



**Community Development
Department**

315 Kennel Ave/PO Box 248
Molalla, OR 97038
Phone 503.759.0205

January 17, 2022

To: Mike Pinney, Oregon DEQ
Re: Plan for Replacing Aeration at Molalla WWTP

Dear Mr. Pinney:

This letter is a follow-up to our phone conversation January 12, 2022, in which we discussed the City's plan for handling the loss of its Aeration Basin. As you know, in October 2022 the City was forced to bypass its Aeration Basin following an inspection of its asphalt lining. The City Engineer was asked to analyze the situation and supplied their results in a technical memorandum (November 2, 2022).

The Engineer's recommendation #4 was that the City "evaluate the scope and effectiveness of spot repairs to the aeration basin". The City performed this evaluation and, after review, has twofold concern: 1. It is unclear whether the City could perform adequate repairs before the aeration basin is scheduled for demolition during new plant construction. 2. Even if spot repairs were managed, before it could go back in to service, a Leak Test would need to be performed to ensure no infiltration into groundwater. Should the results of that Leak test be *fail* then the City will have lost significant time effectively making no progress toward restoring its lost capacity despite its efforts.

The City wishes to avoid that outcome, and believes it should proceed instead with the Engineers' recommendation #2 "Evaluate the immediate installation of aeration into Lagoon No. 1". The remainder of this letter outlines the City's Plan to do that.

The Engineer found that the loss of the Aeration Basin results in the loss of 60 Horsepower of Aeration. The Engineer further estimates that the aerators were supplying between 0.8 to 2.4 lbs O₂/hp-hr, or between 1152 to 3456 lb O₂/day. The Engineer assumed the removal rate of BOD₅ to be 1 lb BOD₅ per 1.5 lb O₂, or between 768 to 2304 lb BOD₅/day. They note for context that the influent BOD₅ the month prior was 1223 lb/day (from the September 2022 DMR).

We know that this is not all the air being added to the system: two 15-hp aerators on Lagoon 1 have also been installed in the past few years, and it is known that the biggest contributor to daily O₂ in any facultative lagoon system is algae – an O₂ feed rate that is not possible to directly measure. Further, it has been questioned whether aeration added right after the influent is as effective as the air added by algae and Lagoon 1's new aerators, both of which feed O₂ directly where the biological processes are actually happening.

Due to these last two facts, some consultants advising the City over the past few years have questioned whether the aeration basin contributes significantly at all, relative to the energy costs of running them. The Aeration basin aerators have been turned off in the past and did not appear to have resulted in loss of O2 feed rate sufficient to cause NPDES permit violations. Some higher ammonia values have been observed during these time periods which seem to be correlated, but there is insufficient evidence to presume turning off the aeration basin is the proximate cause. Biosolids removal activities may also have contributed.

Nevertheless, any O2 feed rate reduction must ultimately result in a reduction of total plant capacity. Therefore, the City proposes to add Aerators to Lagoon 1 in addition to the two aerators previously added.

The City proposes to add a second 100 amp circuit and install two more 15-hp aerators (for a total of 30 HP). There appears to be insufficient surface area on Lagoon 1 to add more than two aerators, and aerators with more Horsepower are thought to be too large to function without disrupting the biosolids layers below, even with anti-erosion shields. While this is less than the 60 HP that has been lost it is not clear whether the new 30 HP will not perform better than the old aeration basin because of its better proximity to the biological processes.

It is therefore possible that this will be enough additional O2 to fully restore the wider capacity of the treatment plant. Further, this additional O2 will be supplied to the plant during construction while the aeration basin is being converted to an equalization basin – air which would have otherwise resulted in a temporary *loss* of capacity during construction.

The new Aerators proposed are *Aqua-Aerobic Systems, Inc. 15 HP Model FSS Endura® Series Aqua-Jet® Aerator*. The floats will be fiber reinforced polyester skin (FRP), filled with closed cell polyurethane foam. The volute and intake cone will be made of machined 304 stainless steel. The Propeller will cast stainless steel, and the Diffusion head will monolithic cast 304 stainless steel. The Motors will be TEFC premium efficient 460 volt, 3 phase, 60 hertz, 1800 RPM with 1.15 Service Factor and Class F nonhygroscopic insulation. The Motor shaft will be one-piece 17-4 PH stainless steel. Each of these aerators will include a 304 stainless steel anti-erosion shield for 15 HP aerator that will keep the circulating water in the top few feet of the Lagoon, so as not to disturb the facultative processes below. The current project cost estimate is \$150,000. Lead time on the Aerators themselves is quoted at 10 weeks.

If you have any questions please contact me. Thank you!

Respectfully,

Andy Peters, Public Works Div Manager

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