SEH

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MEMORANDUM

TO: Jim Benning, Director of Public Works and Utilities

FROM: Jeremy Walgrave, PE

DATE: August 4, 2022

RE: ERU Study 2021

The City of Duluth established a storm water utility (SWU) in 1997. The 1997 Storm Water Utility Development Plan (1997 Study) was developed by Camp Dresser & McKee (CDM). The City's SWU fee is based on the equivalent residential unit (ERU) method. The ERU method uses an average impervious area for residential properties to establish a fee for residential properties. The ERU is then used to determine fees for non-residential properties based on the actual amount of impervious surface for those properties. The ERU was determined in the 1997 Study by measuring a random sample of residential properties. Property type information was obtained from the City Assessor's Office.

Table 1 shows number of residential properties, the average impervious area by residential property type, measurement inclusions, and the resulting weighted average of impervious to be used as a basis for the ERU.

Table 1: Residential Impervious Evaluation – 1997 Study (CDM)

Property Type	% of Total Residential	Number of Dwelling Units	Average Impervious Surface (SF)	Basis of Measurement
Single Family	61%	22,550	2,145	
Multifamily	36%	13,166	909	Two or more residential units on a single parcel under single ownership. Includes impervious amenities such as pools, parking, tennis courts, and other recreational improvements.
Condo	1%	290	2,530	Individually owned parcels. Includes impervious amenities such as pools, parking, tennis courts, and other recreational improvements.
Mobile Home Parks	2%	807	2,255	Mobile home park, including all units. Includes impervious area of recreation facilities, laundries, pools, and private streets.
Total	100%	36,813		
Weighted Ave.			1,708	

The 1997 Study determined an average impervious surface of 1,708 square feet for residential properties, which is a weighted average based on the number of properties in each residential property type.

The 1997 Study does not identify or discuss townhomes.

2021/2022 Approach

In 2021, the City began to reevaluate the average impervious area for residential properties and the ERU basis. The 2021 approach to determining the residential property average impervious area followed the same approach and methodology as the 1997 Study.

The 1997 Study obtained property records from the City of Duluth Assessor's Office. Since 1997, the City Assessor's Office was eliminated and the responsibilities were delegated to St. Louis County. The 2021 study obtained property records from St. Louis County and the City of Duluth Rental License Database. The St. Louis County database contains Class Codes and Style Codes, which were used to identify the different residential property types. In addition, State Class Codes were reviewed to understand how they align to with the St. Louis County Class Codes. The St. Louis County Class Codes do not have a code specific to Condos or Townhomes. The Style Code from the St. Louis County parcel database was used to identify Condos and Townhomes. **Table 2** below shows the County and State Class Codes.

Table 2: County and State Class Codes

CLASS	DESCRIPTION	TEXT ON STMT	STATE CLASS	STATE CLASS CODE DESCRIPTION
200	Residential 2-3 units	RES HMSTD	4b(1)	Residential real estate containing less than four units that does not qualify as class 4bb
201	Residential 1 unit	RES HMSTD	1a	Real estate which is residential and is used for a homestead purposes is class 1a.
202	Residential 1 unit Fractional Tier Adjust	RES HMSTD	1a	Real estate which is residential and is used for a homestead purposes is class 1a.
203	Residential 1-3 units Previously SRR (homestead)	RES HMSTD	1a	In the case of a duplex or triplex where one of the units is used for homestead purposes, the entire property is deemed to be used for homestead purposes and should be classified as class 1a.
203	Residential 1-3 units Previously SRR (non-hmst)	RES NON-HSTD	4b(1)	Residential real estate containing less than four units that does not qualify as class 4bb
204	Non-Homestead Qualifying Single Res Unit	NH SGL RES	4bb(1)	Non-homestead residential real estate containing one unit, other than seasonal residential recreational property
205	Apartment (4 or more units)	APARTMENT	4a	Residential real estate containing four or more units
206	Residential Hstd 1 Unit in Apartment	RES HMSTD	1a	In the case of a duplex or triplex where one of the units is used for homestead purposes, the entire property is deemed to be used for homestead purposes and should be classified as class 1a.

207	Residential Non-hstd 1-3 Units not 4bb	RES NH 4B	4b(1)	Residential real estate containing less than four units that does not qualify as class 4bb
208	Manufactured home park coop > 50%	MH COOP-O	4c(5)(ii)	Manufactured home park cooperatives
209	Manufactured home park coop <= 50%	MH COOP-U	4c(5)(ii)	Manufactured home park cooperatives
210	Manufactured Home Park	MH PARK	4c(5)(i)	Manufactured home parks
215	Manufactured Home Park - Class 1	MH PARK-CLS 1	4c(5)(iii)	Class I Manufactured Home Park was effective starting in assessment year 2018 for parks in which an owner or on-site attendant completes 12 hours of qualifying education courses every three years
321	Qual Low Income Rental Housing - 1 unit	LI RENTAL	4d	Low-income rental housing
322	Qual Low Income Rental Housing - 2 units	LI RENTAL	4d	Low-income rental housing
323	Qual Low Income Rental Housing - 3 units	LI RENTAL	4d	Low-income rental housing
324	Qual Low Income Rental Housing - 4+ units	LI RENTAL	4d	Low-income rental housing
325	Qual Low Income Rental Housing - Tiered	LI RENTAL	4d	Low-income rental housing

For the 2021 Study, residential properties were randomly selected for measurement of impervious surfaces. Single-family residential properties were broken down by neighborhood. Single-family residential properties were randomly selected from each neighborhood, and the number of properties selected in each neighborhood was proportional to the overall percentage of single-family residential properties in that neighborhood compared to the entire City. The amount of impervious surface for each selected property was measured by City of Duluth staff.

It was not feasible to measure the impervious surfaces of all the single-family residential properties. To establish that impervious surface area calculated from the randomly selected group is representative of all City of Duluth single family residential parcels an independent sample T-Test for quality of means was calculated utilizing the statistical software GNU PSPP version 1.6.2. Total surface area of each parcel was used to compare the sampled parcels and the entire single family residential dataset. The Null hypothesis is that there is no statistically significant difference between the two groups. The mean sampled parcels lot size ($M=15506.92$ ft^2, $SD = 38419.65$ ft^2) and City of Duluth Single Family parcel lot size ($M = 15860.35$ ft^2, $SD = 49357.01$ ft^2) were found to not be significantly different ($p = 0.896$).

There are three mobile home parks within the City of Duluth. The impervious surfaces were measured by City of Duluth staff for all of the mobile home parks. Since there is a small number of mobile homes (865) it was feasible to measure all of the mobile homes impervious surface. The impervious surfaces measured include amenities such as private roads, parking areas, laundry facilities, pools, and other shared amenities.

Multi-family residential includes all properties with 2 or more living units. Multi-family properties were selected from the City's Rental License database, and the impervious surfaces were measured by City of Duluth staff. The impervious surface total for multi-family residential properties includes amenities such as private roads, parking areas, laundry facilities, pools, and other shared amenities.

Condos and Townhomes were randomly selected from the St. Louis County parcel database, and the total impervious surface was measured by City staff. The impervious surface total for condos and townhomes includes amenities such as private roads, parking areas, laundry facilities, pools, and other shared amenities.

Table 3 below shows the sample sizes for each residential property type.

Table 3: Measurement Sample Size

Property Type	Dwelling Units Measured	Number of Dwelling Units	% of Dwelling Units Measured
Single Family	334	23,828	1.4%
Multifamily	4,163	15,991	26.0%
Condo	1,142	1,333	85.7%
Townhome	188	284	66.2%
Mobile Home Parks	865	865	100.0%

The impervious surface measurements for each residential property type were provided to SEH for further analysis.

Single family residential – an average impervious surface was calculated from the sample set that was measured.

Multi-family residential – an average impervious surface was calculated from the sample set that was measured. Multi-family residential was further broken up in to sub-categories by the number of units within a property; 2-3 units, 4-9 units, 10-50 units, and greater than 50 units. A weighted average of impervious surface was developed based on the number of units within each sub-category.

Condo residential - an average impervious surface was calculated for condos based on the measured parcels provided by the City.

Townhome residential – an average impervious surface was calculated for townhomes based on the measured parcels provided by the City.

Mobile Home Parks – an average impervious surface was calculated for mobile homes based on the sample set that was measured.

Table 4 shows the results of the 2021 residential property measurements.

Table 4: 2021 Residential Impervious

Property Type	% of Total Residential	Number of Dwelling Units	Average Impervious Surface (SF)	Notes
Single Family	56%	23,828	3,098	
Multifamily	38%	15,991	920	Two or more residential units on a single parcel under single ownership. Includes impervious amenities such as pools, parking, tennis courts, and other recreational improvements.
Condo	3%	1,333	993	Individually owned parcels. Includes impervious amenities such as pools, parking, tennis courts, and other recreational improvements.
Townhome	1%	284	3,239	Individually owned parcels. Includes impervious amenities such as pools, parking, tennis courts, and other recreational improvements.
Mobile Home Parks	2%	865	4,000	Mobile home park, including all units. Includes impervious area of recreation facilities, laundries, pools, and private streets.
Total	**100%**	**42,301**		
Weighted Ave.			**2,228**	

Discussion

Mobile Home Parks – There were three mobile homes parks in 1997. The same three mobile home parks existed in 2021, but with an increase in the number of mobile homes from 807 to 865. The 1997 Study – Section 4.3.4 explains that the measurement of impervious surface for mobile home parks includes, "impervious area of common areas often found within mobile home developments such as recreation facilities, laundries, pools, and private streets." The 1997 Study indicated the average impervious for a mobile home to be 2,255 square feet, whereas the 2021 Study indicated 4,000 square feet, which resulted in an increase of 77% in average impervious surface. Upon further review of aerial photos between 1997 and 2021, it did not appear that the number of mobile homes added would have contributed enough to increase the average impervious surface by 77%. It is speculated that something was incorrectly measured or calculated in the 1997 Study when determining the average impervious surface for mobile homes.

Condo/Townhome – The 1997 Study did not identify or discuss townhomes. It is unknown if townhomes were included in a different category. The St. Louis County Class Codes do not have a category for Condo or Townhome. The St. Louis County parcel database does contain a "Style Code" which indicates

Condo or Townhome. The 2021 Study splits out Condo and Townhome into separate categories to better illustrate the impervious make-up of these two property types.

Limitations

The databases are not perfect data sets. In reviewing the databases from St. Louis County and the City of Duluth, three primary issues were identified, which include:

- Duplicate parcel records
- Incorrect property classification

A GIS analysis was completed on the parcel database, which yielded the removal of duplicate parcel records.
Property classifications were checked during the development of the list of properties to measure. Properties that had the wrong classification were removed from the list of properties to measure.

References

2021 Minnesota State Statute 444.075 WATERWORKS SYSTEMS; STORM, SANITARY SEWER SYSTEMS.
Sec. 444.075 MN Statutes

Minnesota Property Tax Administrator's Manual – Module 3 Classification. Minnesota Department of Revenue. February 2022. St. Paul, MN

Navigating Litigation Floodwaters: Legal Considerations for Funding Municipal Stormwater Programs. National Association of Clean Water Agencies. 2014. Washington D.C.

Storm Water Utility Development Plan – Final Report. City of Duluth and Camp Dresser & McKee. 1997. Duluth, MN

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