Central Plymouth County Water District Commission

Minutes of Tuesday July 27, 2021, ZOOM Meeting

The meeting took place via Zoom video/teleconference due to current COVID-19 social distancing recommendations issued by Governor Charles Baker.

There was a pause to the start of the meeting as there was a typo error in the Zoom link for attendees. Frank Basler resent the ZOOM invite link to all on the blast list. At that point, the meeting moved ahead after sufficient time was given to link in for all interested.

Quorum was reached with three Commissioners voting in affirmative, roll call vote: Commissioner O'Leary – yes, Commissioner Sotir – yes, and Chair Zygmunt – yes. Three in the affirmative, the meeting began at 12:15 PM.

Meeting attendees identified included Al DeGirolamo from Senator Brady's office, Sheila Vaughn of the Kingston Board of Selectman/CPCWDC Advisory Board, Kimberly Groff of Kimberly Groff Consulting, Pine duBois of Jones River Watershed Association, and Don Howard, of Hanson Water Committee. Matt Ladewig and Jeff Hershberger from ESS Group, Inc attended as the Silver Lake Water Quality Monitoring Project consultants. Frank Basler, Plymouth County Administrator, attended and took minutes.

Commissioner O'Leary moved to accept the minutes of June 9, 2021. Seconded by Commissioner Sotir. Roll call vote: Commissioner O'Leary – yes, Commissioner Sotir – yes, and Chair Zygmunt – yes. Motion passes unanimously. Commissioner O'Leary moved to accept the minutes of June 29, 2021. Seconded by Commissioner Sotir. Roll call vote: Commissioner O'Leary – yes, Commissioner Sotir – yes, and Chair Zygmunt – yes. Motion passes unanimously.

Frank Basler gave an overview of the Finance Report. The June 30, 2021, bank balance was $481,260.44. The only transaction was earned interest. There were no questions raised. Frank asked for approval of two invoices as detailed below:

- Plymouth County – invoice dated 7/1/21 for $4,730.08 for FY 21 services
- Kimberly Groff Consulting – invoice dated 6/30/21 #002 for $2,625.00 for services through 6/30/21

Commissioner Sotir moved to pay the Kimberly Groff Consulting invoice of $2,625 as noted above. Seconded by Commissioner O'Leary. Roll call vote: Commissioner O'Leary – yes, Commissioner Sotir – yes, and Chair Zygmunt – yes. Motion passes unanimously.

Commissioner Sotir moved to pay the Plymouth County invoice of $4,730.08 as noted above. Seconded by Commissioner O'Leary. Roll call vote: Commissioner O'Leary – yes, Commissioner Sotir – yes, and Chair Zygmunt – yes. Motion passes unanimously.

Kim Groff discussed the Scope of Work submitted to act as liaison with ESS Group, Inc. during the Water Quality Monitoring project. The Commissioners discussed how much Ms. Groff has helped to date and that her involvement is critical to a great outcome. Commissioner O'Leary moved to

accept the Scope of Services the Ms. Groff submitted on June 30, 2021 for a total of $8,500 (with a sum not to exceed $10.000) for time at $150 per hour and materials. Seconded by Commissioner Sotir. Roll call vote: Commissioner O'Leary – yes, Commissioner Sotir – yes, and Chair Zygmunt – yes. Motion passes unanimously.

Kim Groff updated the meeting on the ESS Group project. The Work Plan outline was signed off by Ms. Groff and the group will now discuss the sampling plan. She then introduced Matt Ladewig to discuss the sampling and analysis plan. Also, Ms. Groff stated that the newest thoughts are the EPA does not need to approve the sampling plan and that sampling can begin in the fall. Mr. Ladewig stated that ESS agrees with Ms. Groff on EPA need for approval. Chair Zygmunt said the QAPP will not need to approval of the EPA as this is not a project funded by the EPA. The Commissioners agreed with this rational.

Mr. Ladewig reviewed the Silver Lake Water Quality Monitoring Sampling and Analysis Plan (SAP) (included as part of the minutes – 42 pages) and started in the project design section. Mr. Ladewig did meet with Mr. Selene, and that the deepest part of the lake will be determined after bathymetry. The sampling plan is part of the document that follows these minutes.

Ms. duBois stated that there is a bisymmetry report that Colantonio Inc. completed around 2003 and is in depth and done well. Ms. duBois will get the information over to ESS Group.

Mr. Ladewig described the sampling design and the four components of the plan. Sediment testing can be included if approved by the Commissioners. The four are: 1. Bathymetry, 2. In-lake Water Column & Quality Sampling, 3. Upstream & Downstream Monitoring, and 4. Groundwater Assessment. The plan also calls out the process for the testing. Testing should be able to begin late summer or early fall as the water level in the lake is quite high. The plan gives structure but also has flexibility worked into it. Macroinvertebrates will also be sampled at different water depths. ESS thinks that e coli and cyanotoxins sampling are important. The ground water assessment will be completed next year.

Mr. Ladewig shared the Detailed Project Schedule: June 2021 to June 2022. There were no questions.

Ms. duBois shared that duck and geese are an issue in the spring and that knowing the difference between waterfowl and human waste is critical. She also stated the winds can play an issue too.

The Chair asked for other questions and there were none. The next discussion centered on review of the Public Involvement Plan (attached to the minutes) which includes outreach in the September to October time frame. Jeff Hershberger took the Commissioners through the plan. Key objectives of the plan include SAP review meeting objectives and holding a public listening session. Goals of each objective were reviewed. Mr. Hershberger reviewed the rest of the document. Commissioner O'Leary discussed how a greater outreach to the four communities of that surround Silver Lake. He also suggested advertising the message in the newspaper.

The Chair asked if the County could email the Commissioners and Ms. duBois with the communications blast list to see if there are any names missing. Frank said that a press release will

go a long way to publicizing the process and plans of the CPCWDC. The town Boards of Health should be included in the outreach along with all Chambers of Commerce executive directors. Also, the County should add the Pembroke Herring Board. Plymouth County will add these to the list and send the list to the group to see who else should be added. Kimberly Groff was asked to prepare a press release to inform the public. The Commissioners asked Ms. Groff and Frank to prepare a letter to go to all town managers/administrators and the Board of Selectmen to communicate about the August 9th SAP listening ZOOM meeting.

The Commissioners then suggested setting a date for a public meeting. Public Review meeting will be Monday, August 9 at 6:00 PM (posted as a CPCWDC meeting) asking people to submit public comments about the SAP. Commissioner O'Leary suggested that the meeting be held via ZOOM and was agreed to by consensus. Ms. duBois said advertising the meeting on the Monponsett Pond public meeting would be a good idea.

Frank should send draft minutes out with all attachments to all the blast group along with the notice of the public meeting.

The Water Quality Fact Sheet and other agenda items will be postponed to the next agenda.

Chair Zygmunt will reach out to Mayor Sullivan for appointees to the CPCWDC Advisory Committee.

Chair Zygmunt stated that the candidates for Brockton public offices should become evident over the next few weeks. The Chair discussed that Ms. duBois would volunteer to inform candidates and run tours for the candidates as needed.

The Chair also shared that a draft Resource Management Plan for Monponsett Pond was released, and the Chair and Commissioner Sotir will be attending the meeting via ZOOM. Commissioner Sotir will represent the CPCWDC at the virtual meeting. Public Comments are due August 23, 2021. Commissioner O'Leary moved that the Chair draft comments representing the CPCWDC about the Resource Plan and send them to Brockton by the deadline. Seconded by Commissioner Sotir. Roll call vote: Commissioner O'Leary – yes, Commissioner Sotir – yes, and Chair Zygmunt – yes. Motion passes unanimously.

Ms. duBois stated that the City of Brockton has been using Aquaria recently drawing 2MM gallons per day.

The next meeting will be a Zoom meeting on August 24th at noon.

Meeting adjourned at 2:00 P.M.

Submitted by Frank Basler

CENTRAL PLYMOUTH COUNTY
WATER DISTRICT COMMISSION
44 OBERY STREET, PLYMOUTH, MA 02360
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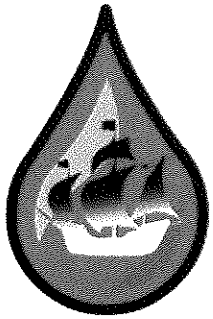

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NOTICE OF MEETING

DATE & TIME: **Tuesday, July 27, 2021, 12:00 PM**

MEETING LOCATION: **Zoom video/Teleconference**

This meeting notice is being filed and posted in each city or town within the Central Plymouth County Water District, pursuant to General Law Chapter 30A, Section 20. Said notice and agenda must be filed in the offices of the city and town clerks within the District **at least 48 hours** prior to such meeting. Such filing and posting shall be the responsibility of the officer calling the meeting.

Please click the link below to join the webinar:
https://us02web.zoom.us/j/88927305946?pwd=ZFpUNDhadXZjMGxsRENmRHZYdmt4dz09 Password: 693524

Or Telephone: Dial US: +1 312 626 6799 or +1 470 250 9358 Webinar ID: 889 2730 5946 Password: 693524

AGENDA

Meeting opening

Approval of minutes: Wednesday, June 9, 2021, and Tuesday, June 29, 2021

Finance report and invoice approval (Groff Consulting and County services)

Kimberly Groff Consulting scope of service - vote

Update on Water Quality Sampling and Analysis of Silver Lake RFP, Project Plan, and Optional Services from ESS Group with possible vote including Review of Draft Sampling and Analysis Plan (SAP) along with the Public Involvement Plan (PIP)

Quality Assurance Project Plan (QAPP) next steps and approvals

Silver Lake Water Quality Fact Sheet

Update and discussion on proposal to purchase hydro dredge

Vacant Brockton seats on Advisory Board

Outreach to Brockton political candidates

Other business not anticipated by Chair

Next meeting time and location

Adjourn

Posted on Tuesday, July 20, 2021, at 11:30 AM at each of the eight Clerk's offices listed below and the County web site at www.plymouthcountyma.gov

DRAFT

Central Plymouth County Water District Commission

Minutes of Wednesday June 9, 2021 Meeting

Quorum was reached with two Commissioners attending the meeting. Chair Zygmunt and Commissioner O'Leary were in attendance and the meeting began at 6:00 PM.

The meeting attendees included Pine duBois and James Garner of Jones River Watershed Association, Don Howard, of Hanson Water Committee, and Charles Matthewson, of WATD.

Commissioner O'Leary moved to accept the minutes of May 12, 2021. Seconded by Chair Zygmunt. Motion passed unanimously.

The next meeting was scheduled for noon on Tuesday, June 29th.

Frank updated the Commissioners on the RFP process. The RFP was released on May 7and due on Friday, June 4th. There were three firms that submitted proposals. The Review Committee completed ratings on the qualitative criteria of the RFP.

At 6:25 PM, Neil Price and Bryan Masa from Horsley Witton Group (HW) presented a handout to the Commissioners. The gentlemen then reviewed their key past experiences, why HW is the right choice, and challenges that were seen with the proposal. Bryan Masa has led other sampling projects, currently working on Barnstable Airport, and the team has done several projects together. Neil did call out that EPA approval of the sampling plan will be a huge challenge.

Corona Environmental Consulting was the next presenting with Margaret Kearns representing the firm at 6:45 PM. Margaret reviewed similar projects that Corona has worked on both nationally and locally. Margaret has worked with Silver Lake in the past. She thought a new face would be great. Margaret stated that statistically they are strong and still developing. Data management is very strong. Communication is a strength that they deliver. They use approaches to the right people with the right type of communication. EPA approval can take up to about three months, or longer, and will be a major hurdle in delivery. They produced a two-year budget as a one-year budget, in their opinion, will not meet the goals of the RFP. Focusing on drinking water is a key. They made assumptions that caused high estimates, but they can be flexible. Margaret stated that this is a diagnostic feasibility study to drive next steps and corrective actions based on information from the Commissioners. Frank asked about the dynamic of work between Corona and the subcontractor GZA and Margaret stated that Corona would be the key contact and GZA would attend meetings when necessary but would not be communicated directly.

Matt Ladewig and Jeff Hershberger from ESS Group were introduced at 7:10 PM and led us through a handout that answered the pre asked questions. Many of the team have experience with Silver Lake and other local bodies of water. Keith Pilgrim is a sub-contractor that would work with modelling, if necessary, and has worked with the team in the past. Bartlett Pond in Plymouth is one of the most recent studies. Matt stated that Silver Lake has been studied many times and thought that looking at things that have not been studied was most important. They are also working with Aquarion Water Co in CT watershed areas and wrapping up this July. ESS called out the tight schedule in the beginning to get field work done and to have public interaction but said that being flexible in the project can overcome some obstacles. This is a large project that involves quantity and quality. ESS then went through key reasons why to work with them is the best alternative. They also called out Silver Lake access is another key challenge.

The Commissioners then finalized the interview rating criteria with Horsley Witton earning a HA 8, Corona receiving a HA 9, and ESS Group receiving a HA 10. When factored in with the other Qualitative Criteria the final qualitative rankings were

1. ESS Group – score of 97
2. Corona Environmental Consulting – score of 84
3. Horsley Witton Group – score of 76

The pricing proposals were then opened. The Commissioners then discussed which The District reserves the right to award one (1) Contract, if at all, to the most qualified responsive and responsible Responder who complies with the Response Submission Requirements and delivers the most advantageous proposal, taking into consideration the Evaluation Criteria as well as the Proposal cost.

Commissioner O'Leary made a motion to select ESS Group as a winner for the May 7th, 2021, Central Plymouth County Water District Commission Silver Lake Water Quality Monitoring RFP, and that the Chair work with Frank Basler to finalize and sign the contract in behalf of the CPCWDC Commissioners and for ESS Group to begin the work. The motion was seconded by Chair Zygmunt. The motion passed unanimously.

The Commissioners would like a kickoff meeting of June 29th and ESS Group can let the Commissioners know what needs to be done for preparation. Frank will work with ESS Group and Kim Groff to set up the meeting and an agenda.

Ms. duBois wanted to know if ESS Group has the bathymetric study of Silver Lake. They will investigate it.

The Commissioners asked Frank to reach out to Kim Groff and ask to extend the contract on an hourly basis for as liaison for the ESS Group project and that she be in attendance on June 29th.

Motion to adjourn at 8:05 PM by Commissioner O'Leary, seconded by the Chair Zygmunt. Motion passes unanimously, and the meeting adjourned.

Respectfully submitted by,

Frank Basler, Plymouth County Administrator

Handouts: CPCWDC Agenda for June 9, 2021, evaluation rating sheets, and the draft minutes package of May 12, 2021.

CENTRAL PLYMOUTH COUNTY
WATER DISTRICT COMMISSION
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NOTICE OF MEETING

DATE & TIME: **Wednesday, June 9, 2021, 6:00 PM**

MEETING LOCATION: **Halifax Town Hall Selectmen Meeting Room**

499 Plymouth St, Halifax, MA

This meeting notice is being filed and posted in each city or town within the Central Plymouth County Water District, pursuant to General Law Chapter 30A, Section 20. Said notice and agenda must be filed in the offices of the city and town clerks within the District **at least 48 hours** prior to such meeting. Such filing and posting shall be the responsibility of the officer calling the meeting.

AGENDA

- Minute acceptance for May 12, 2021
- Approve meeting schedule for 2021
- Silver Lake Water Quality Monitoring Request for Proposal update and review
- RFP submission interviews (order determined at random)
    - 6:30 PM – Horsley Witten Group interview
    - 7:00 PM – Corona Environmental Consulting
    - 7:30 PM – ESS Group
- Final ratings and discussion and award of RFP
- Other business not reasonably anticipated by the Commission

Posted on Friday, June 4, 2021, at noon at each of the eight Clerk's offices listed below and the County web site at www.plymouthcountyma.gov

Firm	Eval Rating Criteria 1 35%	Eval Rating Criteria 2 15%	Eval Rating Criteria 3 20%	Eval Rating Criteria 4 20%	Eval Rating Criteria 5 10%	Total Score
Horsley Witten Group						
rating	HA	HA	HA	A	HA	
rating score	8	8	8	6	8	76
notes				Masa not as experienced as others in sampling programs		
Corona Environmental Consulting						
rating	HA	HA	HA	HA	HA	
rating score	8	8	9	9	8	84
notes	less analytic and technical than other two responders			question on how much this team has worked together in past		
ESS Group						
rating	HA	HA	HA	HA	HA	
rating score	10	8	10	10	10	97
notes	great monitoring experience			Great team	great monitoring experiences	

DRAFT

Central Plymouth County Water District Commission

Minutes of Wednesday May 12, 2021 Meeting

The meeting took place via Zoom video/teleconference due to current COVID-19 social distancing recommendations issued by Governor Charles Baker. Participants attending the meeting were Central Plymouth County Water District Commission Chair Joanne Zygmunt and Commissioner Jack O'Leary.

Quorum was reached with two Commissioners voting in affirmative, roll call vote: Commissioner O'Leary – yes, and Chair Zygmunt – yes. Two in the affirmative, the meeting began at 6:03 PM.

Meeting attendees included Pine duBois of Jones River Watershed Association, Don Howard, of Hanson Water Committee, Monica Mullen, of Senator Morin's office, and Charles Matthewson, of WATD. Frank Basler, Plymouth County Administrator, attended and took minutes.

Commissioner O'Leary moved to accept the minutes of April 14, 2021. Seconded by Chair Zygmunt. Roll call vote: Commissioner O'Leary – yes, and Chair Zygmunt – yes. Motion passes unanimously. Commissioner O'Leary moved to accept the minutes of April 27, 2021, with the addition of his RFP edits added as an addendum to the packet. Seconded by Chair Zygmunt. Roll call vote: Commissioner O'Leary – yes, and Chair Zygmunt – yes. Motion passes unanimously.

Frank Basler gave an overview of the Finance Report. The April 30, 2021, bank balance was $486,170.15. The only transactions ware earned interest and the clearing of the check issued for Ms. Groff's consulting work. There were no questions raised.

The Commissioners discussed the RFP that was published on May 7th and has been distributed to almost a dozen requesting entities. Frank updated the Commissioners on the interaction between the qualitative criteria and the pricing of the proposal. No questions have been submitted thus far. The Chair confirmed that interviews for respondents would be Wednesday, June 9 and a back up time, depending on how many proposals are received, would be Thursday, June 10. Frank will be emailing details on the criteria ratings and proposals to the Commissioners once they are received on June 4.

The Chair asked for an update on the Hydro Dredge and Commissioner O'Leary stated that he has been working on an MOU with Brad Chase, of the MA Division of Marine Fisheries. He believes the two sides are close to agreement and is waiting on final edits or approval.

Commissioner O'Leary discussed the idea of radio beacons in district ponds. He is concerned about potential for vandalism and theft. The Commissioners discussed different web site data that is available to all. Commissioner O'Leary stated that he would be installing seven or eight mechanical gauges in ponds in August and or September.

Ms. duBois asked about support for improving fish passages in partnership with the Division of Marine Fisheries. Commissioner O'Leary made a motion that Chair Zygmunt craft a letter in support of the fish passages between the Jones River and Silver Lake funded by state funds and send the letter to State Senator Moran and Brady. Seconded by Chair Zygmunt. Roll call vote: Commissioner O'Leary – yes, and Chair Zygmunt – yes. Motion passes unanimously.

The Commissioners will discuss the summer meeting schedule at next meeting.

Next regular meeting of the CPCWDC Commissioners will be Wednesday, June 9 at 6 PM.

Motion to adjourn at 7:05 PM by Commissioner O'Leary, seconded by the Chair Zygmunt. Roll call vote: Commissioner O'Leary – yes and Chair Zygmunt – yes. Motion passes unanimously, and the meeting adjourned.

Respectfully submitted by,

Frank Basler, Plymouth County Administrator

Handouts: CPCWDC Agenda for May 12, 2021, Financial Report through April 30, 2021, and the draft minutes packages of April 14 and April 27, 2021.

DRAFT

Central Plymouth County Water District Commission

Minutes of Tuesday June 29, 2021

The meeting was held at the Old Colony Planning Council offices at 70 School Street, Brockton Massachusetts. Participants attending the meeting were Central Plymouth County Water District Commission Chair Joanne Zygmunt and Commissioner Mark Sotir. Commissioner Jack O'Leary joined by Zoom at 12:10 P.M.

Quorum was reached with two Commissioners voting in affirmative, roll call vote: Commissioner Sotir – yes, and Chair Zygmunt – yes. Two in the affirmative, the meeting began at 12:03 PM.

Meeting attendees included Michelle DuBois the Brockton State Representative, Al DeGirolamo from Senator Brady's office, Mary Waldron from Old Colony Planning Council, Pine duBois of Jones River Watershed Association, Don Howard of Hanson Water Committee, Kimberly Groff from KG Consulting, Gino Zellini from Pembroke Conservation, Art Egartson from Pembroke Conservation, and Lenny Rowe from WATD. Also, Matt Ladewig and Jeff Hershberger from ESS Group, Inc attended as the new Silver Lake Water Quality Monitoring Project consultants. Frank Basler, Plymouth County Administrator, attended and took minutes.

- Minute acceptance for June 9, 2021 – tabled unanimously to next meeting

- Hydro Dredge project update – Ms. Pine duBois stated the Brad Chase from the Massachusetts Division of Marine Fisheries and she had discussions about the equipment necessary for the project. She stated that she needed to clarify information on the size of the unit. The budget is still approximately $100,000 to $150,000 for the complete purchase. There is no action necessary for the Commissioners at this point. The goal is to have the equipment on scene for next year. Permitting and project schedules can be lined up for next year. A question was asked about how long the dredge would take to build out prior to delivery; Ms. duBois will ask and report back. She will continue to work with the DMF on the details with Commissioner O'Leary.

- Kimberly Groff continuation of consultant – the Chair stated that Ms. Groff will act as liaison to ESS Group on the project at a rate of $150 per hour, the same as the earlier project, and will be billed on a monthly basis. All Commissioners agreed and a Scope of Service was asked for by Ms. Groff to be addressed by the Commissioners at the next meeting.

- Silver Lake Water Quality Monitoring Request for Proposal update – Frank stated that the contract is ready to be signed and all else is working well.

- ESS Group Silver Lake Water Quality Monitoring Project Kick-off – Matt Ladewig introduced himself as the key contact for ESS Group, Inc. Jeff Hershberger, Senior Hydrologist, also introduced himself and will assist in day-to-day ongoings of the project. Thus far the team has begun review of the studies that have been completed recently in the Silver Lake area. Matt asked for any information that the group knows about that they should look at. It was said that Charlie Seelig, Halifax Town Administrator, sends out information daily on local ponds.

Mr. Ladewig will work with Frank to set up a share drive that we will publicize on the CPCWDC web site. Mr. Ladewig will work with Ms. Groff and Ms. duBois on adding data.

Access to Silver Lake was discussed, using the boat ramp on Silver Lake. Residents around the lake have access to the lake through their back yards. No gasoline engines are allowed on the lake.

Chair Zygmunt will reach out to Mayor Sullivan's office and the DPW to make introductions of the ESS Group to Brockton.

Mr. Ladewig also asked for any available GIS information on stormwater and other GIS data.

For communication Kim will be the point person with all communications copied to Frank Basler for the CPCWDC library. It was suggested that a biweekly meeting be held via a Zoom/conference call between ESS Group and Ms. Groff.

Mr. Ladewig also discussed that they will create a project timeline and look at decision points that mark critical pathways that need to be focused upon in order to stay relevant and answer the Commission's needs. He asked if the CPCWDC has set up an EPA representative for the Quality Assurance Project Plan (QAPP). Nora Connelly was suggested by Ms. Groff as a good contact to reach out to at EPA and Mr. Ladewig will reach out to her. Ms. Groff also asked if the DEP should be looped into the Project Plan, once approved. The decision was it was a good idea to do so, and Ms. Groff will reach out to the EPA.

Commissioner O'Leary left the meeting at 12:58 due to poor audio from the Zoom.

Motion by Commissioner Sotir to authorize Kimberly Groff to approve the ESS Group Silver Lake Water Quality Monitoring Project Plan on behalf of the Commissioners in order to move the process ahead. The motioned was seconded by Chair Zygmunt. The motion passed unanimously.

The Commissioners discussed what part of the process the CPCWDC Advisory Committee should take. The Chair asked that one of the Commissioners be present at the next scheduled Advisory meeting in order to gauge their interest in working on the project.

Mr. Ladewig then discussed the science aspect of the project including mapping, analyzing invasive species of the lake, and looking at a symmetry map of the lake. The project also includes samples of the bottom of the lake to look at oxygen levels and other components that are contained in the sediment.

There are four Solar Bees, a solar powered circulator, in the lake to increase the oxygen levels of the lake. Mr. Ladewig will find out more about the systems and report back to the Commissioners.

The Commissioners discussed the optional items from the RFP proposal and will look at the costs for each of the options. The Commissioners asked for a formal proposal on the optional items for the next meeting. The technical memorandum should be ready for June 2022.

- Approve upcoming meeting schedule – The Commissioners decided to set lunch time meeting on Tuesdays. The next meetings will be Tuesday, July 27th at noon and Tuesday, August 24 at noon. Both meetings will be held via Zoom. The Commissioners will then return to an in-person meeting in September.

- Frank submitted an invoice for $130.76 for reimbursement for the lunch for today's meeting. Commissioner Sotir made a motion to authorize reimbursement of $130.76 to Frank Basler, seconded by Chair Zygmunt. Motion passed unanimously.

- Other business not reasonably anticipated by the Commission. Mr. Al DeGirolamo from Senator Brady's office stated that the budget is still in conference committee and will probably be finalized in July. Senator Brady is supporting fish passage improvements throughout the state with $250,000 some of which may be used at Silver Lake. He also asked for other needs that may be necessary for the Silver Lake project. Senator Brady was able to secure $124,000 for cyanobacteria treatment for the Town of Halifax. He also requested $50,000 for administrative expenses in the budget. Senator Brady teamed with Senator Timilty for $25,000 for East Bridgewater's Forge Pond work.

The Commissioners began discussion on ARPA funds and decided to wait until further information was available.

- Motion to adjourn by Commissioner Sotir, seconded by Chair Zygmunt, passed unanimously.

Respectfully submitted by,

Frank Basler, Plymouth County Administrator

Handouts: CPCWDC Agenda for June 29, 2021

CENTRAL PLYMOUTH COUNTY
WATER DISTRICT COMMISSION
44 OBERY STREET, PLYMOUTH, MA 02360
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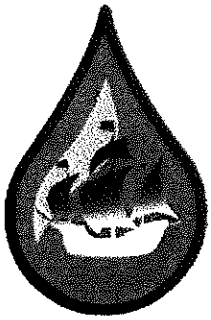

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NOTICE OF MEETING

DATE & TIME: **Tuesday, June 29, 2021, 12:00 PM**

MEETING LOCATION: **Old Colony Planning Council Offices, 70 School St., Brockton MA**

This meeting notice is being filed and posted in each city or town within the Central Plymouth County Water District, pursuant to General Law Chapter 30A, Section 20. Said notice and agenda must be filed in the offices of the city and town clerks within the District **at least 48 hours** prior to such meeting. Such filing and posting shall be the responsibility of the officer calling the meeting.

AGENDA

- Minute acceptance for June 9, 2021
- Approve upcoming meeting schedule
- Hydro Dredge project update
- Kimberly Groff continuation of consultant
- Silver Lake Water Quality Monitoring Request for Proposal update
- ESS Group Silver Lake Water Quality Monitoring Project Kick-off
- Other business not reasonably anticipated by the Commission
- Adjourn

Posted on Thursday, June 24, 2021, at 3:00 PM at each of the eight Clerk's offices listed below and the County web site at www.plymouthcountyma.gov

Financial Activity for CPCWDC

6/30/2021	Interest for June	$ 19.78	$ 481,260.44	statement balance 6/30/21 $481,260.44
5/31/2021	Interest for May	$ 20.51	$ 481,240.66	
5/4/2021	Kimberly Groff Assoc	$ (4,950.00)	$ 481,220.15	
4/30/2021	interest for April	$ 19.98	$ 486,170.15	
3/31/2021	Interest for March	$ 20.64	$ 486,150.17	statement balance 3/31/21 $486,150.17
2/28/2021	Interest for February	$ 18.65		
1/31/2021	Interest for January	$ 20.64	$ 486,110.88	statement balance 1/31/21 $486,110.88
12/31/2020	Interest for December	$ 20.60	$ 486,090.24	statement balance 12/31/20 $486,304.01
12/30/2020	brochure printing and acrylci holders	$ (213.77)		reimb to Frank chk#
11/30/2020	Interest for November	$ 19.93	$ 486,283.41	statement balance 11/30/20 $486,283.41
10/31/2020	Interest for October	$ 20.59		
9/30/2020	Interest for September	$ 20.02	$ 486,242.89	statement balance 9/30/20 $486,497.89 - diff Source4 chk
9/16/2020	invoice for Source4 for brochure final payment	$ (255.00)		pd #1007 $255.00
	transfer for County Expenses	$ (2,805.94)		pd #1008 $2,805.94
8/31/2020	Interest for August	$ 22.06	$ 489,283.81	statement balance 8/31/20 $
7/31/2020	Interest for July	$ 41.44	$ 489,261.75	statement balance 7/31/20 $489,220.31
6/30/2020	Interest for March, April, May, and June	$ 260.56	$ 489,220.31	statement balance 6/30/20 $489,220.31
2/29/2020	Interest for January and February	$ 240.84	$ 488,959.75	statement balance 2/29/20 $488,959.75
1/20/2020	reimb to Basler for Weebly invoices #1006	$ (263.45)		pd #1006 $263.45
1/20/2020	Madeline M. Smith invoice 11/30/19 #1005	$ (1,025.00)		pd #1005 $1,025.00
12/31/2019	Interest December	$ 124.82	$ 490,007.36	statement balance 12/31/2019 $490,007.36
11/30/2020	Interest November	$ 91.36	$ 489,882.54	statement balance 11/30/2019 $489,882.54
11/1/2019	Madeline M. Smith invoice 9/30/19 #1004	$ (1,210.39)		
11/15/2019	DCR Transfer Admin Costs	$ 50,000.00		
11/15/2019	DCR Transfer special earmark	$ 155,000.00		
10/31/2019	Interest October	$ 97.13	$ 286,001.57	
9/30/2019	Interest September	$ 94.13		
8/31/2019	Interest for August	$ 97.66	$ 285,810.31	statement balance 8/31/2019 $287,565.31
8/27/2019	Madeline M. Smith invoice #1003	$ (1,755.00)		
6/30/2019	Interest for July	$ 97.63		
6/30/2019	Interest for June	$ 95.57	$ 287,370.02	statement balance 6/30/19 $287,370.02
5/31/2019	Interest for March, April, and May	$ 302.58		
5/29/2019	Peter Tuttle final payment #1002	$ (10,860.00)		
4/30/2019	County of Plymouth - Admin FY 19 and Expenses (7/1 to 4/30)	$ (2,186.33)		email, admin fee $1,500 for FY 19, and misc services
3/31/2019	interest through March 31, 2019	$ 259.27		
1/22/2019	DCR for water plan	$ 170,000.00		
1/22/2019	DCR for FY 19	$ 50,000.00		
6/1/2018	DCR for FY 18	$ 50,000.00		
5/30/2018	interest through May 31, 2018	$ 138.53		
4/19/2018	Peter Tuttle #1003	$ (7,950.00)		
3/8/2018	County of Plymouth - FY 18 Admin and Expenses	$ (1,227.40)		email, bussiness cards, admin fee $1,000 FY '18
3/8/2018	Corona Environment	$ (9,900.00)		
1/30/2017	County of Plymouth - FY 17 Admin and Expenses	$ (1,302.20)		email, bussiness cards, envelopes, admin fee $1,000 FY '17
5/15/2016	DCR for FY 16	$ 50,000.00		

/26/2021

Kimberly Groff Consulting, 27 Pearl Street, Marblehead, MA 01945

June 30, 2021

c/o Joanne Zygmunt (via e-mail)
Chair
Central Plymouth County Water District Commission (CPCWDC)
44 Obery Street
Plymouth, MA 02360

RE: CPCWDC Technical Assistance: Project Management Oversight ESS Group Silver Lake Water Quality Monitoring Project Halifax, Plympton, Pembroke and Kingston, Massachusetts

Dear Joanne:

This letter is being submitted in response to the Central Plymouth County Water District Commission (CPCWDC or Commission) request for technical assistance in managing and overseeing the tasks performed by ESS group as described in ESS proposal 17835. CPCWDC has selected ESS Group to provide specialized technical services to support CPCWDC's development and implementation of a water quality sampling and analysis plan for Silver Lake located in the towns of Halifax, Plympton, Pembroke and Kingston, MA. It is anticipated that the data collected from the effort will help inform community management decisions to address water quality and quantity issues in Silver Lake.

ESS Group is under contract to: (a) develop a written water quality sampling plan for Silver Lake, (b) develop an EPA approved quality assurance project plan (QAPP (c) develop and implement a plan to collect input from the communities around Silver Lake, the City of Brockton, watershed associations, Massachusetts Department of Environmental Protection (MassDEP), Massachusetts Department of Public Health (DPH), on the sampling plan (d) perform sampling (e) perform analysis of water quality data relative to appropriate targets and or standards; and (f) produce draft and final technical memorandum summarizing data and findings along with any recommendations for improving water quality.

A kick-off meeting was held by the Commission on June 29th and the path forward for developing a work plan was discussed. Kimberly Groff Consulting is proposing to assist the Commission in managing the project, advising on key deliverables to ensure the goals, timelines and budgets established in the contract are met.

Task 1: Project Meetings & Coordination – this task will involve meeting with ESS Group on a periodic basis as the sampling and analysis plan, QAPP and public participation activities are underway. Key issues and decision points will be flagged in advance of Commission meetings to expedite work flows. It is assumes that meeting will be held bi-weekly throughout the summer and at appropriate times thereafter. Periodic attendance at Commissions meetings are assumed throughout the duration of the project.
Estimated Cost: $3,500
Deliverable: attendance at meetings, advisory input upon request

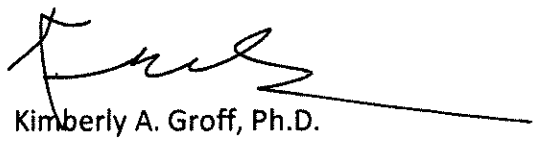
Timeline: June 2022

Task 2: Review of Key Deliverables - During the course of the project key deliverables developed by ESS Group will be reviewed and commented on. These include the work plan, sampling and analysis plan, Quality assurance project plan as well as public engagement products. As appropriate key stakeholders will be looped in as the project unfolds to solicit input.
Estimated Cost: 5,000
Deliverable: Review work plan, sampling and analysis plan, QAPP, data reports and other key work products
Timeline: June 2022

The budget cost for technical service included in this proposal is estimated at $8,500 and will be completed on a time and material basis billed at a rate of $150/hr (project not to exceed $10,000). The estimated cost for technical services are predicated on the assumptions and information described in this letter and may change.

Thank you for the opportunity to work with the Commission on this complex and interesting project. In the meantime don't hesitate to reach out (cell: 508-932-5528, kimberlygroffma@gmail.com) if you have questions or comments.

Sincerely,



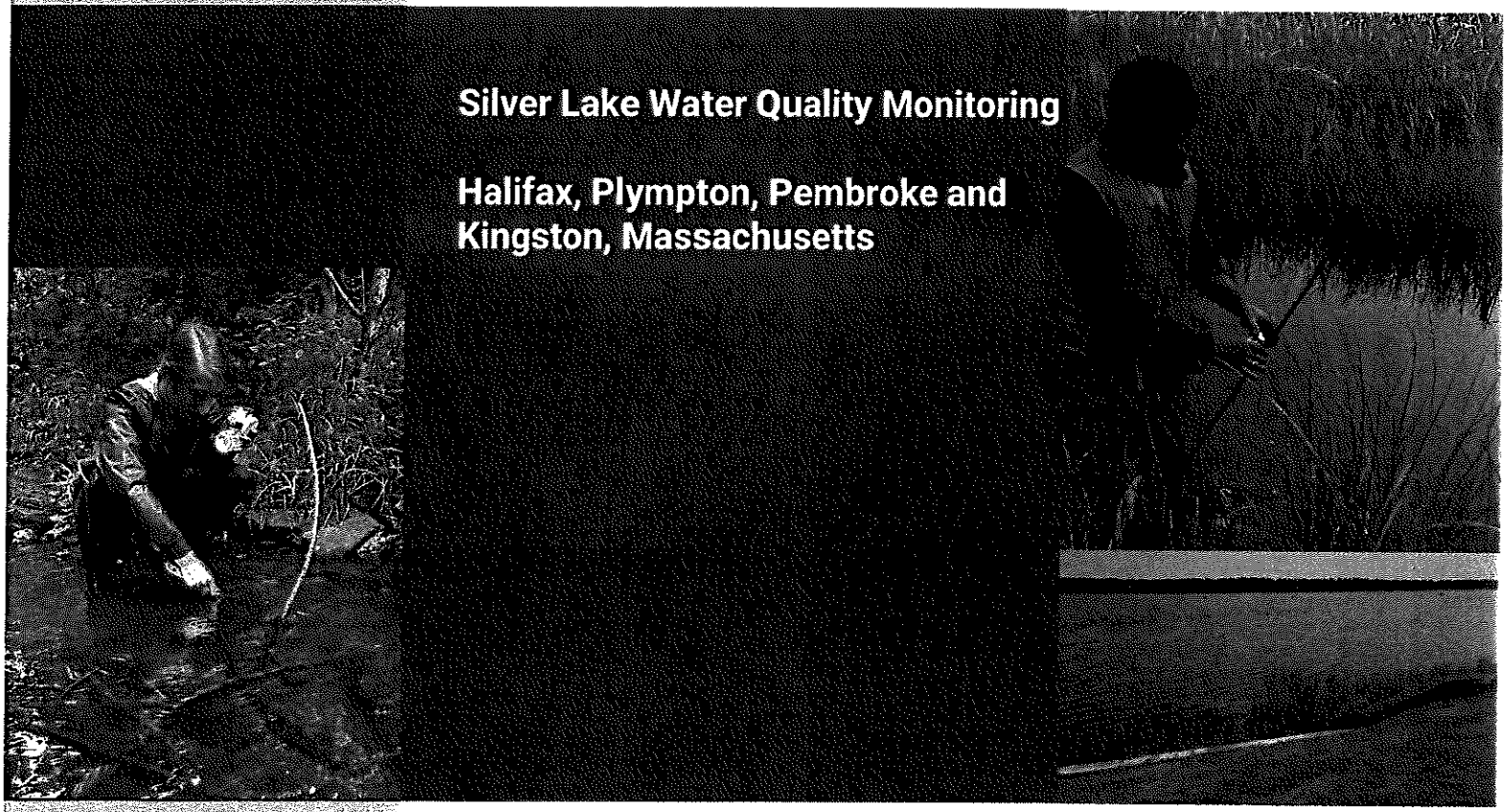
Kimberly A. Groff, Ph.D.
Kimberly Groff Consulting
27 Pearl Street
Marblehead, MA 01945

CC: Frank Basler

DRAFT for Client Review

404 Wyman Street, Suite 375, Waltham, Massachusetts 02451 • 781.419.9696
10 Hemingway Drive, 2nd Floor, East Providence, Rhode Island 02915 • 401.434.5560
780 Lynnhaven Parkway, Suite 400, Virginia Beach, Virginia 23452 • 757.821.3095

Sampling and Analysis Plan



Silver Lake Water Quality Monitoring

Halifax, Plympton, Pembroke and Kingston, Massachusetts

PREPARED FOR

Central Plymouth County Water District Commission
c/o Frank Basler, County Administrator
44 Obery Street
Plymouth, MA 02360

July 24, 2021

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TABLES

FIGURES

APPENDICES

INTRODUCTION AND PROJECT DESCRIPTION

ESS Group, Inc. (ESS) has developed this Sampling and Analysis Plan (SAP) to provide the Central Plymouth County Water District Commission (CPCWDC) with a detailed description of the technical approach and schedule for executing the Silver Lake Water Quality Monitoring Project (the Project).

Silver Lake is a designated Class A waterbody and Outstanding Resource Water (ORW) located in the towns of Halifax, Plympton, Pembroke, and Kingston, Massachusetts. In addition to serving as the primary source water reservoir for the City of Brockton and connected drinking distribution systems, Silver Lake constitutes the headwater source of the Jones River (Figure 1).

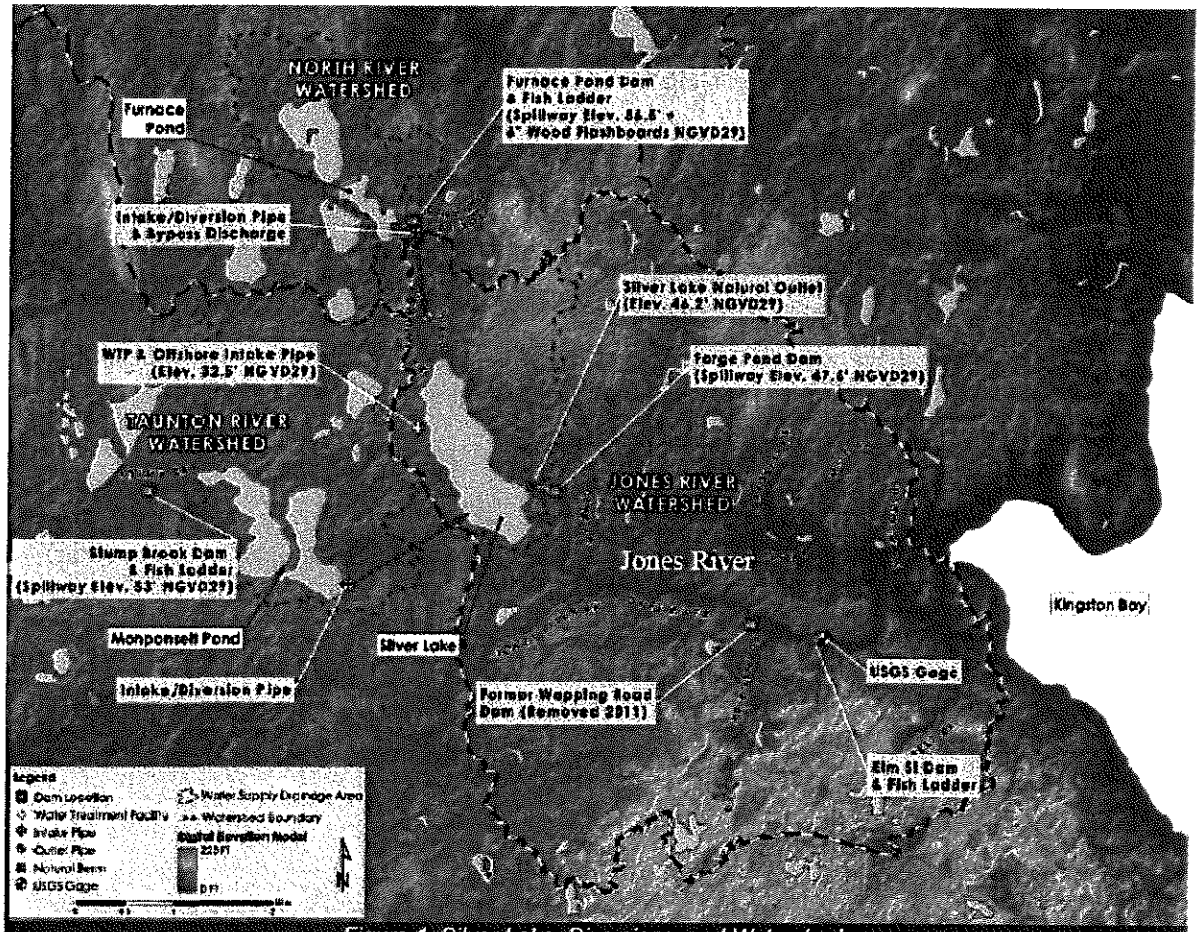


Figure 1. Silver Lake, Diversions, and Watersheds
Source: Princeton Hydro 2013

Concerns have arisen regarding potential water quality impacts to Silver Lake from watershed sources and water diversions. Silver Lake is now proposed for listing in the Draft 2018/2020 Integrated List of Waters by the Massachusetts Department of Environmental Protection (MassDEP). The proposed impairments include Fish Passage Barrier, Flow Regime Modification, and Dissolved Oxygen. The Dissolved Oxygen impairment, if finalized, would require a TMDL.

The overall goals of this Project are as follows:

1. Collect water quality data to help inform community management decisions to address water quality and quantity issues in Silver Lake and connected water bodies; and
2. Develop a baseline understanding of current water quality and continue to develop solutions-oriented relationships with the City of Brockton's Water Division and the public.

To support these goals, ESS will collect and analyze detailed water quality, physical, hydrologic, and biological data.

PROJECT DESIGN

The Project is designed to improve the understanding of key water quality drivers in Silver Lake. This Project approach has been designed with the following questions, issues, and data gaps in mind.

- Publicly available water quality data for Silver Lake appears limited mainly to assessments completed in 2004 (ESS) and in 2008-2009 (JRWA; Chase et al., 2013). More recent data are needed to address the current condition of the lake.
- Diversion of water from East Monponsett Pond by the City of Brockton's public water supply system may increase the external loading of phosphorus to Silver Lake. Over time, this could result in Silver Lake's water quality trending toward a state of more frequent and intense harmful algal blooms.
- In addition to the above, watershed loading to Silver Lake from stormwater runoff, septic systems, agricultural runoff, and other sources may contribute to degradation of water quality.

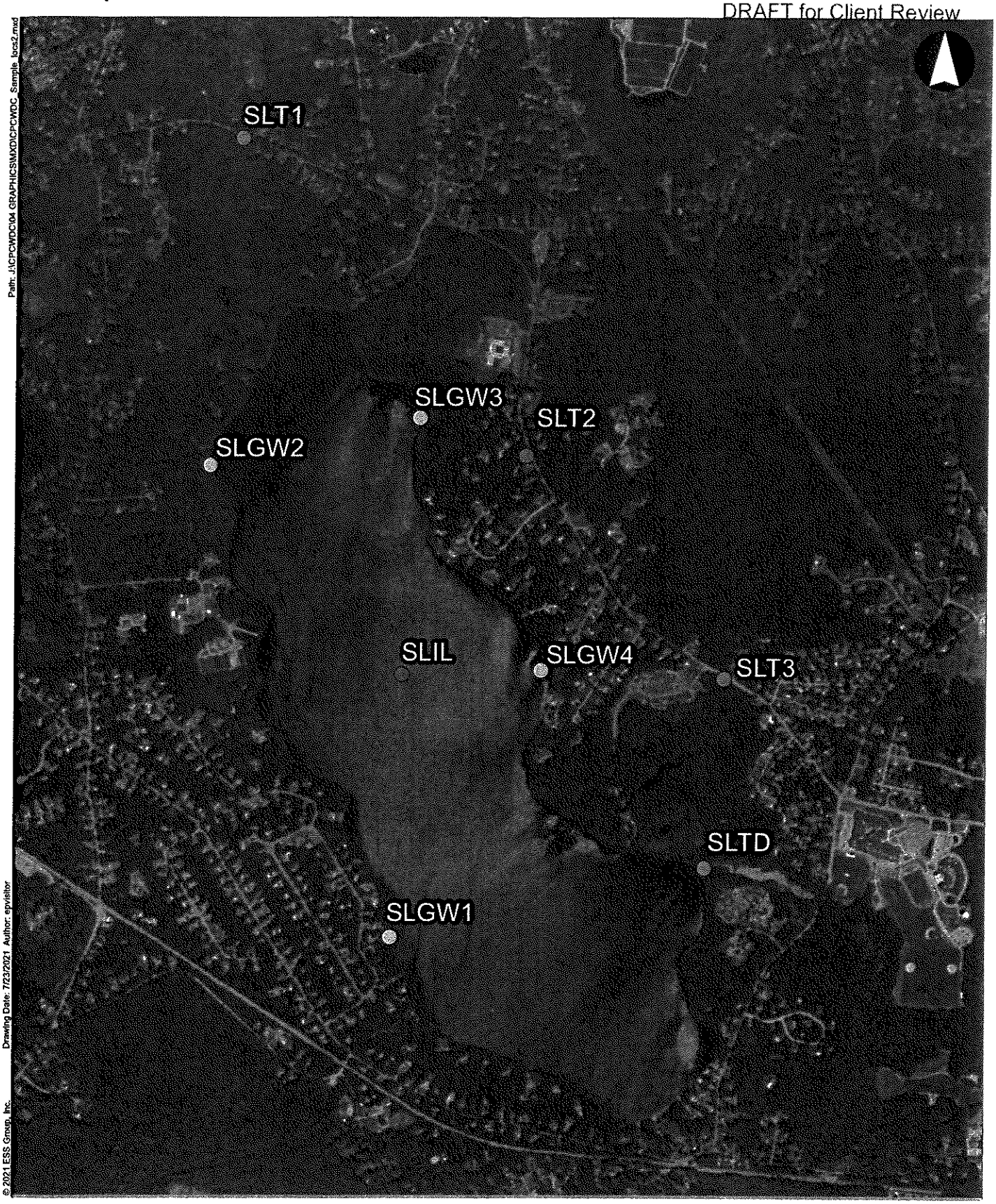
Components of the Project design are described in the following sections.

Sampling Domain

The Project will include collection of data from Silver Lake, its natural tributaries, shallow groundwater, and water diversion sources. The anticipated primary sampling locations are shown in Figure 2 and described in Table A.

East Monponsett and Furnace Ponds are publicly accessible and do not require prior arrangement for sampling. Access to Silver Lake will be through the Silver Lake Water Treatment Plant, which is operated on behalf of the City of Brockton by Veolia North America. ESS will coordinate gate access directly with the plant operator prior to each visit to Silver Lake.

DRAFT for Client Review



Path: J:\ICPCW\DC\04 GRAPHICS\MXD\CPCWDC_Sample locs2.mxd

Drawing Date: 7/23/2021 Author: epvisitor

ess group
environmental consulting & engineering services

0 0.15 0.3 Miles

Source: 1) Esri, World Imagery, 2021

Sample Locations are approximate and subject to change based on field observations

Silver Lake Water Quality Monitoring Project

Halifax, Plympton, Pembroke, and Kingston, MA

Legend

- Groundwater Sample Location
- In-Lake Sample Location
- Tributary/Outlet Sample Location

Proposed Silver Lake Water Quality Sample Locations

Figure 2

Table A. Anticipated Sampling Locations

Water Body	Site ID	Description	Type
Silver Lake	SLIL	Deep hole	In-lake
Silver Lake	SLGW1	Southwestern shoreline	Groundwater
Silver Lake	SLGW1	Northwestern shoreline	Groundwater
Silver Lake	SLGW3	Northeastern shoreline	Groundwater
Silver Lake	SLGW4	Eastern shoreline	Groundwater
Tubbs Meadow Brook	SLT1	Tubbs Meadow Brook between Route 27 and Silver Lake	Tributary
Little Brook	SLT2	Little Brook between Route 27 and Silver Lake	Tributary
Mirage Brook	SLT3	Mirage Brook between Route 27 and Silver Lake	Tributary
Jones River	SLTD	Outlet from Silver Lake	Outlet
Furnace Pond/Diversion	FPD	Furnace Pond diversion to Tubbs Meadow Brook	In-lake/Diversion
East Monponsett Pond/Diversion	MPD	East Monponsett Pond diversion to Silver Lake	In-lake/Diversion

Sampling Design

The Project sampling design consists of the following principal elements:

1. Bathymetry, Aquatic Plant, and Benthic Surveys
2. In-Lake Water Column & Quality Sampling
3. Upstream and Downstream Monitoring
4. Groundwater Assessment

Each of these are described in the following sections.

Bathymetry, Aquatic Plant, and Benthic Surveys

Bathymetric, aquatic plant, and benthic surveys of Silver Lake will be completed and used to create detailed maps of water depth, plant growth, and area of the lake impacted by anoxia. Survey timing is anticipated for August 2021.

Bathymetry. Bathymetry will be measured using an echosounder in deep, open waters and a calibrated sounding line in shallower waters where plant growth is dense. Given the wet antecedent conditions in June and July, Silver Lake is currently near capacity. Therefore, the planned survey timing is likely to provide adequate water depth to complete the bathymetric mapping.

Lake bathymetry will be tied to a vertical control and used to create a contour map of the lake.

The bathymetry survey will include at least 350 survey locations. The locations will be distributed using a gridded survey approach (Figure 3). This method is similar to point-intercept survey methods, in that it uses a pre-determined sampling interval to ensure adequate coverage of the entire water body. The primary difference is that, whereas point-intercept survey methods require navigation to a specific point (i.e., the intersection of each grid line), the gridded survey only requires navigation to each cell. This ensures adequate coverage of survey data throughout the lake while providing field crews with flexibility select the exact location and number of points within each cell based on observed field conditions.

The field data and geographic coordinates for each data point will be recorded using a Differential Global Positioning System (DGPS) capable of sub-meter horizontal accuracy in the NAD83 Massachusetts State Plane Coordinate system.

Aquatic Plants. Aquatic plant growth will be assessed at each survey location using one or more of the following tools: a color underwater video camera, macrophyte pole- and/or throw-rakes, and direct observation from the boat. Aquatic plants will be field identified. Specimens that cannot be readily field-identified to genus/species level will be collected and identification under a high-powered dissecting microscope.

The planned timing provides ideal conditions for mapping rooted plants, which will be at their seasonal peak of growth.

Aquatic plant data collected will include community composition, vegetative cover (percent of bottom) and biomass/volume (measure of vegetative growth in the water column). Supplemental data on substrate type (muck, sand, etc.) will also be collected.

Data collected from the aquatic plant survey will be used to generate maps of plant cover and biovolume for the lake. Additionally, a field guide to the aquatic plants of Silver Lake as a resource for future monitoring efforts.

The aquatic plant surveys will include at least 350 survey locations. As with the bathymetry survey, the plant survey locations will be distributed using a gridded survey approach.

The field data and geographic coordinates for each data point will be recorded using a Differential Global Positioning System (DGPS) capable of sub-meter horizontal accuracy in the NAD83 Massachusetts State Plane Coordinate system.

ess group
environmental consulting & engineering services

0 0.1 0.2 Miles

Silver Lake Water Quality Monitoring Project

Halifax, Plympton, Pembroke, and Kingston, MA

Legend

Silver Lake Boundary

Mapping Grid
Approximately 360 Cells

Source: 1) Esri, World Imagery, 2021

Proposed Silver Lake Mapping Grid

Figure 3

Macroinvertebrates. Due to their relatively long lifespan (months to years), benthic macroinvertebrates are one of the most useful organisms for inferring longer term water quality conditions in surface waters.

Benthic macroinvertebrate samples will be collected along a transect perpendicular to the long axis of the lake, allowing the collection of samples from both shallow and deep environments within the lake. A total of seven samples will be collected, each from a different depth (approximately 5 ft, 15 ft, 25 ft, 35 ft, 45 ft, 55 ft, and 65 ft).

Depending on the conditions observed in the lake and depth of water at the sampling location, ESS will use a grab sampler (e.g., Ekman grab), clam rake, or dip net to collect macroinvertebrate samples. The total area sampled will be noted for each location so that the data can be used to quantify densities of each organism. Samples will be field-preserved in 75% ethanol.

Macroinvertebrates will be sorted from each sediment sample, then identified and enumerated by a Society for Freshwater Science (SFS) certified taxonomist under a high-power dissecting and/or compound microscope. The target level for macroinvertebrate identification will be genus/species for most organisms. This will allow for the mapping of the area of the lake affected by seasonal stressors, such as anoxia (i.e., areas lacking dissolved oxygen).

The geographic coordinates for each data point will be recorded using a Differential Global Positioning System (DGPS) capable of sub-meter horizontal accuracy in the NAD83 Massachusetts State Plane Coordinate system.

In-Lake Water Column & Quality Sampling

In-lake sampling of water quality will be used to establish the current baseline conditions in Silver Lake. Survey timing is anticipated to begin in August 2021 and extend through April 2022, exclusive of months when ice cover is present (currently anticipated to be January and February).

To ensure acquisition of the most useful and complete dataset over a short period of time, the in-lake monitoring program will include both continuous data logging and collection of discrete water quality samples as part of the field program.

Continuous Data Logging. The continuous data logging portion of the field program will include deployment of two monitoring arrays at the deepest location in the lake (currently anticipated to be approximately 75 feet deep when water level is at normal pool elevation). The data logger array will be used to detect differences in key parameters (water level, temperature, and chlorophyll – a surrogate for algal growth) over time and through the vertical water column. One array will be located within 5 meters (16 feet) of the lake surface and the second array will be located within 16 feet of the sediment-water interface. The chlorophyll a datalogger will only be included in the shallow monitoring array. The surface datalogger array will be allowed to move up and down with changes in water level so that it remains at the same relative depth while the bottom datalogger will maintained at a fixed location to effectively track changes in water level.

Loggers will be programmed to collect readings at hourly intervals. Data will be downloaded during each site visit. See Appendix A for more information on logger installation and operation.

Discrete Water Quality Sampling. To complement and supplement the continuous data logging program, multiple rounds of discrete in-lake water quality samples will be collected from September 2021 through April 2022, exclusive of January and February 2022, for a total of six sampling events.

During these events, samples will be collected from the same in-lake location as the datalogger array. Additionally, water quality profiles will be measured in situ within the water column. See Appendix A for more information on sampling methods and Table B for the distribution of in-lake sampling effort.

Water quality samples will be sent to the laboratory for analysis of the following:

- Total Phosphorus
- Soluble Phosphorus
- Total Nitrogen (nitrite-N+nitrate-N and Total Kjeldahl N)
- Alkalinity
- Chlorophyll a
- Phytoplankton Enumeration and ID

Additionally, the following parameters will be field measured:

- pH
- Secchi Disk Transparency
- Apparent Color
- Turbidity
- Water Temperature (full vertical profile at 1 m increments)
- Specific Conductance (full vertical profile at 1 m increments)
- Dissolved Oxygen (full vertical profile at 1 m increments)

Table B. Surface Water Quality Analytes and Parameters to Be Monitored in Silver Lake

Analyte/Parameter	Sampling Position(s) at SLIL	Number of Visits	Number of Samples per Visit	Total Number of Samples
Total Phosphorus	Surface, Mid-depth, Bottom	6	3	18
Soluble Phosphorus	Surface, Mid-depth, Bottom	6	3	18
Total Nitrogen	Surface, Mid-depth, Bottom	6	3	18
Alkalinity	Surface, Mid-depth, Bottom	6	3	18
Chlorophyll a	Surface	6	1	6
Algal ID and Enumeration	Surface	6	1	6
E. coli	Surface	4	1	4
Cyanotoxins	Surface	2	1	2
pH	Surface, Mid-depth, Bottom	6	3	18
Secchi Disk Transparency	Surface	6	1	6
Apparent Color	Surface, Mid-depth, Bottom	6	3	18
Turbidity	Surface, Mid-depth, Bottom	6	3	18
Water Temperature*	Every meter	6	22	132
Specific Conductance*	Every meter	6	22	132
Dissolved Oxygen*	Every meter	6	22	132

*Number of samples is estimated. Actual number will be determined by field conditions (i.e., water depth).

Since there is concern regarding documented impairments in East Monponsett Pond and Furnace Pond and the potential for these to impact Silver Lake through inter-basin water transfer, surface samples will also be collected from these diversions concurrent with a subset of the in-lake sampling events at Silver Lake. The timing of these sampling events will be targeted during periods of active diversion, as conditions allow. See Table C for the distribution of sampling effort.

Table C. Surface Water Quality Analytes and Parameters to Be Monitored from Diversions (East Monponsett and Furnace Ponds)

Analyte/Parameter	Number of Visits	Number of Samples per Visit	Total Number of Samples
Total Phosphorus	3	2	6
Soluble Phosphorus	3	2	6
Total Nitrogen	3	2	6
Alkalinity	3	2	6
Chlorophyll a	3	2	6
Algal ID and Enumeration	3	2	6
E. coli	3	2	6
Cyanotoxins	2	2	4
pH	3	2	6
Secchi Disk Transparency	3	2	6
Apparent Color	3	2	6
Turbidity	3	2	6
Water Temperature	3	2	6
Specific Conductance	3	2	6
Dissolved Oxygen	3	2	6

Upstream and Downstream Monitoring

Upstream and downstream monitoring will be used to improve understanding of the hydrologic and nutrient budgets for Silver Lake. Survey timing is anticipated to begin in September 2021 and extend through April 2022, inclusive of the winter months.

To ensure acquisition of the most useful and complete dataset over a short period of time, the upstream and downstream monitoring field program will include continuous data logging, direct measurement of discharge, and collection of discrete water quality samples.

Continuous Data Logging. The continuous data logging portion of the field program will include deployment of four water level loggers, including one each at Tubbs Meadow Brook, Little Brook and Mirage Brook (tributary inlets) and one downstream (outlet to Forge Pond). Additionally, since the water level loggers will be sealed (unvented), a fifth pressure logger will be deployed in a discreet location to allow for continuous atmospheric pressure correction. The deployed loggers will also continuously monitor temperature over the course of the study.

Water level loggers will be programmed to collect readings at hourly intervals. Data will be downloaded during each site visit. See Appendix A for more information on logger installation and operation.

Discrete Water Quality and Discharge Sampling. To complement and supplement the continuous data logging program, monthly rounds of discrete upstream and downstream water quality and discharge measurement will be completed from September 2021 through April 2022, for a total of eight sampling events. At least one of the rounds will be collected during wet weather conditions to capture the impact of stormwater runoff.

See Appendix A for more information on sampling methods.

Water quality samples will be sent to the laboratory for analysis of the following:

- Total Phosphorus (low detect)
- Soluble Phosphorus (low detect)
- Total Nitrogen (includes nitrite-N+nitrate-N and TKN)

Additionally, the following parameters will be field measured:

- Stream Discharge
- pH
- Apparent Color
- Turbidity
- Specific Conductance
- Temperature
- Dissolved Oxygen

The discharge measurements collected in each stream monitoring location will be used to develop stage-discharge rating curves. These curves will, in turn, be used to convert logger water levels into a continuous discharge record for the period of study. This will also allow for the estimation of surface water contaminant loads from surface tributaries into Silver Lake and out of the lake into downstream waters.

Groundwater Assessment

Groundwater seepage sampling will be used to assess the influence of groundwater inflows on water quality in Silver Lake. Survey timing is anticipated for April 2022.

Direct groundwater seepage can sometimes be a major source of pollutants to surface water bodies, including densely developed shorelines. Measuring the quantity and quality of these groundwater inputs can be important for understanding why the system is no longer meeting its water quality goals. A seepage survey measures the quantity and quality of groundwater entering the lake along the immediate shorelines where groundwater inseepage is highest and typically the most influenced by human behaviors and activities.

To measure the seepage rate, eight seepage meters will be deployed along four key shoreline segments of Silver Lake, including two at the upper end and two closer to the dam and outlet. Two of these shoreline segments will be located downgradient of nearby developed areas and two will be located adjacent to natural or less-developed areas. Two meters will be deployed along each shoreline segment to adequately capture the local variability in groundwater movement.

On the same day, shallow porewater samples will be collected from each of the four shoreline segments using a littoral interstitial porewater (LIP) sampler, which is essentially a mini-well that extracts groundwater from sediments for water quality testing. Samples will be measured in the field for temperature, pH, and specific conductance and compared to surface water quality measurements to ensure that groundwater is being obtained by the LIP sampler. A total of four composite groundwater quality samples will be collected in Silver Lake; one from each shoreline segment.

See Appendix A for more information on sampling methods.

Laboratory analysis will be conducted for the following at each shoreline sampling segment:

- Soluble Phosphorus
- Ammonia
- Nitrate-Nitrogen

ESS anticipates completing the seepage sampling program in spring of 2022 to capture seasonal high water-table conditions.

Quality Assurance

A Quality Assurance Project Plan (QAPP) will be prepared under separate cover and submitted to EPA Region 1 for review and comment. The purpose of the QAPP is to ensure that the data collected under this SAP meet the required data quality objectives.

PROJECT SCHEDULE

The overall Project schedule is currently anticipated to extend from July 2021 to June 2022. A detailed Project schedule showing the timing of planned sampling events and deliverables is provided in Figure 4. Task 4 presents the specific schedule for sampling and analysis components included in this SAP.

Task	2021 June Late	July Early	July Late	August Early	August Late	September Early	September Late	October Early	October Late	November Early	November Late	December Early	December Late	2022 January Early	January Late	February Early	February Late	March Early	March Late	April Early	April Late	May Early	May Late	June Early	June Late
1 Administration and Reporting																									
Project Kick-off																									
Project Detail																									
Status Updates/Meetings					Timing of additional meetings TBD																				
2. SAP and QAPP																									
Draft SAP																									
Revised SAP																									
Final SAP																									
Draft QAPP																									
Revised QAPP																									
Final QAPP									Depends on EPA review time																
3. Public Input Plan																									
Draft PIP																									
Final PIP																									
SAP Review Meeting																									
Draft Launch Informational Leaflet																									
Final Launch Informational Leaflet																									
Public Listening Session																									
Draft Project Informational Leaflet																									
Final Project Informational Leaflet																									
4. SAP Implementation																									
Bathymetric, Aquatic Plant, and Benthic Surveys																									
In-Lake Water Column & Quality Sampling																									
In-Lake Bacteria Testing (added to Task 4)																									
In-Lake Cyanotoxin Testing (added to Task 4)																									
Upstream and Downstream Monitoring																									
Groundwater Assessment																									
Draft Technical Memorandum																									
Revised Final Technical Memorandum																									
5. Internal P-Loading Analysis and Water Quality Modeling																									
Sediment Coring and Phosphorus Fractionation																									
Water Quality Model																									

Planned Event
Completed Event
Planned Deliverable
Completed Deliverable

Figure 4. Detailed Project Schedule for Silver Lake Water Quality Monitoring Project
Current through July 24, 2021

Appendix A

Field SOPs

GUIDELINES FOR MEASUREMENT OF SPECIFIC CONDUCTANCE

1.0 INTRODUCTION

1.1 Purpose and Applicability

These Standard Operating Guidelines (SOG) provide basic instructions for routine calibration and operation of a variety of specific conductance meters. This SOG document also addresses estimation of total dissolved solids (TDS) and salinity by direct measurement of specific conductance (specific methods and capabilities for these parameters are outlined in the manufacturer's individual instrument manuals). This SOG is designed to be consistent with EPA Method 120.1 and Standard Method 2510 B which address specific conductance measurements of drinking, surface, and saline waters, domestic and industrial wastes, and acid rain.

1.2 Quality Assurance Planning Considerations

The end use of the data will determine the quality assurance requirements that are necessary to produce data of acceptable quality. These quality assurance requirements will be defined in the site-specific workplan or Quality Assurance Project Plan (QAPP) (hereafter referred to as the project plan) or laboratory Quality Assurance Manual (QAM) and may include duplicate or replicate measurements or confirmatory analyses.

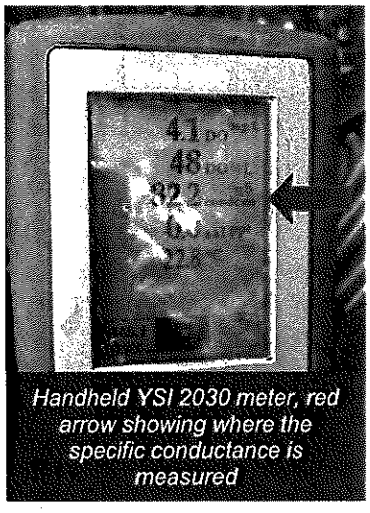
2.0 RESPONSIBILITIES

- The project manager is responsible for ensuring that project-specific requirements are communicated to the project team and for providing the materials, resources, and guidance necessary to perform the measurements in accordance with this SOG and the project plan.
- The analyst is responsible for verifying that the specific conductance meter is in proper operating condition prior to use and for implementing the calibration and measurement procedures in accordance with this SOG and the project plan.

3.0 REQUIRED MATERIALS

The following materials are necessary for this procedure:

- Specific conductance meter
- Specific conductance meter manufacturer's instruction manual
- Deionized water
- Conductivity standard at concentration that approximates anticipated range of sample concentrations
- Lint-free tissues
- Calibration sheets or logbook
- Laboratory or field data sheets or logbooks



Handheld YSI 2030 meter, red arrow showing where the specific conductance is measured

4.0 METHODS

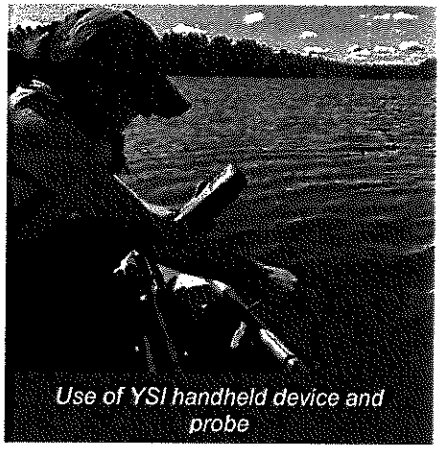
4.1 Sample Handling, Preservation, and General Measurement Procedures

- Specific conductance measurements should be taken in situ or soon after sample collection since temperature changes, precipitation reactions, and absorption of carbon from the air can affect the specific conductance. If specific conductance measurements cannot be taken immediately (within 24 hours), samples should be filtered through a 0.45 µm filter, stored at 4°C and analyzed within 28 days.
- Report results as specific conductance, µmhos/cm or µS/cm at 25°C.

- Secondary standards may be purchased as a solution from commercial vendors. These standards should not be used after their expiration dates as provided by the manufacturer. An expiration date of one year from date of purchase should be used if the expiration date is worn or missing.

4.2. Calibration and Measurement Procedures

- The specific conductance meter must be calibrated (or the calibration checked) before any analyses are performed.
- Set up the instrument according to the manufacturer's instructions.
- Rinse the probe with deionized water prior to use. If necessary, dry with a lint-free tissue or cloth.
- Follow the manufacturer's recommendations for appropriate calibration receptacle and depth of immersion.
- Record the stabilized specific conductance reading of the standard and the temperature. Enter the calibration mode (according to manufacturer's instructions) and change the value on the primary display to match the value of the calibration standard. The meter may be adjusted to ±20% from the default setting. If the measurement differs by more than ±20%, the probe should be cleaned, serviced, or replaced as needed.



Use of YSI handheld device and probe

- An additional check may be performed, if required by the project plan, by placing the probe into an additional standard. This standard should be from a different source than the standard used for the initial calibration. This standard should read within 5% of the true value.
- Verify the calibration at least once a month or whenever the instrument has been moved from freshwater to saltwater environments or vice versa. Recalibrate or service the instrument, as needed, if the check value is not within 15% of the true (calibration standard) value.

4.3. Troubleshooting Information

If there are any performance problems with any of the specific conductance meters which result in inability to achieve the acceptance criteria presented in Section 5.0 or the project-specific acceptance criteria, consult the appropriate section of the meter instruction manual for troubleshooting procedures. If the problem persists, consult the manufacturer's customer service department immediately for further guidance.

4.4. Maintenance

- Instrument maintenance should be performed according to the procedures and frequencies required by the manufacturer.
- The probe must be stored and maintained according to the manufacturer's instructions.

5.0 QUALITY CONTROL

- The meter must be calibrated (or the calibration checked) before sampling, and will not be used for sample determinations of specific conductance unless the initial check standard value is within 5% of the true value.

- Duplicate measurements of a single sample will be performed at the frequency specified in the project plan. In the absence of project-specific criteria, duplicate measurements should agree within 10%.

6.0 DOCUMENTATION

- Meter calibration, temperature check, and maintenance information will be recorded in a calibration log. Specific conductance data may be recorded on the appropriate laboratory or field data sheets or logbooks.
- Calibration documentation should be maintained in a thorough and consistent manner. At a minimum, the following information should be recorded:
  - Date and time of calibration
  - Person performing the measurement
  - Instrument identification number/model
  - Expiration dates and batch numbers for all standards
  - Reading for standard before and after meter adjustment
  - Readings for all continuing calibration checks
  - Temperature of standards (corrected for any difference with reference thermometer)
  - Comments
- Documentation for recorded data must include a minimum of the following:
  - Date and time of analysis
  - Person performing the measurement
  - Sample identification/station location
  - Temperature (corrected for any difference with reference thermometer) and conductance of sample (including units and duplicate measurements).
  - Comments

7.0 TRAINING/QUALIFICATIONS

To properly perform specific conductance measurements, the analyst must be familiar with the calibration and measurement techniques stated in this SOG. The analyst must also be experienced in the operation of the meter.

Certain state certification programs require that specific conductance measurements be taken in the field by, or in the presence of, personnel that are qualified under the certification program.

GUIDELINES FOR MEASUREMENT OF DISSOLVED OXYGEN

1.0 INTRODUCTION

1.1 Purpose and Applicability

These Standard Operating Guidelines (SOG) provide basic instructions for routine measurement of dissolved oxygen using a polarographic sensor-equipped dissolved oxygen meter with a digital read-out (e.g., YSI Pro2030 Dissolved Oxygen, Conductivity, Salinity Instrument). Measurements are made in accordance with methods that address dissolved oxygen measurement of drinking, surface, and saline waters, and domestic and industrial wastes.

1.2 Quality Assurance Planning Considerations

The end use of the data will determine the quality assurance requirements that are necessary to produce data of acceptable quality. These quality assurance requirements will be defined in the site-specific workplan or Quality Assurance Project Plan (QAPP) (hereafter referred to as the project plan) or laboratory Quality Assurance Manual (QAM) and may include duplicate or replicate measurements or confirmatory measurements.

2.0 RESPONSIBILITIES

- The project manager is responsible for ensuring that project-specific requirements are communicated to the project team and for providing the materials, resources, and guidance necessary to perform the measurements in accordance with this SOG and the project plan.
- The analyst is responsible for verifying that the dissolved oxygen measuring device is in proper operating condition prior to use and for implementing the calibration and measurement procedures in accordance with this SOG and the project plan.

Handheld YSI 2030 meter, Red arrow showing were the dissolved oxygen is measured

3.0 REQUIRED MATERIALS

The following materials are necessary for this procedure:

- Dissolved oxygen meter with digital read-out device
- Manufacturer's instruction manual for the instrument
- Manufacturer's recommended operating solution and replacement membranes or caps
- Laboratory or field data sheets or logbooks

4.0 METHODS

4.1 Sample Handling, Preservation, and General Measurement Procedures

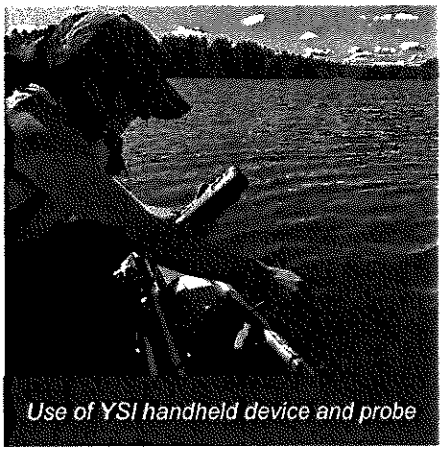
To achieve accurate dissolved oxygen measurements, samples should be analyzed in situ. Measurements in flowing waters should be made in relatively turbulent free areas. Measurements in standing waters may require gentle probe agitation to create water movement around the probe (check instrument manual to confirm).

4.2. Calibration and Measurement Procedures

To accurately calibrate some dissolved oxygen meters, it may be necessary to know the altitude of the region in which you are located and the approximate salinity of the water you will be analyzing. Fresh water has a salinity of approximately zero. Seawater has an approximate salinity of 35 practical salinity units

(psu). If uncertain, measure salinity first with an appropriate device. The instructions below are applicable to the YSI Model 55; for other instruments, consult the instruction manual.

- Ensure that the sponge inside the instrument's calibration chamber is wet then insert the probe into the chamber. Turn the instrument on and wait for readings to stabilize (as long as 15 minutes, depending on the model).
- To calibrate, enter the calibration menu by pressing and releasing both the up and down arrow keys at the same time. Enter the altitude (in hundreds of feet) at the prompt by using the arrow keys to increase or decrease the altitude (example: 12 = 1,200 feet). Press enter when correct altitude is shown.
- The meter should display CAL in the lower left of the display with the calibration value in the lower right of the display and the current D.O. reading (before calibration) should be on the main display. Once the D.O. reading is stable, press ENTER. Enter the salinity at the prompt by using the arrow keys. Press ENTER when finished and the instrument will return to normal operation.
- Calibration should be performed at a temperature within ± 10°C of the sample temperature. Recalibrate every 15 samples and whenever the unit is turned on.
- If calibration is out of range, erratic readings occur, bubbles appear, or if the membrane becomes damaged, wrinkled, or fouled refill the membrane solution and/or replace the membrane, per the manufacturer's manual.



Use of YSI handheld device and probe

- Avoid contact with environments containing substances that may attack the probe materials (e.g. acids, caustics, and strong solvents).

4.3. Troubleshooting Information

If there are any performance problems with the dissolved oxygen-measuring device, consult the appropriate section of the instruction manual for the checkout and self-test procedures. If the problem persists, consult the manufacturer's customer service department immediately for further instructions.

4.4. Maintenance

Instrument maintenance for meter-type dissolved oxygen measuring devices should be performed according to the procedures and frequencies required by the manufacturer. Rinsing the probe with distilled or deionized water and preventing exposure of the membrane to drying is typically all that is required on a day-to-day basis.

5.0 QUALITY CONTROL

Duplicate measurements of a single sample should be performed at the frequency specified in the project plan. In the absence of project-specific criteria, duplicate measurements should agree within ± 0.2 mg/L.

6.0 DOCUMENTATION

All dissolved oxygen meter calibration, checks, and maintenance information will be recorded in a calibration logbook. Dissolved oxygen data may be recorded on the appropriate field data sheets or field books.

- Calibration documentation must be maintained in a thorough and consistent manner. At a minimum, the following information must be recorded:
    - Date and time of calibration
    - Person performing the measurement
    - Instrument identification number/model
    - Readings for all continuing calibration checks
    - Comments
- Documentation for recorded data must include a minimum of the following:
    - Date and time of analysis
    - Person performing the measurement
    - Sample identification/station location
    - Dissolved oxygen, both in mg/L and percent saturation and temperature of sample (including units and duplicate measurements)
    - Comments

7.0 TRAINING/QUALIFICATIONS

To properly perform dissolved oxygen measurements, the analyst must be familiar with the calibration and measurement techniques stated in this SOG. The analyst must also be experienced in the operation of the meter.

Certain state certification programs require that dissolved oxygen measurements in the field be taken by, or in the presence of, personnel that are qualified under the certification program.

GUIDELINES FOR MEASUREMENT OF PH

1.0 INTRODUCTION

1.1 Purpose and Applicability

These Standard Operating Guidelines (SOG) provide basic instructions for routine calibration and operation of a variety of pH field pens. Although these meters may measure additional parameters (e.g., temperature, specific conductance, etc.), this SOG addresses pH measurement only (other capabilities are outlined in the appropriate SOG and manufacturer's individual instrument manuals). This SOG is designed specifically for the measurement of pH in accordance with EPA Method 150.1 and Standard Method 4500-H B which address electrometric pH measurements of drinking, surface, and saline waters, domestic and industrial wastes, and acid rain.

1.2 Quality Assurance Planning Considerations

The end use of the data will determine the quality assurance requirements that are necessary to produce data of acceptable quality. These quality assurance requirements will be defined in the site-specific workplan or Quality Assurance Project Plan (QAPP) (hereafter referred to as the project plan) or laboratory Quality Assurance Manual (QAM) and may include duplicate or replicate measurements or confirmatory analyses.

2.0 RESPONSIBILITIES

- The project manager is responsible for ensuring that project-specific requirements are communicated to the project team and for providing the materials, resources, and guidance necessary to perform the measurements in accordance with this SOG and the project plan.
- The analyst is responsible for verifying that the pH meter is in proper operating condition prior to use and for implementing the calibration and measurement procedures in accordance with this SOG and the project plan.

3.0 REQUIRED MATERIALS

The following materials are necessary for this procedure:

- pH meter
- pH meter manufacturer's instruction manual
- Deionized or distilled water
- 4.0, 7.0, and 10.0 buffer solutions
- Lint-free tissues
- Mild detergent
- Manufacturer's recommended storage solution
- Manufacturer's recommended cleaning solution
- Field data sheet or logbook
- Calibration sheet or logbook

4.0 METHODS

4.1 Sample Handling, Preservation, and General Measurement Procedures

- To achieve accurate pH measurements, samples should be analyzed immediately in the field, or as soon as possible after collection. Sample should be measured *in situ* or collected in plastic or glass containers.
- As temperature can affect the pH measurements obtained, both the pH and the temperature of the sample must be recorded, unless the meter is capable of automatic temperature correction (ATC).
- Primary standard buffer salts available from NIST can be purchased and are necessary for situations where extreme accuracy is required. Secondary standard buffers may be purchased as a solution from commercial vendors and are recommended for routine use. Buffers should not be used after their expiration dates as provided by the manufacturer. An expiration date of one year should be used if the manufacturer does not supply an expiration date or if the buffers are prepared from pH powder pillows, etc.
- Keep the probe elevated off the bottom to avoid disturbing sediments. Allow readings to fully stabilize before recording the pH measurement. This may take several minutes, especially if the pH is drastically different from the last reading or the bulb has been allowed to dry out between readings.
- Rinse the electrode with deionized or distilled water between samples and wipe gently, if needed, with a lint-free tissue. If a more thorough cleaning is required, use a mild detergent (e.g., dish soap) or the manufacturer's recommended cleaning solution.
- Store the probe in the manufacturer's recommended storage solution or, if this is not available, tap water. Do not use distilled or deionized water for storage purposes.

Handheld pH meter

4.2. Calibration and Measurement Procedures

- The pH meter should be checked weekly before any analyses are performed. Otherwise, the meter should be checked or calibrated at the frequency specified in the project plan.
- Calibration should include a minimum of one point but ideally, a two point calibration that brackets the expected pH of the samples to be measured is desirable. Calibration measurements should be recorded in the calibration logbook.
- Choose either 7.0 and 10.0 (high range) or 4.0 and 7.0 (low range) buffers, whichever will bracket the expected sample range. Pour each buffer into a clean glass beaker. The volume should be sufficient to fully submerse the pH bulb and thermistor. If the pH is being measured in a laboratory, place the beaker on the magnetic stirrer and place the stirring bar in the beaker. Measure and record the temperatures of the buffers using a calibrated thermometer or automatic temperature compensation (ATC).
- Follow the manufacturer's calibration instructions.
- Once calibration is complete, discard the buffer and rinse the beaker (and stirring bar, if used) thoroughly with distilled or deionized water.

- An additional check may be performed, if required by the project plan, by placing the electrode into an additional buffer solution. This buffer should be from a different source than the buffers used for the initial calibration. This buffer should read within ±0.2 pH units of the buffer's true pH value.
- Recalibrate the instrument if any of the following apply:
  - the check value varies more than 0.2 pH units from the true value
  - the expected pH of the sampled water body is outside the current calibration range
  - readings are erratic or do not stabilize
  - the instrument has just been cleaned or otherwise disturbed for maintenance

4.3. Troubleshooting Information

If there are any instrument performance problems that result in the inability to achieve the acceptance criteria presented in Section 5.0, consult the appropriate section of the meter instruction manual for troubleshooting procedures. If the problem persists, consult the manufacturer's customer service department immediately for further guidance.

4.4. Maintenance

- Instrument maintenance should be performed according to the procedures and frequencies required by the manufacturer.
- The electrode should be stored and maintained according to the manufacturer's instructions.

5.0 QUALITY CONTROL

- Duplicate measurements of a single sample will be performed at the frequency specified in the project plan. In the absence of project-specific criteria, duplicate measurements should agree within ±0.2 pH units.

6.0 DOCUMENTATION

- All pH meter calibration, temperature check, and maintenance information will be recorded in a calibration logbook.
- pH data may be recorded on the appropriate laboratory or field data sheets or logbooks.
- Calibration documentation must be maintained in a thorough and consistent manner. At a minimum, the following information must be recorded:
  - Date and time of calibration
  - Person performing the measurement
  - Instrument identification number/model
  - Expiration dates and batch numbers for all buffer solutions
  - Reading for pH 7.0 buffer before and after meter adjustment
  - Reading for pH 4.0 or 10.0 buffer before and after meter adjustment
  - Readings for all continuing calibration checks
  - Temperature of buffers (corrected for any difference with reference thermometer), including units
  - Comments

- Documentation for recorded data must include a minimum of the following:
    - Date and time of analysis
    - Person performing the measurement
    - Sample identification/station location
    - Temperature and pH of sample (including units and duplicate measurements)
    - Comments

7.0 TRAINING/QUALIFICATIONS

To properly perform pH measurements, the analyst must be familiar with the calibration and measurement techniques stated in this SOG. The analyst must also be experienced in the operation of the meter.

GUIDELINES FOR MEASURING STREAMFLOW

1.0 INTRODUCTION

These guidelines provide instructions for the field measurement of flow rate in bodies of running water.

Descriptions of two field techniques are provided.

The first, called the time of travel method, is simple and does not require expensive or specialized equipment. This is most appropriate for rapid streamflow assessments where order of magnitude accuracy is acceptable or water depth is too low for the accurate measurement using a velocity meter.

The second method requires the use of a current meter, which is the preferred method where discharge measurements are being used to develop at-a-station rating curves and water depth is sufficient for measurement.

Additionally, these guidelines provide This method of calculating streamflow involves determining the cross-sectional area of the stream and measuring the average time it takes for a neutrally buoyant object to travel a known distance.

2.0 REQUIRED MATERIALS

The following materials are necessary for the measuring streamflow:

- Measuring stick to measure stream depth (folding stick is recommended)
- Flexible tape measure (longer than the width of the stream)
- Field data sheet, logbook, or tablet with electronic data sheet

If using a velocity meter, the following additional materials are also required:

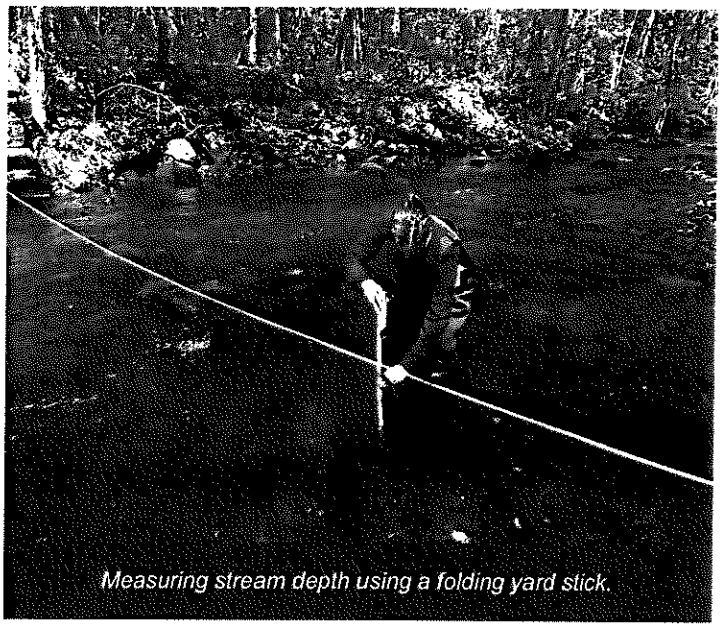
- Swoffer Model 2100 current velocity meter (or similar)
- Calibrated wading rod

If using the time of travel method, the following additional materials are also required.

- A neutrally buoyant float
- Stopwatch (built-in app on most smartphones)
- Net (to catch the float)

3.0 METHODS

3.1 Choosing a Cross Section


Measuring stream depth using a folding yard stick.

- Select an appropriate stream cross section. The location selected should be straight (no bends), and free of obstructions. Unobstructed runs are ideal.
- Identify the left and right banks of the stream. When working in streams, left and right are relative to the mean flow direction. Therefore, the left bank will be to one's left when facing downstream but to one's right when facing upstream.
- To assure consistency of measurements and allow for easier comparison of data across time, flow should be measured at the same cross section of the stream during all visits. Include descriptions of site landmarks in field notes, and/or take photos of measurement locations. If site conditions allow, install permanent cross section markers, such as stakes or rebar.
- If a staff gauge is present near the stream measurement location, record the staff gauge depth during each visit.

3.2. Divide the Channel into Subsections

- Establish a transect by stretching the measuring tape across the stream, perpendicular to the channel axis. Secure each end of the tape to the stream banks so that the tape is taut.
- Take a minimum of four photographs, including one each facing upstream, the left bank, downstream, and the right bank.
- Starting with the left edge of water, measure width and stream depth at no less than three locations (stations) within the steam channel. This is the minimum number of stations and most streams will require more than three measurements to accurately calculate discharge.
- The area between each vertical station represents a channel subsection.

3.3. Measuring Velocity

3.3.1 Time-of-Travel Method

- To measure travel time, time how long it takes for a neutrally buoyant object (a float) to travel a known distance. Suitable objects should float, but sit very low in the water to minimize influence from wind, and can be untethered or tethered (methods adapted from EPA, 2012a described below).

- Suitable floats include:
    - citrus fruits or pieces of citrus peel
    - cheese puffs
    - small sponge rubber balls
    - small sticks or bits of vegetation
- Always face upstream when taking velocity measurements. Stand far enough downstream that stream velocity is not affected in the location being measured.
- Surface velocity is generally greater than depth-averaged velocity, so a correction factor (0.8 for rocky-bottom streams, 0.9 for muddy-bottom streams) is applied to float travel times (see Section 3.3, EPA 2012b)
- Untethered floats should be biodegradable, or a second person equipped with a net should be stationed downstream of the sampling reach to retrieve the float(s).
- Hold the measuring stick above the water surface, perpendicular to the cross section. Release the untethered float somewhat upstream of the end of the measuring stick to allow the float to reach full flow velocity. Using a stopwatch, time how long it takes for the float to travel a known distance (3 ft is recommended for most streams but longer distances may be appropriate where velocity is high). Repeat this process three times to obtain an average time to travel at one station before proceeding to the next station.

3.3.2 Depth-Averaged Current Meter Method

- Set the current meter to average measurements over at least a three second period. Longer periods may be used if appropriate to conditions.
- Always face upstream when taking velocity measurements. Stand far enough downstream that stream velocity is not affected in the location being measured.
- Carefully place the wading rod in the flow until the base is firmly on the stream bottom.
- Orient the current meter perpendicular to the cross section transect.
- Ensure that the wading rod is straight up and down (not angled).
- Hold the wading rod steady while adjusting the calibrated height of current meter to match the measured depth. This will allow collection of measurements that are reflective of depth-averaged velocity.
- Once at least three seconds have passed, view the reading from the current meter. Allow at least three readings to occur before recording. This will prevent erroneous data due to averaging of measurements from the set up process.

3.4. Calculating Flow

- The following equation is used to calculate flow using the time-of-travel method):

$$Q = (ACL)/T$$

  - Q = stream discharge
  - A = cross sectional area
  - L = distance traveled by the float
  - C = correction factor (0.8 for rough streambeds, 0.9 for smooth streambeds)
  - T = average time of travel (seconds)

The following equation is used to calculate flow using the depth-averaged current meter method:

$$Q = AV$$

  - Q = stream discharge
  - A = cross sectional area
  - V = velocity at 60% depth

4.0 DOCUMENTATION

Record streamflow data on field sheets, field notebooks, or electronic tablets. Any unanticipated site-specific information, which requires deviation from the above guidelines should also be recorded. In addition to recording the required discharge data, field notes for streamflow measurement should include a minimum of the following:

- Name or initials of person conducting the measurement
- Discharge measurement method used
- Site ID or name
- Date and time of streamflow measurement
- Environmental conditions (wind, temperature, etc.)
- Other relevant observations about site conditions
- Photographic evidence of streamflow and site conditions is also useful for verification of relative stream stage and flow from different visits, as well as any environmental factors that may have influenced data collection.

5.0 REFERENCES

EPA, 2012a. Water: Monitoring and Assessment. 5.1 Stream Flow. United States Environmental Protection Agency. Office of Water. EPA 841-B-97-003. Accessed January 27, 2020 at https://archive.epa.gov/water/archive/web/html/vms51.html

EPA, 2012b. SESD Operating Procedure, Hydrologic Studies. Effective Date November 1, 2012. United States Environmental Protection Agency. Office of Water. SESDPROC-501-R3. Accessed January 27, 2020 at https://www.epa.gov/sites/production/files/2015-06/documents/Hydrological-Studies.pdf

GUIDELINES FOR COLLECTION OF SURFACE WATER SAMPLES

1.0 INTRODUCTION

These guidelines provide basic instructions for the routine acquisition of surface water from lakes, ponds, and streams. The methods outlined below are intended to (1) standardize water sample collection methods; (2) ensure that samples delivered to the laboratory represent field conditions as accurately as possible; (3) assure proper documentation of sample collection; and (4) minimize cross contamination between sampling sites.

2.0 REQUIRED MATERIALS

The following materials are necessary for the acquisition of surface water samples:

- Nitrile gloves
- Labeled sample bottles provided by contracted laboratory (appropriately sanitized and containing the necessary preservative for desired analyses, see Table 1.0 for examples)
- Field data sheets or logbooks, including list of sites or locations to be sampled, and pencil
- Cooler with ice packs for sample storage
- Integrated depth sampler (if collecting algae sample)
- Secchi disk (if collecting algae samples)
- Laboratory Chain of Custody

Table 1.0 Example Container Types, Preservative Requirements, and Hold Times for Water Quality Samples.

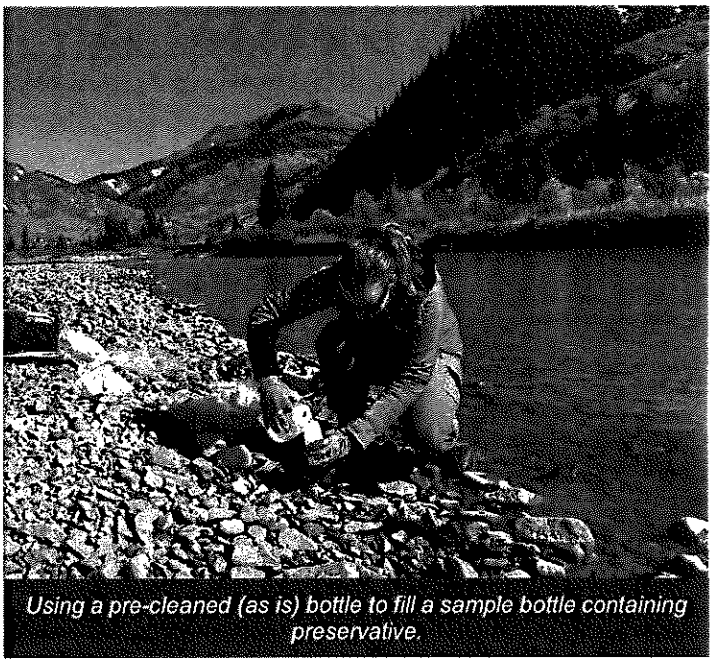
Analysis	Bottle Type	Preservative	Hold Time
Total Phosphorus	plastic	H_2SO_4	28 days
Dissolved Phosphorus	plastic	As Is	analyze immediately*
Total Suspended Solids (TSS)	plastic	As Is	7 days
Nitrate/Nitrite	plastic	As Is	48 hrs
Total Kjeldahl Nitrogen (TKN)	plastic	H_2SO_4	28 days
Metals - Total	plastic	HNO_3	6 months**
Metals - Dissolved	plastic	As Is	6 months**
Algae	opaque plastic	Lugol's iodine	>1 year
Chlorophyll-a	opaque plastic	As Is	analyze immediately
Bacteria	sterile plastic	As Is	6 hrs

* = 24 hrs with field filtration, ** = 28 days for mercury

3.0 METHODS

3.1 General Sampling Instructions

- Testing methods, sample containers, preservation techniques, and sample volumes should be selected in consultation with the laboratory to ensure that samples obtained will provide the desired results.
- Hold times vary considerably between different analytes and must be taken into consideration when planning field sampling efforts and lab courier pickups to assure the validity of analytical results.
- Field filtration of certain samples (dissolved phosphorus) is recommended. The laboratory can supply syringes and filters for use in the field.



Using a pre-cleaned (as is) bottle to fill a sample bottle containing preservative.

- In general, surface water samples should be collected via direct grab methods.
- Sample collection should precede the measurement of physical field parameters (including pH, apparent color, turbidity, conductivity, and dissolved oxygen) in order to minimize the risk of sediment disturbance and/or sample contamination.
- Clean rubber gloves should be worn at each sampling location. When sampling multiple sites on the same day, gloves may be rinsed in the immediate area of the waterbody to be sampled (downstream at flowing sites).
- Approximately 1-inch of air space should be left when filling sample bottles (except for dissolved oxygen, alkalinity, and BOD samples), so that bottles may be shaken (if needed) before analyses (EPA, 1997; Simpson 1991).
- Sample containers with preservatives should not be used to collect water samples. If using containers with preservatives, a pre-cleaned container of similar type (an as is bottle) should be used to collect and subsequently transfer the sample to the preserved container.
- Ensure that all sample bottles are correctly and completely labeled before storage. Sample bottles should be stored in a cooler with ice packs (it is best to avoid ice, as meltwater could potentially contaminate samples) or in a refrigerator until they are submitted to a lab courier.

3.1.1. Lake and Pond Sampling

- Grab samples from lakes and ponds should be collected at approximately 8 to 12 inches beneath the water surface or mid-way between the surface and the bottom if the waterbody is shallow (EPA 1997). Samples should not be collected in close proximity to the lake shoreline or submerged obstacles.

- To collect water samples, hold an as is bottle near the base, remove the lid, and plunge it into the water with the opening facing downward. Invert the bottle and allow it to fill before bringing it to the surface. Decant sufficient water from the bottle to allow for the required headspace and replace the cover, or carefully pour the contents into a bottle containing preservative. Repeat the above process to refill the as is bottle as many times as necessary.

Algae Samples

- Algae samples should be stored in opaque bottles with a small amount of Lugol's iodine for preservative (~1-2 drops in a 250 mL bottle). Algal taxonomy labs can provide opaque plastic bottles, but standard plastic as is bottles covered in aluminum foil can also be used.

Integrated depth sampler for collection of algae samples.

- Algae samples should be collected using an integrated depth sampler. An integrated depth sampler consists of a length of tubing (~1in diameter, at least 2 m long) with a weight attached to one end. Sample collection procedures using the depth sampler should proceeds as follows (procedure adapted from EPA 2012):

    - Determine the euphotic zone:

        - Lower the secchi disk over the shaded side of the boat until it disappears. Lower the disk a bit further, then slowly raise the disk until it reappears. Record the reappearance depth. The euphotic zone is calculated by multiplying the reappearance depth by 2.

    - Holding onto the non-weighted end of the sampler, lower the tube into the water column. Rinse the sampler by submerging it three times.

    - Lower the sampler so that it is submerged to the depth of the euphotic zone, or fully submerged if the euphotic zone is deeper than the length of the sampler. Cover the opening at the non-weighted end with a gloved thumb.

- Lift the sampler completely out of the water and cover the opening at the weighted end with a gloved thumb (both ends should be covered). Repeatedly lift each end of the sampler to mix the water sample within the tube.
- Fill the algae sample bottle with the required volume of water from the sampler (the bottle will contain Lugol's solution as preservative so be careful not to over-fill).
- Unlike samples for most other analytes, preserved algae samples can be stored at room temperature before submission to a lab.

3.1.2. Stream Sampling

- Samples should be collected from the center of small streams (i.e., 10-20 feet wide with a maximum depth of less than 2 feet), and at a location where water depth is 2-3 feet in larger streams.
- Always approach a sampling location from downstream, traveling so as to minimize the disturbance of bottom sediments and upstream waters.
- Stand downstream of the desired sampling location, hold the sample bottle near its base and plunge it below the water surface with the opening (mouth) downward. The opening of sample bottles should always be directed away from the sampler in an upstream direction.
- To inform investigations about nutrient inputs, stream flow should be measured whenever water quality samples are collected (see Guidelines for Measuring Stream Flow)

4.0 DOCUMENTATION

Report surface water field data on sheets or in notebooks. Any unanticipated site-specific information, which requires deviation from the above guidelines, should be recorded. Field notes for surface water sampling should include a minimum of the following:

- Name or initials of person collecting the samples
- Sample identification/station location
- Date and time of sample collection
- Environmental conditions (e.g. wind, weather)
- Other comments or observations about water quality and site conditions (e.g. visible algae bloom, dead fish nearby, sample has noticeable odor or color, etc.)

Photographic evidence of any notable conditions is also desirable.

5.0 REFERENCES

EPA, 2012. 2012 National Lakes Assessment Field Operations Manual. Version 1.0, May 15, 2012. United States Environmental Protection Agency. Office of Water. EPA-841-B-11-003. Accessed January 22, 2020 at https://www.epa.gov/sites/production/files/2013-11/documents/nla2012_fieldoperationsmanual_120517_final_combinedqrg.pdf

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GUIDELINES FOR MEASURING GROUNDWATER SEEPAGE QUANTITY AND QUALITY

1.0 INTRODUCTION

These Standard Operating Guidelines (SOG) provide basic instructions for the routine measurement of groundwater seepage quality and quantity. These standard methods describe the proper installation of seepage meters and the operation of Littoral Interstitial Porewater (LIP) samplers.

2.0 REQUIRED MATERIALS

The following materials are necessary for the seepage meter installation procedure:

- Seepage meters of known diameter
- Plastic tubing with one hole stopper
- Seepage bags with one hole stoppers and plastic clamps
- 250 mL graduated cylinder
- Field book or data sheets

The following materials are necessary for the collection of groundwater samples for analysis:

- Hand pump
- 2-1 L filter flasks with stoppers and tubing
- Littoral Interstitial Porewater (LIP) sampler
- Sample bottles with labels

3.0 METHODS

3.1 Seepage Meter Installation

- Initially, representative segments of the shoreline, where seepage meters will be positioned, are selected based on topography and housing density. Such segments may also be assigned to shoreline locations based on specific project objectives.

- ESS personnel shall estimate seepage quantity by installing two seepage meters per defined shoreline segment and measuring the change in volume in the attached seepage bag over time. Change in volume multiplied by a conversion factor relating the allotted seepage time (i.e., fraction of the day for which the seepage meter was running) and then adjusting to unit area (square meter), yields the liters of inseepage (positive value) or outseepage (negative value) per square meter per day.

- Seepage meters shall be firmly embedded in the substrate to depth of greater than 4 inches. Inserting seepage meters to this preferred depth will ensure that volumetric changes observed in the attached seepage bags are truly representative of groundwater flows and will increase the likelihood that seepage meters will not be disrupted by strong currents or wave action.

- At each designated shoreline location (segments pre-determined by project plan), one seepage meter should be placed at a relatively shallow depth and one at a deeper depth in order to capture ground water flows that may be occurring in different strata.

- Seepage meters must be allowed to equilibrate for a minimum of 5 minutes before the system is "closed" by the attachment of the seepage bags.

- The seepage bag should be filled with an appropriate pre-measured volume of water. In most instances 250 mL will be appropriate. The pre-determined volume of water is necessary since this volume is compared to the volume obtained after sufficient time has elapsed to quantify the change in volume (either positive or negative).

- Seepage bags are to be secured in place with as little disturbance of the seepage meter as possible. The best approach is to slowly twist the seepage bag's rubber stopper into the hole of the seepage meter.

- Prior to use, seepage bags must be air dried in order to ensure that all residual water is removed from bags and therefore will not confound the change in volume measurements. Additionally, each bag and associated stopper must be visually inspected and air pressure tested prior to each use to ensure that no leakage can occur.

3.2. Groundwater Sampling Using Littoral Interstitial Porewater Sampler

- Groundwater seepage quality can be collected through sampling with a Littoral Interstitial Porewater (LIP) sampler. A hand pump, attached to a 250 ml HDPE plastic flask, creates a low-pressure vacuum causing water to flow from the LIP sampler into the attached plastic flask. To avoid accidental contact of the extracted water with the hand pump, a second plastic flask should be connected in-line using additional tubing.

- Porewater should be extracted from a minimum of three locations in each segment and composited using equal volumes from each location.

- Samples collected may be tested in the field for parameters such as, temperature, conductivity, and pH, and/or transferred into labeled bottles and sent to a laboratory for the other analyses.

4.0 DOCUMENTATION

Record data on field sheets, field notebooks, or electronic tablets. Any unanticipated site-specific information, which requires deviation from the above guidelines should also be recorded. Documentation should include a minimum of the following:

- Name or initials of person conducting the measurement
- Date
- Site ID or name
- Size of seepage meter (diameter)
- Time of seepage meter installation
- Time of seepage meter retrieval
- Volume of water added to seepage meter bag at installation
- Volume of water remaining in seepage meter bag at retrieval
- Results of in-lake and extracted groundwater field parameter measurements (temperature, pH, and specific conductance at a minimum)
- Environmental conditions (wind, temperature, etc.) and other relevant observations about site conditions
- Photographic evidence of conditions

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GUIDELINES FOR THE MEASUREMENT OF TURBIDITY

1.0 INTRODUCTION

1.1 Purpose and Applicability

These Standard Operating Guidelines (SOG) provide basic instructions for routine measurement of turbidity using a nephelometric turbidity meter with a digital read-out device (e.g., LaMotte 2020we Turbidimeter). Measurements are made in accordance with EPA Method 180.1 that addresses nephelometeric turbidity measurement of drinking, surface, and saline waters, and domestic and industrial wastes.

1.2 Quality Assurance Planning Considerations

The end use of the data will determine the quality assurance requirements that are necessary to produce data of acceptable quality. These quality assurance requirements will be defined in the site-specific workplan or Quality Assurance Project Plan (QAPP) (hereafter referred to as the project plan) or laboratory Quality Assurance Manual (QAM) and may include duplicate or replicate measurements or confirmatory measurements.

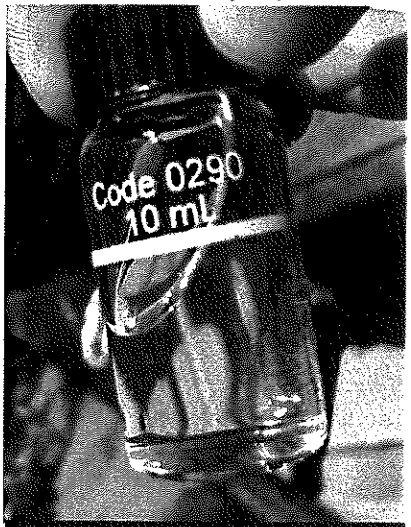
2.0 RESPONSIBILITIES

- The analyst is responsible for verifying that the turbidity measuring device is in proper operating condition prior to use and for implementing the calibration and measurement procedures in accordance with this SOG and the project plan.
- The project manager is responsible for ensuring that project-specific requirements are communicated to the project team and for providing the materials, resources, and guidance necessary to perform the measurements in accordance with this SOG and the project plan.

3.0 REQUIRED MATERIALS

The following materials are necessary for this procedure:

- Turbidity meter with digital read-out device
- Manufacturer's instruction manual for the instrument
- Turbidity tubes/cuvettes
- Mild detergent
- Lint-free cloth
- Distilled water
- Nephelometric Turbidity Unit (NTU) calibration standards
- Laboratory or field data sheets or logbooks



Example of a sample cuvette

4.0 METHODS

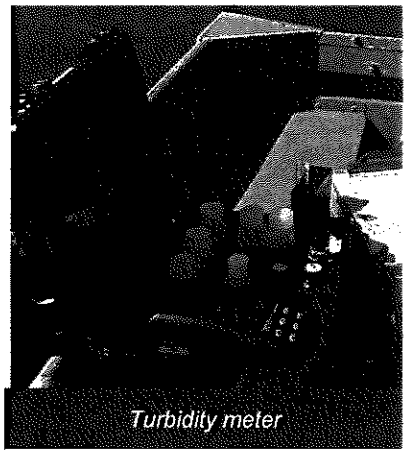
4.1 Sample Handling, Preservation, and General Measurement Procedures

To achieve accurate turbidity measurements, samples should be analyzed immediately upon collection (preferably within 15 minutes). Samples should be collected in glass or plastic containers.

4.2. Calibration and Measurement Procedures

- Select a turbidity standard in the range of the samples to be tested (typically 0.00 NTU, 1.00 NTU or 10.0 NTU) or as recommended by the manufacturer. Fill a turbidity tube or cuvette with the standard, cap, and wipe the tube with the clean lint-free cloth.

- Place the sample into the turbidity meter such that the indexing arrow or line on the turbidity tube is aligned with the indexing arrow or notch on the meter face. Close the lid and press the "READ" button. If the displayed value is not the same as the value of the standard (within 10%), continue with the calibration procedure.
- Follow the calibration procedures outlined by the manufacturer's manual.
- Verify the calibration every 15 samples and at the end of the day. Recalibrate the instrument if the check value varies more than 10% from the true value.
- Rinse cuvettes with deionized or distilled water and wiped gently with a lint-free tissue between sample analysis.
- Recalibrate the instrument with the appropriate NTU standard if the standard is not of the same order of magnitude as the samples being tested.
- The meter must be re-calibrated following any maintenance activities and prior to the next use.
- Record the turbidity reading to the nearest 0.01 NTU for measurements less than 11 NTU and to the nearest 0.1 for measurements greater than 11 NTU but less than 110 NTU. For values greater than 110 NTU record to the nearest 1 NTU.



Turbidity meter

4.3. Troubleshooting Information

If there are any performance problems with any of the meter-type turbidity measuring devices, consult the appropriate section of the meter instruction manual for the checkout and self-test procedures. If the problem persists, consult the manufacturer's customer service department immediately for further instructions.

4.4. Maintenance

Instrument maintenance for meter-type turbidity measuring devices should be performed according to the procedures and frequencies required by the manufacturer.

5.0 QUALITY CONTROL

The turbidity measuring tubes will, at a minimum, be checked against NTU calibration standards at the frequency stated in Section 4.2. This verification procedure will be performed in accordance with the manufacturer's manual.

Duplicate measurements of a single sample will be performed at the frequency required in the project plan. In the absence of project-specific criteria, duplicate measurements should agree within + 5% for readings below 10 NTU and + 10% for readings above 100 NTU.

6.0 DOCUMENTATION

All turbidity meter calibration, checks, and maintenance information will be recorded on the daily calibration sheet or logbook. Turbidity data may be recorded on the appropriate laboratory or field data sheets or logbooks.

Calibration documentation must be maintained in a thorough and consistent manner. At a minimum, the following information must be recorded:

- Date and time of calibration
- Person performing the measurement
- Instrument identification number/model
- Expiration dates and batch numbers for all standard solutions
- Reading for each standard before and after meter adjustment
- Readings for all continuing calibration checks
- Comments

Documentation for recorded data must include a minimum of the following:

- Date and time of analysis
- Person performing the measurement
- Sample identification/station location
- Turbidity of sample (including units and any duplicate measurements)
- Comments

7.0 TRAINING/QUALIFICATIONS

To properly perform turbidity measurements, the analyst must be familiar with the calibration and measurement techniques stated in this SOG. The analyst must also be experienced in the operation of the meter.

GUIDELINES FOR USE OF WATER LEVEL DATALOGGERS IN SURFACE WATER

1.0 INTRODUCTION

These guidelines provide basic instructions for programming, deploying and downloading data from electronic dataloggers which are used for long-term water level monitoring and monitoring of other water quality parameters (e.g., temperature, conductivity). The methods outlined below are intended to (1) standardize datalogger monitoring of water levels; (2) ensure that data collected represent field conditions as accurately as possible; (3) provide guidance for the secure transfer and storage of data; and (4) assure proper field measurements and documentation.

2.0 REQUIRED MATERIALS

The following materials are necessary:

- Datalogger or Barologger
- Rebar, metal fence post or similar
- Sledgehammer or post driver
- Computer, laptop or tablet
- Communications device
- Datalogger software
- PVC housing and hose clamps
- Braided nylon twine or wire
- Water level monitoring device (electronic water level meter, plunker, etc.)
- Tools

3.0 PROGRAMMING THE DATALOGGER

The following general procedure is followed to edit the datalogger information and program the datalogger to collect readings. Always refer to the manufacturer's instructions for datalogger programming, deployment and data downloading and correction instructions.

If the datalogger is unvented, a second datalogger or Barologger will also need to be deployed to collect barometric pressure readings to support the barometric pressure correction of the data downloaded from the unvented datalogger.

- Connect the datalogger or Barologger to the computer, laptop or tablet using the supplied communications device.
- Select the appropriate COM or USB port for the communications device.
- Open the logger programming or launching page to allow for entering the logger details and programming the device for frequency of readings.
- Check the datalogger battery life and available memory to verify that it is acceptable for the intended use. This information can also be used to determine the frequency of data downloads that will be necessary.
- Rename the datalogger using the Site location.

- Program the datalogger to collect readings for the selected parameters at the specified interval.
    - The additional datalogger or Barologger should be programmed to collect readings at the same interval.
- Disconnect the datalogger from the communications device using the software program to disengage or remove from the communications device.

4.0 DEPLOYING THE DATALOGGER

The following general procedure should be used to deploy the datalogger for collection of readings.

- An appropriate location for the installation of the datalogger should be selected within a deep portion of the water body to allow for fluctuations in the water level.
    - An additional datalogger or Barologger should be mounted in the air in an inconspicuous location such as a tree or attached to a building.
- In surface water, the datalogger should be deployed within a PVC housing, if possible, to help to dampen any fluctuations (e.g., wave action or turbulence) in the surface water surface.
- The PVC housing should be secured using hose clamps to a mounting post (typically either rebar, metal fence post or similar) that can be driven into the substrate beneath the water body.
- Prior to deployment, collect a depth to water measurement from the top of the mounting post (rebar, metal fence post or similar) and an approximate depth to the bottom of the PVC housing.
- Deploy the datalogger by placing inside the PVC housing, attaching either braided nylon twine or wire to the datalogger, and threading through the top of the PVC cap to allow for retrieval of the datalogger without disturbing the position of the PVC housing.

5.0 DOWNLOADING DATA

The following general procedure should be followed when downloading the data.

- Soon after deployment (typically within two weeks, or as soon as possible given project constraints), a verification download should be performed to verify that the datalogger was programmed correctly and is collecting data at the appropriate interval.
- Subsequent downloads can be scheduled as necessary taking into consideration the frequency of readings and the available memory and battery life of the datalogger.
- Prior to removing the datalogger to download the data, collect a depth to water measurement from the top of the mounting post or other acceptable measuring point.
- Remove the datalogger and connect to the communications device.
- Connect the communications device to the computer, laptop or tablet and open the software.
- Navigate to the data download page and proceed with downloading the collected data.

- Certain datalogger software packages will require that the datalogging process be stopped and the datalogger will have to be reprogrammed prior to redeployment.

- If the datalogger is unvented, correct the downloaded data using the program supplied by the Vendor using the data collected from the additional datalogger or Barologger.

6.0 STREAMFLOW MEASUREMENTS

In order to convert the hydraulic head (pressure) measurements from the datalogger to streamflow, a series of streamflow measurements needs to be collected at varying stream stages or flow stages to support the development of a rating curve.

REFER TO THE GUIDELINES FOR MEASURING STREAMFLOW SOP FOR DETAILS ON THE COLLECTION OF STREAMFLOW MEASUREMENTS AND DEVELOPMENT OF A RATING CURVE.

7.0 DOCUMENTATION

Maintain field notes for the datalogger deployment and data download events including the collected field measurements that will be used to QC the data collected by the datalogger and convert the collected measurements to elevation, if applicable.

Photodocumentation of the datalogger deployment and setup should also be maintained as well as any observations during the field visits.

8.0 REFERENCES

Select references to Vendors that supply dataloggers are provided below.

Solinst, Levelogger Series Software User Guide, https://www.solinst.com/products/dataloggers-and-telemetry/3001-levelogger-series/operating-instructions/user-guide/3001-user-guide.php

In-Situ, Rugged Troll 100 and 200 and Rugged Troll BaroTroll Instruments, https://in-situ.com/pub/media/support/documents/Rugged_TROLL_Manual.pdf

Onset, HOBO U20L Water Level Logger (U20L-0x) User's Manual, https://www.onsetcomp.com/support/manuals/u20l_17153/

Pepared on 7/26/2021

CPCWDC - Silver Lake
Detailed Project Schedule: June 2021 to June 2022

Task	2021 June Late	July Early	July Late	August Early	August Late	September Early	September Late	October Early	October Late	November Early	November Late	December Early	December Late	2022 January Early	January Late	February Early	February Late	March Early	March Late	April Early	April Late	May Early	May Late	June Early	June Late
1 Administration and Reporting																									
Project Kick-off																									
Project Detail																									
Status Updates/Meetings						Timing of additional meetings TBD																			
2. SAP and QAPP																									
Draft SAP																									
Revised SAP																									
Final SAP																									
Draft QAPP																									
Revised QAPP																									
Final QAPP						Depends on EPA review time																			
3. Public Input Plan																									
Draft PIP																									
Final PIP																									
SAP Review Meeting																									
Draft Launch Informational Leaflet																									
Final Launch Informational Leaflet																									
Public Listening Session																									
Draft Project Informational Leaflet																									
Final Project Informational Leaflet																									
4. SAP Implementation																									
Bathymetric and Aquatic Plant Surveys																									
In-Lake Water Column & Quality Sampling																									
In-Lake Bacteria Testing (added to Task 4)																									
In-Lake Cyanotoxin Testing (added to Task 4)																									
Upstream and Downstream Monitoring																									
Groundwater Assessment																									
Draft Technical Memorandum																									
Revised Final Technical Memorandum																									
5. Internal P-Loading Analysis and Water Quality Modeling																									
Sediment Coring and Phosphorus Fractionation																									
Water Quality Model																									

Planned Event
Completed Event
Planned Deliverable
Completed Deliverable

7/23/21

DRAFT
Public Involvement Plan
Silver Lake Water Quality Monitoring Project

This Public Involvement Plan (PIP) provides the approach to be taken to engage various stakeholders, including the public, in the development of the Sampling and Analysis Plan (SAP) for the Silver Lake Water Quality Monitoring Project (the Project). This program involves the sampling of surface water, groundwater and sediment within Silver Lake, its tributaries, and the supporting water bodies (Monponsett ponds, Furnace Pond), evaluation of the resulting data, and development of potential alternatives for consideration for both short- and long-term management of Silver Lake.

As stated in the May 7, 2021, Request for Proposal (RFP) – Silver Lake Water Quality Monitoring, the Central Plymouth County Water District Commission (CPCWDC) was seeking a qualified contractor to assist CPCWDC by providing specialized technical services to support CPCWDC's development and implementation of a water quality SAP for Silver Lake in the towns of Halifax, Plympton, Pembroke and Kingston, Massachusetts. It also states that the overarching goal of water quality data collection will be to help inform community management decisions to address water quality and quantity issues in Silver Lake and connected water bodies. More specifically, to develop a baseline understanding of current water quality and continue to develop solutions-oriented relationships with the City of Brockton public water department (BWD) and the public.

Task 3 under the RFP focuses on engagement of the public in the development of the SAP. The primary goal of these efforts is to inform the District of the Project and solicit oral and written comments on the draft final SAP from the District and their representatives as well as key stakeholder representatives, such as local watershed associations, Massachusetts Department of Environmental Protection (MassDEP), and the Massachusetts Department of Health (MDPH).

This plan outlines the enterprising steps that will be taken to facilitate this public involvement as well as the presentation of the findings of the initial year of monitoring to the public in 2022.

PUBLIC INVOLVEMENT PROCESS The objectives of the public involvement process are listed below.	
Objective 1	**Present the scope of the proposed water quality monitoring program during a public meeting.**
Objective 2	Provide an opportunity for the public to provide oral or written comments or input into the scope of the Project.
Objective 3	**Provide certain key stakeholders the opportunity to review and comment on the draft final SAP.**
Objective 4	Provide a written overview of the final SAP to the public.
Objective 5	**Present the results of the initial year of the monitoring project to the public.**
Objective 6	Provide a written overview of the results of the initial year of monitoring.

The following outlines the approach proposed to meet these stated objectives.

A two-step public involvement process is envisioned for this Project which will include the following public meetings.

- SAP Review Meeting (target date - August 2021)
- Public Listening Session (target date - June 2022)

The anticipated timing for each of these two meetings is also shown above. Once the actual dates for these meetings are finalized, notice of the meetings will be provided through the CPCWDC website (https://www.centralplymouthcountywater.org/).

The following provides an overview for each of these two planned public meetings including the objectives of each meeting, the opportunities for public involvement and how the previously stated objective will be met.

SAP REVIEW MEETING	
Objective 1: Present the scope of the proposed water quality monitoring program during a public meeting.	**Goal 1** Hold a public meeting to present the scope of the draft final SAP and solicit input from the public. • A public meeting is planned for August 2021. Announcement of the public meeting will be provided through the CPCWDC website. • The scope of the water quality monitoring program as detailed in the draft final SAP will be presented.
Objective 2: Provide an opportunity for the public to provide oral or written comments or input into the scope of the Project.	**Goal 1** Public will be allowed the opportunity to provide oral comments on the draft final SAP during the SAP Review Meeting.
	Goal 2 Public will be allowed the opportunity to provide written comments on the draft final SAP within two calendar days of the SAP Review Meeting. Written comments should be submitted to Frank Basler, Plymouth County Administrator.
Objective 3: Provide certain key stakeholders the opportunity to review and comment on the draft final SAP.	**Goal 1** Prior to the SAP Review Meeting, copies of the draft final SAP will also be provided directly to certain key stakeholders including: • Jones River Watershed Association • Taunton River Watershed Alliance • North and South Rivers Watershed Association • MassDEP • MDPH • City of Brockton Water Division
Objective 4: Provide a written overview of the final SAP to the public.	**Goal 1** Following the SAP Review Meeting and preparation of the final SAP, a Launch Information Leaflet will be prepared that outlines the goals, objectives, and scope of the Silver Lake Water Quality Monitoring Project. • This leaflet will be made available to the public through the CPCWDC website.

PUBLIC LISTENING SESSION	
Objective 5: Present the results of the initial year of the monitoring project to the public.	**Goal 1** Hold a public meeting to present the results of the initial year of monitoring and address any questions. • A public meeting is planned for June 2022 to present the results of the initial year of monitoring.
Objective 6: Provide a written overview of the results of the initial year of monitoring.	**Goal 1** Following the Public Listening Session and finalization of the summary report for the initial year of monitoring, a Project Informational Leaflet will be prepared that outlines the results of the initial year of monitoring and any management alternatives being considered.

Primary Project contacts are listed below if you have any questions about the proposed Project or opportunities for Stakeholder involvement.

Project Contacts:

CPCWDC:	Francis G. Basler Jr., Administrator	fbasler@plymouthcountyma.gov
ESS Group:	Matt Ladewig, Project Manager	mladewig@essgroup.com