



This fact sheet addresses common questions about the influent splitter box and **biological nutrient removal (BNR) basins** that are being incorporated in the proposed project.

BNR Basins



Purpose and Benefits of Process

The main purpose of the Influent Splitter Box is to split flow equally to the three existing BNR basins. The BNR basins at the Franklin WRF are used to remove organic material and nutrients from wastewater.

Aeration basins are commonly used in medium to large sized wastewater treatment plants throughout the United States for these purposes.

The benefits of BNR Basins include:

- Consumption of soluble and insoluble organic matter by microorganisms to produce settleable material that can be removed from the wastewater in settling basins;

- Removal of nutrients such as nitrogen and phosphorus from the wastewater; and
- These processes result in producing a low nutrient clear water that can be safely discharged after filtration and disinfection.

Description of Process

Following physical treatment at the headworks, untreated sewage from the City of Franklin's sewage system flows through the Influent Splitter Box and into the BNR Basins. The Influent Splitter Box does not provide biological treatment. Its goal is to split flow equally to the City's three BNR Basins.

Oxygen is introduced into the BNR basins by surface aerators (large rotating propellers that agitate the surface of the wastewater) and blowers (large air compressors). The

presence of oxygen encourages bacterial growth, which consumes organic matter and creates large masses of settleable material that can then be removed in quiescent settling basins. Certain zones of the BNR Basins remain unaerated to encourage specialized bacteria to remove nutrients such as nitrogen and phosphorus from the wastewater.

A portion of the settled sludge is pumped back to the beginning of the BNR Basins and mixes with incoming wastewater. This returned sludge "seeds" the incoming flow with bacteria that consume the organic matter and perform nutrient removal. A portion of the wastewater in the BNR basins is also channeled back to one of the unaerated zones at the beginning of the BNR Basins to encourage even more nutrient removal. Once the

wastewater exits the BNR Basins, a majority of the organic matter and nutrients that entered the tank as untreated wastewater, have now either been removed or converted to a settleable form that can be removed in a downstream process.

What Process Modifications will be made?

The existing BNR basins are capable of treating more flow than can be put through the basins without causing overflows. Thus, piping and water level control structure changes will be made to allow conveyance of larger peak flows through the BNR basins. The changes will include construction of a new concrete Influent Splitter Box, increasing the size of pipes to and from the BNR basins, and modifications to overflow weirs. Once the new structures and changes are in place the old influent splitter boxes will be demolished.

Modifications will also be made to the existing basins to improve nutrient removal capability. These changes will occur inside of the BNR basins rather than exterior to the basins. Walls will be added inside of the first section of BNR Basins to create an “anaerobic” zone to encourage biological phosphorus removal, and the influent and RAS flow piping will be re-routed to the opposite side of each tank. An “anoxic” zone will then follow the anaerobic zone in each modified BNR tank to encourage nitrogen removal.

New platform mounted mixers will be installed in the anaerobic zones. The existing platform mixers in the anoxic zones will be removed and

replaced with new mixers. New concrete walkways and platforms will be provided for access to the mixers. In addition, the mechanical surface aerators in each BNR Basin will need to be raised slightly to accommodate the slightly higher water levels that will result from the proposed changes. As another measure to increase phosphorus removal, aluminum sulfate (alum) chemical dosing points are being added at the effluent weir of each BNR Basin to chemically bind phosphorus and remove it from the wastewater. Alum is a widely used chemical for both water and wastewater treatment.

Additional oxygen is needed in each BNR Basin to achieve additional nutrient removal. Two new blowers and air piping will be added to the BNR Basins to accommodate this. The blowers will be installed adjacent to existing blowers of the same size, which are located adjacent to the north wall of the BNR basins. Additional coarse bubble diffusers will be installed at the bottom of the BNR Basins, submerged beneath the waterline, to bubble air from the floor.

Is the process a potential odor source? Is the process odor controlled?

BNR basins and influent splitter or junction boxes to BNR basins are not normally a significant source of odor in a treatment plant and thus are not normally odor controlled. The BNR Basins are existing and the proposed are not anticipated to increase odor emissions from the basins. The new Influent Splitter Box is replacing two existing splitter boxes, which are not currently odor controlled.

Does the process include equipment that has the potential to create noise? If so, is there any noise control provided?

The BNR Basins are existing and any changes that are being made are not anticipated to increase noise. The new Influent Splitter Box does not have motorized equipment associated with it and thus will not be a source of noise.

Like the existing mixers, the new mixers at the BNR Basins will be located outside on top of the BNR basins. Like the existing mixers, the new mixer motors are small horsepower low speed motors and will not create significant noise. They won't be audible from the property lines.

The mechanical aerators are existing and outside and no new mechanical aerators will be added. Therefore noise levels from the aerators will not change.

The new blowers at the BNR Basins will be located outside. The new blowers will be located on the ground near the north wall of BNR Basin No. 1 adjacent to the existing blowers. The new blowers are similar to the existing blowers and are not anticipated to create additional noise beyond that created by the existing units.

Will the process modification change the look and feel of the site?

The BNR Basins are existing and any changes that are being made will not be noticeable from offsite and will not significantly affect the look and feel of the site.

The new Influent Splitter Box will replace the existing splitter boxes, and the two existing splitter boxes will be demolished. Elimination of one of the splitter boxes should improve the look and feel of the site.

Will the process modification change the safety of the site?

The equipment and processes at the BNR Basins and the Influent Splitter Box do not pose any offsite safety concerns. The BNR Basins are existing and any changes that are being made will not affect the level of safety of the site. The addition of an alum feed system for phosphorus removal also does not pose any offsite safety concerns.