City of Bellingham (Steve Bradshaw)

Please see attached file for City of Bellingham comments.

Public Works Department

August 26, 2025

Jeremy Reiman, Water Quality Scientist
Washington Department of Ecology
PO Box 47600
Olympia, WA 98504-7600

RE: City of Bellingham comments on Draft Puget Sound Nutrient Reduction Plan

Dear Mr. Reiman:

The City of Bellingham, Washington, (City) appreciates the opportunity to comment on the Washington State Department of Ecology (Ecology) Draft Puget Sound Nutrient Reduction Plan, dated June 2025 (Publication 25-10-038) (Draft Plan). Our goal in submitting these comments is to help ensure that the final version of the plan is feasible, affordable, and will result in tangible environmental benefits to the Puget Sound. Our comments are organized below according to major topics.

General Comments

The City supports Ecology's intent to improve water quality in Puget Sound. Our community has a strong environmental ethic that has resulted in significant infrastructure investments at the Post Point Resource Recovery Plant (Post Point Plant) to improve water quality, and we plan to continue making justified investments that will preserve and enhance water quality in Bellingham Bay for generations to come. The City has the responsibility of articulating not only the need for investments to protect Bellingham Bay and the Puget Sound, but also the tangible public benefits that will result from those investments. Accordingly, the City has a significant interest in ensuring that the Puget Sound Nutrient Reduction Plan is appropriate for the community and the result is improved living resources with rates that support economic sustainability.

The City has been addressing the requirements of the Puget Sound Nutrient General Permit (PSNGP) and we continue to advance the Nutrient Reduction Evaluation (NRE). Based on our current NRE work, we have estimated that the City's wastewater rates would increase to 6-7 times the current rate to comply with the PSNGP. These unprecedented upgrades would create substantial hardships for our ratepayers, negatively impact the community, and significantly contribute to affordability issues existing within western Washington.

The Draft Plan does not provide enough guidance yet to allow us to fully understand the implications of these nutrient allocations on our plant. Therefore, our comments herein are based on our interpretation of the limited information provided in the Draft Plan framework. As more details are provided, the

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implications of this framework to the Post Point Plant may change. Based on our current understanding of the Draft Plan framework, the called-for levels of nutrient reduction are more stringent than what were evaluated in the PSNGP NRE and likely infeasible within the available Post Point Plant site space without stranding substantial assets.

Also, our review of the Draft Plan does not lead to the conclusion that these extraordinary costs would result in commensurate environmental benefits. Rather, the approach described in the Draft Plan fails to make a meaningful connection between levels of nutrient reductions and ecologically meaningful responses. It is also incapable of distinguishing between reasonable levels of nutrient reductions and levels that would represent huge incremental costs for no significant gain.

We want to partner with Ecology to ensure that investments in nutrient removal are science-based and will result in meaningful and sustainable positive impacts to the environment. As such, these comments propose specific approaches to set water quality goals, reasonable nutrient reduction levels, and a sustainable path forward.

Comments on Water Quality Goals

The City's specific comments start with the topic of water quality goals because these goals drive the rest of the plan. Establishing defensible, science-based water quality goals is a prerequisite to achieving stakeholder buy-in to large water quality investments.

1. *The human use allowance (HUA) approach as utilized as the basis for this plan does not demonstrate a robust linkage between environmental investments and ecological outcomes*. The United States Environmental Protection Agency (USEPA) and states have taken various approaches to dealing with aquatic systems that cannot achieve default dissolved oxygen (DO) criteria due to natural or unavoidable causes. These include (1) the HUA approach pursued by Ecology; (2) revising DO criteria to better match the ecological needs of attainable aquatic life uses; and (3) variances, use attainability analysis (UAA), or other natural-conditions exclusions of the application of default DO criteria. These approaches are not necessarily mutually exclusive, as DO criteria refinement can be performed in parallel with UAA or variances for different segments.

   In comparing these approaches, the HUA approach can be considered a "low science" approach because it makes no effort to match the controlling water quality with a meaningful ecological response. By targeting limited departures from a theoretical natural condition, huge expenditures are likely to be driven by very small changes in DO that provide no meaningful shifts in living resources. This is especially true for the Puget Sound, where DO is relatively insensitive to changes in anthropogenic nutrient loading. For example, as shown in the Draft Plan and the Phase 2 modeling report (Ecology, 2025), the ambitious Opt2_8 scenario is predicted to increase DO by less than 0.2 milligrams per liter (mg/L) in the great majority of the Puget Sound area. Washington regulations (WAC 173-201A-320(3)(b)) define 0.2 mg/L as the lowest measurable change in DO concentration. Hence, the enormous expenditures required to implement the Draft Plan would not even be measurable across most of the Puget Sound area.

   A few areas of the Puget Sound (e.g., Hood Canal and some shallow embayments) were predicted to experience slightly higher increases in DO, still measured in the tenths of mg/L of DO. But even for these limited areas, it is unclear that the predicted shift would increase DO concentration above thresholds that would support significantly more living resources for aquatic life. The likelihood of measurable increases in salmon, orca, etc. is questionable given that the small model-predicted increases do not appear to increase DO over thresholds associated with those species. If there were measurable benefits to other taxa, that demonstration has not been made. Hence, the ecological benefits of the Draft Plan are even more uncertain than the water quality effects. We incorporate by reference the City's May 2025 comments on Ecology's Draft Performance-Based Approach Methods Document (Publication 25-10-022).

2. *Nutrient reductions from Bellingham and the other Northern Bay sources appear to be especially ineffective at causing meaningful water quality improvements*. The previous comment addresses the low environmental benefits of the Draft Plan on the Puget Sound in general. This observation is even more marked for the Northern Bays region. Summarizing the Salish Sea modeling results for the Strait of Georgia and Northern Bays, the Puget Sound Institute (2025) observed that currently only up to 0.025 percent of the water volume exhibits DO non-compliance. Modeling demonstrates that complete elimination of the Post Point Plant total inorganic nitrogen (TIN) loading would decrease non-compliant volume-days in the region by 0.001 percent (Puget Sound Institute, 2025) -an ecologically insignificant and immeasurable change. Moreover, nitrogen loadings in the Strait of Georgia and Northern Bays have minimal impacts on DO levels in other Puget Sound regions. This calls for a rethinking of Ecology's basic approach to setting nutrient loading caps for the region.

   We ask Ecology to consider the addition of an eleventh Opt2 scenario that would cap the Northern Bay dischargers (Basin No. 1) at existing loads like Basins 5-8 in Opt2_4 through Opt2_10. Providing the additional framework results would provide us with valuable information about the incremental impact that change would have on water quality compliance in Bellingham Bay. If useful, the City would be willing to discuss gathering additional data to better understand the impact that the Post Point Plant has on the Bay, and, given the immense economic strain put on our community by this plan, we think that further study to investigate what effect (if any) this will have on the Northern Bay is warranted.

3. *Ecology should pursue a different, high-science approach to setting water quality goals and gaining stakeholder buy -in*. In contrast with the HUA approach, most large-scale coastal water quality improvement efforts in the United States have targeted metrics and outcomes that are more relatable to living resource needs or outcomes. Examples of metrics include:

   a. Chesapeake Bay (MD/VA):
      i. DO concentration criteria tied to specific aquatic life uses.
      ii. Water clarity for protection of submerged aquatic vegetation (SAV).
      iii. Chlorophyll-a criteria derived by empirical relations related to harmful algal bloom (HAB) effects.
   b. Long Island Sound (CT/NY):
      i. DO concentration criteria.
      ii. Reduction of hypoxia area.
   c. Neuse River Estuary (NC):
      i. Chlorophyll-a related to excessive algal blooms.
      ii. DO/fish kills.
   d. Tampa Bay (FL):
      i. Water clarity for SAV protection.
   e. Delaware Bay (PA/DE):
      i. DO concentration criteria.

   f. San Francisco Bay (CA) (ongoing Nutrient Numeric Endpoint framework):
      i. DO concentration and saturation.
      ii. Phytoplankton biomass and community composition.
      iii. HAB toxins.
   g. Santa Monica Bay (CA):
      i. DO concentration and saturation.
      ii. Water clarity targets.

The Chesapeake Bay Total Maximum Daily Load (TMDL) is a highly relevant example because, like the Puget Sound, it experiences natural limitations to achieving default DO concentration criteria. In this case, the USEPA and partner states refined the aquatic life uses based on when and where different types of aquatic life inhabit the Bay (e.g., open water, deep water, shallow water, spawning/nursery habitat), considering natural limitations, and then derived DO concentration criteria to match those uses (USEPA, 2003a; USEPA, 2003b).

This "high science" approach was key to getting broad stakeholder buy in to the Chesapeake Bay TMDL. Importantly, utilities, rate payers, and elected officials had confidence that significant investments in water quality would result in specific ecological improvements. The success of this science-based approach in building stakeholder confidence is demonstrated by the broad coalition that defended the TMDL when it was legally challenged. Municipal wastewater utilities, environmental groups, and most of the Bay states actively intervened to support the TMDL in federal court (American Farm Bureau v. USEPA, 2015). The broad support also facilitated legislative efforts to secure state cost-share funding for upgrades, such as Virginia's Water Quality Improvement Fund and Maryland's Bay Restoration Fund.

As the nation's second largest estuary with a population of nearly 5 million and billions of dollars of investment at stake, the Puget Sound merits a high science approach to water quality goal setting. We encourage Ecology to explore the Chesapeake Bay example and other alternatives to the HUA-driven approach. We understand that this would be a major shift in direction for Ecology and would require both time and resources. But, it would put the planning efforts on a firm scientific basis and greatly increase stakeholder buy in.

4. *The Technical Advisory Committee (TAC) should address water quality goal setting approaches prior to water quality-based effluent limits (WQBEL) development methods*. On page 41 of the Draft Plan, Ecology mentions the intention to form a TAC to seek recommendations on WQBEL development and implementation methods, including concepts such as compliance schedules, interim WQBELs, and variances. The City supports the formation of such a TAC at the appropriate time. However, the priority should be a TAC to advise Ecology on alternatives to the HUA approach for setting water quality goals in accordance with comments above and then implementing those approaches. The TAC should include diverse representation, including municipal science and engineering experts. The TAC should also include unbiased, third-party facilitation to achieve the best outcomes, and an independent review of the modeling framework. The City would be happy to work with Ecology and other stakeholders to flesh out a more detailed approach.

Comments on Feasibility and Attainability

5. *The Draft Plan contains no evaluation that the called-for levels of nutrient reduction are economically, technically, or programmatically feasible*. Watershed restoration plans must be developed with reasonable assurance that the called-for levels of nutrient reduction can be

implemented. However, the Draft Plan provides no evaluation of this important question. Rather, the draft plan is built around model-derived load reductions with no critical examination of economic impacts, social impacts, or technical feasibility. For example, the Draft Plan sets basin-wide point source nitrogen loading caps with no consideration of whether point source facilities could achieve the underlying treatment assumptions, individually or in aggregate. Similarly, the Draft Plan calls for enormous levels of watershed load reduction with no evaluation of whether the opportunity area and financial capability exist for the associated levels of Best Management Practice (BMP) implementation.

One of the required elements of a 9-element watershed plan is to "identify the technical and financial assistance necessary to implement the plan" (USEPA, 2008). This USEPA guidance on watershed planning emphasizes the need to estimate costs, including both capital and long-term operations and maintenance (O&M) costs. The guidance also emphasizes the need to characterize the level of effort for installation and maintenance of management measures and administration/management of watershed restoration efforts.

The City infers that Ecology's approach to the Draft Plan has been to assume that any consideration of feasibility would occur at later stages of plan implementation, such as the development of point source compliance schedule, variances, or basin-specific plans. However, we believe it is short-sighted to ignore questions of feasibility in the development of the Draft Plan itself. An infeasible plan would not benefit the Puget Sound and could have adverse impacts on surrounding communities.

Returning to the Chesapeake Bay example, USEPA and the partner states performed a UAA in parallel with use/criteria refinement (USEPA, 2003c). The UAA specifically addressed the technological attainability of the recommended actions and the economic impacts/benefits, prior to adoption of watershed wide load reduction targets. Importantly, the UAA provided critical analysis of what was not considered feasible (i.e., attaining the default DO standards) and why the proposed use/criteria framework was economically and technically feasible. Variances were adopted for zones that were insensitive to external nutrient reductions. The UAA was an important element in achieving stakeholder buy-in.

6. *The Draft Plan appears to be economically, technically, and programmatically infeasible*. Although the Draft Plan does not consider feasibility, there are several lines of evidence that the plan is infeasible as currently formulated. For example, the total nitrogen (TN) treatment assumptions underlying the basinwide point source loading caps are clearly infeasible because, at the fully permitted design flow, they would require wastewater treatment plants (WWTP) to attain TN concentrations that are well below All Known, Available, and Reasonable Methods of Prevention, Control, and Treatment (AKART) or any commonly-accepted definition of limit-of-technology for municipal wastewater treatment. See our comments 8 through 12 on basin-wide load caps and reduction goals below for more details on that conclusion.

   The levels of nonpoint source/watershed reduction also appear to go far beyond what is realistically feasible. The Draft Plan calls for 53-90 percent reductions in anthropogenic nitrogen from individual basins. For example, the Draft Plan calls 61-67 percent reduction from the Northern Bay watersheds over 2026-2048, equating to about 3 percent per year. We are not aware of any national watershed program that has achieved anything close to this level of nonpoint source pollutant reduction, either as a total reduction or as a sustained rate. For example, the Chesapeake Bay TMDL called for an approximate 25 percent reduction in TN from a 2009 baseline (USEPA, 2010). The Bay partners achieved a 14 percent TN reduction by 2021, driven by massive investments (including new state funds) in point source updates, urban BMPs, and agricultural BMPs. Although impressive, this equates to a reduction rate of only about approximately 1 percent year. By this measure, the Draft Plan calls for a nitrogen reduction rate about three times that of the nation's highest-profile and best-funded watershed nutrient reduction effort.

In reality, the comparison above understates the infeasibility of the watershed reductions of the draft plan. Most other watershed-scale nitrogen reduction have far more opportunities for cost-effective nonpoint source reduction than the Puget Sound watershed. The most cost-effective nitrogen practices are mostly agricultural such as cover crops, conservation tillage, and nutrient management. The Chesapeake Bay watershed is about one-quarter to one-third agricultural land. In contrast, the Puget Sound watershed has only about 6 percent agricultural land. The City's own evaluation of potential nutrient offsets has revealed very limited opportunities from animal operations (e.g. dairies) because most of these farms are already operated as no-discharge facilities. So, in contrast to precedents, a much higher proportion of the nutrient reduction would have to come from urban stormwater retrofits. Such retrofits are the most expensive way to reduce nitrogen, costing 10-100 times more than agricultural practices on a per-pound basis (Price et al., 2021). Land requirements/availability and design requirements often severely constrain where such retrofits can be placed. We conclude that Draft Plan assumes much more aggressive implementation rates than have been achieved elsewhere, but with much more expensive BMPs and more limited opportunity area. Obviously, this contributes to the conclusion that that plan is infeasible as drafted.

7. *The financial assistance outlined is insufficient to offset the expenditures required and manage significant affordability concerns for ratepayers.* The economic feasibility of the plan is predicated on significantly increasing the funding assistance available and/or relying on unprecedented levels of other state/federal assistance. Current financial assistance outlined by Ecology is insufficient to offset the expenditures required for us to make improvements, let alone all dischargers, agencies, and entities impacted by this plan. The financial impact of the plan as proposed poses significant affordability concerns for all utility ratepayers within the Puget Sound watershed.
As previously mentioned, we have estimated that the City's wastewater rates would increase to 6-7 times the current rate to comply with the PSNGP. These unprecedented upgrades would create substantial hardships for our ratepayers and negatively impact the community.

In summary, even a cursory evaluation of the Draft Plan feasibility suggests that it is highly unrealistic, unaffordable, and unfunded. We encourage Ecology to consider economical and technical feasibilities as well as the feasibility of many treatment plants simultaneously constructing upgrades within the Puget Sound as part of the Plan development in parallel with a revised approach for setting water quality goals. The Final Plan should demonstrate reasonable assurance that the proposed nutrient reduction levels and socio-economic costs are feasible within the proposed timeframe.

Comments on Basin-Wide Load Caps and Reduction Goals

The following comments are related to the methods in which Ecology utilized model scenarios to set basinwide point source nitrogen loading targets. They outline several reasons why the proposed point source caps are unattainable and inappropriate. These comments also make specific recommendations for how basinwide caps should be set. These comments should be considered in parallel with previous comments on replacing the HUA approach, which could also result in significant changes to the basinwide caps.

8. *Methodology for developing basin-wide load caps is not clear*. The Draft Plan states how the dissolved inorganic nitrogen (DIN – sum of ammonia, nitrate and nitrite) loads were derived for the marine point sources and that reductions were only assumed for the DIN fraction of the nitrogen load:
   a. For Post Point (being a Dominant Discharger in the Northern Bays) DIN concentrations were set to 8 mg/L in the cool season, 5 mg/L in the warm season and 3 mg/L in the summer season (Draft Plan page 31).
   b. For State WWTPs, DIN was used as the target nitrogen species for applying nitrogen reductions (Draft Plan page 32).
   c. Flows were kept constant at 2014 levels (Draft Plan page 31).

   However, the Draft Plan is not clear on how the State WWTP loads presented as pounds per year of TN (sum of DIN and organic nitrogen) in either Table 5 of the Draft Plan or the similar totals in Appendix E.1 were 1) calculated nor 2) the organic nitrogen conversion(s) assumed. Due to the lack of clarity in the Draft Plan and Appendix E, it is unclear what, if any, organic nitrogen allowance was made for each of the marine WWTPs.

9. *It is inappropriate to convert DIN-based model scenarios to TN-based nutrient caps without accounting for the difference, which contributes to the non-attainability of the caps.* Ecology has issued three documents (Model Updates and Optimization Scenarios Phase 2, PSNGP, Draft Plan) that discuss potential permit limits based on three different forms of nitrogen. As discussed in the prior comment, it is unclear how or if Ecology accounted for the differences between TIN, DIN and TN when developing the basin wide TN load allocations. It is inappropriate to interchange these species without consideration of the difference, nor does converting limits to a TN based cap increase the flexibility or ease of attainment of the limit. The use of DIN in the Model Updates and Optimization Scenarios Phase 2, TIN in the PSNGP and TN in the Draft Plan does not lend clarity in limits, nor flexibility to utilities in meeting them.

   Converting DIN-based model scenarios into TN-based point source loading caps without accounting for the organic nitrogen fraction represents a technical mismatch that penalizes dischargers and contributes to the infeasibility of the proposed caps. If the modeled DIN loads are converted to TN loads without accounting for the organic nitrogen load, then the resulting basinwide loading caps are lower (i.e., more stringent) than the model scenario from which they were derived. This is because the resultant basinwide caps as set by Ecology would effectively represent the DIN loads from the model scenario minus other components of TN that are present in treated effluent, such as particulate and organic nitrogen. It is unclear to the City that Ecology fully appreciated this mismatch when converting the model assumptions to basinwide caps.

   TN in municipal wastewater liquid streams is present in 6 basic forms which are divided into particulate and soluble, organic and inorganic, and degradable and unbiodegradable forms as shown in Figure 1.

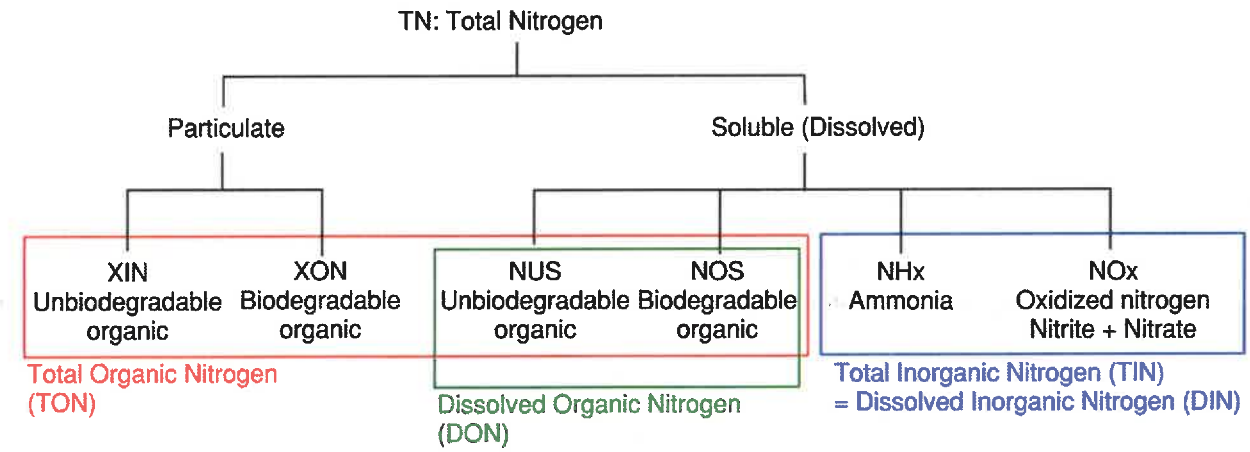

Figure 1 Nitrogen Species Present in Wastewater

TIN, by definition, includes dissolved and particulate inorganic nitrogen. However, particulate inorganic nitrogen is limited in municipal wastewater influent and is generally removed or precipitated through the treatment process in primary clarifiers and solids handling. Therefore, as particulate inorganic nitrogen is considered negligible in the effluent, TIN is typically equal to DIN in wastewater effluent.

Thus, the difference between TN and TIN is the organic nitrogen, which comes in four forms including:

- Particulate: particulate inert nitrogen (XIN) and particulate organic nitrogen (XON)
- Dissolved: unbiodegradable soluble nitrogen (NUS) and organic soluble nitrogen (NOS)

A portion of the particulate organic material (XIN, XON) is removed during solids/liquid separation such as clarifiers, and systems with membrane filtration or tertiary filtration are likely to have low levels of this material in the effluent. Of the soluble organic material, most of the NOS will be converted to ammonia (NHx) within the treatment plant, while the unbiodegradable nitrogen (NUS) will pass through the treatment plant and discharge with the effluent. NUS is not available for eutrophication and should not have any impact on Puget Sound DO.

Speciation conversion is however complex chemistry that is site specific and would require future study and analysis within our system to understand current state and variability. Currently we have less than 30 days when we can calculate an effluent organic nitrogen concentration. From this data, the organic nitrogen concentration ranges from 0 to 11 mg/L with an average of 3 mg/L. It is difficult to draw conclusions with this limited data set but one could speculate that the modeled summer TIN (or DIN) concentration of 3 mg/L may equate to an effluent TN between 3 mg/L and 14 mg/L given the available data. If the summer season DIN concentration target of 3 mg/L were to be converted directly to a TN concentration without accounting for the organic nitrogen component, then this resultant warm season TN concentration of 3 mg/L would be unattainable with the NRE assumed technologies and require restarting planning efforts towards a new goalpost. Even if the TN is adjusted to account for particulate and dissolved organic nitrogen, establishing this conversion will require significant time for sampling and study to determine appropriate site-specific conversion values.

Preliminary calculations indicate that tertiary filtration (or equivalent) would likely be required to reliably meet the summertime and year-round mass loads listed in Appendix E for Post Point. Based on the work conducted thus far in the NRE, the Post Point Plant does not have available space to accommodate the increase in secondary treatment capacity required to reduce the TIN concentrations to below 3 mg/L along with a tertiary filtration process to further reduce the particulate organic nitrogen concentration.

10. *The proposed methodology for calculating basinwide caps result in effluent TIN concentrations below Ecology's definition of Limit of Technology at Post Point's permitted design flow.* By setting basinwide loading caps based on 2014 effluent flows and effluent DIN concentrations of 3 mg/L in the summer season (Draft Plan Page 31), Ecology has ensured that the resulting summer season TIN concentration at Post Point's National Pollutant Discharge Elimination System (NPDES) permitted/full design flow (around the year 2045) is well below Ecology's published estimate for the lower limit of technology of 3 mg/L TIN (Puget Sound Nutrient General Permit Fact Sheet 2022). It is unclear to the City why Ecology would base loading caps on such clearly unattainable levels. However, beyond the question of legality, there is also the issue of (1) permitting precedent: the vast majority of WQBELs are calculated based on permitted design flow, even in Washington; and (2) good permitting practice.

    Point source loading caps should be based either on the full design flow of each facility, or projected design flows needed to meet future community needs. Loading caps that are unattainable at full design flow effectively revoke the prior regulatory approval of the WWTP as constructed, which is both poor planning policy and questionable considering:

    - Federal Regulations: The Code of Federal Regulations 40 CFR § 122.45(b)(1) states that "In the case of POTWs, permit effluent limitations, standards, or prohibitions shall be calculated based on design flow." These federal regulations were specifically adopted to ensure that the facilities are regulated according to its maximum intended capacity, providing a consistent basis for environmental protection and compliance.
    - WQBEL Permitting Precedent: The majority of WQBELs in the United States are calculated based on permitted design flow including the State of Washington.
    - City Planning: In the State of Washington, the design flows of WWTPs undergo a rigorous regulatory approval process before construction can begin. This process is governed primarily by Chapter 173-240 of the Washington Administrative Code (WAC), which outlines the requirements for submitting engineering reports and plans for wastewater facilities. Once a WWTP receives a NPDES permit, it is authorized by federal and state law to operate up to its full design flow. This approval is critical, as the permitted design flow reflects the anticipated wastewater volume needed to serve the community reliably. The facility's ability to meet public health and environmental standards hinges on this capacity. Therefore, WWTPs depend on their full design flow not only for operational efficiency but also to fulfill their essential role in supporting economic development and meet future community needs.

    The points made above pertain to every WWTP in the Puget Sound region, and are especially important for the City. The City has experienced higher population growth compared to state and national averages. Since 1980, the City's population has increased by nearly 220 percent, surpassing Washington State's growth of approximately 200 percent and the national growth rate of around 150 percent. Between 2014 and 2025, over 10,000 new residents have made Bellingham their home (City of Bellingham, 2025).

    In response to ongoing growth and in alignment with Washington State Department of Ecology's approved Facility Planning practices, the City of Bellingham is actively planning for future wastewater treatment capacity. Current flow and load projections are designed to accommodate anticipated wastewater contributions through the year 2045.

Applying 2014 load allocations to future projected flows is not a suitable strategy for managing growth. The City has already invested significant capital in providing wastewater treatment for the next twenty years. This could "regulatorily decommission" existing infrastructure via flow capacity reduction. This infrastructure has already been paid for by rate payers; the simultaneous additional costs for investment in tertiary treatment works is effectively a "double whammy", and has the potential to require growth restrictions to be implemented. Additionally, the high sewer rates that would result from implementation of the Draft Plan would very likely lead to a higher proportion of the growth occurring in the rural areas of Whatcom County. Moving growth outside of the Urban Growth Area to the rural areas of Whatcom County would be counter to the intention of the Washington State Growth Management Act and would likely lead to higher non-point source TN loads. The City requests that Ecology consider the nutrient load allocation for Post Point be calculated from the previously Ecology approved design flow for Post Point and be consistent with the City's Comprehensive Plan, such that the TN load limits will not significantly limit growth within the City.

11. *Model scenarios used to set point source goals should not assume point source concentrations stricter than AKART*. As defined in the WAC, AKART represents "the most current methodology that can be *reasonably* [emphasis added] required for preventing, controlling, or abating the pollutants associated with a discharge." By definition, treatment levels stricter than AKART are unreasonable. AKART can be facility-specific, and Washington's past and proposed PSNGP framework requires individual facilities to determine AKART through the NRE process. Ecology's model scenarios for deriving the basinwide targets ignore the concept of AKART and instead assumes infeasible treatment levels, as discussed in the previous comment. Ecology should instead allow facilities to proceed with the NREs, define facility-specific AKART, and then interpret those treatment levels as the minimum concentrations to assume in model scenarios. Higher concentrations might also be appropriate, depending upon the effort needed to meet ecologically meaningful water quality goals.

12. *The analysis should consider the incremental costs/benefits and ancillary impacts of different levels of treatment/nutrient reduction*. A growing body of literature has evaluated the cost-benefit of different tiers of nutrient removal at WWTPs, generally highlighting the higher incremental costs and lower benefits of the most stringent treatment levels. For example, Falk et al. (2013) demonstrated that the most stringent nutrient removal tiers at POTWs achieve only marginally more nutrient removal than more moderate nutrient removal tiers, but at much higher incremental costs. This is driven by technology "breakpoints" whereby TN concentrations of 5-8 mg/L can often be cost-effectively achieved by biological nutrient removal, but the small incremental decreases (e.g., to 3-4 mg/L) requires installation and O&M of much more expensive technology such as filtration and external carbon supply.

    The USEPA approved Life Cycle Impact Assessments and Life Cycle Cost Analysis (LCCA) are holistic approaches to understanding the 'cradle-to-grave' impacts of the reduction - not just the economic costs but also the environmental impacts and benefits. The USEPA's Life Cycle and Cost Assessments of Nutrient Removal Technologies in Wastewater Treatment Plants (USEPA, 2021) identified breakpoints in technology and benefits dependent on nutrient targets. This sharp rise in operational costs underscored the diminishing returns of ultra-low nutrient targets, suggesting that moderate reductions may offer a more cost-effective balance between environmental benefit and resource expenditure. The "diminishing returns" effect might be especially striking for the Puget Sound given the relative insensitivity of DO to changes in anthropogenic nutrient loading.

Moreover, the study reveals that the environmental benefits of the lowest treatment tiers may be offset by unintended increases in adverse ancillary impacts including:

- Global warming potential.
- Eutrophication potential.
- Water depletion due to water use in processes.
- Acidification potential.
- Particulate matter formation potential.
- Smog formation potential.
- Ozone depletion potential.
- Fossil depletion.

The potential impacts of the Draft Plan should consider environmental and social costs associated with a preferred approach, including directly monetizable impacts. Potential impacts should be considered not just in subsequent NRE evaluations but in the establishment of the plan. These impacts should include standard LCCA costs such as lifecycle costs for chemical usage and other disposables, energy usage, operations and maintenance labor, and refurbishment or replacement of assets to extend useful life to establish a $/lb N removed. Energy usage and the social cost of carbon alone can pose environmental impacts beyond what is considered.

In addition, although the NRE examines the recreational and commercial benefits for socially vulnerable communities, it does not examine the social cost of increased impacts such increased construction activities, on-going chemical deliveries, etc. to these same communities.
Ultimately, a more holistic and nuanced approach should weigh not only the direct cost-benefit of different nutrient removal tiers but also the broader environmental trade-offs associated with each treatment level. The City would support integrating triple bottom line assessments into cost-benefit analyses, to better identify optimal treatment thresholds that maximize environmental gains without incurring disproportionate economic, social, or ecological costs.

Comments on Deriving Water Quality-Based Effluent Limits
The comments below correspond to issues raised in Appendix H of the Draft Plan.

13. *It is premature to identify a method for translating basin-wide goals into WQBELs before more fundamental approach/attainability issues (discussed in comments above) are resolved.* The issues that Ecology raises in Appendix H of the Draft Plan primarily pertain to how basinwide loading targets should be translated into WQBELs at individual point sources. They do not address the basinwide loading target themselves. Although the distinction between basinwide loading targets and individuals WQBELs is understood, the basinwide loading targets were based on very specific assumptions regarding point source flow and treatment levels, and so they are by far the most important factor that affects individual WQBELs.

    As discussed in previous comments, the City recommends a fundamentally different approach to setting water quality goals and considering feasibility/reasonableness than represented in the Draft Plan. This approach could result in significant changes to the basinwide targets, which in turn could change perspectives on how the targets should be translated into WQBELs. Hence, it is premature to fully address the questions of Appendix H until more progress has been made on setting scientifically-defensible basinwide targets. Similarly, judgement must be reserved on the utility of the proposed CBOD5 concentration limits, pending demonstration that these limits are necessary to achieve ecologically meaningful outcomes.

14. *The WQBEL-setting methods should consider many of the same attainability and reasonable factors described in previous comments*. The previous comment section identified several factors that should be considered when setting point source treatment assumptions for model scenarios and setting basinwide caps. The same concepts apply to setting individual WQBELs. These concepts include:
    - Setting WQBELs based on full WWTF design flow or future flow needs.
    - Considering AKART of individual facilities as the most stringent treatment level of those to be considered.
    - Considering incremental cost/benefits, diminishing returns, and ancillary impacts of different treatment tiers.
    - Avoiding nutrient species-related mismatches between model scenarios and limits, especially those that would contribute to the non-attainability of limits.

15. *Comments on expressing WQBELs as load vs. concentration.* This is another topic that partially depends on the technical basis of the water quality goal setting framework. Technology-based treatment limits (TBELs) in lieu of WQBELs would allow the limits to be expressed as concentration-only, which would in turn be an option for accommodating future growth and flow needs. If load caps are adopted, there would be no additional benefit to also including concentration limits, which would only constrain operational flexibility and trading/offsets. Although DO in most of the Puget Sound has little sensitivity to nutrient loads, it is expected to have even less sensitivity to effluent nutrient concentrations.

16. *Support compliance schedules, and support for variances or use revision if existing use attainment is not practicable. 2050 deadline is likely not feasible given nutrient reduction improvement design and construction timelines, financial constraints and ongoing projects.* Meeting the nutrient reductions laid out in the plans will likely require a portfolio of projects to achieve. Project sequencing is dependent on boundary conditions such as funding availability and strategy, our organizational capacity due to staffing and other responsibilities, the availability of our consultant and contractor partners, and the need to coordinate with ongoing site improvements and operations. These factors would influence how we package and prioritize projects required to meet new regulatory limits.

    Therefore, significant hurdles would need to be addressed to meet a 2050 deadline, and it is likely not feasible. Currently, the City is engaged in an ongoing project to upgrade the Incinerator Emissions Control system - a critical project that enables the Post Point Plant to meet or exceed air emission regulatory standards. Following the planned completion of this work, the City will be starting a master planning effort at the Post Point Plant to identify the infrastructure requirements and layout for "build out" of Post Point, for both the solids and liquids stream processes. Based on previous planning efforts, the City will need to essentially replace the entire solids stream process within the next 15 years.

    A major project in our capital improvement program requires 2-3 years of study, 2-3 years of design and 5-7 years of construction. To allow for the extensive stakeholder outreach and coordination needs these major projects require, the timeline can be extended even further. Since the nitrogen limits will not be finalized until 2031, this project planning cannot start until this date. In addition, between 2031 and 2050, the City will need to complete a major solids upgrade project. Since we cannot construct these two projects simultaneously while reliably meeting our current NPDES permit, we will likely need to break the nitrogen upgrade project into multiple phases. Implementation of these large projects will extend beyond 2050. Compounding technical challenges such as site constraint and construction sequencing, we also expect to face challenges to secure consultant and contractor partners to perform critical design packages and ultimately construct the improvements given that our peer utilities around Puget Sound will be seeking the same services.

Miscellaneous Comments on Trading/Offsets and Monitoring

17. *Support for trading/offsets*. The City supports the concept of nutrient trading and offsets, which could be a supplementary method to increase the efficiency of nutrient reductions, increase operational flexibility, address upset conditions, or accommodate future growth. Although point-point trading would be a logical starting point, we also encourage the longer-term development of options for trading with and between other sectors, and between basins. We believe that Ecology needs to lead the development of a trading framework and that any such program will need to be defined, developed and readily available prior to the implementation of the nutrient discharge limits.

18. *Effluent diversion has many benefits but will likely not alleviate financial, technical, and schedule challenges.* While the City supports increase in reclaimed water and recognizes its multiple benefits, our review of reclaimed water opportunities (as part of the NRE) indicates that there are not enough reclaimed water opportunities that would address nitrogen reduction in a meaningful way. The diversion volumes required exceed the market demand for water reuse and the investment needed to establish partnerships is significant. Reclaimed water standards may also require additional site space that is unlikely to be available.

19. *Schedule should include development of pollutant reduction/tracking system.* The Draft Plan acknowledges limitations in Ecology's current ability to track and quantify nutrient reductions achieved across the Puget Sound watershed. The development and maintenance of an effective Sound-wide tracking system is an ambitious endeavor that will require dedicated funding and staffing. Hence, we recommend that development of a tracking system be explicitly added to the Schedule and Milestones section of the Draft Plan.

We appreciate the opportunity to comment on the Puget Sound Draft Nutrient Reduction Plan and welcome the opportunity to discuss these comments with Ecology. We are confident that through a collaborative and transparent process, justified science-based regulations will guide future investments to achieve ecologically and socially sustainable solutions. First and foremost, these regulations should be based on attainable, ecological outcomes.

Sincerely,

Joel Pfundt, AICP CTP
Public Works Director

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