BOWEN COLLINS & ASSOCIATES

TECHNICAL MEMORANDUM

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FROM:	Keith J. Larson, P.E. and Tucker Jorgensen, P.E.
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SUBJECT:	Calculation of Non-Standard Sewer Impact Fees
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INTRODUCTION

An impact fee is a one-time fee, not a tax, imposed upon new development activity as a condition of development approval to mitigate the impact of the new development on public infrastructure. Impact fees are generally calculated based on the impact a typical residential unit has on the system. Thus, system demand is often expressed in terms of Equivalent Residential Units (ERUs) and impact fees are calculated in terms of cost per ERU.

While this makes calculation of impact fees for single-family residential units easy (i.e. 1 unit = 1 ERU), the calculation of ERU equivalency (and corresponding impact fees) for connections other than single family residential requires additional consideration. The purpose of this memorandum is to define a recommended process for calculating ERU equivalency for different types of connections.

ERU DEFINITION

The definition of an ERU is imbedded in the level of service identified in the Impact Fee Facilities Plan (IFFP). Based on historic water usage, the IFFP indicates that the typical single family residential unit in Central Weber Sewer Improvement District (CWSID or District) has an average indoor water usage rate of 220.4 gallons per day (gpd). This then becomes the basis of ERU equivalency for all other types of connections. If the average volume of water use can be accurately projected for a given connection, ERU equivalency can be calculated simply as follows[1][2][3]:

$$\#\ ERUs = \frac{Projected\ water\ use\ per\ connection\ in\ gpd}{220.4\ gpd/ERU}$$

[1] Please note that this conversion assumes that water use patterns and peaking factors are similar between different users. Significant deviations from typical water use patterns may merit additional consideration.

[2] The defined water usage assumes 10% consumption of indoor water usage and a 90% return flow. For customers where the consumption rate is known to be higher, the number of ERUs should account for an equivalent return flow.

[3] The ERU definition assumes that the bio-loading for the new customer is typical for residential units including an average BOD of not more than 245 mg/L and TSS of not more than 258 mg/L. Increases in wastewater strength values will require adjustments to the ERU calculation.

Unfortunately, detailed projections of water use data are not generally available for most potential customers. To facilitate administration of impact fees, there needs to be other options for calculating the number of ERUs associated with uses outside single-family residential.

CUSTOMER ERU CATEGORIES

Based on the District's current and expected customer types, BC&A would propose the following customer categories:

- Residential – Single-Family
- Residential – Multiple-Family
- Non-Residential
- Special Development

Residential – Single-Family

It is recommended that the "Residential – Single-Family" category be used for all single-family residential dwellings and townhomes or other dwelling types that are individually metered. In these situations, ERU equivalency will simply be 1 unit = 1 ERU in most cases. Meters larger than 3/4-inch should not be allowed in this category. When a larger residential meter is requested to accommodate greater than average demand, it is recommended that equivalency be calculated as defined in the "Special Development" section.

Residential – Multiple-Family

In general, multiple-family dwelling units will have indoor water use characteristics, and therefore sewer characteristics, very similar to those of single-family units. In the case of larger multiple-family units, water use is expected to be nearly identical to single-family. For smaller units, patterns will still be similar, but the total volume may be reduced as a result of smaller household sizes.

Because of the similarities to single-family residential water demands, it is recommended that ERU equivalency for multiple-family dwellings be calculated on a per unit basis. This most accurately parallels the impact on the system. However, in consideration of the potential range of multiple-family unit sizes that may be proposed, it is recommended that two size categories be used for equivalency calculation as summarized in Table 1.

Table 1
Residential – Multiple-Family ERU Equivalency

Unit Size	ERUs per Unit
Average	1.0
Small	0.65

In this table, a small unit is defined as any multiple-family dwelling unit that meets all of the following criteria:

- 1 or less bedrooms
- 1 bathrooms
- Less than 1,000 square feet

Units meeting this criteria would qualify for the reduced ERU equivalency. The ERU equivalency for small units is based on detailed studies conducted by BC&A in other locations along the Wasatch Front[4]. It will be noted that this category is also the appropriate category for calculating the ERU equivalency of detached Auxiliary Dwelling Units (ADUs).

Non-Residential

Non-residential water use patterns can vary widely depending on the type and nature of the non-residential customer. Correspondingly, it is recommended that non-residential impact fees be assessed based on total water demand for each non-residential customer. If detailed water demand data is available for a non-residential customer, this can be used directly to calculate ERU equivalency per the definition in the IFFP. However, if the projected water demand is unknown or if insufficient data exists to reliably establish expected water use to the satisfaction of the District's general manager, it is recommended that the impact fee be calculated based on the type of establishment proposed. Recommended estimates of water use for various types of development are summarized in Table 2. These values are based on information collected by the District and by other sewer districts along the Wasatch Front (including Mt. Olympus Improvement District, South Valley Sewer District, and Jordanelle Special Service District).

Table 2
Non-Residential – ERU Equivalency

Type of Establishment	Projected Usage (gpd) per Unit of Measurement	Unit of Measurement
Nursing Homes	350	Thousand Sq. ft.
Office Buildings with Cafeteria	200	Thousand Sq. ft.
Office Buildings w/o Cafeteria	90	Thousand Sq. ft.
Churches	50	Thousand Sq. ft.
Restaurants	590	Thousand Sq. ft.
Retail Stores	50	Thousand Sq. ft.
Convenience Stores	210	Thousand Sq. ft.
Retirement Homes	180	Thousand Sq. ft.
Day Care	5.5	Per Student
Schools	10	Per Student
Supermarkets	80	Thousand Sq. ft.
Swimming Pools	21.6	Per Swimmer
Theaters – Drive In	2.5	Per car space
Theaters – Walk In	1	Per seat
Gyms and Fitness Centers	204	Thousand Sq. ft.
Warehouse	25	Thousand Sq. ft.
Carwash (manual)	1,200	Per Wand
Carwash (automatic)	2,400	Per Auto
Drive-Thru Only Restaurants	2,000	Thousand Sq. ft.

To use Table 2 in calculating an Impact Fee, the proposed development needs to first calculate the appropriate measurement for the type of establishment proposed. This value is then multiplied by

[4] E.g. Technical Memorandum #3 - Resident Equivalent Study, Mt. Olympus Improvement District, Bowen Collins & Associates, November 15, 2012.

the middle column to get an estimate of the water demand for the facility. The number of ERUs can then be directly calculated according to the definition of an ERU in the IFFP.

Special Development

The categories above are intended to encompass most of the development types the District will regularly encounter. However, it is possible that certain types of development may be proposed that are not consistent with the categories outlined here. This could include industrial or other non-residential customers whose sewer patterns are significantly different than typical. It might also include residential development types outside those historically seen in the District (e.g. extremely large or extremely small dwelling units). In these cases, the Impact Fees Act provides an option for adjustment of the fee based on studies and data submitted by the developer. In these cases, ERU equivalency can always be calculated by returning to the base definition of an ERU as defined in the IFFP level of service.