Resource Recovery at Post Point

Turning our waste into valuable resources

Frequently Asked Questions

Why is the City doing this project?

The wastewater treatment plant at Post Point is designed to remove solids from our sewage so the water can be cleaned before discharging it into Bellingham Bay. Currently at Post Point, the City disposes these solids by burning them in large incinerators. The current incinerators are aging and need expensive on-going repairs. In addition, the incinerators are not consistent with our community's values because they:

- Destroy the valuable nutrients in the solids, rather than recycling them
- Don't recover the substantial energy content of the solids

Thus, the City is exploring other options to manage the wastewater solids and recover resources (nutrients and energy).

How are the alternatives being evaluated?

The alternatives for managing biosolids at Post Point are being evaluated using a two-step process. First, the range of all possible solids treatment and end-use alternatives were identified and screened based on pass/fail criteria. These criteria represented "must haves" for the community; any alternative that did not meet these basic criteria was considered unacceptable.

The second stage of the evaluation is a triple bottom line plus (TBL+) evaluation. The TBL+ evaluation uses financial, community/social, environmental, and technical considerations to compare alternatives based on community values.

The pass/fail and TBL+ criteria were developed based on the *Legacies and Strategic Commitments* adopted by the City Council on behalf of our community.

What technologies have already been ruled out?

Technologies were screened out that:

- Did not have a well-established track-record of treating wastewater solids
- Did not allow for recovery of biosolid nutrient and energy resources
- Required the City to bring outside materials into the plant to support the process
- Would adversely impact neighbors
- Were considered a safety risk

Based on the considerations above, the project team screened out:

- Some biological treatment methods (e.g., lagoons, aerobic digestion)
- Newer thermochemical processes (e.g., gasification, incineration)
- Continuing to burn or landfill the treated biosolids

As a result, the project team determined that anaerobic digestion is the best method for treating Post Point's biosolids (see "What is anaerobic digestion?"). The City continues to evaluate several processing and end-use options that work with anaerobic digesters to select the best overall system alternative.

What is anaerobic digestion?

Anaerobic digestion occurs when microorganisms naturally decompose organic material in an air-free (anaerobic) environment. The digestion process is very similar to how the human digestion system breaks down food into the nutrients and energy we need to survive.

The digestion process in a wastewater treatment plant uses large tanks that are continually mixed and heated. Depending on the specific design of the digestion process, two potential classes of biosolids product can be produced – Class A and Class B (see "What is the difference between Class A and Class B biosolids?").

A tank producing Class B biosolids is kept at a temperature around 100 degrees Fahrenheit. A tank producing Class A biosolids is kept at a temperature around 135 degrees Fahrenheit. The flow-through process is very slow. Solids are generally in the tank for 15 to 30 days to allow for consistent breakdown of the material and to reduce pathogens.

Microorganisms that break down organic material in biosolids produce a biogas byproduct, a mixture of carbon dioxide and methane. This biogas can be recovered and:

- Used as a fuel to generate electricity and heat in an engine/generator at Post Point
- Purified and used as a natural gas replacement or in compressed natural gas (CNG) vehicles

Because the biogas is produced as part of the natural biological breakdown of our waste, it is considered a renewable fuel that can offset the greenhouse gas load of fossil fuels.

Solids are thickened and dewatered before and after digestion, respectively. These steps remove water from the solids, making the digestion process more efficient and reducing the weight and volume of biosolids that require transportation to their final end use.

What is the difference between Class A and Class B biosolids? Why wouldn't we just produce Class A biosolids?

The only difference between Class A and Class B biosolids is the pathogen content. Class A biosolids have no detectable pathogens while Class B biosolids have reduced the pathogens by approximately 95%. This classification is based on the Environmental Protection Agency's (EPA) biosolids management regulations. The EPA has established that Class A biosolids are

suitable for use by the general public whereas Class B biosolids must be used at sites with proper permits. As a result, Class A biosolids have a greater variety of potential end uses.

Most municipalities in the U.S. produce Class B biosolids instead of Class A. This is because, especially in Washington, there are many available permitted sites where Class B biosolids can be taken. The additional treatment required to produce Class A biosolids can be also expensive and energy-intensive. We will consider these benefits and costs when evaluating whether to produce Class A biosolids at Post Point.

The project team will consider benefits and costs when evaluating whether to produce Class A or Class B biosolids at Post Point. In either case, the benefits of nutrient and energy recovery will be realized.

What biosolids end-use options are being considered?

Because of their organic content and nutrients, biosolids make an excellent fertilizer to support plant growth and rebuild damaged soils. The project team is considering a variety of land-based beneficial end uses for Post Point biosolids. These include:

- Sending the biosolids to dryland farms in central and eastern Washington for use as year-round fertilizer.
- Producing a compost or blended soil using the biosolids and wood waste. The compost or blended soil could be used locally by gardeners, landscapers, and farmers in Bellingham and the surrounding areas.
- Drying the biosolids to remove almost all water content, then bagging the dried product for sale as a fertilizer in local stores or across the Northwest.

Most biosolids programs have multiple end-use options to maximize opportunities for reuse; the project team intends to consider a diversified end-use program.

What's in the biosolids? Are they harmful to the environment?

Biosolids are composed almost entirely of the rich organic matter recovered in the wastewater treatment process, but do contain some trace metals and chemicals from what people put in the sewers. Historically, metals in biosolids were a concern, but since the 1970s, the Environmental Protection Agency has extensively tested them to establish regulations that protect the environment and people from overapplication of metals to agricultural land.

There is a long history and widespread acceptance of biosolids reuse. Biosolids are proven to be safe for the environment and people when used in land-based applications.

Is incineration still an option?

The pass/fail screening process considered incineration, but removed this option as a viable alternative because it did not sufficiently recover resources from the solids. If, after completing a detailed evaluation, we find that anaerobic digestion would not meet our

community's values and goals, we may reconsider other options. For now, we are focusing on a resource recovery alternative.

Will this process increase odors or noise?

The new system will have the same solids thickening and dewatering equipment as the current incineration process used at Post Point, so odors should not increase. The digesters are enclosed and airtight, and will only be exposed to air during infrequent cleanings. Odors could escape when biosolids are loaded onto trucks. The City wants to be a good neighbor to the surrounding community, and will assess odor control systems as part of the design to capture and treat any potential odors.

The new systems are not anticipated to be any noisier than the plant's current process. Any large mechanical equipment will be located indoors or within acoustic enclosures, and the digestion process only involves biological treatment of the solids in a closed tank. Like odor control systems, the project team will assess any noise mitigations measures that may be appropriate as part of the final system design.

How would this project impact air quality in our area?

An anaerobic digestion process will have less impact on local air quality than the current incineration process. How much improvement will depend on how the biogas produced in the digesters is used. We are evaluating three possible biogas end uses:

1) Burning the gas in an engine-generator at Post Point to produce electricity and heat
2) Separating the methane from the biogas so it can be injected into the natural gas pipeline
3) Purifying the gas and compressing it so it can be used as a fuel in compressed natural gas (CNG) vehicles

Of these options, burning the gas onsite at Post Point would have the greatest impact on air quality.

Will this project increase the number of trucks leaving the plant each week?

Currently, the City hauls roughly one truckload of ash per week from Post Point. Because a digestion system does not burn the organic material in the biosolids, the amount of solids and number of truckloads will increase, but the amount will depend on the final process selected. For example, if a biosolids drying alternative is selected, the number of trucks could increase to 4 to 5 per week. If an alternative without drying is selected, the number of trucks could increase to 1 to 2 trucks per day.

The impact of these additional trucks can be mitigated by choosing routes and travel times that impact as few people as possible.

Will a greenhouse gas analysis be completed? How does anaerobic digestion compare to incineration?

Yes, the carbon footprint of each alternative is being evaluated and considered as part of the triple bottom line plus (TBL+) evaluation. The analysis will include:

- The energy consumed by the equipment
- The energy produced by the biogas system
- Fuel for trucking biosolids and any other feedstock (materials needed to support the process)
- Carbon sequestration from land applying the biosolids
- Nutrient offsets from using biosolids instead of chemical fertilizers
- Other relevant emissions

The project team's preliminary assessment is that nutrient and energy recovery from the anaerobic digestion system will significantly improve the treatment process carbon footprint compared to incineration.

Can the new system produce more energy than the plant uses?

Generally, anaerobic digestion cannot produce more power than the entire treatment plant requires. The biogas produced is typically more than enough to power the digestion process and can provide additional power for about half of the treatment plant. We will evaluate this in more detail for each alternative. We will also consider whether to bring additional digester feedstock to Post Point (e.g., food waste, fats oils and grease) to generate more biogas. At other treatment plants, adding feedstock to digesters has resulted in more power being produced than the entire treatment plant needs. In this case, the treatment plant would sell power back to the power utility.

How much will this project cost?

We are working through handling alternatives for solid waste to reflect the values of our community. One of the main evaluation triple bottom line plus (TBL+) criteria is the value of the biosolids project and associated costs. As we work though the community's priorities we will develop associated costs and anticipate producing financial numbers within the next year.

What's the project schedule?

The project schedule will depend on which alternative is selected, but the new facilities could be completed as early as 2023.

Where would the new system be located?

For most of the alternatives being evaluated, the new systems would be located in the northeast corner of the current treatment plant facilities. The City has identified this area for plant expansion through past Post Point facility planning efforts. The total area needed for new facilities would depend on which process is selected.

We are also looking at alternatives that use areas other than Post Point. Offsite locations would be required if the City creates a compost or Class A blended soil product, because these processes require more space than is available at Post Point. Offsite location options will not be identified unless the triple bottom line plus (TBL+) process indicates that an offsite alternative aligns best with our community's goals.

How long will the new system last?

The City aims to create sustainable infrastructure, so reliability will be key. The digesters will be designed to have a long useful life.

- Structural components (e.g., concrete tanks and buildings) can last for up to 60 to 80 years
- Pipes generally need to be replaced after 40 to 60 years
- Mechanical equipment will last for 20 to 30 years

When we evaluate the financial implications of the different alternatives, costs will be included for equipment repair and replacement as it ages.