


# MEMORANDUM

CITY/BOROUGH OF JUNEAU  
155 South Seward Street, Juneau, Alaska 99801

**DATE:** November 13, 2014

**TO:** Planning Commission

**FROM:** Beth McKibben, Planner   
Community Development Department

**FILE NO.:** CSP2014 0022

**PROPOSAL:** CBJ Biosolids Treatment and Disposal Evaluation - Phase II Final Report

## ATTACHMENTS

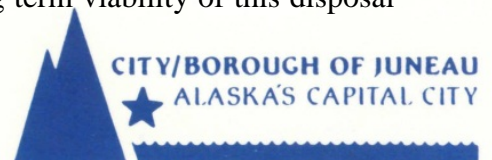
- A- Non-monetary criteria used in Alternatives Evaluation
- B- Table 1 Advantages/Disadvantages of Biosolids Facility Location

## BACKGROUND

In response to concern over the long -term stability of shipping biosolids to Oregon, the CBJ has performed an evaluation of viable treatment and disposal alternatives for biosolids. Biosolids are the semi-solid organic materials resulting from the treatment of sewage sludge. From 1992 to 2010, an incinerator located at the Juneau Douglas Wastewater Treatment Plant (JDWWTP) effectively combusted our biosolids to produce an inert ash that was disposed of on site.

In 2010, the incinerator was decommissioned due primarily to corrosion issues after performing for its expected lifespan of 20 years. The cost of repair, estimated at \$2 Million, was considered too expensive to pay to extend the service life. Instead, the CBJ worked with Waste Management (WM) to handle our biosolids. WM first disposed of the biosolids at the local landfill but discontinued this after a few months due to complaints of a significant increase of odors by the public. WM management also found the material was difficult to handle because of the high moisture content. WM then began shipping the biosolids to Oregon for disposal in another WM owned- landfill while other alternatives were considered by the CBJ. The cost per wet ton to the CBJ for biosolid disposal at the local landfill in 2010 was \$88. The cost to ship the biosolids to Oregon in 2013 was \$140/wet ton. The current cost to ship the biosolids under the contract with WM to Oregon is \$215/wet ton.

Since the incinerator was decommissioned, rising fuel costs, uncertainty over environmental regulations in Oregon, and issues with odors and leaking containers that threatened the CBJ/ WM contract, have become real and immediate threats to the long term viability of this disposal



strategy. If the contract is terminated, the CBJ would be in an emergency situation with no method for disposal of the biosolids, posing a significant health hazard for the community.

In the Phase I study, CBJ worked with Tetra Tech to provide a general overview of 10 treatment processes and 3 disposal strategies. The goal was to understand the spectrum of treatment and disposal options that may be viable for Juneau. During the process of research and evaluation, the following two governing principles were established for further analysis and decision making:

- **Produce a Class A biosolid.** This refers to the United States Environmental Protection Agency (USEPA) classification for biosolids pathogen characteristics. A Class A product meets the most stringent pathogen standards, is considered safe for public use, and has the least disposal restrictions; for example, it can be used as topsoil in residential gardens.
- **Reduce the volume of the biosolids.** Disposing of biosolids costs money. The more biosolids we have to dispose, the more expensive it is. Juneau has very little land that is of suitable size (multiple acres), flat, uplands, and in areas with compatible uses.

As scoping for the 2014 Phase II study began, the following governing principles were added to further define requirements of the long-term biosolids solution:

- **Allow for multiple end uses enabling ease of disposal.** Available disposal options include landfilling, monofilling, land applying (as a soil amendment), or burning (as a fuel source). Unfortunately, ground appropriate for a monofill or land application is limited, the landfill is nearing its capacity (within 20 years), and the market demand for a soil amendment product is uncertain.
- **Is classified as an established or innovative technology as defined by USEPA for system reliability.** An established technology is used at more than 25 facilities in the United States. An innovative technology may be established overseas but has some degree of initial, full-scale tested use in the United States.

The CBJ Land Use Code section CBJ 49.10.170(c) on City and Borough Land Acquisitions, Disposals and Projects, states:

“The commission shall review and make recommendations to the Assembly on land acquisitions and disposals as prescribed by Title 53, or capital improvement projects by any City and Borough Agency. The report and recommendation of the commission shall be based upon the provisions of this title and the comprehensive plan, and the capital improvement program.”

Therefore, Staff has reviewed the proposed alternatives and locations evaluated in the study and provided the following evaluation of the project in accordance with adopted plans and the CBJ Land Use Code. There will be another review when a specific project, in a specific location is being planned.

## **ANALYSIS**

The final report, Biosolids Treatment and Disposal Evaluation, Phase II considers four alternatives. The alternatives for biosolids management selected by the CBJ for detailed evaluation in Phase II are:

1. Continuation of the current practice of shipping dewatered biosolids from the JDWWTP and the MWWTP by barge, rail, and road to Oregon for landfill disposal (also known as the “status quo” or “base case” alternative).
2. Thermal drying of biosolids at a central facility with local disposal or marketing of the dried, Class A biosolids product.
3. Thermal drying of biosolids followed by combustion of the biosolids in a furnace to recover heat that is then recirculated to the biosolids drying process, thus reducing the amount of purchased fuel.
4. Thermal combustion (incineration) of the biosolids in a new fluidized-bed incinerator that recovers heat from the combusted biosolids to aid in evaporation and reduce the amount of purchased fuel.

In Phase II, the four alternatives were compared based on Capital and Operational Costs and the Non- Monetary Criteria listed below (attachment A):

- Public Health and Safety Considerations
- Risk of New Technology
- Implementation Timeline
- End Product Disposal Options
- Energy Sourcing and Consumption
- Operational Complexity
- Environmental and Permitting Issues
- Logistics of Transport
- Carbon Footprint
- Location of the Technology

The recommended alternative is Alternative 3, a thermal belt dryer that circulates hot air to dry the sludge and produces pellets. The pellets would be combusted in a furnace; the heat generated from this process would return to the belt dryer to dry the biosolids. Some supplemental fuel in the form of oil or wood pellets would be required for the process. The dried pellets from the thermal dryer could alternatively be used as a soil amendment. The cost estimate provided uses wood pellets as supplementary fuel.

The Phase II report considers two potential sites for a biosolids drying facility. One is the MWWTP and the other is JDWWTP. The MWWTP produces almost 80% of the biosolids. Table 1 (attachment B) articulates the advantages and disadvantages of the two sites. Prior to

construction of a new treatment facility there will be a second CSP review and a Conditional Use permit review. However, considering, in a general way, the three standards the Commission evaluates when reviewing a Conditional Use permit; public health and safety, neighborhood harmony, and conformity with adopted plans; is prudent in this broader review.

MWWTP is located off Radcliff Road near the airport. The site is 3.2 acres and is zoned Industrial. It is immediately adjacent to D5 zoning on the north and a mix of D15 and General Commercial zoning to the east. To the west is Mendenhall River and to the south the airport as well as the airport dike trail and public parking.

JDWWTP uses approximately 10 acres of a 105 acre site. It is accessed from Thane Road and is also zoned Industrial. There is a narrow area of Waterfront Industrial (WI) zoned land between the JDWWT and the channel to the west. The site is adjacent to industrially zoned and used land to the north. To the east, across Thane Road is zoned Rural Reserve. To the south is again a narrow strip of WI and the channel.

The use of MWWTP requires trucks and other traffic traveling to the plant drive through residential and general commercial neighborhoods. The Phase II report notes there have been complaints about odors over the years. The use is not harmonious with the surrounding neighborhood; there are no similar uses in the area. As noted in the report, this site is within the non-attainment area for air emissions, which will like cause challenges to receiving an air emissions permit.

Use of the JDWWTP will require more trips to haul waste material from the MWWTP to the JDWWTP for disposal. The site is less constrained and surrounded by primarily Industrial zoned land, including Waterfront Industrial, and industrial uses. It is in harmony with the surrounding neighborhood. However, there are impacts to the Radcliff Road neighborhood because of the number of trucks that would be hauling material from the MWWTP to the JDWWTP.

Because there will be trucking from one site to the other, either site will create truck traffic through residential and general commercial neighborhoods near the MWWTP and through downtown to reach or leave the JDWWTP.

Both sites are zoned appropriately for this type of use. However, the JDWWTP is more harmonious with the surrounding neighborhood in both use and zoning and is not in the non-attainment area for air emissions.

### **CONFORMITY WITH ADOPTED PLANS**

Staff reviewed the 2013 Comprehensive Plan, the 2011 Juneau Climate Action plan (JCAP) and the 2004 Long Range Waterfront Plan. Below is a summary of the plan sections that staff found

to be most relevant when evaluating the four alternatives for biosolids management selected by the CBJ in Phase II.

### **2013 Comprehensive Plan**

#### CHAPTER 2, SUSTAINABILITY

Policy 2.2 To model sustainability through its operations, practices, and projects.

2.2 IA2 Identify opportunities throughout the CBJ government to conserve energy, use alternative fuels and renewable energy sources, and reduce the CBJ's carbon footprint.

#### CHAPTER 6, ENERGY

Policy 6.5 To incorporate technologies and operating practices that will promote clean, efficient, and cost effective energy use into all of its own new and existing buildings and energy-using projects.

6.5.IA6 When designing new facilities or major renovation of CBJ facilities, analyze life-cycle costs of energy applications with consideration of using renewable energy sources given high priority.

Policy 6.6 To maximize the ratio of local, renewable-source energy to imported fossil-source energy in Juneau's internal energy economy.

Policy 6.8. Include the indirect, or external, costs of energy use in its economic analyses.

6.8-SOP1 Use quantifiable external and indirect costs in establishing the cost of energy when conducting life-cycle cost analysis of CBJ owned facilities, projects and operations.

#### CHAPTER 10, LAND USE

Policy 10.4 To minimize conflicts between residential areas and nearby recreational, commercial or industrial uses that would generate adverse impacts to existing residential areas through appropriate land use decisions and regulatory measures.

### **2011 Juneau Climate Action Plan**

The JCAP speaks to wastewater treatment energy use as follows:

CBJ has three wastewater treatment facilities, Mendenhall, Juneau-Douglas and Auke Bay (ABTP). This system consumes both electricity and fuel oil. In 2010, Mendenhall treatment facility alone used over 3 million kwhs of electricity. Additional electricity was used by the JDWWTP, ABTP, and the 45 lift stations. In addition, wastewater processing in 2010 required almost 155,500 gallons of fuel. The CBJ wastewater system consumes both building energy (lights, ventilation, and heat) and process energy. These energy usages are not separately metered. Staff notes this summary is before CBJ began barging waste out of Juneau.

### 3.1.3 Cost of implementation

Implementing the actions in this plan will have costs to all levels of governments and to the general public. In many cases, though, making changes that reduce energy use will be more expensive up front and will result in lower energy costs in the future.

Goal B-1: Reduce energy consumption in, and Green House Gas (GHG) emission produced by, borough government buildings. (Estimate: 30% emission reduction for CBJ buildings).

Action Item: Set energy efficiency standards for all new local government buildings. Use specific standards that exceed the minimum baselines of such standards as the American Society of Heating, Refrigeration and Air-conditioning Engineers energy efficiency standard (ASHRAE 90.1 or 90.2), for example, the 10 BTUS per square foot of heated floor area standard. New buildings should aim to achieve a 50% reduction in energy use per square foot compared to existing buildings. GHG emissions abatement and energy efficiency need to be incorporated into the early stages of building design.

Action Item: Establish a policy that requires equipment purchased or leased by local government to meet specified energy efficiency standards, such as energy star.

Action Item: Adopt a policy requiring that all new CBJ government buildings undergo a life cycle analysis and that this information be used to make decisions about energy efficiency and alternative systems.

Goal U-1 – Reduce energy consumption and GHG emissions from wastewater treatment (Estimate: 25% reduction in emissions from wastewater plant).

Wastewater is pumped through pump stations to the MWWTP, JDWWTP, or ABTP. At the main treatment facilities (MWWTP and JDTP), wastewater is processed and the solid phase is separated from the liquid. The liquid phase (treated water) is further disinfected with UV light before discharging to the Gastineau Channel or Mendenhall River. At both facilities, the remaining solid phase/sludge is dewatered. At the time the JCAP was written the biosolids were being disposed of at the land-fill. The JCAP states that while it was in operation, the incinerator at JDWWTP emitted a large portion area-wide GHG reported in the 2010 GHG emissions

inventory. In reviewing appendix VII it appears that wastewater accounted for 13% of the CBJ total emissions.

### **2004 Long Range Waterfront Plan**

The JDWWTP is located within the planning area of the 2004 Long Range Waterfront Plan. The JDWWTP is in subarea E. The Plan states that with the high level of investment in industrial, public works and marine facilities this area is envisioned to remain similar to present levels of activity and character. Page 58 of the Plan states that the Plan encourages the strengthening of land regulations in this subarea primarily to allow only industrial and non-cruise related maritime activities. The Plan also calls for continued utilization of a part of this area for the operation of the CBJ waste water treatment facility. The Plan further recommends buffering this use through plant materials or other means to improve the possibility of development eastward should be explored.

The Phase II report includes both a life-cycle cost analysis and a GHG emissions analysis for the four proposals considered. Both analyses are recommended for CBJ projects in the 2013 Comprehensive Plan and JCAP. These analyses allow for considering factors beyond the initial construction cost. The report also weighs other non-monetary factors, which are summarized above and also in attachment A). This is helpful for reviewing the alternatives for consistency with our plans.

### **FINDINGS**

The recommended alternative, Alternative 3, a thermal belt dryer that circulates hot air to dry the sludge and produces ash is most consistent with the 2013 Comprehensive Plan and the 2011 JCAP.

The JDWWTP location is most consistent with the 2013 Comprehensive Plan. The JDWWTP is also consistent with the 2004 Waterfront Plan.

### **RECOMMENDATION**

Staff recommends that the Planning Commission recommend to the Assembly that they initiate the design and construction of the thermal belt dryer and energy recovery furnace at the JDWWTP.