEY DEPARTMENT OF HEALTH - 11036		4500-NO3(F)	APHA	0.012	mg/l	0.00427	mg/l			28 days	H2SO4 to ph < 2, Ice to 4 deg C
Phosphorus (Total)	NEW JERSEY DEPARTMENT OF HEALTH - 11036		365.1	USEPA	0.01	mg/l	0.00553	mg/l			28 days	H2SO4 to ph < 2, Ice to 4 deg C
Phosphorus (Dissolved)	NEW JERSEY DEPARTMENT OF HEALTH - 11036		365.1	USEPA	0.01	mg/l	0.00553	mg/l			28 days	H2SO4 to ph < 2, Ice to 4 deg C
Potassium (Dissolved)	NEW JERSEY DEPARTMENT OF HEALTH - 11036		200.7(W)	USEPA	0.1	mg/l	0.028	mg/l			6 months	HNO3 to pH <2, Ice to 4 deg C
Sodium (Dissolved)	NEW JERSEY DEPARTMENT OF HEALTH - 11036		200.7(W)	USEPA	0.1	mg/l	0.005	mg/l			6 months	HNO3 to pH <2, Ice to 4 deg C
Sulfate (Dissolved)	NEW JERSEY DEPARTMENT OF HEALTH - 11036		375.2	USEPA	10	mg/l	1.59	mg/l			28 days	Ice to 4 deg C
Total Dissolved Solids	NEW JERSEY DEPARTMENT OF HEALTH - 11036		2540-C	APHA	1	mg/l	1	mg/l			7 days	Ice to 4 deg C
Kjeldahl Nitrogen (Total) (TKN)	NEW JERSEY DEPARTMENT OF HEALTH - 11036		351.2	USEPA	0.1	mg/l	0.046	mg/l			28 days	H2SO4 to ph < 2, Ice to 4 deg C
Kjeldahl Nitrogen (Diss.) (TKN)	NEW JERSEY DEPARTMENT OF HEALTH - 11036		351.2	USEPA	0.1	mg/l	0.046	mg/l			28 days	H2SO4 to ph < 2, Ice to 4 deg C
Total Suspended Solids	NEW JERSEY DEPARTMENT OF HEALTH - 11036		2540-D	APHA	1	mg/l	1	mg/l			28 days	Ice to 4 deg C
Aluminum (Total Rec.)	NEW JERSEY DEPARTMENT OF HEALTH - 11036		200.7(W)	USEPA	10	ug/l	1.4	ug/l			6 months	HNO3 to pH <2, Ice to 4 deg C
Arsenic (Total Rec.)	NEW JERSEY DEPARTMENT OF HEALTH - 11036		200.8 (W) Ultra Trace ICPMS	USEPA	10	ng/l	6	ng/l			6 months	HNO3 to pH <2, Ice to 4 deg C
Cadmium (Total Rec.)	NEW JERSEY DEPARTMENT OF HEALTH - 11036		200.8 (W) Ultra Trace ICPMS	USEPA	10	ng/l	1.7	ng/l			6 months	HNO3 to pH <2, Ice to 4 deg C
Chromium (Total Rec.)	NEW JERSEY DEPARTMENT OF HEALTH - 11036		200.7(W)	USEPA	2	ug/l	0.238	ug/l			6 months	HNO3 to pH <2, Ice to 4 deg C
Copper (Total Rec.)	NEW JERSEY DEPARTMENT OF HEALTH - 11036		200.8(W)	USEPA	1	ug/l	0.01	ug/l			6 months	HNO3 to pH <2, Ice to 4 deg C

Table 6. Laboratory Analytical Methods and Detection Limits

Iron (Total Rec.)	NEW JERSEY DEPARTMENT OF HEALTH - 11036		200.7(W)	USEPA	20	ug/l	0.94	ug/l			6 months	HNO3 to pH <2, Ice to 4 deg C
Lead (Total Rec.)	NEW JERSEY DEPARTMENT OF HEALTH - 11036		200.9	USEPA	1	ug/l	0.16	ug/l			6 months	HNO3 to pH <2, Ice to 4 deg C
Mercury (Total Rec.)	NEW JERSEY DEPARTMENT OF HEALTH - 11036		1631	USEPA	0.5	ng/l	0.2	ng/l			90 days	BrCl, Ice to 4 deg C
Nickel (Total rec.)	NEW JERSEY DEPARTMENT OF HEALTH - 11036		200.8(W)	USEPA	0.5	ug/l	0.01	ug/l			6 months	HNO3 to pH <2, Ice to 4 deg C
Selenium (Total rec.)	NEW JERSEY DEPARTMENT OF HEALTH - 11036		200.8(W)	USEPA	0.1	ug/l	0.097	ug/l			6 months	HNO3 to pH <2, Ice to 4 deg C
Zinc (Total rec.)	NEW JERSEY DEPARTMENT OF HEALTH - 11036		200.8(W)	USEPA	5	ug/l	0.2	ug/l			6 months	HNO3 to pH <2, Ice to 4 deg C

Table 7. Data Inventory Supplement

Geographic Regions	Statewide
Counties	Somerset, Mercer, Monmouth, Passaic, Union
Dates	10/1/2018-9/30/2020
Status	Future/Planned
Sample Frequency	Other
Seasons Sampled	Spring, Summer, Fall, Winter
Waterbody Type	River/Stream
Salinity Category	Fresh
Tidal Influence	Non-tidal, Tidal
Project Description	Through continuous and discrete monitoring, collect water quality data to address various gaps and needed enhancements identified in the State's Long Term Monitoring Strategy.
Parameters analyzed type	Chemical/Physical (Conventionals, Nutrients, Metals)

Table 8. Data Management Supplement

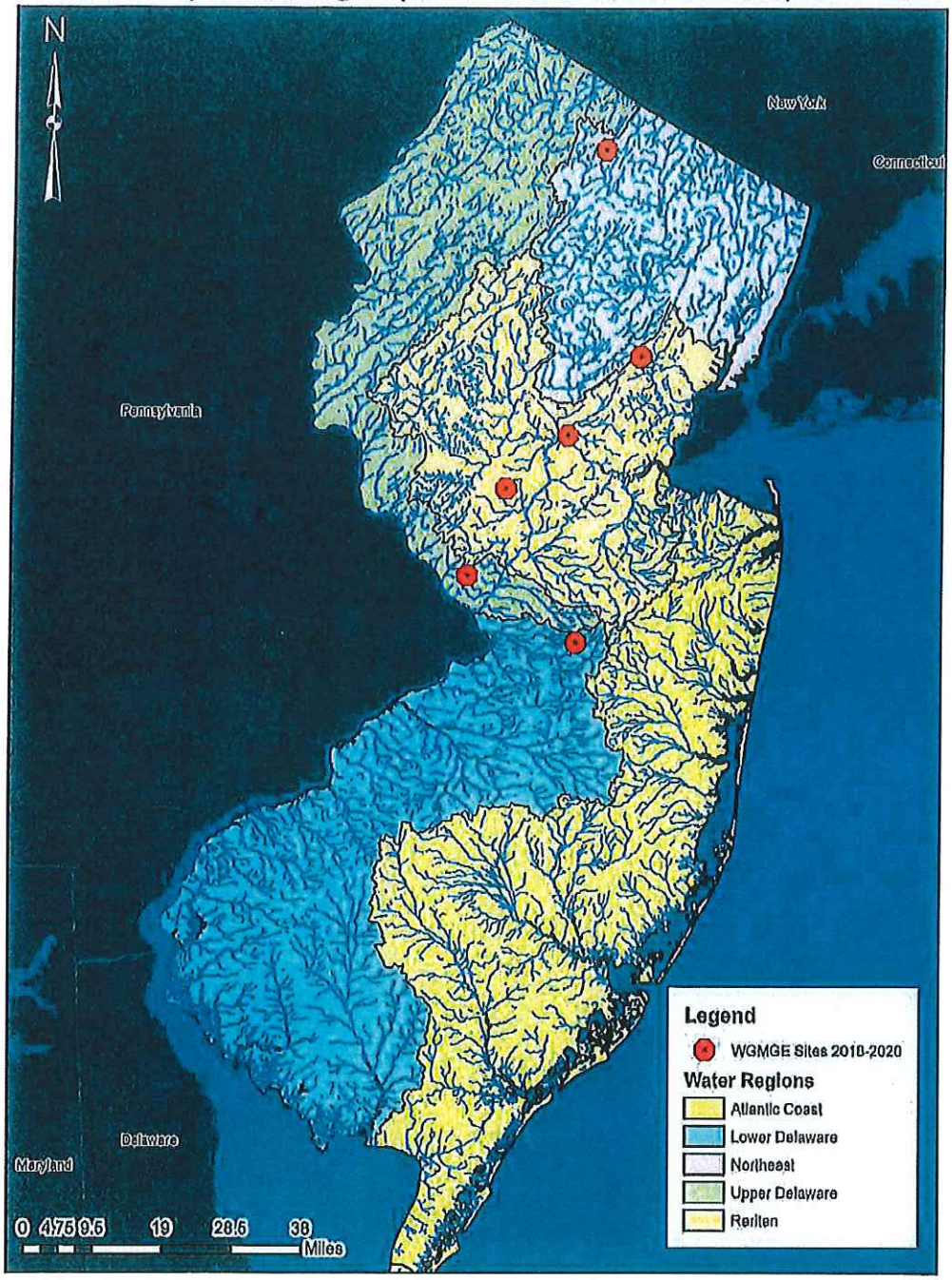
QAPP network path file location?	V:\LUM\BFBM\Bfbm\Quality Assurance Plans\Calendar Year 2018 QAPPS\
Where will data be recorded in field (media)	Paper
If on tablets or phones, will download at office occur or will you connect wirelessly?	NA
If on tablets or phones, who will do the download?	NA
If data collected electronically, where will it be stored?	http://njdep.marine.rutgers.edu/buoy/#data
Format to be received from Lab	LIMS
Method of receipt from lab/s	
Personnel receiving outside lab data	Carol O'Donnel-Kee
Is data expected to go to WQDE/STORET?	Yes. Continuous Data: http://njdep.marine.rutgers.edu/buoy/#data
Data manager - (Bureau and Name)	BFBM Leigh Lager

ATTACHMENT B.
Detailed Monitoring Station and Parameter List

Site #	Stream	Lat	Long	Continuous Monitoring	Discrete Monitoring	Analyze Immediately Parameters	Sample Frequency	Rationale	Sub-Project Code for NJDOH Data Feed
01403300	Raritan River	40.55961	-74.52781	N/A	Conventionals, Nutrients, Metals	Dissolved Oxygen, Specific Conductance, Water Temperature, pH, Turbidity	Quarterly, Metals 2X per year	obtain new water quality data to update trends	WQMGE-2
AN0260	Mossmans Brook	41.10694	-74.43444	N/A	Conventionals, Nutrients, Metals	Dissolved Oxygen, Specific Conductance, Water Temperature, pH, Turbidity	Quarterly, Metals 2X per year	Investigate potential eco-regionally based reference stations	WQMGE-2
BFBM000232	Doctor's Creek Tributary	40.16069	-74.50358	N/A	Conventionals, Nutrients, Metals	Dissolved Oxygen, Specific Conductance, Water Temperature, pH, Turbidity	Quarterly, Metals 2X per year	Investigate potential eco-regionally based reference stations	WQMGE-2
BFBM000245	Shabakunk Creek Tributary	40.28934	-74.78434	N/A	Conventionals, Nutrients, Metals, Continuous Monitoring	Dissolved Oxygen, Specific Conductance, Water Temperature, pH, Turbidity	Quarterly, Metals 2X per year	Identify potential sources of water quality issues	WQMGE-2
BFBM000256	Cruser Brook	40.45709	-74.68555	N/A	Conventionals, Nutrients, Metals, Continuous Monitoring	Dissolved Oxygen, Specific Conductance, Water Temperature, pH, Turbidity	Quarterly, Metals 2X per year	Identify potential sources of water quality issues	WQMGE-2
BFBM000290	Rahway River Tributary	40.71065	-74.33976	N/A	Conventionals, Nutrients, Metals, Continuous Monitoring	Dissolved Oxygen, Specific Conductance, Water Temperature, pH, Turbidity	Quarterly, Metals 2X per year	Identify potential sources of water quality issues	WQMGE-2

ATTACHMENT C.
Map

Water Quality Monitoring Gap and Enhancement Stations; 2018-2020



ATTACHMENT D:

Standard Operating Procedure for Making Discharge Measurements in Wadable, Non-tidal, Freshwater Streams with a Handheld Acoustic Doppler Velocimeter (ADV); revised 12/18/2018

With additional guidance from the United States Geological Survey, the New Jersey Department of Environmental Protection's Bureau of Fresh Water and Biological Monitoring (NJ DEP/BFBM) has adopted the Standard Operating Procedures for using a handheld ADV (Flowtracker and Flowtracker 2) from the manufacturer (Sontek) and the United States Geological Survey Techniques of Water-Resources Investigations Reports (https://pubs.usgs.gov/twri/index-last.html)

I. **Diagnostic Test Before Use** – Before any sampling run, or quarterly, a system diagnostics test called a "beam check" should be performed in a lab environment. A beam check should show that signal amplitude plots from each probe are roughly the same and should show noticeable peaks for "sample volume', "boundary reflection" and "noise level". If not, it is possible the probe(s) may be damaged. A complete description of "beam check" can be found in the manual. Should the meter fail the beam check, it will be removed from service and sent back to the manufacturer for repair.

II. **Site Selection** - To ensure that quality discharge measurements are made, it is important to select a location which minimizes the amount of interference and error during the measurement. Ideally, the location should be at a section of stream which is as straight as possible. If possible, avoid bends in the stream and areas of dead water. A general rule of thumb is that a transect location should be a distance (upstream and downstream) of 2X the width of the stream from any type of control, such as a riffle or pool or incoming tributary. Flow at the location should be as close to being laminar as possible. Once the location is selected, any moveable obstructions (small rocks, tree branches, macrophytes) should be removed from the transect.

III. **Setting up a tagline** - A tagline consisting of a tape measure will be set up perpendicular to the stream flow. The tape measure units should be in feet with sub-increments in 10ths of a foot. It is important that the line is taught and secure. Once established, a stream width will be determined from wetted edge to wetted edge. Edges (right or left) will be determined by looking downstream.

IV. **Measuring discharge** - Measuring discharge involves wading across the stream/ river while taking measurements of water depth and velocity at different locations (based on International Organization for Standardization/USGS procedures) along a transect. By combining this information, the total discharge can be calculated.

Preparation

Divide the river cross-section into a number of stations appropriate for its width.
According to the United States Geological Survey, 25-30 stations will give a representative measurement. There is a limitation however for streams <8.25 feet wide. The meter's probes collect measurements 4 inches from the probe face, perpendicular to stream flow. Increments

less than 4 inches (0.3 feet) will result in overlapping measurements. In these cases, it is acceptable to have as many increments as the stream width will allow. Below is a chart that can be used to determine how many increments to use for streams less than 8.25'

Stream Width	Number of Increments
8'	23
7.5'	21
7'	20
6.5'	18
6'	17
5.5'	15
5'	14
4.5'	12
4'	11
3.5'	9
3'	7
2.5'	6
2'	5
1.5'	3
1'	2
<1'	1

These are general guidelines and actual on-site conditions will determine how many increments can be done for a given stream. It should also be noted that the meter is incapable of measuring flows at a depth less than 3", so increments at those depths may need to be omitted. Depending on site conditions, alternate methods may be necessary to accurately measure discharge in very small streams. Non-wadable streams also require the use of different methods and equipment.

The starting edge is then established. The meter automatically defaults to left edge (descending bank or facing downstream), so it is
advisable to begin on the left edge. If it is not possible, then the operator must change the starting edge to right (see manual).
The operator must then establish the increments that will be used to measure velocity for the given stream width. For example, if the stream is 26 feet width, the increment is 1.04 feet (26/25). This will give the operator the minimum required number of stations (25).

Facing upstream, orient the hand held ADV perpendicular to the tagline Velocity data is recorded once per second for the entire averaging time (40 seconds), and then averaged to compute the mean velocity. Quality control data is also reviewed and displayed; you will be alerted to any unexpected values. If the velocity measurement is found to be unsatisfactory, you should repeat the measurement.

During the entire measurement, the probe's X-axis must be maintained perpendicular to the tagline. The probe should be held away from underwater obstacles that may disturb the flow. Do not turn the hand held ADV into the direction of flow, as it will automatically account for flow direction when making discharge measurements.

Measuring Discharge

Follow manufacturer's guidelines for the correct procedure for measuring discharge using the Flowtracker or Flowtracker 2. A copy of the Quick Start Guide for each meter is attached.

V. Quality Assurance Procedures

To ensure accuracy, NJDEP/BFBM will follow manufactures instructions for determining probe/meter condition. This consists of a beam check and ping test. The beam check is performed in a lab quarterly. The ping test is done in stream daily. These tests ensure that the meter and probe are operating within the manufacturers guidelines. If either of these tests are failed, no discharge measurement will be made and the meter will be sent back to the manufacturer for repair.

NJDEP/BFBM has also developed a quality assurance check for utilizing the handheld ADV. Each staff member trained to obtain discharge measurements will be required to have a flow comparison check against an existing USGS real-time gage. Any flow comparison at a USGS real-time station that is off more than 20% will be repeated. If the repeated measurement is still off by more than 20%, then that staff member will undergo additional training. After the comparison is completed a hard copy will be stored of both the samplers discharge measurement and the ADR flow rate. Once staff are trained, they must perform these comparisons quarterly for a period of two years. If all eight comparisons are within 20% of the real-time gage readings, then comparisons will only be required once per year. If comparisons are not within 20% then, staff will be evaluated by a supervisor or project manager and will have to restart the two-year period of quarterly comparisons.

All discharge measurements made should have the flow rate (cubic feet per second) and also be designated a rank (see below) which determines the quality of measurement.

NJDEP/BFBM ranks the quality of stream flow measurements by summing the International Organization of Standardization and Statistical uncertainty percentages that are calculated within the data file.

Sum of Percent Uncertainty:	**</= 5.0%**	**Very good**
	> 5.0 and </= 10.0%	**Good**
	>10.0% and </= 20.0%	**Fair**
	> 20.0%	**Poor**

All ranks should be entered with the data on all lab analysis and field sheets.

ATTACHMENT E:
Sensor Information For Continuous Monitoring Devices

Logger/Probe Type	Manufacturer	Model #	Range	Resolution	Accuracy
Temperature Logger	Onset	U22-001	-40 to 50° C	0.02 °C at 25°C	+/- 0.21 from 0 to 50 C
pH	YSI	6 series	0-14 units	0.01 units	+/-0.2 units
pH	YSI	EXO	0-14 units	0.01 units	+/- 0.1 units within 10 DEGREES C,+/-0.2 units
D.O. optical	YSI	6150	0-50 mg/l	0.01 mg/l	0-20 mg/l +/- 1% of the reading or +/- 0.1 mg/l w
D.O. optical	YSI	EXO	0-50 mg/l	0.01 mg/l	0-20 mg/l +/- 1% of the reading or +/- 0.1 mg/l w
Turbidity	YSI	6163	0-1000 NTU	0.1 NTU	+/- 5% reading or 2 NTU (Whichever is greater)
Turbidity	YSI	EXO	0-4000 FNU	0-999 FNU: .01 FNU, 1000-4000 FNU: .1 FNU	0-999 FNU: +/-2% of reading (whichever greate
Conductivity	YSI	6560	0-100 mS/cm	0.001 mS/cm to 0.1 mS/cm (Range dependent)	+/- 0.5 % of reading +0.001 mS/cm
Conductivity	YSI	EXO	0 to 200 mS/cm	0.001 mS/cm to 0.1 mS/cm (Range dependent)	0-100 mS/cm:.001, 100-200 mS/cm: +/- 1%
Temperature	YSI	6560	-5 to 45 °C	0.01 ° C	+/- .15 °C
Temperature	YSI	EXO	-5 to 45 °C	.001 ° C	-5 to 35 C : +/- .01; 35-50 C +/- .05 C

ATTACHMENT F: Chain of Custody

Field ID Number	New Jersey Department of Health Environmental and Chemical Laboratory Services PO Box 361, Trenton, NJ 08625-0361 Phone: 609-530-2820 **ORGANIC AND INORGANIC CHEMISTRY SAMPLE SUBMITTAL** *(See Instructions)*	Lab Sample Number (For Lab Use Only)

AGENCY INFORMATION

Submitting Agency	Send Results To	Agency No.	Project Name
Street Address	Final Report Option ☐ Tier 1 ☐ Tier 2 Electronic Report Option ☐ EDD ☐ E-2	Would you like copies of the internal chain of custody forms sent with your report? ☐ Yes ☐ No	Project Code Memo Number
City, State, Zip Code	Phone	Fax	Email

SAMPLE INFORMATION

Sample Point/Station ID Number/Water Facility ID	Collection Date (YY/MM/DD) ___/___/___	Sample Type Non-Potable: ☐ Stream/Surface ☐ Ground Water ☐ Private Well ☐ Septic ☐ Ocean/Saline ☐ Sediment ☐ Tissue ☐ Sewage: ☐ Raw ☐ Effluent ☐ Industrial: ☐ Raw ☐ Effluent
Sampling Site/Facility/Supply/Location/Sampling Point ID	Coll. Time (24h) Start / Coll. Time (24h) End	
Waterbody Name	Sample Retention Retain? ☐ No ☐ Yes Duration ____	
Municipality/County	Type of Sampling Event ☐ Regular ☐ Compliance ☐ Repeat ☐ Non-Regulatory ☐ Other	
Sampling Point Street Address	If Repeat or GWR, List Original Lab Sample No.	
	Sample Collector	
PWSID	Trip #	Potable: ☐ Groundwater Rule ☐ Source ☐ Confirmation ☐ Raw ☐ Finished ☐ Private Well ☐ At Source ☐ Flushed ☐ 1st Draw ☐ Lead Source Line ☐ Surface H_2O Intake ☐ Distribution System Fraction: ☐ Total ☐ Dissolved Other: ☐ Priority: ☐ Routine ☐ Priority ☐ Emergency

FIELD INFORMATION

Air Temp °C	Water Temp °C	Stream Flow-CFS
Weather Conditions	Sample pH (Field)	Gage Height-Ft.
Preserved In: ☐ Field ☐ Lab Date: __ __ / __ __ / __ __ Time: __ __ __ __	DO (mg/l)	Spec. Cond. (µS/CM)
	DO% Sat	Salinity (ppm)
Chlorine Residual	Sample Depth Ft.	Tide Stage
Comments/Field Checks	Barometric Pressure (mmHg)	Turbidity (NTU)

ANALYSIS REQUESTS

Metals

☐ Ag.....Silver	☐ Mg.....Magnesium
☐ Al.....Aluminum	☐ Mn.....Manganese
☐ As.....Arsenic	☐ Mo.....Molybdenum
☐ B.....Boron	☐ Na.....Sodium
☐ Ba.....Barium	☐ Ni.....Nickel
☐ Be.....Beryllium	☐ Pb.....Lead
☐ Ca.....Calcium	☐ Sb.....Antimony
☐ Cd.....Cadmium	☐ Se.....Selenium
☐ Co.....Cobalt	☐ Si.....Silica
☐ CR-T....Chromium	☐ Tl.....Thallium
☐ Cu.....Copper	☐ U.....Uranium
☐ Fe.....Iron	☐ V.....Vanadium
☐ K.....Potassium	☐ Zn.....Zinc

Preferred Methodology
☐ EPA 200.7 / 200.9 ☐ EPA 200.8

Residues
☐ Total Suspended Solids (TSS)
☐ Total Solids (TS)
☐ Total Dissolved Solids (TDS)
☐ Settleable Solids (SS)
☐ Total Volatile Solids (TVS)

General

☐ Alkalinity	☐ Fluoride by IC
☐ Bromide by IC	☐ Hardness
☐ Chloride	☐ MBAS
☐ Chloride by IC	☐ Odor
☐ Chromium, Hexavalent	☐ pH
☐ Chromium, Hexavalent by IC	☐ Phenols (PW)
☐ Color	☐ Phenols (NPW)
☐ Conductance	☐ Sulfate by IC
☐ Cyanide	☐ Sulfide Lachat
☐ Dissolved Oxygen	☐ Turbidity
☐ Fluoride	

Mercury
☐ Mercury by EPA 245.1
☐ Low Level Mercury EPA 1631E

Nutrients

☐ Nitrite	☐ Nitrite + Nitrate
☐ Total Phosphorus	☐ Ortho Phosphorus
☐ Ammonia	☐ Total Kjeldahl Nitrogen (TKN)
☐ Nitrate (Calculated)	
☐ Nitrogen, Total (Calculated)	

Organics (Drinking Water)
☐ EPA 504.1 - EDB, DBCP, 123TCP
☐ EPA 505 - Chlordane
☐ EPA 505 - Toxaphene
☐ EPA 507 - N and P containing Pesticides
☐ EPA 515.3 - Chlorinated Acid Herbicides
☐ EPA 524.2 - Purgeables
☐ EPA 525.2 - Liquid-Solid Extractables
☐ EPA 531.1 - N-Methylcarbamoyloximes and N-Methylcarbamates

Organics (Non-Potable Water)
☐ EPA 624 - Purgeables
☐ EPA 625 - Base/Neutral and Acid Extractables

Demands
☐ Total Organic Carbon (TOC)
☐ Dissolved Organic Carbon (DOC)
☐ Chemical Oxygen Demand (COD)

Suggested Dilutions
☐ BOD5 ☐ BOD20 ___ ___ ___
☐ CBOD5 ☐ CBOD20 ___ ___ ___

Other
☐ _____ ☐ _____ ☐ _____

Relinquished By:	Affiliation:	Received By:	Affiliation:	Date/Time	Remarks/Condition
Name (Print):		Name (Print):			
Signature:		Signature:			
Name (Print):		Name (Print):			
Signature:		Signature:			

CHEM-44
EGO 1A