City of Coos Bay - Issue Paper
May 29, 2015

Issue Title

This issue paper discusses the current practice and structure of wastewater rates in the City.

Background

The City of Coos Bay is the largest community on the Oregon coast and provides wastewater collection, treatment, and disposal services to retail customers within the city limits. The City also provides wholesale wastewater treatment services to the Bunker Hill and Charleston Sanitary Districts. The City owns and operates two activated sludge wastewater treatment plants. Plant 1 is located in the downtown area, and has a dry weather design flow of 2.9 million gallons per day (mgd). Plant 2 is located in the Empire area and has a 2.02 mgd dry weather design flow. Wastewater is conveyed to one of the two wastewater treatment plants using a combination of up to 23 sanitary sewer pump stations and a combined total of over 90 miles of sanitary collection system piping. The City also operates 3 storm water pump stations, a four acre facultative sludge lagoon, three under the bay/slough high pressure force mains, and various other high pressure in-ground force mains.

To pay for the operation, maintenance, replacement and improvement of these wastewater systems, the City charges its customers fees on a monthly basis. Since the early 1980's, the City's methodology for calculating these fees has been based on industry standard, cost of service analysis (COSA). The process used to prepare the COSA for the City's wastewater utility follows standard ratemaking principles, as outlined by the Water Environment Federation (WEF) and the U.S. Environmental Protection Agency (EPA). The last formal wastewater COSA was completed in 2009, but the City reviews the rates annually through its fiscal budget process. This process consists of three steps:

1. Determine revenue requirements…(how much does it cost to provide service system-wide)
2. Allocate costs to customer classes…(who is causing the need for the service, and in what proportion)
3. Determine rate structure and develop rates…(align rates to recover costs from those causing the need)

Step 1: Determination of Revenue Requirements

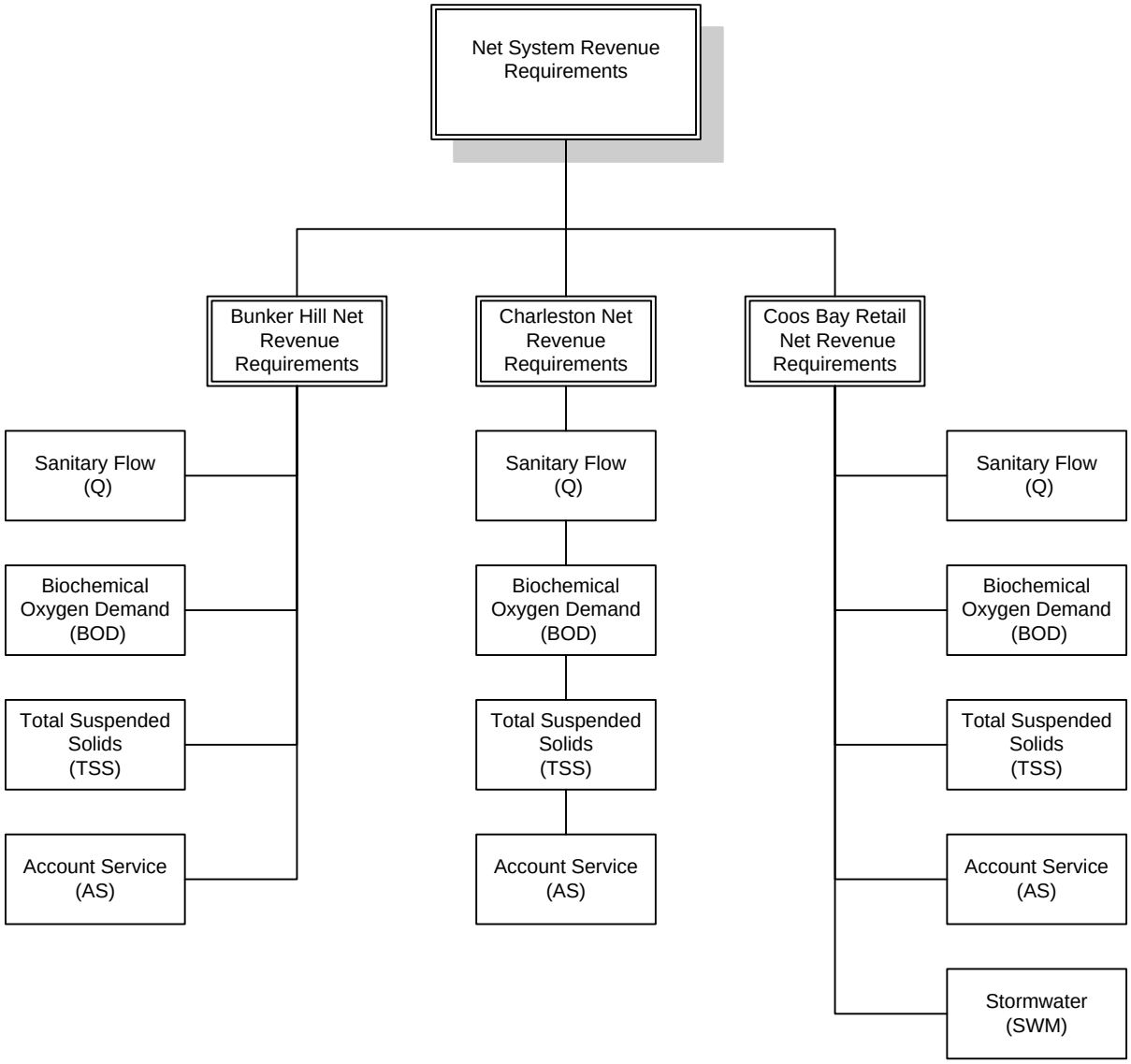
Revenue requirements are the total costs of providing services to utility customers over a specific period of time (usually one year). These costs include operation and maintenance (O&M) and capital costs. O&M costs are the routine costs of operating and maintaining a utility system in order to provide service. For the purpose of rate setting, revenue requirements are projected from budgeted expenses, and adjusted based on historical cost trends and the expertise of utility staff. Examples of O&M costs are chemicals and electricity used at plants, skilled plant operator labor, and administrative expenses.

Capital costs, as defined for the City's wastewater rates structure, are the resources used to acquire or construct capital assets. These include current revenue funded (pay-as-you-go) improvements, planned

annual contributions to funds for such purposes, and ongoing debt service requirements (principal and interest payments on outstanding loans and other obligations). Capital assets are defined as major assets that benefit more than a single fiscal period. Typical examples are land, improvements to land, easements, buildings, building improvements, vehicles, machinery, equipment and other infrastructure. Capital costs are projected for the rate-setting period based on the capital improvement plan, the City's bond covenants and utility staff expertise.

To determine the amount of revenue that rates must generate annually, the total revenue requirements are reduced by nonrate or other system revenues. Examples of other system revenues are unrestricted interest earnings, revenues from wholesale contract customers, and revenue from miscellaneous charges. Total requirements less other system revenues equal requirements from rates. A graphical presentation of the City's net wastewater system revenue requirements is shown below in Figure 1.

Figure 1 - Breakdown of Net System Revenue Requirements by Functional Cost Center



Step 2: Allocate Revenue Requirements to Customer Classes

Determination of the costs-of-service by customer class is a four-step process. These steps are referred to as functionalization, joint and specific groupings, classification, and allocation. Functionalization involves categorizing revenue requirements according to utility functions. Wastewater functions typically include treatment (often broken up by unit process), collection, pumping, and customer service. Utilities incur varying levels of costs to perform the different system functions needed to meet customer demands. Therefore, the first step in the cost allocation process is to determine what it costs the utility to perform different service functions. Next, functional costs are grouped by joint and specific categories. This process allows for certain types of costs (e.g., industrial pretreatment costs) to be allocated directly to benefiting customers. The majority of costs are generally joint or common to all customers.

Following functionalization and joint and specific groupings, a classification process is undertaken. A fundamental objective in developing a rate system is to price utility services so that each customer pays for the service they receive in proportion to their use. Some costs incurred by the utility are a function of the quantity of wastewater discharged by customers. Other costs are associated with serving customers regardless of the quantity that flows through the system. WEF and EPA methods classify wastewater system costs according to flow (annual average and wet weather), biochemical oxygen demand1 (BOD) loadings, total suspended solids2 (TSS) loadings and customer services. Costs are classified among these service characteristics so they may then be allocated to customer classes in proportion to system demands.

Ideally, each customer would be charged according to the actual cost of providing service to his or her connection. However, it is impractical to estimate the cost of serving each individual customer. Therefore, it is accepted practice in the utility industry to classify customers into relatively few, reasonably homogeneous groups, and then to develop rates for each group. In the final step of the cost allocation process, the characteristics of the utilities' customers are analyzed and costs are allocated to each class. For wastewater systems, user characteristics include sewage flows, strengths and the number of customer accounts.

The user characteristics serve as the basis for allocating costs by service characteristic to each customer class. For example, if residential customers represent half of the wastewater utility's average flow, they will be allocated half of the utility's average flow-related costs. However, if this class is responsible for none of the system's pretreatment program costs, their allocation of these program costs will be zero. The sum of each class's proportionate cost share of each service characteristic is that class's total cost-of-service.

When a wastewater engineer uses the term "high-strength" wastewater, it can mean it contains greater amounts of fats, oils, and greases (FOG) or other organic components than residential wastewater. It can also mean the effluent contains large quantities of suspended solids or high amounts of certain chemicals, such as disinfectants. Any or all of these components can interfere with the normal biological processes of a treatment plant. These characteristics vary from day to day, even hour to hour, and they can have a major impact on how a system performs. When it comes to treatment plant design,

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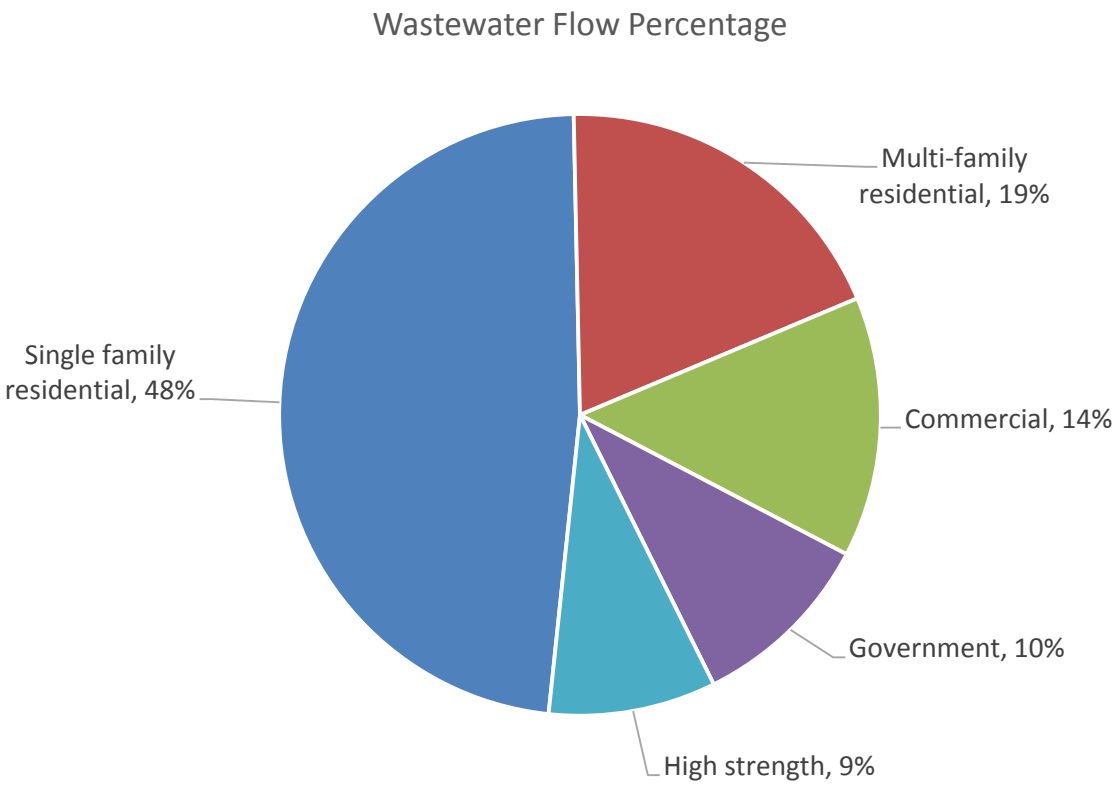
[1] BOD is the quantity of oxygen used in the biochemical oxidation of organic matter in a specified time and at a specified temperature.

[2] TSS are solids that float on the surface of, or are in suspension in wastewater or other liquids, and are largely removable by laboratory filtering.

traditionally the most important factors to consider are the five-day biochemical oxygen demand (BOD5) for a given flow, and the total suspended solids (TSS), which is a measure of the amount of waste particles suspended in the wastewater. BOD5 is a measure of the amount of oxygen that microorganisms need to consume and break down organic matter. In addition, when dealing with commercial establishments, designers must consider the FOG levels in the waste flow.
Typical sources of high strength wastewater are restaurants, laundries, bakeries, facilities with food services (e.g. assisted living facilities), medical facilities,

Figure 2 shows the estimated annual wastewater flow contributions by retail customer classes in Coos Bay. This data was collected in the 2009 wastewater COSA, and is net of wastewater flow contributions from Bunker Hill and Charleston Sanitary Districts.

Figure 2 – Estimated Annual Wastewater Flow Contributions by Retail Customer Classes in Coos Bay



The data in Figure 2 shows that 67% of all estimated wastewater flows to the City's treatment plants originates from the residential classes (i.e., single family and multi-family). This makes sense, because Coos Bay is essentially a residential community. This means that 67% of the net system revenue requirements assigned to flow is recovered from the residential customer classes.

Step 3: Determine Rate Structure and Develop Rates

The last step in the rate development process is the design of the rate structure and the development of rates. There are a variety of rate structure options available to meet a wide range of policy objectives. In the City's case, wastewater rates generally are comprised of a fixed charge per customer per billing period (monthly) and a volume charge that varies based on water usage or estimated sewage flow. Historically, the City Council's policy on wastewater rate development stresses rate equity, revenue stability and administrative efficiency.

Once a rate structure is selected, rates are calculated based on the costs-of-service by class determined in Step 2. The end result of this rate development process is an equitable distribution of system revenue requirements to system users.

Alternatives to the Current Wastewater Rate Structure

Although the City's current COSA-based wastewater rate structure is based on industry convention, and is the most common in Oregon, there are communities that use different methodologies. The most common of these alternative rate structures is the "flat rate" or "uniform rate" approach. As the name implies, this approach takes total system revenue requirements and divides it by the number of active customers to arrive at an average rate per customer.

At the onset of the 2009 COSA study, the City expressed interest in evaluating the merits of moving the system away from its current consumption based rate structure and toward a system of flat rates. It was argued that as the City embarks on a long term capital improvement program, it may make sense to have all customers share in the burden of funding this program on a dollars per account basis.

The results of that analysis were eye opening. Because a large number of single family residential customers have winter average water consumption below the class average, the relative differences between the consumption based bills and the flat rate bills is significant. Based on a statistical analysis of actual winter water consumption data, if the City chose to move to a schedule of flat rates in the fiscal 2009-10 test period, roughly 50% of the single family residential customer class would incur rate increases from a low of 19% to a high of 197%.

There are a variety of wastewater rate structures in use across the state and the nation. This issue paper seeks to establish the guiding principles to be considered during the wastewater rate setting. It is important to establish the principles in advance of undertaking the technical work of rate setting. Once the principles are established and fixed, then the rate setting process evolves from them. It must also be recognized that there needs to be a balance in how the principles are applied; e.g., a flat rate is simple, but it may not necessarily be fair and equitable if customers are not equally responsible for the cost of the system. The Review will seek to determine and evaluate alternatives by comparing the various types of rate structures against each principle to determine which structure most satisfies the principles. One must recognize that one or more principles may compete or be in direct contrast with another. Ultimately, the objective is to identify the structure that best meets as many of the principles as possible.

Any rate structure that is considered must respect current legislation and contractual commitments. The main objective is to ensure the wastewater system is sustainable over the long term, thereby ensuring the protection of the health of citizens and the environment. The concepts of user pay and full cost pricing are key elements of which the City needs to address in the future. The question of what each customer pays is, however, a complex issue with varying viewpoints and interests.

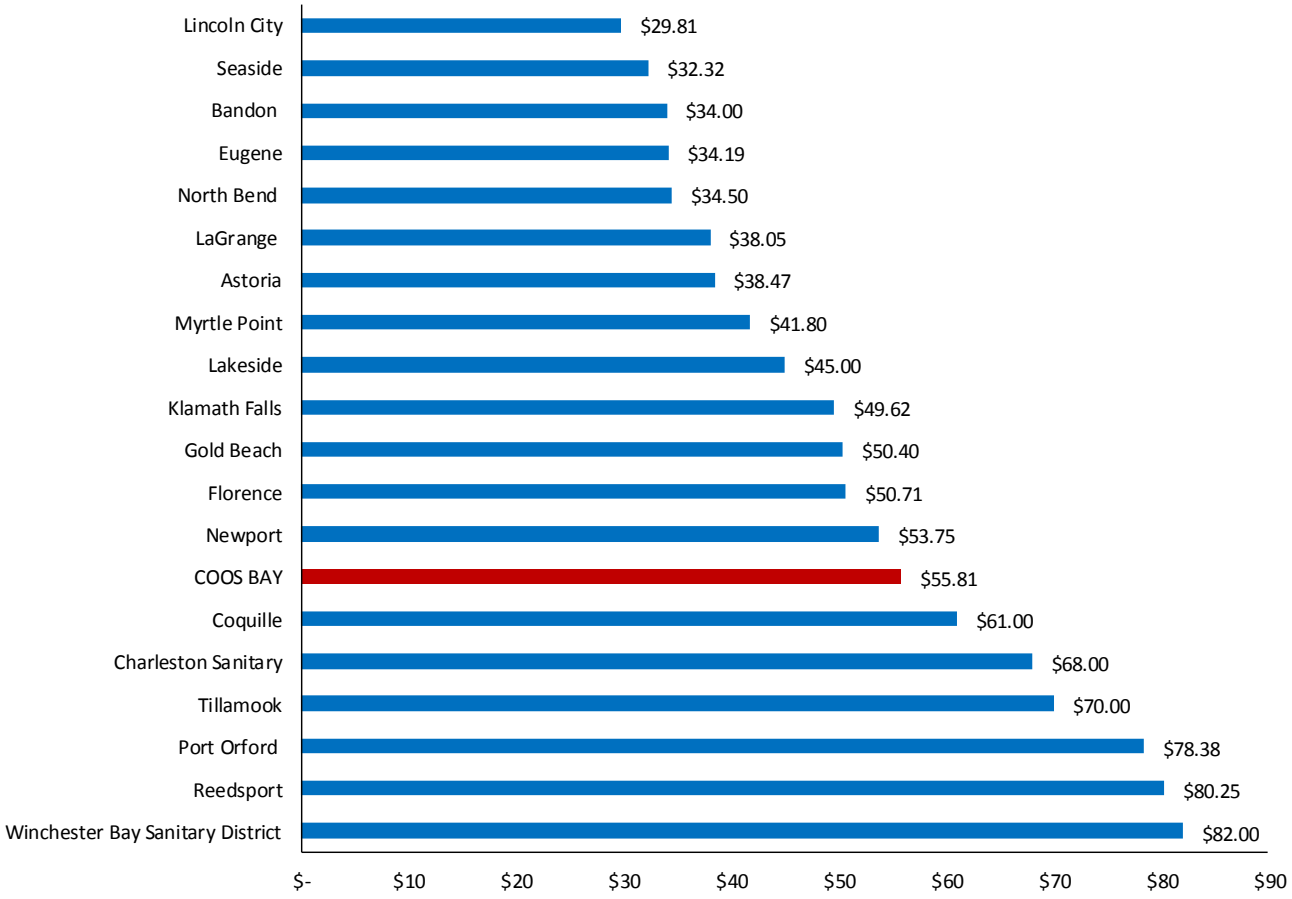
The following principles should be used to develop alternative rate structures for Council's consideration:

1. be fair and equitable
2. promote conservation
3. be affordable and financially sustainable
4. stabilize revenue
5. be justifiable
6. be simple to understand
7. support economic development;

Wastewater Rates in Neighboring Communities

Monthly wastewater bills for single family residential customers in neighboring communities are shown below in Figure 3. The monthly bills were calculated based on 560 cubic feet of monthly metered water consumption.

Figure 3 – Monthly Wastewater Bills in Neighboring Communities as of April, 2015



Although the monthly wastewater bills shown above in Figure 3 are based on an array of ratemaking methodologies, the take away for Coos Bay customers is that the wastewater rates in the City appear to be in line with neighboring peer communities.

Estimation versus Metering of Sewage Flows

As discussed above, in a perfect world where cost was not an issue, each sewer customer would have their sewage flows and strength of discharge metered and analyzed in real time. In this way, all estimating of flows and strengths would be eliminated. In the real world this is simply not feasible. It would be extremely costly to the City as well as to its customers to meter and sample sewage flows for

each customer in real time. Sewer meters are expensive to buy, expensive to maintain and not as accurate as water meters. Automated sampling devices are even more expensive than sewer meters, as is the cost of laboratory analysis of the sewage samples. In addition to these hardware costs, the City would have to hire a professional wastewater pretreatment program staff consisting of engineers and technicians.

Usually, metering and sampling of sewage is reserved only for large commercial or industrial users and then those accounts are reviewed on an individual basis to determine if it is cost-effective to do this special type of metering and monitoring. Currently, there are no sewer meters used in the City to monitor the sewage flows of customers.

The industry standard approach that the City uses is to classify customers into relatively few, reasonably homogeneous groups, and then to develop rates for each group based on the estimated characteristics for each group. Overall, the City's rate methodology is broadly based, industry accepted (i.e., WEF, Oregon DEQ, and United States EPA), and is one in which the costs to administer are kept to a minimum.