

# Data Description

## CITATION

### Title Statement

Title: Puget Sound Stormwater Utility Fee and Stormwater Program Budget Dataset

### Production Statement

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Date of Production: 2020-2021

Place of Production: Puget Sound Institute, University of Washington Tacoma

### Distribution Statement

Distributor: [ResearchWorks](#) (University of Washington Libraries)

Date of Distribution: March 2022

### Version Statement

Version: 1

Version Responsibility: Puget Sound Institute

### Bibliographic Citation

Evrard, R., C.A. James, K. Bogue, and A. Kinney. 2022. Puget Sound Stormwater Utility Fee and Stormwater Program Budget Dataset 2019-2020 [Data files]. 1st version. Prepared by Puget Sound Institute, University of Washington Tacoma. Distributed by ResearchWorks, University of Washington Libraries.

## PROJECT DESCRIPTION

### Subject Information

Topic Classification(s): stormwater utility fee, stormwater funding, Puget Sound National Estuary Program

### Abstract

This data collection was compiled to support Puget Sound National Estuary Program planning efforts and provide a baseline for tracking of recovery progress. A key Puget Sound National Estuary Program recovery strategy is to increase funding for stormwater management by supporting the development and/or expansion of local (i.e., county and municipal government) revenue streams. However, when this strategy was developed there was a

notable lack of data about how local stormwater programs were funded; total funding levels; how many jurisdictions charged Stormwater Utility Fees (SUFs); and how often SUFs are increased. The Puget Sound Institute project team aimed to close these data gaps by compiling detailed information about SUF rate structure and fees charged, stormwater program revenue by source, and expenditures for operations/maintenance and capital expenses.

This data collection includes 13 files. Metadata for each file are provided in this data description. **“Spreadsheet\_1\_SUF\_data”** provides 2019 and 2020 rate structure and fee data for the 124 local jurisdictions in the Puget Sound watershed. **“Spreadsheet\_2\_Budget\_data”** provides 2019 data on stormwater program revenue by source and expenditures for capital versus operations and maintenance expenses. Budget reports were obtained for 80 jurisdictions, but only 14 included sufficient detail to classify expenditures. **Spreadsheets 3-13** contain raw parcel data for 11 jurisdictions downloaded from county assessor offices, parcel-level impervious area estimates, SUF calculations for all parcels in each jurisdiction (2019), and impervious area-normalized SUF calculations (\$ per ft<sup>2</sup> impervious area) for all parcels in each jurisdiction.

## Funding Source

This project has been funded in part by the United States Environmental Protection Agency under cooperative agreement PC-01J32201 to the Puget Sound Partnership. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

## Data Collection Summary

Time Period:	2019-2020
Date of Collection:	2020-2021
Country:	United States
Geographic Coverage:	12 counties in the Puget Sound, WA region
Geographic Unit:	city and unincorporated county (i.e., “local jurisdictions”)
Primary Unit of Analysis:	U.S. dollars
Kind of Data:	<ul style="list-style-type: none"><li>– Annual stormwater utility fees charged by 102 local jurisdictions (2019 and 2020)</li><li>– Stormwater program revenue by source for 80 jurisdictions (2019)</li><li>– Calculated per capita and per housing unit revenue for 80 jurisdictions (2019)</li><li>– Budgeted stormwater program expenditures for 14 jurisdictions (2019)</li><li>– Calculated SUFs applied to individual parcels in 11 jurisdictions (2019)</li><li>– Calculated area-normalized SUFs (dollar per ft<sup>2</sup> impervious area) for individual parcels in 11 jurisdictions (2019)</li></ul>

## METHODOLOGY AND DATA SOURCES

### Spreadsheet\_1\_SUF\_data

The project team began by following methods developed by Warren Campbell (Western Kentucky University), who leads an annual survey of U.S. stormwater utilities (e.g., Campbell 2018). Since many stormwater professionals do not respond to questionnaires (e.g., Black & Veatch 2018), Campbell relies on internet searches to collect data

about stormwater utility fees (SUFs). A similar approach was adopted here. Western Kentucky University's annual surveys provide data about fee type, size of Equivalent Residential Units (ERUs), monthly single-family residential fees, and year created for more than 1800 stormwater utilities nation-wide. Campbell recognizes that data obtained from the internet may contain errors, and identifies potential sources of error (e.g., community websites being unclear about frequency of posted fees). However, based on the prevalence of citations of the Campbell surveys in the academic literature, the benefits of such a large dataset appear to outweigh data quality concerns. Since the number of target jurisdictions in this survey was an order of magnitude lower than the number in the Campbell surveys, the project team compiled more detailed rate structure data including fees applied to multi-family residential and commercial/industrial parcels.

Black & Veatch Management Consulting, LLC. 2018. 2018 Stormwater Utility Survey.

<https://www.bv.com/sites/default/files/18%20Stormwater%20Utility%20Survey%20Report%20WEB.pdf>

Campbell, W. 2018. Western Kentucky University Stormwater Utility Survey 2018. SEAS Faculty Publications Paper.

<https://www.wku.edu/seas/undergradprogramdescription/stormwaterutilitysurvey.php>

## Spreadsheet\_2\_Budget\_data

Zhao et al. (2019) noted a lack of academic literature on the overall composition of revenues used to fund local stormwater management programs and the distribution of expenditures between capital and operating expenses. Filling this data gap was also relevant to Puget Sound recovery partners. Consequently, the project team conducted internet searches for jurisdiction budget reports containing information about stormwater enterprise funds.<sup>1</sup> We located 2019 quarterly, annual, or biennial budget reports as well as annual Financial Statements and Audit Reports prepared by the Office of the Washington State Auditor for several jurisdictions. Compared to SUF data, budget information was harder to find and formats were less consistent. Every Washington state jurisdiction undergoes audits, but not all post the resulting reports online. Data quality and consistency could be improved in future surveys by requesting these reports directly from the State Auditor's office.

We calculated per capita and per housing unit revenue (total and SUF) for each jurisdiction using census data from the Washington Office of Financial Management. Given the presence of outliers in the data sets evaluated, we prefer to use median values to represent central tendencies. However, we also calculated average values to enable direct comparisons to national data sets and/or historical estimates for the Puget Sound region (e.g., Visitacion et al. 2009).

Visitacion, B. J., D. B. Booth, and A. C. Steinemann. 2009. Costs and Benefits of Storm-Water Management: Case Study of the Puget Sound Region. *Journal of Urban Planning and Development*. 135:150-158.

WA Office of Financial Management. Postcensal estimate of population (2019) from April 1, 2020 data products.

[https://ofm.wa.gov/sites/default/files/public/dataresearch/pop/april1/hseries/ofm\\_april1\\_postcensal\\_estimates\\_pop\\_1960-present.xlsx](https://ofm.wa.gov/sites/default/files/public/dataresearch/pop/april1/hseries/ofm_april1_postcensal_estimates_pop_1960-present.xlsx)

WA Office of Financial Management. Postcensal housing estimates (2019) from April 1, 2020 data products.

[https://ofm.wa.gov/sites/default/files/public/dataresearch/pop/april1/hseries/ofm\\_april1\\_postcensal\\_estimates\\_housing\\_1980\\_1990-present.xlsx](https://ofm.wa.gov/sites/default/files/public/dataresearch/pop/april1/hseries/ofm_april1_postcensal_estimates_housing_1980_1990-present.xlsx)

Zhao, J.Z., C. Fonseca, and R. Zeerak. 2019. Stormwater Utility Fees and Credits: A Funding Strategy for Sustainability. *Sustainability*. 11: 1913. DOI: 10.3390/su11071913

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<sup>1</sup> An **enterprise fund** is a government account where revenue from user fees related to the fund's mission is placed. This money can only be spent on that mission. **General funds** receive tax revenue from multiple sources that can be spent on a variety of public services.

## Spreadsheets 3 – 13

Zhao et al. (2019) noted a lack of academic literature on equitable types of SUF and proposed questions to assess two outcomes: proportionality and affordability. Proportionality in SUF rate setting is achieved when costs borne by a customer or customer group are commensurate to the impact their parcel places on the stormwater system (Campbell 2010, Chalfant 2018, Zhao et al. 2019). Impervious area is the most frequently used proxy for impact since runoff volume is strongly related to the extent of impervious surface. The most equitable rate structure would charge customers a consistent amount per square foot of impervious surface. However, consistency cannot be determined by comparing SUFs across the wide range of parcel sizes and impervious coverage. Following the general approach taken by Fedorchak et al. (2017), we calculated impervious-area-normalized fees for all parcels in 11 jurisdictions to allow assessment of proportionality across customer groups and jurisdictions.

Parcel-level SUFs were calculated using rate information from the SUF database; land use designation and area data from online parcel viewers (King County 2021, Snohomish County 2021); and percent imperviousness from the National Land Cover Database (NLCD) 2016 Urban Imperviousness dataset. Parcel impervious area was obtained by aggregating NLCD data to each parcel by computing zonal statistics to arrive at the mean impervious surface percent for each parcel, then multiplying parcel size by impervious surface percent. This method of estimating parcel impervious area introduced a potential source of error because NLCD resolution (30 m) is larger than many of the parcels in the dataset. However, calculated fees were verified by spot-checking against actual assessed fee data provided in the online parcel viewers and comparing sums of calculated fees to Total SUF Revenue for these jurisdictions from “Spreadsheet\_2\_Budget\_data.” This potential error did not appear to have a significant impact on the results, though calculated fees differed markedly from actual charges where senior or low-income discounts were applied by the jurisdiction. Normalized SUFs were calculated by dividing parcel fee by parcel impervious area (\$ per ft<sup>2</sup> impervious area).

Campbell, W. 2010. Western Kentucky University Stormwater Utility Survey 2010. Civil Engineering Publications Paper 1. [https://digitalcommons.wku.edu/civil\\_engin\\_pubs/1/](https://digitalcommons.wku.edu/civil_engin_pubs/1/)

Chalfant, B.A. 2018b. Paying for Rain: The Emergence, Diffusion, and Form of Stormwater Fees in the United States, 1964-2017. PhD dissertation. University of Pittsburgh. <http://d-scholarship.pitt.edu/35183/>

Fedorchak, A., R. Dymond, and W. Campbell. 2017. The Financial Impact of Different Stormwater Fee Types: A Case Study of Two Municipalities in Virginia. *Journal of the American Water Resources Association*. 53(6): 1483-1494. DOI: 10.1111/1752-1688.12590

King County. *Parcels for King County with Address with Property Information / parcel address area*. 2021. Available via King County GIS Open Data: <https://gis-kingcounty.opendata.arcgis.com/datasets/parcels-for-king-county-with-address-with-property-information-parcel-address-area>.

Multi-Resolution Land Characteristics Consortium. *NLCD 2016 Percent Developed Imperviousness (CONUS)*. 2019. Available via Multi-Resolution Land Characteristics Consortium: <https://www.mrlc.gov/data?f%5B0%5D=category%3AUrban%20Imperviousness&f%5B1%5D=year%3A2016>.

Snohomish County. *allparcels* [data file]. 2021. Available via Snohomish County Assessor's Office: <ftp://ftp.snoco.org/Assessor/shapefiles/>.

Washington State Department of Ecology. *Municipal Stormwater Permit Areas*. 2019. Available via Washington Geospatial Open Data Portal: <https://geo.wa.gov/datasets/waecy::municipal-stormwater-permit-areas>.

Washington State Department of Natural Resources. *WA County Boundaries*. 2021. Available via Washington Geospatial Open Data Portal: <https://geo.wa.gov/datasets/wadnr::wa-county-boundaries-1>.

Washington State Labor and Industries. *L&I - City Limits (Statewide)*. 2018. Available via Washington Geospatial Open Data Portal: <https://geo.wa.gov/datasets/LNI::li-city-limits-statewide>.

Zhao, J.Z., C. Fonseca, and R. Zeerak. 2019. Stormwater Utility Fees and Credits: A Funding Strategy for Sustainability. *Sustainability*. 11: 1913. DOI: 10.3390/su11071913

## DATA ACCESS

### Dataset Availability

Location: Seattle, WA: [ResearchWorks](#) (University of Washington Libraries)

Number of files: 13 Microsoft Excel files  
1 data description (this document)

### Data Use Statement

Citation Requirement: Publications based on this data should include acknowledgement by means of bibliographic citations in the footnotes or a reference section. The bibliographic citation for this data collection is: Evrard, R., C.A. James, K. Bogue, and A. Kinney. 2022. Puget Sound Stormwater Utility Fee and Stormwater Program Budget Dataset 2019-2020 [Data files]. 1st version. Prepared by Puget Sound Institute, University of Washington Tacoma. Distributed by ResearchWorks, University of Washington Libraries.

Disclaimer: The original collector of this data, ResearchWorks, and the relevant funding agencies bear no responsibility for uses of this collection or for interpretation or inferences based on such uses.

## RELATED PUBLICATION(S)

Kinney, A., C.A. James, R. Evrard, and K. Bogue. 2021. Use of Stormwater Utility Fees in Puget Sound: Summary of Implications for Implementation Strategies. Critical Analysis Memo prepared by Puget Sound Institute for the Stormwater Strategic Initiative and Puget Sound Partnership.

Kinney, A., R. Evrard, K. Bogue, and C.A. James. *manuscript in prep*. Filling the Gap: A Comparative Analysis of Stormwater Utility Fees and Stormwater Program Budgets in the Puget Sound Watershed.

## File-by-File Descriptions

### FILE DESCRIPTION

File Name: Spreadsheet\_1\_SUF\_data.xlsx

### File Structure

Type of File: Excel spreadsheet

Type of Data: Raw

Sheets: Sheet 1 - 2019 Rate Structure and Fee Data  
Sheet 2 - 2020 Rate Structure and Fee Data

File Dimensions: Sheet 1 - 24 columns x 282 rows of data  
Sheet 2 - 23 columns x 271 rows of data

### Variables

Column	Name	Unit	Description
A	City	Name	<p>Rows 3-255 contain the names of incorporated cities located within the Puget Sound watershed. In many cases names repeat because those cities have SUF rate structures requiring multiple rows to capture relevant detail.</p> <p>Rows 256-280 are blank because this section provides data for unincorporated areas of the 12 counties in the Puget Sound watershed.</p> <p>Rows 281-284 contain names of four islands within San Juan County that are subject to different SUFs.</p>
B	County	Name	<p>Rows 3 - 255 contain the name of the county or counties within which the city in Column A is located.</p> <p>Rows 256 - 284 contain the names of all 12 counties in the Puget Sound watershed. In some cases names repeat because those counties have SUF rate structures requiring multiple rows to capture relevant detail.</p>
C	Phase 1	<p>X = yes</p> <p>Blank = no</p>	<p><b>Yes</b> indicates jurisdiction status as a National Pollutant Discharge Elimination System (NPDES) Municipal Stormwater General Permit Phase I permittee.</p> <p><b>No</b> indicates jurisdiction status as a NPDES Municipal Stormwater General Permit Phase II permittee or as a</p>

			jurisdiction without permit coverage.
D	Phase 2	X = yes  Blank = no	<b>Yes</b> indicates jurisdiction status as a NPDES Municipal Stormwater General Permit Phase II permittee.  <b>No</b> indicates jurisdiction status as a NPDES Municipal Stormwater General Permit Phase I permittee or as a jurisdiction without permit coverage.
E	SUF	X = yes  Blank = no	<b>Yes</b> indicates the local jurisdiction does charge a Stormwater Utility Fee (SUF).  <b>No</b> indicates the local jurisdiction does not charge a SUF.
F	ERU (ft2)	Area in square feet	Size of an <b>Equivalent Residential Unit (ERU)</b> , which is a metric calculated by individual jurisdictions to represent the average amount of impervious surface on developed single family parcels.
G	Structure	Flat, Tier, ERU, or Other	The type of Rate Structure applied to <b>Single-Family Residential</b> parcels.  <b>Flat:</b> Every parcel is charged the same fee.  <b>Tier:</b> Parcels are placed into categories based on a variable such as parcel size or development intensity and SUF charges vary by category, generally increasing with increasing impervious surface area.  <b>ERU:</b> SUF charges are based on measured impervious surface expressed as the number of ERUs (see description for Column F). Single-Family Residential parcels are charged for 1 ERU.  <b>Other:</b> Non-standard rate structure (e.g., metered water consumption, type of impervious surface).
H	Notes	Varies	Miscellaneous notes about rate structure coverage details for duplex, condo, or mobile home parcels and explanation of "Other" rate structures.
I	Tier unit	Description	Description of the unit of measure that is used to determine appropriate tier category, in jurisdictions with tiered rate structures (e.g., dollar per parcel, dollar per square foot impervious surface).
J	Tier basis	Description	Description of how criteria and thresholds for categorizing parcels in tiered billing systems (e.g., range of parcel size, range of square foot impervious surface, development intensity)

K	Rate	U.S. dollars	The monthly rate charged per parcel, per tier unit, or per ERU.
L	Structure	Flat, Tier, ERU, or Other	The type of Rate Structure applied to <b>Multi-Family Residential</b> parcels.  See description for Column G
M	Notes	Varies	See description for Column H.
N	Tier level	Number	Labels developed to order tiers.
O	Tier unit	Description	See description for Column I.
P	Tier basis	Description	See description for Column J.
Q	Rate	U.S. dollars	See description for Column K.
R	Structure	Flat, Tier, ERU, or Other	The type of Rate Structure applied to <b>Commercial and Industrial</b> parcels.  See description for Column H.
S	Notes	Varies	See description for Column H.
T	Tier level	Number	See description for Column N.
U	Tier unit	Description	See description for Column I.
V	Tier basis	Description	See description for Column J.
W	Rate	U.S. dollars	See description for Column K.
X	Sources	URL	Link to jurisdiction webpage(s) where rate structure and fee data was initially obtained. Note that these links may not be permanent Also rates may be updated annually, and rate structures are occasionally changed. The data provided reflects information available during the project period (2020-2021).



## FILE DESCRIPTION

File Name: Spreadsheet\_2\_Budget\_data.xlsx

## File Structure

Type of File: Excel spreadsheet

Type of Data: Raw and processed

Sheets: Sheet 1 - 2019 Revenue  
Sheet 2 - 2019 Expenditures

File Dimensions: Sheet 1 - 13 columns x 80 rows of data  
Sheet 2 - 8 columns x 14 rows of data

## Variables

### Sheet 1 - 2019 Revenue

Column	Name	Unit	Description
A	Permit status	I, II, or blank	Jurisdiction status as a Phase I or Phase II NPDES Municipal General Stormwater Permittee. When blank, the jurisdiction is not regulated under either permit.
B	Jurisdiction	Name	Name of a city or an unincorporated county area for which 2019 budget data was discoverable.
C	SUF revenue	U.S. dollars	Revenue received from SUF charges in 2019.
D	Other funds	U.S. dollars	Revenue received from other sources in 2019 (e.g., grants, intergovernmental transfers, connection fees, interest on capital reserve accounts, and late fees).
E	Total operational revenue	U.S. dollars	Revenue received from SUF charges plus other sources in 2019. For some jurisdictions, values are the reported total from budget reports. For others, values are a sum of Column C and Column D. Where only biennial budget reports were available, values are the reported total divided by 2.
F	Start-of-year fund balance	U.S. dollars	Unexpended operational revenue from previous years (i.e., excluding capital reserve accounts).
G	Total revenue with carry-over	U.S. dollars	Calculated value. Total operational revenue plus Start-of-year fund balance. Formula = Column E + Column F
H	Total housing units	Number	Postcensal estimate of total housing units (2019) from WA Office of Financial Management's April 1, 2020 data products (link provided in "Methodology and Data Sources" section)

I	Revenue per housing unit	U.S. dollars	Calculated value. Total operational revenue divided by Total housing units. Formula = Column E / Column H
J	Population	Number	Postcensal estimate of population (2019) from WA Office of Financial Management's April 1, 2020 data products
K	Total revenue per capita	U.S. dollars	Calculated value. Total operational revenue divided by Population. Formula = Column E / Column J
L	SUF revenue per capita	U.S. dollars	Calculated value. SUF revenue divided by Population. Formula = Column C / Column J
M	Percent of total revenue generated by SUFs	Percentage	Calculated value. Percentage of Total operational revenue derived from SUFs. Formula = Column C / Column E

**Sheet 2 - 2019 Expenditures**

Column	Name	Unit	Description
A	Jurisdiction	Name	Name of a city or an unincorporated county area for which 2019 budget data was detailed enough to classify expenditures.
B	O&M	U.S. dollars	Amount spent on stormwater program operations and maintenance (O&M) in 2019.
C	Capital	U.S. dollars	Amount spent for stormwater program capital investments in 2019.
D	Interfund	U.S. dollars	Transfers of cash from one fund to another (e.g., Stormwater Fund to General Fund) that do not require repayment.
E	Other	U.S. dollars	Transfers out of the Stormwater Fund (e.g., debt repayment).
F	Total	U.S. dollars	Total stormwater expenditures in 2019. In some cases, values are directly from the budget report and in others calculated. Formula = SUM (Column B : Column E)
G	FTE	Number	Number of full time equivalent (FTE) staff supported by the stormwater program budget.
H	Notes	Varies	Miscellaneous notes about instances where data was pulled from biennial budgets or where combined sewer overflow/wastewater expenditures were included.

## FILE DESCRIPTION

Name of Files: Spreadsheet\_3\_Bellevue.xlsx  
Spreadsheet\_4\_DesMoines.xlsx  
Spreadsheet\_5\_FederalWay.xlsx  
Spreadsheet\_6\_KingUnincorporated.xlsx  
Spreadsheet\_7\_MercerIsland.xlsx  
Spreadsheet\_8\_Renton.xlsx  
Spreadsheet\_9\_Sammamish.xlsx  
Spreadsheet\_10\_Seattle.xlsx  
Spreadsheet\_11\_SnohomishCity.xlsx  
Spreadsheet\_12\_Tukwila.xlsx  
Spreadsheet\_13\_Woodinville.xlsx

## File Structure

Type of File: Excel spreadsheet

Type of Data: Raw and processed

Tabs: Sheet 1 - Summary  
Sheet 2 - Fee Calculations  
Sheet 3 - [jurisdiction]\_parcels\_LULC\_RAW  
Sheet 4 - LU Conversion  
Sheet 5 - SUF Table

File Dimensions: Sheet 1 - 11 columns x 6 rows  
Sheet 2 - 12 columns x up to 180,003 rows (varies by number of parcels)  
Sheet 3 - 20 columns x up to 180,003 rows (varies by number of parcels)  
Sheet 4 - 8 columns x up to 116 rows (varies by number of land use designations)  
Sheet 5 - varies by complexity of SUF rate structure

## Variables

### Sheet 1 – Summary

This sheet contains a pivot table that analyzes results of Sheet 2 - Fee Calculations. Summary statistics needed for our proportionality analysis are provided (e.g., average and median parcel SUF by customer group, average and median normalized SUF by customer group).

### Sheet 2 – Fee Calculations

This sheet combines relevant data from Sheet 3 - LULC RAW, Sheet 4 - LU Conversion, and Sheet 5 - SUF Table to calculate parcel impervious area, parcel impervious percent, number of ERUs, SUF, and normalized SUF. Not all files have the exact same columns because, depending on that jurisdiction's rate structure, some parcel characteristics were not necessary for calculating SUFs. For example, the number of ERUs is not relevant where SUF charges are based on percent impervious surface.

Column	Name	Unit	Description
A	PIN_1 (or SITEID or PARCEL_ID)	Number	Jurisdiction-assigned Parcel Identification Number from Sheet 3 - LULC RAW
B	ADDR_FULL	Address	Property address from Sheet 3 - LULC RAW
C	LOTSQFT (and/or ACRE)	Area	Lot size in either square feet or acres (unit varies by jurisdiction) from Sheet 3 - LULC RAW
D	PREUSE_DESC	Land Use	Jurisdiction-assigned land use category/zoning from Sheet 3 - LULC RAW
E	Sq_ft	Area	Calculated in GIS to ensure area values had a map projection consistent with the NLCD impervious dataset.
F	ImperviousSurface_pct	Percentage	Computed in GIS by using NLCD Impervious Surface data to calculate zonal statistics mean value for each study area parcel.
G	Impervious area (ft2)	Area	Calculated in GIS by multiplying parcel size by impervious surface percent. Formula = Column E * Column F
H	SUF designation (lookup)	Multi, Com/Ind, NA, Single	<p>SUF customer group into which parcel has been placed from Sheet 4 – LU Conversion</p> <p><b>Multi:</b> Multi-family residential customer group including categories such as Apartment, 4-Plex, Condominium (Residential).</p> <p><b>Com/Ind:</b> Commercial and industrial customer group including categories such as Parking, Warehouse, Shopping Center, Light Industrial.</p> <p><b>Single:</b> Single-family residential customer group including categories such as Single-family (Residential Use), Mobile Home, Townhouse Plat.</p> <p><b>NA:</b> No SUFs assessed based on categories such as Easement, Reserve/Wilderness Area, Open Space Timber Land/Greenbelt.</p> <p><b>Blank:</b> No land use designation per assessor data.</p>
I	Rate	U.S. Dollars	From Sheet 5 – SUF Table
J	ERU Area (ft2)	Area	Size of Equivalent Residential Unit from Sheet 5 – SUF Table

K	Number of ERUs	Number	Calculated by dividing parcel area by ERU area. Formula = Column E / Column J
L	Parcel SUF Annual	U.S. Dollars	For ERU rate structures: Calculated by multiplying the SUF rate by Number of ERUs. Formula = Column I * Column K  For Tier rate structures: Calculated by dividing data from Column E, F, or G (depending on the jurisdiction's tier basis) and the tier categories from Sheet 5 – SUF Table then multiplying by the rate for the corresponding tier category.
M	Normalized Parcel SUF (Annual - \$ per ft <sup>2</sup> impervious)	U.S. Dollars	Area-normalized SUF (dollar per square foot impervious surface). Calculated by dividing the Parcel SUF by parcel impervious surface area Formula = Column L / Column G

### Sheet 3 – [jurisdiction]\_parcels\_LULC\_RAW

This sheet provides the raw Land Use and Land Cover (LULC) downloaded from King County GIS Open Data (King County 2021) and Snohomish County Assessor's Office (Snohomish County 2021). This sheet is missing in the "Spreadsheet\_10\_Seattle.xlsx" due to file size limitations. Seattle has far more parcels than the other jurisdictions.

### Sheet 4 – LU Conversion

This sheet assigns SUF customer groups (n=4) to each of the jurisdiction's land use designations (n=44 to 116). Assignments were made by referencing jurisdiction zoning overlays as well as [Master Land Use Category Descriptions](#) from the Washington Department of Commerce's [Puget Sound Mapping Project](#).

Column	Name	Unit	Description
A	OBJECTID	Number	Row identification number.
B	PREUSE_DESC	Name	Land use designations from County data.
C	FREQUENCY	Number	Calculated value. Number of parcels with this land use designation.
D	SUF CUSTOMER GROUP	Multi, Com/Ind, NA, Single	SUF customer group assigned to this land use designation.  <b>Multi:</b> Multi-family residential customer group including categories such as Apartment, 4-Plex, Condominium (Residential).  <b>Com/Ind:</b> Commercial and industrial customer group including categories such as Parking, Warehouse, Shopping Center, Light Industrial.  <b>Single:</b> Single-family residential customer group

			<p>including categories such as Single-family (Residential Use), Mobile Home, Townhouse Plat.</p> <p><b>NA:</b> No SUFs assessed based on categories such as, Easement, Reserve/Wilderness Area, Open Space Timber Land/Greenbelt.</p> <p><b>Blank:</b> No land use designation per assessor data.</p>
E	MEAN_sq_ft	Area	Calculated value. Mean area of all parcels with this land use designation.
F	MEDIAN_sq_ft	Area	Calculated value. Median area of all parcels with this land use designation.
G	MEAN_Impervious Surface_pct	Percentage	Calculated value. Mean impervious surface area as a percent of parcel area for all parcels with this land use designation.
H	MEDIAN_ImperviousSurface_pct	Percentage	Calculated value. Median impervious surface area as a percent of parcel area for all parcels with this land use designation.

**Sheet 5 – SUF Table**

This sheet provides a summary of the jurisdiction’s SUF data (from the 2019 tab of “Spreadsheet\_1 \_SUF\_data”). This data is used in Sheet 2 - Fee Calculations via formula to calculate the SUF for each parcel.