Monitoring Guidance for In-Water Work



Guidance for ensuring compliance with
state surface water quality standards
per WAC 173-201A

2022

Washington State
Department of Transportation

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1. Background & applicability

This document provides guidance for Washington State Department of Transportation (WSDOT) environmental staff and project teams to help them ensure in-water construction activities are in compliance with state surface water quality standards per Washington Administrative Code (WAC) 173-201A.

Projects must comply with the state surface water quality during in-water work unless otherwise permitted. WSDOT and contracted project teams are responsible for understanding these requirements along with any additional monitoring or documentation requirements listed in permits or approvals obtained for their project.

WSDOT project teams should contact their region environmental office if they have specific questions regarding sampling or water quality requirements. WSDOT staff may also contact the Washington State Department of Ecology (Ecology) liaison if they have questions concerning monitoring requirements.

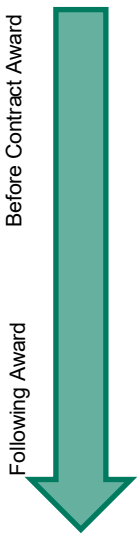
This document does not provide sampling guidance for complying with the National Pollutant Discharge Elimination System (NPDES) Construction Stormwater General Permit. NPDES Construction Stormwater General Permit Sampling Procedures can be found in Chapter 4 of WSDOT's Temporary Erosion & Sediment Control Manual.

This document assumes that Ecology has 401 authority for the project. If the Environmental Protection Agency or a Tribe have 401 authority, coordinate with them on the water quality standards and monitoring needs.

2. Planning to ensure compliance

In-water work is a high-risk activity. It's essential that WSDOT and the contractor carefully plan and discuss the work to avoid non-compliance with water quality standards.

Take the following steps before allowing the contractor to perform in-water work:



1. **Know your project.** Review environmental permits and approvals to determine project-specific requirements for in-water work and sampling. Visit the project site to determine access points to the water body and potential limitations.
2. **Procure sampling equipment.** Acquire the necessary sampling equipment to ensure compliance with state surface water quality standards. WSDOT typically monitors for turbidity and pH.
3. **Collaborate.** Make sure the monitoring plan is consistent with the activities and locations where the Contractor will conduct in-water work. Coordinate with the regulatory agencies and tribes to provide advance notifications and a copy of the monitoring plan (if required).
4. **Communicate.** Ensure the contractor is aware of the requirements and will implement the necessary best management practices (BMPs) during in-water work to reduce the risk of an exceedance of water quality standards.

Water Quality Monitoring Plans

To obtain an Individual Section 401 Water Quality Certification (WQC), WSDOT staff are required to submit a draft WQMP, or equivalent information, as part of the application. The WQMP provides basic information that allows Ecology to determine adequacy of protections prior to the issuance of a 401 certification.

See the Stormwater & water quality webpage for guidance on what to put in a WQMP.

Water Quality Monitoring & Protection Plans

Ecology may determine that additional information beyond a WQMP is required to provide "reasonable assurance" of the protection of water quality for more complex projects. WSDOT staff **may** be requested to submit a draft WQMPP. The contractor will be required to use the draft to create a final version for approval from Ecology prior to starting in-water work. **Applicants are encouraged to work with their liaisons at Ecology to determine what information will be required at the time of application submittal.**

See the Stormwater & water quality webpage for guidance on how to prepare a WQMPP.

Programmatic coverage under the Nationwide Permits

If a project is verified under a Nationwide Permit and meets the programmatic Section 401 WQC for the Nationwide Permits, you will not need a WQMP. It is recommended that all sites have a water quality monitoring plan to help ensure that water quality standards are met.

See the Stormwater & water quality webpage for guidance on what to put in a wqmp.

Section 303(d) listed waters with Total Maximum Daily Loads

If your in-water work occurs within an impaired water body on the Section 303(d) list has a Total Maximum Daily Load (TMDL) established by Ecology, you may receive additional permit conditions or sampling requirements.

See the Stormwater & water quality webpage for guidance on how to determine if there are impaired waters in your project area and what to do if there are.

3. Determining sample locations & standards

Follow the guidance below to establish sampling locations and schedules for turbidity and pH. Select sampling locations based on:

- The type of parameter you are monitoring for based on the water quality standards.
- The location and type of in-water activity occurring.

Determine the applicable water quality standards

All projects must comply with the applicable water quality standards. Ecology establishes water quality standards for different parameters based on the type of water body and the designated uses and criteria.

Follow these easy steps to identify the applicable water quality standards for waterbodies where in-water work will occur:

1. **Determine the designated "Aquatic Life Use" category for the water body where in-water work will occur.** Use Ecology's Surface water criteria guidance to determine the aquatic life use for your water body. To find designated uses for rivers and streams, use Table 602. If the water body is not specifically named, see WAC 173-201A-600. To find designated uses for marine water bodies, use Table 612.
2. **Look up the Water Quality Criteria for the Aquatic Life Use Category that Applies to Your Water Body.** Look in WAC 173-201A- 200 for freshwater criteria and WAC 173-201A-210 for marine criteria.

Establish sampling locations & schedules for turbidity

In rivers & streams

Sample upstream and downstream of work in rivers and streams. Locate and clearly name the following sampling points on a map and in the field:

- **Upstream (Background)**. Locate where the water body enters the WSDOT right-of-way or 100 feet upstream of construction activities, whichever is closer to the in-water work. The background sample location must be outside the area of influence from the project. Be mindful of water quality influences that may occur between your background sample location and the in-water activity that could affect your sample readings (e.g., outfalls, tributaries, etc.).
- **Downstream.** Locate the point of compliance downstream of the construction activity based on the parameters for which you will be sampling. Use the area of mixing granted in the standards (based on the velocity of the water (cubic feet per second) at the time of construction), or the extended area of mixing granted in the Individual 401 WQC to determine the compliance point for turbidity. If the edge of WSDOT right-of-way prevents access to sample at the point of compliance, the project team can either obtain a temporary easement or "right of entry" from the property owner to conduct sampling or sample at the edge of WSDOT right of way and that point becomes the new "compliance point." If the project has an Individual 401 Certification, WSDOT should notify Ecology of that change.

Sample daily when in-water work activities occur. One upstream and one downstream sample should be collected shortly after work begins each day. No further sampling is required if the sample meets standards and visual inspections reveal no change in water quality throughout the day unless otherwise required in your 401 Certification or approved WQMPP.

Additional downstream samples must be collected if in-water work activities change. No further sampling is required if standards are met and there is no visible change in water quality unless otherwise required in your 401 Certification or approved WQMPP.

Additional upstream and downstream samples must be collected if there is a visible change in water clarity during in-water work.

See Example 1 in Appendix A for an example of the parameters, compliance criteria, and sampling locations for work in rivers and streams.

In lakes, ponds, wetlands, & marine waters

Collect the background sample to get the value of the water quality parameter before the construction work occurs and a radius sample reveals the effect of the construction work on water quality (by comparing it to the background).

Locate and clearly name the following sampling points on a map and in the field:

- **Background.** Sample near where the radius sample will be taken. The sample needs to be taken 30-minutes PRIOR to the start of the in-water work.
- **Radius.** For turbidity, sampling should occur at a radius of one hundred fifty feet from the in-water activity. Establish and position the necessary number of sample points to accurately capture project impacts on water quality. Ecology recommends a minimum of three sample points, spread around the radial boundary.

Take turbidity samples 15 minutes after the activity begins at the 150-foot radius to determine if the project is in compliance. If the work is occurring within in a tidally influenced water body, sample at a location in which the tide is moving towards. If you're in a lake, you may need to take more than one sample since turbidity could travel in any direction.

Visually monitor the clarity of the water within the 150-foot radius as work occurs. If you observe a visual change, take turbidity samples to ensure compliance. If the samples exceed water quality standards, the contractor must stop the in-water work until samples demonstrate compliance. If necessary, discuss additional procedural or physical BMPs to ensure compliance with the Project Engineer and the Contractor.

See Example 2 in Appendix A for an example of the parameters, compliance criteria, and sampling locations for work in lakes, ponds, wetlands, and marine waters.

Establish sampling locations & schedules for pH

During concrete work, the Contractor should have BMPs in place that prevent any discharges of concrete, pH modifying substances or any concrete slurry into waters of the state. There are some situations where this may not be possible such as underwater pier cutting with a diamond wire saw. If this is the case, work with Ecology during the permitting process to discuss situations where a discharge cannot be prevented.

Conduct visual monitoring during pouring activities to identify any leaks or unauthorized discharges of concrete, slurry, etc. from sealed forms or contained/isolated work areas.

The contractor should monitor the volume of concrete on a pour since exceeding the required amount could be an indicator that a form is not sealed properly and an unauthorized discharge may be occurring. This situation is particularly applicable when pouring into a structure or form that is in the water, like when pouring a bridge pier/column/shaft/footing.

If a leak or unauthorized discharge occurs collect samples and test the pH:

- Of the slurry (if possible, there may not be any slurry left) that discharged to state waters.
- Of the water body at the point where material entered the water (or as close as possible within a 50-foot radius). It is important to collect this sample right away or as soon as possible after the discharge occurs.

Although Ecology does not grant a temporary area of mixing for pH, consideration is given to worker safety when entering an in-water work zone. Discuss pH sampling distances with the Ecology liaison.

If the sample cannot be safely collected within 30 minutes of the discharge, document why and report the incident in accordance with Section 5 of this guidance. A sample could be taken but would not necessarily capture the resulting changes to pH. It is highly likely that any effect on pH from the discharge has dissipated due to current and/or depth o f the water body.

If an in-water form might be losing concrete/slurry, sample right adjacent to the form to determine the effect to water quality or if there is a leak. Discuss this approach with the contractor and Ecology as this approach may or may not be effective. It will be dependent on the type of activity.

Remember, the physical characteristics of the discharge can be affected by the water body you're working in. The discharge could be a discrete amount that goes into the water and sinks to bottom (such as concrete) or it could be slurry that contains fine particles and could create a visual plume or the slurry could be diluted/dispersed by the current or tides and impossible to capture within a water quality sample. Regardless, an effort should be made to sample.

4. Sampling equipment & procedures

Prior to starting work, make sure that you have the appropriate sampling equipment available and it is calibrated and in good working order.

Equipment calibration & documentation

Most manufacturers recommend a standard calibration schedule and a verification procedure. For data to be legally defensible, follow the manufacturers' recommendation for calibration schedules and procedures. The verification procedure is a quick way to verify that equipment is still calibrated and ready to use. Additional calibration may be needed based on the results of a verification procedure or if data appears suspect (measuring higher or lower than expected).

Maintain a calibration log and keep it in a convenient location (for example, in the equipment case) so it can be updated and referred to as needed.

Equipment use & storage

Key factors to remember when using sampling equipment:

- Use current calibration standards.
- Verify calibration before use, especially if equipment travels or is abused.
- Keep pH meter probes submerged in storage fluid when not in use so they do not dry out and break.
- Clean sample vials with distilled water (preferred) immediately after use.
- Dry or wipe sample vials with glass cleaning wipes or microfiber cloth (paper based material can scratch glass which affects measurements).
- Use proper storage and good housekeeping methods and visually examine equipment for dirt or damage that may affect measurements.

- Replace sample vials if they appear scratched or damaged.
- Contact product manufacturers if further assistance is needed.

Recommended field equipment checklist

Make sure the following equipment is on hand during in-water work:

- □ Clean containers, telescoping sampling rod or a "bomb sampler" for discrete depth sampling in lakes or marine waters.
- □ Calibrated sampling equipment.
- □ Distilled water and glass wipes for cleaning sampling equipment.
- □ WSDOT-approved safety vest, hardhat, boots, rain gear.
- □ Camera and cell phone.
- □ Survey stakes and marking tape to identify sample locations in the field or a weighted buoy(s) to identify sample locations within a non-flowing body of water.
- □ Weather-proof field notebook or data sheet for recording data.

Sampling location setup

When setting up sampling locations for in-water turbidity sampling:

- Mark all sampling locations with clearly labeled survey stakes immediately adjacent to where the background and downstream turbidity samples will be taken. If the work is occurring in a marine water body or lake, weighted buoy(s) can be used to identify 150-foot sample radius (or an extended area of mixing if one has been granted by Ecology in a 401 Individual Certification).
- Mark all sampling locations on the map in the water quality monitoring plan or Ecology required Water Quality Monitoring and Protection Plan (WQMPP).

Sample locations may need to change based on the water body flow (cfs) at the time of construction and the location where the in-water activity is occurring.

Standard sampling procedures

Use the following sampling procedures:

- Collect samples that are representative of the flow.
- Measure samples as soon as possible (temperature can affect pH).
- Wipe sample vials clear of fingerprints or other residue before inserting into a turbidity meter, use glass cleaning cloth to prevent scratching.
- Invert the sample vial several times (to resuspend particulates) before inserting the sample vial into the turbidity meter. Do not shake sample vials; shaking may create small bubbles that can affect measurement.

5. Documenting & reporting sample data

To ensure data is not lost or forgotten, record sample data on an In-Water Sampling Form (see Appendix B). Follow the project-specific permit requirements for reporting. For example, most Individual WQCs have a condition requiring the project to submit all sample results monthly to the Ecology.

The project office should retain copies of the completed sample forms on the project site so they are readily accessible by interested individuals upon request.

If sampling indicates an exceedance of water quality standards

If sampling indicates an exceedance of water quality standards or the conditions of your permits or approvals, take the following steps:

1. Work with the WSDOT Project Engineer immediately to stop the work that is causing the exceedance.
2. Initiate the Environmental Compliance Assurance Procedure (ECAP) immediately. See the Construction Manual, SS1-07.5. Ensure immediate notification is made to the necessary regulatory agencies and/or tribes per ECAP.
3. Continue sampling so you can quantify the amount of time the project was out of compliance. Also, the regulatory agencies typically like to know the volume of turbid or high pH water released that exceeded standards.
4. Talk with the Contractor to discuss ways to adjust in-water work methods or means. Consider additional BMPs that could be used to prevent the issue from reoccurring.
5. When sampling indicates that the exceeded parameters are back in compliance, the in- water work may resume.

Appendix A – Sampling plan examples

Example 1. How to apply the freshwater criteria in rivers & streams

Water body: Middle Nemah River

Aquatic Life Use: Core Summer Salmonid Habitat

Aquatic Life Turbidity Criteria in Freshwater: Turbidity shall not exceed 5 NTU over background when the background is 50 NTU or less; or a 10% increase in turbidity when the background turbidity is more than 50 NTU.

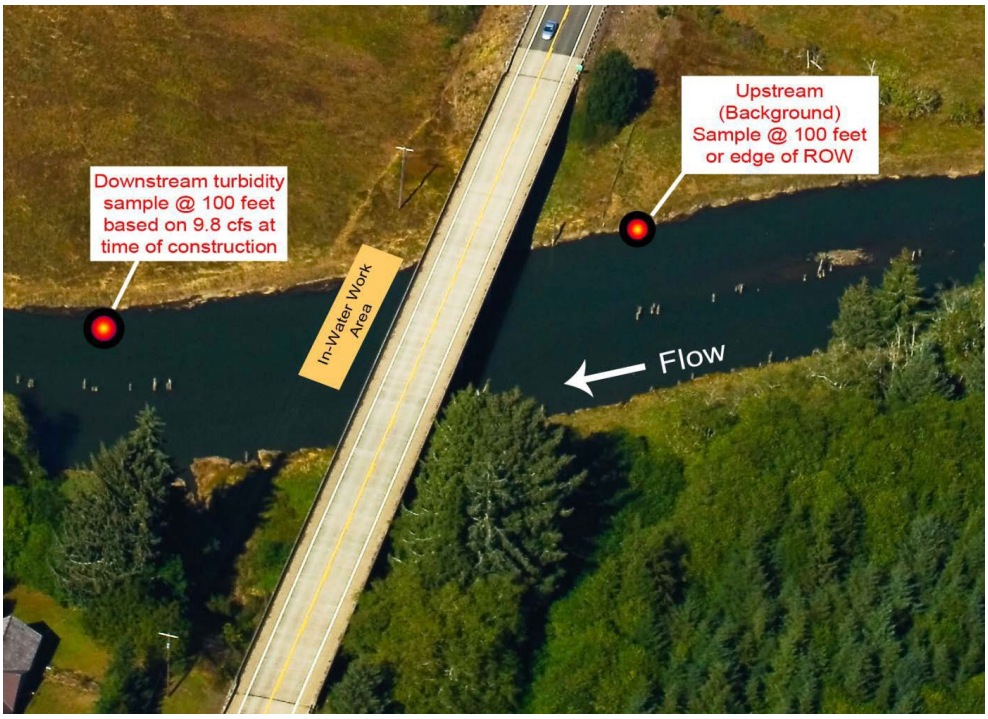
Flow at time of construction: 9.8 cfs

Temporary area of mixing for turbidity: 100 feet

Aquatic Life pH Criteria in Freshwater: pH shall be within the range of 6.5 to 8.5 with a human- caused variation within the above range of less than 0.2 units from the background pH. Note: no temporary areas of mixing are allowed for pH and discharges of concrete process water are not allowed (including high pH process water that has been treated).

Considerations: Sample locations may need to change if the stream or river is tidally influenced. It's possible that your upstream (background) sample could become your downstream sample and vice versa depending on when the in-water work occurs. Note: sampling locations may need to change if the location of the in-water activity changes. Also, the point of compliance for turbidity can change if flow changes during construction.

Figure 1: Sample locations for turbidity for the Middle Nemah River.



Example 2. How to apply the freshwater criteria in lakes, ponds, wetlands, & marine waters

Water body: Eagle Harbor (Bainbridge Island) Aquatic Life Use: Extraordinary (AA)

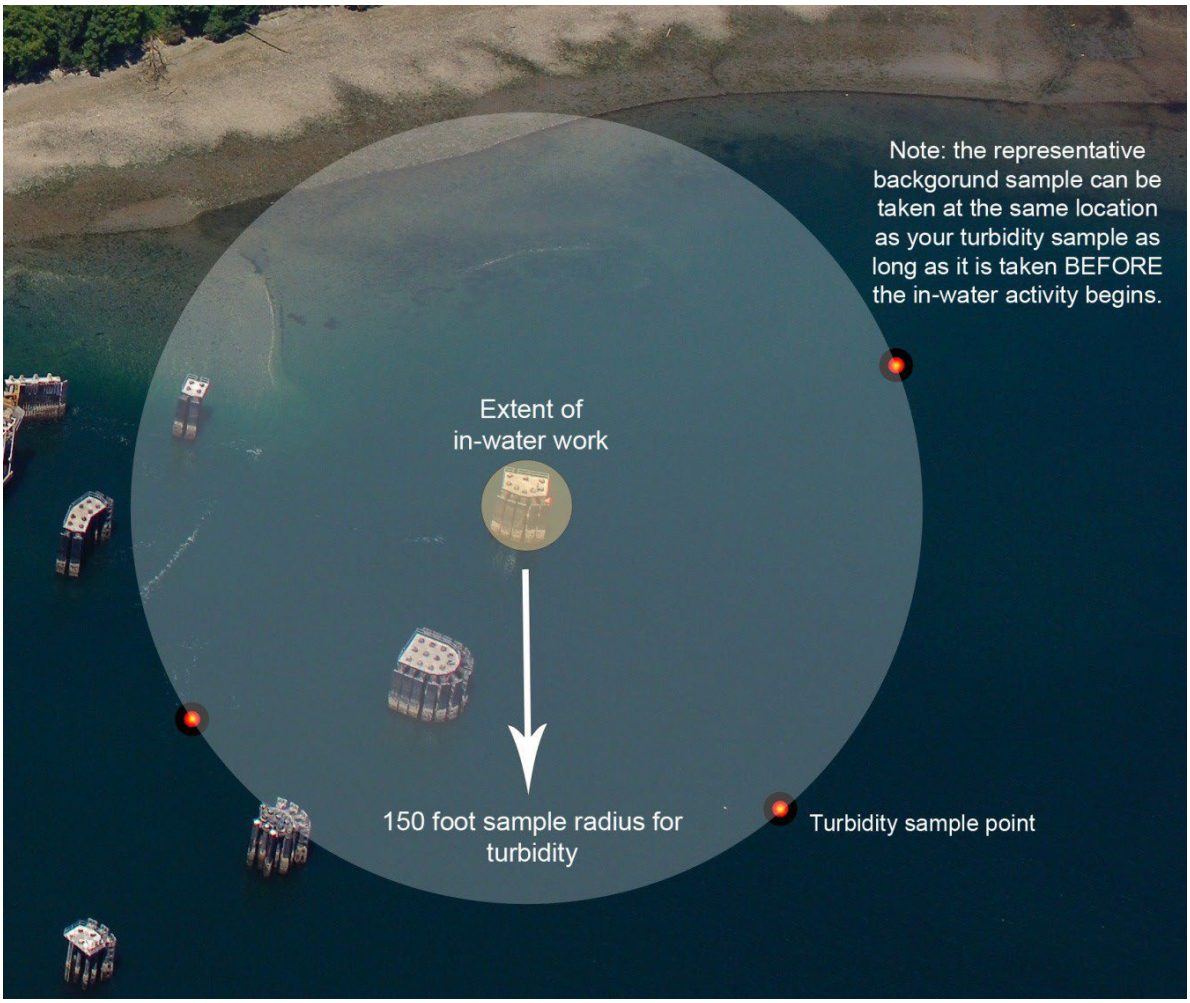
Aquatic Life Turbidity Criteria in Marine Water: Turbidity shall not exceed 5 NTU over background when the background is 50 NTU or less; or a 10% increase in turbidity when the background turbidity is more than 50 NTU.

Turbidity point of compliance for a temporary area of mixing: A radius of 150 feet from the activity causing the turbidity.

Aquatic Life pH Criteria in Marine Water: pH shall be within the range of 7.0 to 8.5 with a human-caused variation within the above range of less than 0.2 units from the background pH. Note: no temporary areas of mixing are allowed for pH.

Considerations: Sample locations may change based on the location where the in-water activity is occurring or due to tidal influences at the time of work. For example, if the tide is going out during in-water work, the sample shall be taken at a location where the water is moving towards (i.e., best representative sample).

Figure 2: Sample locations for turbidity based on a marine water body – Eagle Harbor.



Appendix B – Sample Form for In-Water Work

Download a MS Word version of the form from:

https://wsdot.wa.gov/sites/default/files/2021-10/env-constr-InWaterSamplingForm.docx

Sampling Form for In-Water Work

Date:_____ Project: _____

Name of person sampling: _____

Date of last calibration for Turbidity Meter:_____ Date of last calibration for pH meter: _____

Water body: _____

Activity description: _____

Activity start time:_____ Activity stop time: _____

Sample Location	**Monitoring point**	**Time**	**Turbidity**	**pH**	**Visible sheen?**	**Notes** Include weather, water body flow in cfs, other observations of water body, etc.

Sampling form for in-water work
Project: _____
Date: _____

Sample Location	**Monitoring point**	**Time**	**Turbidity**	**pH**	**Visible sheen?**	**Notes** Include weather, water body flow in cfs, other observations of water body, etc.