DEPARTMENT OF ECOLOGY
State of Washington

Addendum 1 to Quality Assurance Project Plan:

Assessment of PFAS Levels in Biosolids in WA State 24-07-040

March 2025

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This Quality Assurance Project Plan Addendum is on the Department of Ecology's website at https://apps.ecology.wa.gov/publications/SummaryPages/250048.html This is an addition to an original Quality Assurance Project Plan (QAPP). It is not a correction (errata) to the original plan.

This QAPP addendum was approved to begin work in March 2025. It was finalized and approved for publication in July 2025.

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Data for this project will be available as an appendix on the final report.

Original Quality Assurance Project Plan:
Mounia Sassi. 2024. Quality Assurance Project Plan: Assessment of PFAS Levels in Biosolids in WA State QAPP. Publication 24-07-040. Washington State Department of Ecology, Olympia. https://apps.ecology.wa.gov/publications/SummaryPages/2407040.html.

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Addendum 1 to Quality Assurance Project Plan

Assessment of PFAS Levels in Biosolids in WA State

Approved by

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Signatures are not available on the Internet version.
EAP: Environmental Assessment Program

1.0 Table of Contents

Tables

Note: The numbered headings in this document correspond to the headings in the original QAPP. Only relevant sections are included here; therefore, some numbered headings may be missing.

4.0 Project Description

The department of Ecology has collected the first set of data for biosolids under Quality Assurance Program Plan - Assessment of PFAS in Biosolids in Washington (Publication No. 24-07-040).

The need for additional data was identified following the latter collection. To meet the data quality objectives, Ecology will be sampling and analyzing from the same facilities where the data quality objectives were unmet.

4.1 Project Goals

The goal of this Quality Assurance Program Plan (QAPP) Addendum is to satisfy the objectives in Section 6 of the original QAPP regarding collection of biosolids PFAS concentration data.

PFAS concentrations from biosolids will be obtained using Targeted Analysis using EPA method 1633. This data will be used as the basis for:

- Characterizing Washington biosolids for PFAS concentrations.

4.2 Project Objectives

The specific sampling project objectives updated in this addendum include:

- Collection of new samples following Appendix B, Biosolids Sampling Plan from the original QAPP.
- Samples will be collected from the same facilities where the following occurred:
    - Liquid biosolids had inconsistent results.
    - Samples collected failed the temperature preservation during shipment.
    - Any other samples that would help confirm the first-round data results.

4.4 Tasks Required

- Select the facilities where the need for new samples is a priority.

- Collect triplicate biosolids samples from the selected WWTPs. Samples shall be collected in the same manner describe in Appendix B from the original QAPP.

4.5 Systematic Planning Process Used

Ecology Solid Waste Management program coordinated with the Ecology Environmental Assessment program to determine sampling protocols related exclusively to PFAS sample collection and handling. Protocol from those discussions will be documented in the appropriate appendices in the final report.

5.0 Organization and Schedule

5.1 Key individuals and their responsibilities

Table 1. Organization of project staff and responsibilities.

Staff (All EAP except client)	Title	Responsibilities
Mounia Sassi Solid Waste Management Eastern Regional Office Phone: 509-220-3166	Project Manager/Principal Investigator	Writes the QAPP Addendum. Provides process for sampling and shipment of samples to the laboratory to regional Biosolids Coordinators that will conduct the sampling in respective regions. Conducts QA review of data, analyzes and interprets data. Writes the draft and final report with data added as appendixes.
Marni Solheim Solid Waste Management Eastern Regional Office Phone: 509-385-9142	Section Manager for the Study	Reviews the project scope and budget, tracks progress, reviews the draft QAPP Addendum, approves the final QAPP Addendum, reviews draft and final report.
Robert Waldrop Manchester Environmental Laboratory Phone: 360-871-8801	Laboratory Director	Provides input on analysis, Reviews the draft and final QAPP.
Karna Holquist Chemist 4 Manchester Environmental Laboratory (MEL) Phone: 564-669-4189	Quality Assurance Coordinator	Prepares and reviews bids for laboratory contracts. Ensures quality assurance goals at lab are met. Manages contract bidding and approves bid award.
John Weakland Chemist 4 MEL Phone: 360-480-7515	Data Validation Chemist	Verifies and validates the final analytical data.
SGS Axys	Project Manager	Supervises analysis of samples. Coordinates with MEL QA Coordinator.
Mady Lyon Solid Waste Management Industrial Phone: 360-628-3250	Quality Assurance Coordinator/Environmental Engineer	Reviews the draft QAPP Addendum. May review and comment on the draft project report.
Christina Frans Environmental Assessment Program Headquarters Phone: 360-407-6964	Quality Assurance Officer	Review and approval of final QAPP and QAPP Addendum for Ecology.

5.2 Expertise

- Mounia Sassi, MS Chemistry, is a Biosolids Coordinator with extensive experience in biosolids sampling and analysis.

- Regional Biosolids Coordinators were trained on sampling by Mounia Sassi during the first round of sampling.
- Technical details of sampling protocols related to Targeted Analysis will be provided by the Environmental Assessment program.

5.3 Proposed Project Schedule

Sampling is planned to start spring of 2025 if the following conditions are met:

- QAPP Addendum is approved.
- Sampling schedules for the sites are arranged with WWTPs participating in the study.
- Resources remain to do the work.

Table 2. Proposed schedule for completing field and laboratory work, analysis of data, and completion of a report.

Field and laboratory work	Due date	Lead staff
Sampling completed	March 2025	Mounia Sassi
Laboratory analyses completed	June 2025	Nancy Rosenbower
Data validation completed	November 2025	John Weakland
Final report		
Author lead/Support staff	Mounia Sassi/Amber Corfman	
Schedule		
Draft due to supervisor	January 2026	
Draft due to client/peer reviewer	January 2026	
Draft due to external reviewer(s)	February 2026	
Final (all reviews done) due to publications coordinator	February 2026	
Final report due on web	March 2026	

5.4 Budget and Funding

Table 3. Project budget and funding.

Parameter	Number of Samples	Number of QC Samples	Total Number of Samples	Cost Per Sample	Lab Subtotal
Analysis Method (EPA method1633)					
Biosolids	16-19	64-78[1]	80-97	$420-$450	$36,346-$43,842
				PFAS Contract Lab Total	$36,578-$44,074
				MEL Contract Lab Fee Total (30%)	$10,973-$13,222
				Equipment Rental and Supplies	$900*
				Shipment	$800*
				Grand Total:	$50,083-$59,828*

[1] At each facility: Biosolids will be collected in triplicate plus blank samples.

* Pricing for shipment and purchased items are approximate.

6.0 Quality Objectives

6.1 Data quality objectives

The primary data quality objective for this project is to collect three (3) biosolids samples and equipment blank from selected WWTPs across the state.
The analysis will use the following method:

- EPA method 1633 using LC-MS/MS for biosolids; this method will identify 40 PFAS compounds. Refer to table 9 in original QAPP.

6.2 Measurement Quality Objectives

6.2.1 Targets for precision, bias, and sensitivity

Measurement Quality Objectives (MQOs) for project results expressed in terms of acceptable precision, bias, and sensitivity are described in this section and summarized in Table 6 below.

As of the writing of this QAPP addendum, EPA has published its final Method 1633, Revision A (EPA, Dec2024). For assessment projects completed under this QAPP addendum, laboratories must use the version of this method for which they are accredited. Any changes to the MQOs as a result of updates to Method 1633 will be documented in another QAPP addendum. The laboratory must be capable of meeting the requirements for precision, accuracy, and limits of quantitation applicable to this method.refer to table 9 in original QAPP.

Table 4. Measurement Quality Objectives for laboratory analyses of biosolids samples

Parameter	Sample Matrix	Lab and Field Duplicate Samples (RPD[5])[1]	Matrix Spike/Matrix Spike Duplicate (% Recovery[5])	Matrix Spike/Matrix Spike (RPD[3])	Method Blank	Ongoing Precision and Recovery (OPR) and Low-level OPR (LLOPR) (% Recovery[3])	Surrogate Standards (% Recovery[3])	Method Detection Limit
PFAS-Analytes[2]	Biosolids (Solid)	≤40	50-150	≤30	No analytes detected > ½ LOQ[3] or ML[3]	25-200	5-200	0.04-0.87 ng/g
PFAS-Analytes[2]	Biosolids (Liquid)	≤40	NA	NA	No analytes detected > ½ LOQ[3] or ML[3]			0.32-9.59

[1]This criteria applies to results >5x the ML; for duplicate results <5x the ML, the acceptance criteria will be the absolute difference of the sample results <2x the ML.

[2]Laboratories must be able to meet the precision, accuracy, and limits of quantitation defined in Method 1633A (EPA, Dec2024)

[3]LOQ: Limit of Quantitation
ML: Minimum Level
RPD: Relative Percent Difference
RL: Reporting Limit

6.2.2 Targets for comparability, representativeness, and completeness

6.2.2.2 Representativeness
Biosolids selected for sampling shall be taken from 16-19 selected facilities under original QAPP across the state.

8.0 Field Procedures

8.4 Equipment decontamination

In round one of sampling, the equipment blanks showed the same levels as the field blanks, therefore Ecology will only run equipment blanks in the second round of sampling.

8.5 Sample Identification

Sample identification (ID) will consist of the WWTP number assigned by Ecology and followed by replicate number.
For example, the triplicate samples taken from WWTP#1 will be assigned the following numbers “WO#-1, WO#-2 and WO#-3.” Sample IDs will be recorded in the field notebook and on the chain of custody. Workorder number will be assigned prior to the start of the sampling.

8.6 Chain-of-custody

Chain of custody procedures will be provided by EAP/External laboratory.

14.0 Data Quality (Usability) Assessment

14.5 Documentation of assessment

Analytical results from this project will be added as an appendix in the final report. Field notes will be stored at Ecology’s Eastern Region Office.

Appendix B: Biosolids Sampling Plan

3.0 Biosolids Sampling Protocol

14.A. For the liquid sludge: after collection of composite samples in 5 gallon bucket, use the following two methods a and b for the sub-sampling:

a. Open all the sample bottles for the triplicate samples:(02) 60 ml and (02) 120 ml bottles for each replicate. Start by stirring the liquid sludge in the bucket then do the following:
    i. Fill the first sample bottle about a quarter of the bottle volume.
    ii. Stir again then repeat 14.A.a.i for the second bottle.
    iii. Repeat the operation 14.A.a.i to 14.A.a.ii until all sample bottles have been filled out about a quarter of their volume.
    iv. Repeat 14.A.a.i-14.A.a.iii to add the second quarter volume to all the bottles.
    v. Then proceed to add the final quarter in the same manner in order to fill the sample bottles about ¾ of their capacity.

b. Open all the sample bottles for the triplicate samples:(06) 60 ml bottles for each replicate. Start by stirring the liquid sludge in the bucket then do the following:
    i. Fill the first sample bottle about 1/10th of the bottle volume.
    ii. Stir again then repeat 14.A.b.i for the second bottle.
    iii. Repeat the operation 14.A.b.i to 14.A.b.ii until all sample bottles have been filled about 1/10th of their volume.