

Stormwater Fee Proposal and Implementation Plan

WASTEWATER DIVISION



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1.0 Introduction

1.1 Purpose

The purpose of this report is to prepare an implementation plan to assist Capital Region Water (“CRW”) in establishing a dedicated funding source to help address its stormwater regulatory requirements. CRW’s regulatory requirements consist of a partial consent decree related to water quality issues from combined and separate sewer system discharges, a Municipal Separate Storm Sewer System (“MS4”) permit that addresses stormwater requirements, and a total maximum daily load (“TMDL”) associated with Paxton Creek. Some of the benefits of implementing a separate stormwater management fee include the following:

- Dedicated funding source for stormwater programs facilitates regulatory compliance.
- Improved drainage facility maintenance promotes better management of stormwater runoff such as abatement of localized flooding and basement backups.
- Equitable recovery of stormwater-related costs from customers.
- Provides incentive for property owners to implement stormwater management measures.

1.2 Project Background

CRW is organized and has been granted the legal authority to manage stormwater by the Pennsylvania Municipal Authorities Act. Ownership of the City of Harrisburg’s (“City”) sewer collection and stormwater systems was transferred to The Harrisburg Authority (now CRW) as part of the Harrisburg Strong Plan, the fiscal recovery plan for the City, dated August 26, 2013, and pursuant to a Transfer Agreement with the City dated November 13, 2013. CRW is currently in the process of addressing several stormwater and wastewater regulatory requirements that have and will continue to result in incremental increases in capital and operations and maintenance (“O&M”) costs.

1.2.1 Regulatory Drivers

In 2013, CRW entered into a Partial Consent Decree with the U.S. Department of Justice, U.S. Environmental Protection Agency (“EPA”), and the Pennsylvania Department of Environmental Protection (“PADEP”). The Partial Consent Decree requires CRW to develop a plan to reduce runoff pollution entering the Paxton Creek and the Susquehanna River, undertake improved operation and control of the sanitary sewer and stormwater systems, and implement early action projects to become compliant with the federal Clean Water Act and the Pennsylvania Clean Streams Law. The Partial Consent Decree requires CRW, among other items, to:

- Complete an update of CRW’s Long-Term Control Plan (“LTCP”) for the City’s combined sewer system.
- Update CRW’s Combined Sewer System Operations and Maintenance Manual consisting of Nine Minimum Controls.
- Obtain a MS4 permit and establish a stormwater management program.

CRW is currently updating its LTCP for combined sewer overflows (“CSOs”). The LTCP is comprised of three elements, which include characterization of the current system, development and evaluation of alternative

control measures, and selection of preferred controls and implementation strategy. The LTCP will be completed by April 1, 2018. CRW is working to ensure that green stormwater infrastructure opportunities are integrated into the LTCP as a component of the overall wet weather planning effort.

CRW submitted a new MS4 Individual Permit Application to the PADEP in September 2017 and is currently in the process of obtaining a new MS4 permit. The MS4 permit covers the portion of the City's separate storm sewer system, which discharges stormwater into local bodies of water, including the Paxton Creek, Spring Creek, and the Susquehanna River. Permittees are required to incorporate six minimum control measures into stormwater management programs to reduce the negative effects of stormwater, including pollution.

CRW and the townships of Lower Paxton and Susquehanna are currently working on a strategy to improve the health of the Paxton Creek by reducing sediment from combined sewer overflows, stormwater discharges, and stream bank erosion. This Paxton Creek Total Maximum Daily Load ("TMDL") strategy covers 20 miles of the Paxton Creek (about 40 percent of the creek), which are considered by the PADEP to be impaired by sediment. The EPA requires entities discharging stormwater or combined sewer overflows to the creek to reduce sediment by 35 percent. The plan calls for, among other items, the installation of new or retrofitted stormwater management controls for 10 percent of the drainage area within the creek's watershed, control of CRW's CSOs to reduce sediment load and improve the health of the creek, and enhanced riparian preservation practices, construction of site erosion and sediment controls, post-construction stormwater control for development projects, and maintenance of MS4s.

1.2.2 Community Greening Plan

In 2017, CRW completed a Community Greening Plan to identify areas of opportunity for green stormwater infrastructure and reduce stormwater and its negative effects, while beautifying the community. The plan's four goals consist of (1) increasing the benefits provided by public investment, (2) reducing the volume of stormwater entering the system, (3) fostering a network of partners for CRW to work with to reach its goals, and (4) enhancing and revitalizing the City through public/private investment in public gathering spaces. The Community Greening Plan was developed through an 18-month process that encouraged the community to contribute ideas to achieve the program's goals. Stakeholder surveys that were completed identified the implementation of green stormwater infrastructure in the public realm (schools, parks, streets, etc.) as the greatest areas of opportunity. Participants in the public meetings were asked about the preferred method of recovering the cost of stormwater management among options including integrating the costs within the sewer rates, developing a flat fee per parcel, developing a fee based on the size of the parcel, and developing a fee based on the amount of stormwater generated. The vast majority of respondents preferred recovering stormwater management costs from customers based on the amount of stormwater generated, citing that this method more equitably distributes the cost of stormwater management so that the properties with the most impervious surfaces, as a measure of stormwater runoff, pay the highest fee.

2.0 Stormwater Program Elements, Level of Service, and Cost

2.1 Program Elements and Level of Service

One of the policies that CRW will need to establish is how much annual revenue will need to be generated from the stormwater fee to comply with the above listed regulations. This decision is based on what CRW must do to effectively manage its stormwater system and meet its regulatory requirements. These stormwater-related program elements include the following:

- Program administration
- Inspection and maintenance
 - Storm sewers
 - Stormwater best management practices (“BMPs”) (Green Infrastructure, Stormwater Retention and Detention)
 - Street sweeping
 - Inlet and catch basin cleaning
- Compliance with MS4 permit requirements
- Compliance with TMDLs (a portion may be considered stormwater-related)
- Compliance with the Wet Weather LTCP (a portion may be considered stormwater related)
- Public education
- Data and information management
- Capital improvement planning and implementation

Each of these elements have either internal or external program costs, or both, and the level of cost is based on the level of service desired to be achieved by CRW. For the purposes of this implementation plan report, program cost elements were identified based on input from CRW and from stormwater-related work completed by other consultants to CRW.

2.2 Stormwater Management Costs

2.2.1 Cost Elements

A stormwater fee can fund O&M costs, capital costs, or both. O&M costs can include administrative costs, inspection and maintenance costs, billing and collection costs, design costs, and other stormwater-related functions. Capital project costs can include new facilities, rehabilitation and replacement of existing stormwater facilities, and debt service related to stormwater project financing. A list of program elements that could be funded by CRW's stormwater fee include the following:

- Capital Improvement Projects
 - Catch basin rehabilitation and replacement
 - Storm drain rehabilitation and replacement
 - Additional capital projects or equipment needed to address TMDLs or MS4 permit requirements

- Administration of the Stormwater Management Program
 - Fee establishment, billing, and collections
 - Management of the incentive or credit program
 - General administration of the stormwater program
- Inspections and Maintenance
 - Stormwater management facility maintenance (detention facilities, manholes, catch basins, outfalls, pipes, etc.)
 - Street sweeping
 - Flow monitoring (a portion may be considered stormwater-related)
- Implementation of the MS4 permit, including the six minimum control measures as outlined in the General Permit:
 - Public education and outreach on stormwater impacts
 - Public involvement and participation
 - Illicit discharge detection and elimination
 - Construction site stormwater runoff control
 - Post-construction stormwater management
 - Pollution prevention and good housekeeping
- Water quality monitoring (e.g., TMDL compliance) (a portion may be considered stormwater-related)
- Streambank or floodplain management

2.2.2 Projected Stormwater Management Costs

Stormwater related costs are currently funded by wastewater user rates. Therefore, the adopted fiscal year (“FY”) 2019 wastewater budget was reviewed to identify stormwater related O&M costs and to allocate stormwater costs from the wastewater system to the stormwater system. Based on this review, O&M costs allocated to the stormwater system were identified as:

- A portion of the personnel costs (salaries and wages, benefits, etc.) attributable to staff in the wastewater system’s Field Maintenance Department.
 - projection of annual staff full-time equivalents (“FTE”) required to address nine minimum controls compliant preventative maintenance and remedial maintenance activities that was prepared by CRW’s consultant, CDM Smith, was reviewed to estimate the amount of time Field Maintenance dedicates to stormwater related work. Based on these projections, approximately 8.75 FTEs were attributable to maintenance of stormwater related assets, such as inlets and catch basis. The department currently includes 14 FTEs. Therefore, 62.5 percent ($8.75 \text{ FTEs} \div 14 \text{ FTEs}$) of personnel costs attributable to the Field Maintenance Department were allocated to the stormwater system.
- All costs associated with street sweeping service provided to CRW.
- All green stormwater infrastructure (“GSI”) costs such as inspections and maintenance, reporting and asset management, training and workforce development, and overall program management.
 - GSI costs were obtained from CRW’s GSI O&M budget.
- A portion of the administrative related costs allocated to the wastewater system as part of CRW’s Administrative Fee.
- It was estimated that approximately 16.5 percent of the administrative related costs allocated to the wastewater system as part of CRW’s Administrative Fee were stormwater related. This estimate was based on the proportion of costs allocated to stormwater from the Field Maintenance Department and street

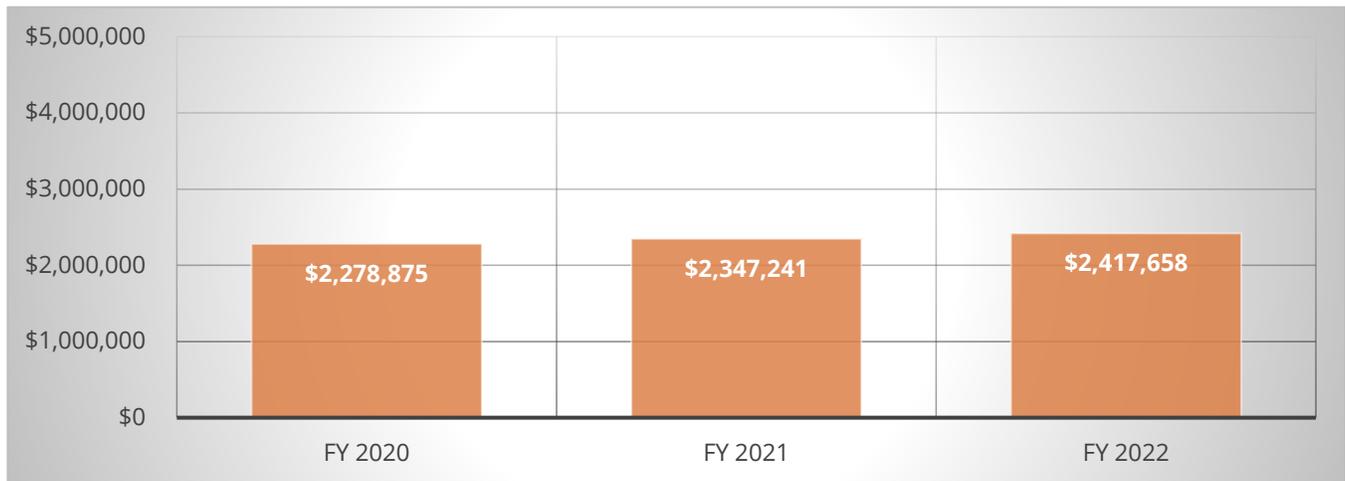
sweeping, as compared to the total annual O&M expenses of the wastewater system, excluding Administrative Fee related costs.

- All personnel costs attributable to CRW’s Wet Weather Coordinator, which have been allocated to the wastewater system as part of the CRW’s Administrative Fee.

The O&M costs allocated to stormwater in FY 2019 were escalated in future years to account for estimated annual cost inflation. Salaries and wages allocable to stormwater, including those allocated as part of CRW’s Administrative Fee, were escalated by 3.0 percent per year, while employee benefit related costs were escalated by 6.0 percent per year. Street sweeping and the non-personnel related portion of Administrative Fee costs were each escalated at 2.8 percent per year.

The capital plan assumed that 177 acres of GSI would be added over 20 years, with 8.85 acres added each year over the 20-year timeframe. With an assumed cost of \$250,000 per acre, the addition of 8.85 acres per year of GSI equates to approximately \$2.2 million (2019 dollars), or between about \$2.3 million and \$2.4 million (escalated dollars), of GSI capital related costs per year. The annual capital expenditures from FY 2020 to FY 2022 are shown in Figure 2-1. Cost totals shown in the table were estimated in 2019 dollars and were assumed to escalate in future years at a rate of 3.0 percent per year.

Figure 2-1: Three-Year Stormwater Capital Plan



It was assumed that all stormwater related capital project costs will be funded with cash generated from stormwater fee revenues, as no project costs were assumed to be funded with grant proceeds or new debt. In addition, no debt service payments from previously issued debt was allocated to the stormwater system. To the extent that CRW is successful in receiving grants or low-cost loans from the Pennsylvania Infrastructure Investment Authority, or other funding agencies, the annual revenue requirements that were projected herein could be lower or additional projects could be funded in the years shown.

The annual stormwater O&M costs and capital expenditures from FY 2020 through FY 2022 are shown in Table 2-1. As shown in the table, total projected stormwater system costs were estimated to be approximately \$4.9 million in FY 2020. In FY 2021 and FY 2022, total projected costs were approximately \$5.1 million and \$5.3 million per year, respectively.

Table 2-1: Projected Stormwater System Costs

Description	FY 2020	FY 2021	FY 2022
O&M Costs:			
Field Maintenance Personnel	\$860,461	\$895,551	\$932,251
Administrative Personnel	505,978	526,133	546,098
GSI O&M	401,000	465,000	539,000
Administrative Non-Personnel	153,108	157,395	161,802
Street Sweeping	<u>668,200</u>	<u>686,910</u>	<u>706,143</u>
Total O&M Costs	\$2,589,747	\$2,730,989	\$2,885,295
Capital Related Costs:			
Cash-Funded Capital	\$2,278,875	\$2,347,241	\$2,417,658
Total Stormwater Costs	\$4,868,622	\$5,078,230	\$5,302,953

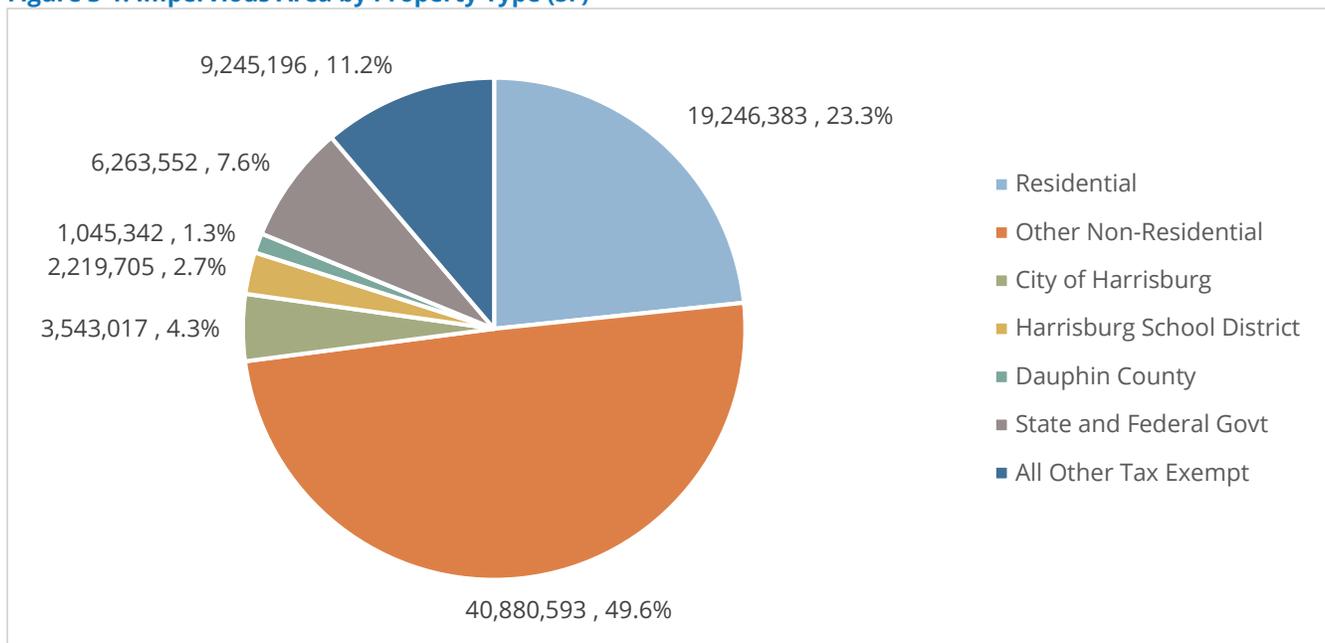
3.0 Stormwater Fee

3.1 Impervious Area

It is recommended that CRW establish a stormwater fee based on property impervious area. This approach results in equitable recovery of stormwater management costs because these costs are related to the amount of stormwater runoff from properties within the service area. Furthermore, establishment of a stormwater fee based on impervious area is a common industry accepted approach for recovery of stormwater management costs.

Impervious area data was provided by CRW in Geographic Information System (“GIS”) format for its service area, which corresponds to the geographic boundaries of the City. Within the GIS layer, the impervious area associated with each parcel of land was identified and the amount of impervious area associated with each parcel was then calculated and summarized. A second GIS layer that included additional data about each parcel within the City, including property type, was laid over the impervious area GIS data. This allowed individual parcels and their impervious area data to be associated with a specific property type, to better describe the impervious area data. Specifically, this allowed for the determination of the amount of impervious area attributable to residential versus non-residential property types, the portion attributable to state and federal government owned tax-exempt properties, and the amount of impervious area attributable to the City of Harrisburg. Based on this analysis, the estimated amount of impervious area in square feet (“SF”), by property type, is shown in Figure 3-1.

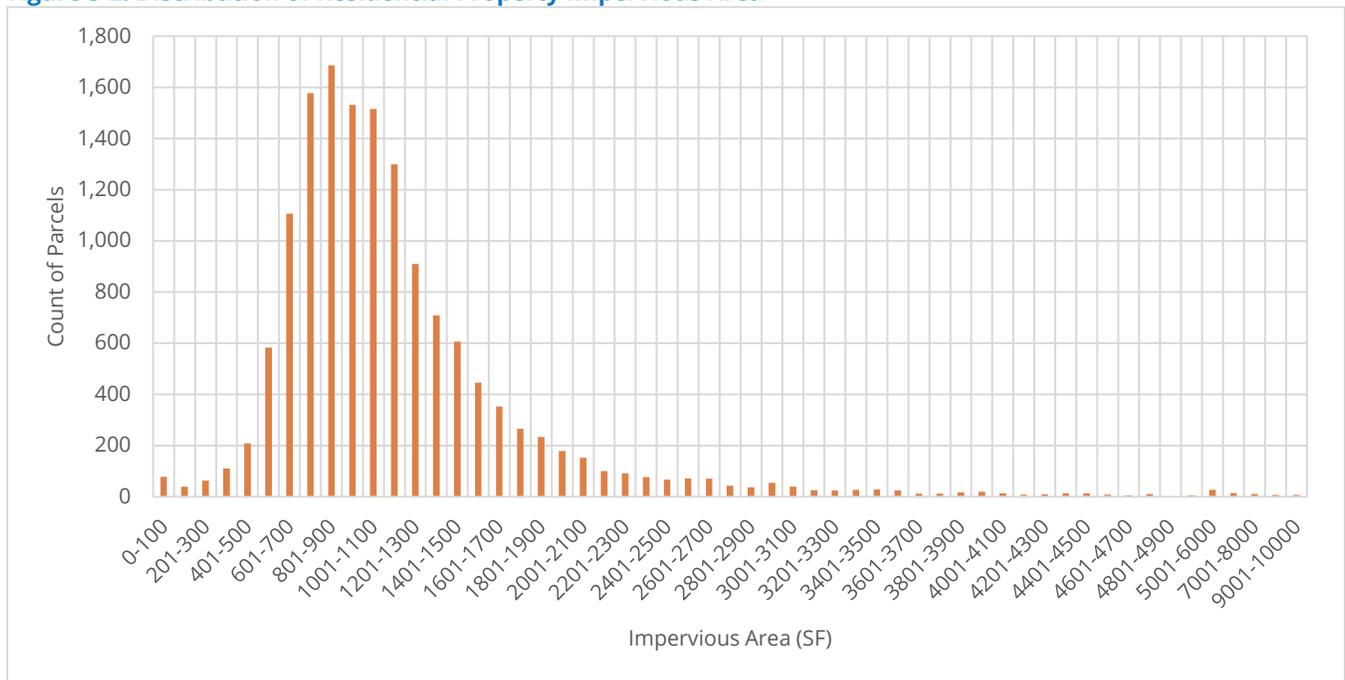
Figure 3-1: Impervious Area by Property Type (SF)



As shown in Figure 3-1, residential properties comprised approximately 19,246,000 SF, or 23 percent of the total impervious area, while all non-residential parcels comprised approximately 63,197,000 SF, or 77 percent

of the total. It's important to note that on an individual basis, residential properties within CRW's service area exhibit varying amounts of impervious area as a result of varying lot sizes and the proportion of the lot that is developed. To illustrate this, Figure 3-2 provides the distribution of all residential properties (including single-family, apartment, and condominium units) by impervious area. As shown in the figure, residential property impervious areas ranged from 0-100 SF to as much as several thousand square feet. The range of individual residential property impervious areas was carefully considered in the development of a recommended fee structure alternative that would aim to assess fees to properties in a manner that is proportional to their contribution of stormwater runoff to the system while not creating an excessive administrative burden for CRW.

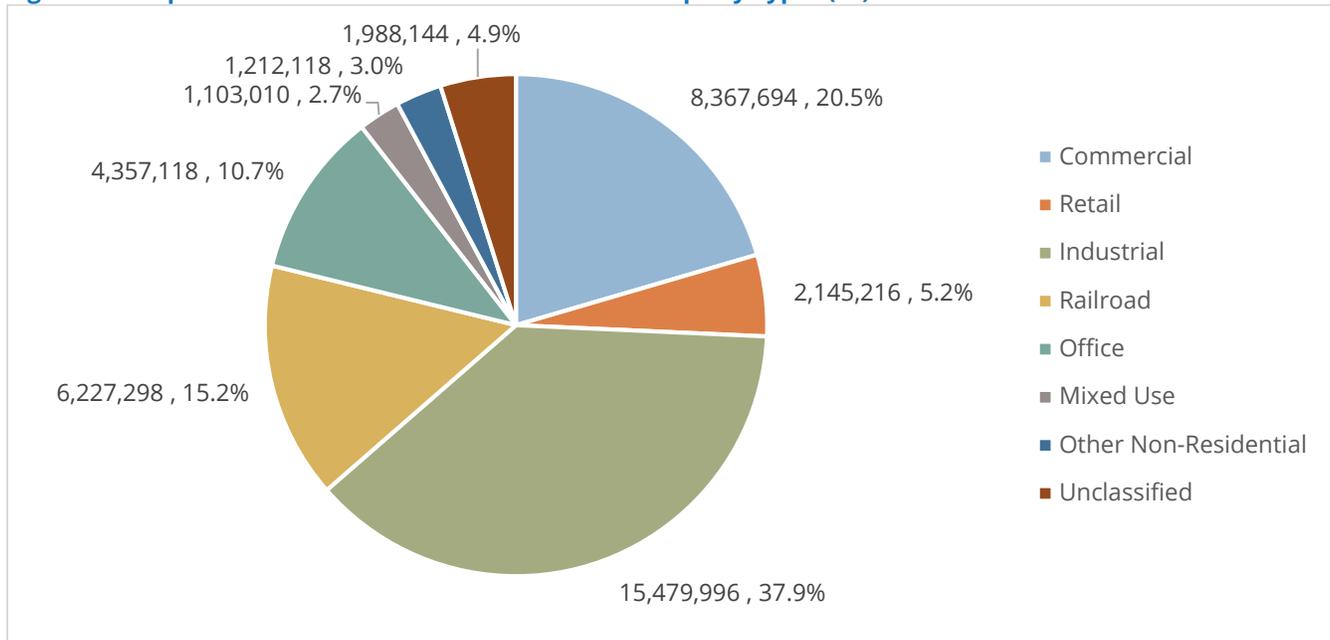
Figure 3-2: Distribution of Residential Property Impervious Area



Of the non-residential properties, City properties comprised about 3,543,000 SF, or 4.3 percent, of the total impervious area of the service area, while Harrisburg City School District properties comprised roughly 2,220,000 SF, or 2.7 percent. Dauphin County properties comprised approximately 1,045,000 SF, or 1.3 percent, while State and Federal Government properties comprised approximately 6,264,000 SF, or 7.6 percent, of the total impervious area within the service area. All Other Tax-Exempt properties, such as educational facilities (excluding those related to the Harrisburg School District), hospitals, clinics, long-term care facilities, churches, other religious facilities, other local government properties, and other miscellaneous tax-exempt properties comprised about 9,245,000 SF, or 11.2 percent, of the total impervious area.

Total impervious area attributable to Other Non-Residential properties was 40,881,000 SF, or 49.6 percent, of the total impervious area. Several different property types were included under this category, as shown in the breakdown of this classification in Figure 3-3.

Figure 3-3: Impervious Area of Other Non-Residential Property Types (SF)



As shown in Figure 3-3, the category of Other Non-Residential properties is largely comprised of Industrial (15,480,000 SF, 37.9 percent), Commercial (8,368,000 SF, 20.5 percent), and Railroad (6,227,000 SF, 15.2 percent) property types.

3.2 Stormwater Fee Structure

The stormwater fee structure and level of initial stormwater fees are significant policies that CRW will need to define prior to implementation. In general, the stormwater fee structure should treat similar properties similarly within the fee structure. The fee structure should also distinguish between properties that are different and assess fees to properties in a manner that is proportional to their contribution of stormwater to the system. Several different fee structure alternatives were identified and are discussed below for CRW's consideration.

- **Single Flat Residential Fee:**

Under this alternative, residential properties would be charged the same flat fee on a periodic basis. This would include all single-family dwellings, regardless of their impervious area. CRW may elect to define residential dwellings to include multi-family dwellings with up to four individual housing units. Multi-family structures with more than four housing units may be better classified as non-residential properties.

The flat fee would be calculated by estimating the average impervious area for residential properties that would be subject to the flat fee. The average impervious area would be defined as one equivalent residential unit ("ERU") and would serve as the basis for billing non-residential property types.

From an administrative standpoint, this option is relatively easy to implement and administer. However, due to its relative simplicity, it may be less equitable for residential properties with dissimilar impervious

area characteristics, as opposed to more complex stormwater fee structures. For example, residential properties may have significantly more or less impervious area than the average but would pay the same flat fee as the average customer.

- **Tiered Residential Fee:**

One alternative to a single flat residential fee is to implement a tiered residential stormwater fee in which the amount of the fee is based on a range of impervious areas. For example, the lowest residential fee tier may include properties that have impervious areas ranging from 0 to 1,000 SF, while a second tier may include properties with impervious areas exceeding 1,000 SF. Residential properties are placed into one of the tiers based on their estimated amount of impervious area. The stormwater fee would differ between the two tiers, with the properties within the second, or higher, tier paying a higher fee than those in the lower tier. This alternative requires maintaining impervious area data for all residential properties, is more complex, and may result in an additional administrative burden. However, for some utilities, the greater equitability of this alternative may outweigh the greater complexity and administrative burden.

- **Individually Calculated Residential Fee:**

A third alternative residential stormwater fee structure is to establish a stormwater fee per unit of impervious area, and then calculate a specific stormwater fee for each residential property based on the property's impervious area. While this fee structure may be considered more equitable than the other alternatives, it also is the most complex and would likely result in a relatively high administrative burden.

Non-residential properties are typically assessed a stormwater fee based on the impervious area of the property. For example, under this approach, if a non-residential property's impervious area is three times that of the area associated with a typical residential property, its stormwater fee would be three times that of the fee associated with a typical residential property. In a scenario where the residential fees are calculated individually, the stormwater fee for all non-residential properties would also be determined based on the property's impervious area.

To gain an understanding of the stormwater fee structures employed by other municipalities in Pennsylvania, a survey of stormwater fees was completed and the results are summarized in Table 3-1. As shown in this summary, both a flat fee and tiered stormwater fees based on impervious area are commonly used fee structures in Pennsylvania.

Table 3-1: Other Stormwater Fee Structures in Pennsylvania

Municipality	Fee Structure
Chambersburg Borough	Flat fee based on the number of sewer connections. \$36.00 per year or \$3.00 per month per sewer connection
Derry Township	Flat fee for residential, scaled based on ERUs for non-residential customers. \$78.00 per year or \$6.50 per month per ERU. 1 ERU = 3,800 SF
Ebensburg Borough	Flat fee for residential, scaled based on ERUs for non-residential customers. \$96.00 per year or \$8.00 per month per ERU. 1 ERU = 2,830 SF
Hampden Township	Flat fee for residential, scaled based on ERUs for non-residential customers. \$53.00 per year or \$4.42 per month per ERU. 1 ERU = 3,534 SF
City of Hazleton	Flat fee for residential, scaled based on ERUs for non-residential customers. \$25.00 per year per ERU. 1 ERU = 2,133 SF
Jonestown Borough	Flat fee for residential, scaled based on ERUs for non-residential customers. \$80.00 per year or \$6.67 per month per ERU. 1 ERU = 3000 SF
City of Lancaster	Tiered fee based on parcel IA. \$0 per year for Tier 0 - 0 – 300 SF \$15.48 per year for Tier 1 - 301 -1,000 SF \$46.44 per year for Tier 2 - 1,001 – 2,000 SF \$77.40 per year for Tier 3 - 2,001 – 3,000 SF Base rate (\$30.96 per year) × IA for Tier 4 - > 3,000 SF
City of Meadville	Flat fee for residential, scaled based on ERUs for non-residential customers. \$96.00 per year or \$8.00 per month per ERU 1 ERU = 2,660 SF
Mt. Lebanon Township	Flat fee for residential, scaled based on ERUs for non-residential customers. \$96.00 per year or \$8.00 per month per ERU. 1 ERU = 2,400 SF
City of Philadelphia	Formula based on gross and IA. \$0.605 per 500 SF of gross area, or \$4.70 per SF of IA. \$2.88 billing charge.
Radnor Township	Tiered fee based on lot size for residential, scaled based on IA for non-residential. \$29.00 per year for lot size - 0 – 7,000 SF \$58.00 per year for lot size - 7,001 – 20,000 SF \$87.00 per year for lot size - 20,001 – 43,560 SF \$116.00 per year for lot size - > 43,560 SF
West Chester Borough	Tiered based on parcel IA. \$40.20 per year for Tier 1 - 0 – 1,000 SF \$100.56 per year for Tier 2 - 1,001 – 1,500 SF \$140.76 per year for Tier 3 - 1,501 – 2,000 SF \$180.96 per year for Tier 4 - 2,001 – 2,500 SF \$221.16 per year for Tier 5 - 2,501 – 3,000 SF \$241.20 per year for Tier 6 - > 3,000 SF

Based on the review of impervious area data for residential customers, the consideration of stormwater fee structure alternatives, and discussions with CRW, it is recommended that the residential stormwater fee structure be segregated into three tiers corresponding to residential properties with low, medium, and high amounts of impervious area, and that non-residential properties be charged based on their individual property impervious area because of the wide range of IA coverage for properties within this tier (2,200 square feet to just over 4M square feet). In addition, based on the range of individual residential property impervious area amounts, it is recommended that the following three tiers be established for residential customers, as shown in Table 3-2.

Table 3-2: Residential Stormwater Fee Tiers

Tier	Total Impervious Area (SF)	Number of Residential Properties	Fee Multiplier
Tier 1 (>400 and <= 700 SF)	1,144,951	1,897	0.5x
Tier 2 (>700 and <=2,200 SF)	13,165,906	11,565	1.0x
Tier 3 (>2,200 SF)	4,935,526	941	n/a (individualized)

As shown in Table 3-2, Tier 1 includes residential properties with between 400 SF and 700 SF of impervious area. In total, there are 1,897 properties with impervious areas that were within this range, which together totaled approximately 1,145,000 SF. The average impervious each of properties within this range was 604 SF, which was about 59 percent of the impervious area associated with a typical residential property; therefore, these customers would each be charged one-half the amount charged to a typical residential property. Furthermore, it is recommended that residential and commercial properties with 400 SF or less of impervious area not be assessed a stormwater fee. Based on a review of the GIS data, properties with less than 400 SF of impervious area were typically undeveloped parcels that contributed little, if any, stormwater runoff to the system. In total, there were 2,445 parcels (residential and non-residential) with less than 400 SF of impervious area.

Tier 2 includes residential properties with between 700 and 2,200 SF of impervious area. Most (11,565) residential properties had impervious areas within this range, which together totaled roughly 13,166,000 SF of impervious area. The average impervious area of properties within this range was 1,138 SF, which was comparable to the amount of impervious area associated with a typical residential property (1,023 SF); therefore, these customers would each be charged a fee amount equivalent to 1,023 SF of impervious area. There was a total of 941 residential properties, which in total comprised about 4,936,000 SF, that have more than 2,200 SF of impervious area and who would fall within Tier 3. The stormwater fee for these customers would be calculated based on their actual amount of impervious area.

Non-residential customers would be assessed stormwater fees in the same manner as Tier 3 residential customers (i.e., based on the actual amount of impervious area). There were 2,752 non-residential properties, which together totaled about 63,065,000 SF of impervious area, that would be assessed the fee based on their individual impervious area. In addition, it is recommended that non-residential customers with greater than 400 SF of impervious area, but less than 700 SF of impervious area, be assessed a minimum charge, equal to one-half of the annual stormwater fee applicable to a typical residential property. Under this approach, there were 238 additional non-residential properties that would be charged the minimum charge, which together comprised about 132,000 SF. Tax-exempt non-residential properties were included in the parcel count and

impervious area totals documented in this report, as it is recommended that all non-residential properties, including tax-exempt properties, be charged a stormwater fee in accordance with their individualized impervious area. Additional stormwater billing policy recommendations are provided in Appendix B.

3.3 Stormwater Fee Calculation

The projected annual stormwater fee per 1,023 SF of impervious area was calculated for FY 2020 through FY 2022 based on the annual stormwater related costs shown in Table 2-1, the number of typical residential properties in each residential tier, and the total number of non-residential units of 1,023 SF. In addition, an operating cash reserve target equal to at least 90 days of annual operating expenses was established and incorporated into the fee calculation such that the target would be reached in FY 2022. The minimum reserve target represents additional revenues to be generated by the fee over the three-year timeframe (FY2020 – FY 2022), in excess of the annual system costs. Based on the level of operating expenses projected for FY 2020, the minimum level of operating cash reserves to be accumulated by that year was \$721,000, meaning that roughly \$240,000 ($\$721,324 \div 3$) per year in additional cash would need to be generated by the stormwater fee in each year. Given the number of billable impervious area units within the service area, the additional cost in FY 2020 through FY 2022 attributable to the implementation of the operating cash reserve was \$3.33 per 1,023 SF ($\$240,441 \div 72,174.5$) per year.

In addition, the projections assumed the impervious area would remain constant over the forecast period. The amount of impervious area associated with a typical residential property was also assumed to remain constant over the forecast period, at approximately 1,023 SF, which results in the number of total units of 1,023 SF within the service area remaining constant at 72,174.5. An adjustment was factored into the fee calculation that reduced the number of residential units of 1,023 SF by 1.0 percent and the number of non-residential units of 1,023 SF by 11 percent in each fiscal year to reflect that some customers will take advantage of the stormwater credit program, which will reduce the revenue collected from the proposed stormwater fees (see Section 4 of this report for a more detailed discussion of stormwater fee credits). It was also assumed that CRW would achieve a collection rate of 100 percent. The calculation of stormwater fees per 1,023 SF for FY 2020 through FY 2022 is shown in Table 3-3.

As shown in Table 3-3, the annual stormwater fee per 1,023 SF was projected to be \$70.79 in FY 2020. Under the recommended stormwater fee structure (see Section 3.2), residential Tier 1 customers would pay a flat fee of \$35.40 per year, while Tier 3 customers would pay a fee based on their total impervious area multiplied by a fee of \$6.92 per each 100 SF of impervious area per year. All non-residential customers would be assessed stormwater fees in the same manner as residential Tier 3 customers, except for those with impervious area between 400 SF and 700 SF, which would be assessed a minimum charge. However, if CRW identifies additional stormwater capital needs in excess of those assumed under any of the capital plan scenarios discussed previously, the stormwater fees could be higher than those projected in Table 3-3.

Table 3-3: Projected Annual Stormwater Fee per 1,023 SF – FY 2020 through FY 2022

Description	FY 2020	FY 2021	FY 2022
Stormwater Revenue Requirement	\$4,868,622	\$5,078,230	\$5,302,953
Credit Adjusted Units of 1,023 SF			
Residential:			
Tier 1 – 400 SF to 700 SF	939.0	939.0	939.0
Tier 2 – 700 SF to 2,200 SF	11,449.4	11,449.4	11,449.4
Tier 3 – Greater than 2,200 SF	4,778.0	4,778.0	4,778.0
Subtotal	17,166.4	17,166.4	17,166.4
Non-Residential:			
Greater than 700 SF	54,889.1	54,889.1	54,889.1
Minimum – 400 SF to 700 SF	119.0	119.0	119.0
Subtotal	55,008.1	55,008.1	55,008.1
Total Credit Adjusted Units of 1,023 SF	72,174.5	72,174.5	72,174.5
Annual Fee per 1,023 SF: ¹	\$70.79	\$73.69	\$76.81

¹Calculated fee amounts include an additional \$3.33 per unit of 1,023 SF in each year to accumulate a 90-day operating cash reserve target by FY 2022.

CRW has elected to implement a fee per 1,023 SF that would recover the full revenue requirement over a three-year period and remain unchanged during this period. The recommended three-year average fee that should be implemented under this scenario would be \$73.76 per 1,023 SF $[(\$70.79 + \$73.69 + \$76.81) \div 3]$. The three-year average fee per month and per year by residential tier and for non-residential customers is shown in Table 3-4.

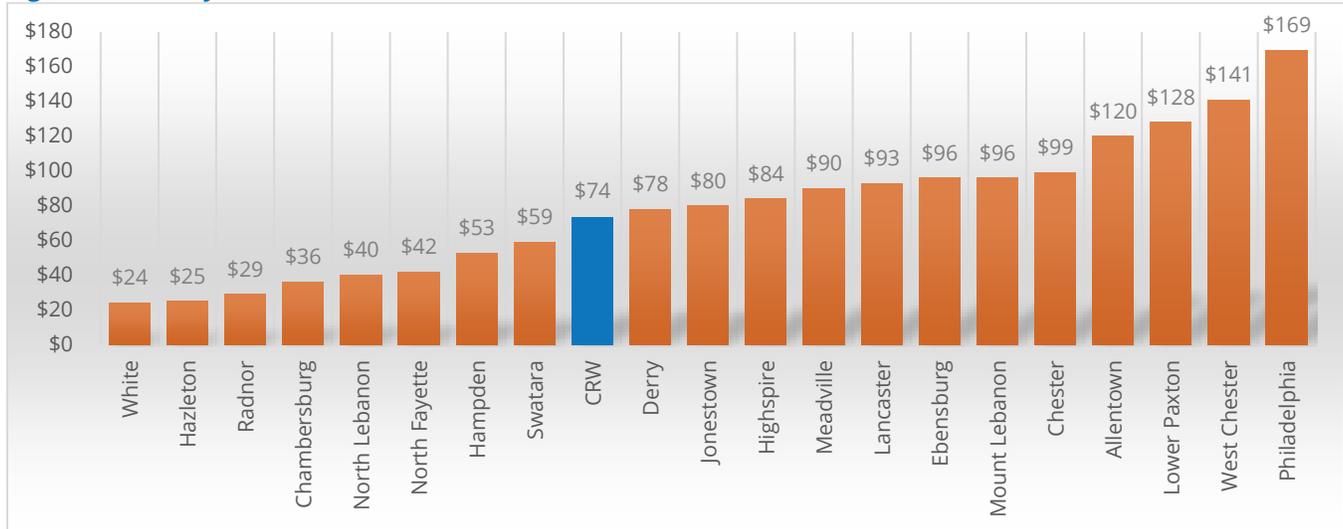
Table 3-4: Three-Year Average Fee – FY 2020 – FY 2022

Tier	Fee Multiplier	Fee per Month	Fee per Year
Tier 1 (>400 <= 700 SF)	0.5x	\$3.07	\$36.88
Tier 2 (>700 and <=2,200 SF)	1.0x	\$6.15	\$73.76
Tier 3 (>2,200 SF)	n/a (individualized)	\$6.15 per 1023 SF	\$73.76 per 1023 SF
Non-Residential	n/a (individualized)	\$6.15 per 1023 SF	\$73.76 per 1023 SF

3.4. Stormwater Fee Comparisons

The three-year average annual stormwater fee was compared to the annual stormwater fees currently assessed by a sample of 20 other municipalities in Pennsylvania. This comparison is shown in Figure 3-4. As shown in the figure, the projected fee was generally comparable to the stormwater fees currently assessed by other utilities in the region. For example, the projected fee per 1,023 SF was less than 12 out of the 20 utilities included in the survey.

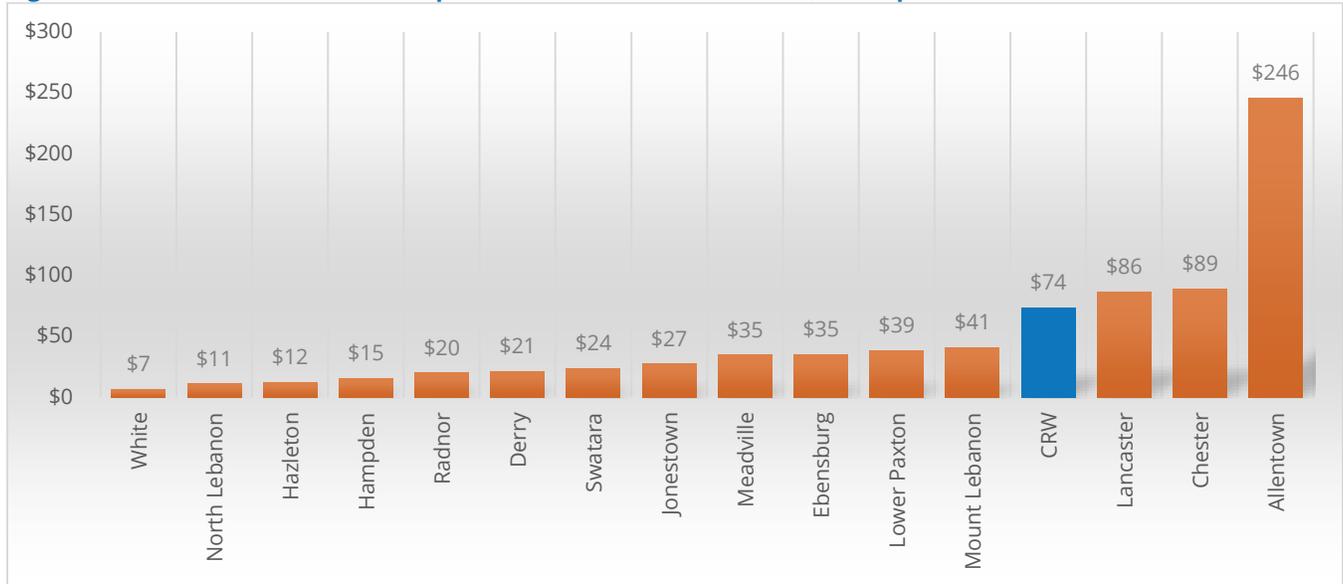
Figure 3-4: Survey of Annual Residential Stormwater Fees in PA



It should be noted that the amount of impervious area typical for a residential property differed amongst CRW and the other municipalities that assessed their fee in this manner. This affects the residential fee that is assessed, as municipalities that have more impervious area per residential parcel will attribute more stormwater runoff, and thus higher costs, to a typical residential customer. Therefore, to normalize the differences in the amount of impervious area included per typical residential property, the comparison was adjusted based on the amount of impervious area included in a typical residential property for CRW (1,023 SF). For example, if the amount of impervious area per typical residential property for a municipality was 1,500 SF, their associated fee amount would be normalized with CRW's annual fee by multiplying the municipality's annual fee by 68.2 percent ($1,023 \text{ SF} \div 1,500 \text{ SF}$).

A comparison of the normalized fees of the utilities included in the survey, per 1,023 SF of impervious area, is shown in Figure 3-5. The amount of impervious area within an ERU was not able to be obtained for five municipalities (Chambersburg, Highspire, North Fayette, Philadelphia, and West Chester), as this information was not included in the stormwater fee information that was made available by the municipality or the fee is not assessed on an ERU basis. As shown in the figure, CRW's projected stormwater fee per 1,023 SF of impervious area exceeded the adjusted fees calculated for many of the other municipalities on a normalized basis by between \$33 to \$67 per 1,023 SF.

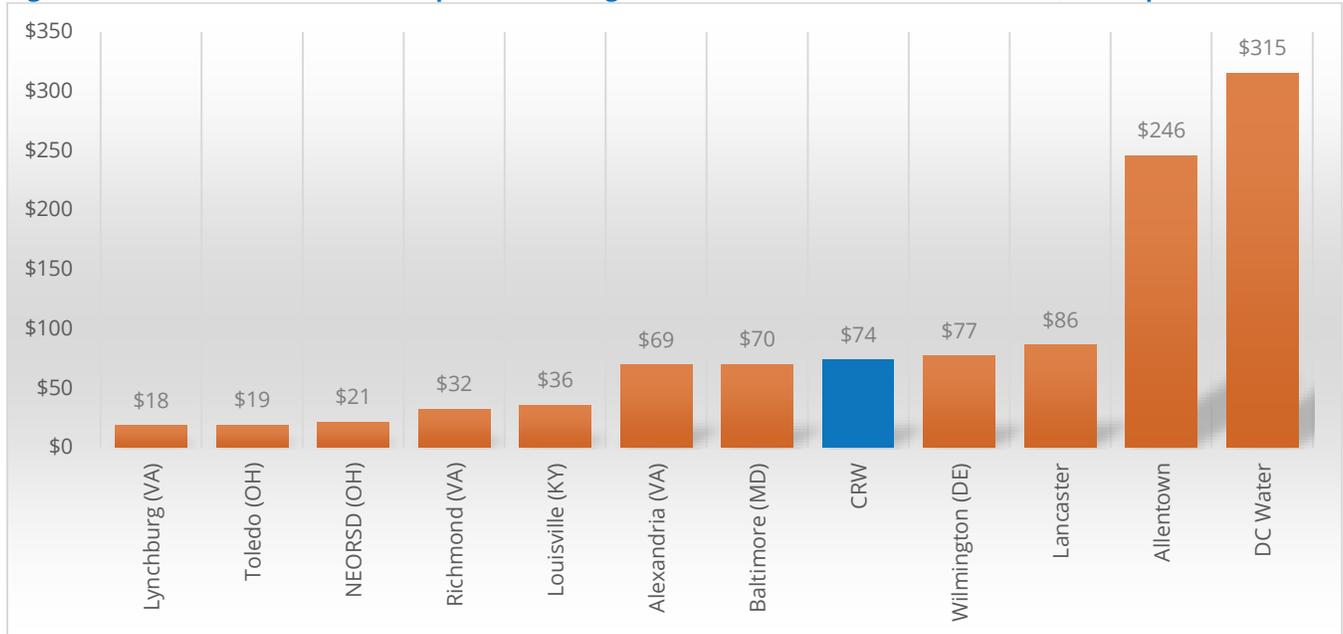
Figure 3-5: Annual Stormwater Fees per ERU in PA – Normalized to 1,023 SF per ERU



While on a normalized basis the cost per 1,023 for CRW is much higher than most of the other municipalities included in the survey, it should be noted that with the exception of Lancaster and Allentown, none of the communities shown in Figure 3-5 are currently under a consent order with the EPA related to combined sewer overflows. As discussed previously, CRW is under a partial consent decree with the U.S. Department of Justice, EPA, and PADEP and the agreed-upon actions under the consent decree are expected to impose a significant cost on CRW's wastewater and stormwater systems.

Therefore, a second survey was completed to compare CRW's three-year average cost per 1,023 SF with combined sanitary and stormwater systems that are also under consent orders from the EPA. The municipalities included in the survey and their normalized annual stormwater fees per typical residential property, based on 1,023 SF of impervious area, are shown in Figure 3-6. As shown in the figure, CRW's average fee per 1,023 SF is somewhat more comparable to the normalized fees of municipalities also under consent orders for combined sewer overflows. For example, its three-year average fee was less than four of the other 11 municipalities.

Figure 3-6: Annual Stormwater Fees per ERU Among Utilities with CSOs - Normalized to 1,023 SF per ERU



4.0 Stormwater Credits and Incentives

4.1 Introduction

Many stormwater fee programs provide incentives to properties to manage stormwater runoff through on-site stormwater measures. Two types of incentive programs that are typically considered include rebates and credits. The purpose of rebates is to provide a one-time subsidy to reduce the cost of installing stormwater mitigation measures on private property. Examples include providing rebates for the purchase of rain barrels, for tree plantings, or for installing green roofs. The purpose of credits is to incentivize property owners to implement stormwater mitigation measures by reducing their stormwater fee. The credit amount that a property can receive typically varies by stormwater mitigation measure. Stormwater credits are usually earned as a result of the construction, operation, and maintenance of stormwater management practices that reduce a parcel's contribution of stormwater runoff. As part of the implementation of CRW's stormwater fee system, it is recommended that CRW adopt a stormwater user fee credit policy to provide a process for owners of non-residential properties to obtain rebates or credits for stormwater mitigation measures that have been implemented and are maintained by these property owners.

4.2 Stormwater Credit and Incentive Options

There are many stormwater credit and rebate options that have been used by municipalities to incentivize property owners to install and maintain stormwater mitigation measures. Some credit programs offer opportunities for residential customers to earn stormwater credits; however, most credit programs are designed and targeted toward non-residential property owners because these properties generally contain the largest amount of impervious area. Typical residential stormwater fee credit options include credits or rebates for:

- Downspout disconnection from storm sewers
- Rain barrels or cisterns
- Tree canopy expansion
- Rain gardens or bioretention

Typical non-residential fee credit options include the items listed above, as well as other stormwater mitigation measures, such as installing pervious pavement, green roofs, and other stormwater BMPs. Non-residential stormwater mitigation measures and associated credits are typically classified into three categories and include structural BMPs, non-structural BMPs, and institutional credits.

- **Structural BMP Credits:**

Natural vegetation and soil mechanisms, or conventional brick and mortar structures to mitigate stormwater runoff, such as infiltration basins, trenches, porous pavement, wet basins, retention ponds, constructed wetlands, and other measures. Structural BMPs are comprised of either rate controls, measures that control the rate of stormwater runoff, volume controls, or measures that control the volume of stormwater runoff.

- **Non-Structural Credits:**

Non-structural BMPs are not a single, prescriptive design standard, but a combination of practices that can result in a variety of environmental and financial benefits. Non-structural BMP credits may include education program credits available to public and private schools that inform students on the importance of preserving and restoring the source and integrity of water sources, or fertilizer management programs applicable to properties with lawns or landscaped areas where fertilizers are typically applied and that constitute a significant portion of the parcel area.

- **Institutional Credits:**

Applicable to parcels that are required to obtain and comply with the terms of a separate MS4 permit. Eligible parties may receive a credit that will be applied to the portions of the parcel served by its separate MS4 permit. A summary of stormwater fee credits offered by other municipalities in Pennsylvania is provided in Appendix C. As shown in the table, there are a variety of credits that are offered to stormwater customers located in these municipalities and there is no uniform or standard approach. Rather, each stormwater credit program is tailored to specifically meet the needs and objectives of the municipality.

4.3 Stormwater Credit Program Recommendations

It is recommended that CRW consider implementation of the stormwater credits summarized in Table 4-1 as part of its stormwater fee program. The table shows the recommended credits or incentives to be offered by customer type, the credit or incentive amount, and a description of how the credit may be applied. It is also recommended that the maximum credit that can be obtained by a customer be capped at 50 percent, since the programmatic elements included in CRW's revenue requirement to address MS4 compliance exceed 50 percent of the total.

Table 4-1: Recommended Credit and Incentive Program

Description	Typical Credit or Incentive Amount	Description
Residential:		
Credit for downspout disconnection	10%	Existing downspout must be directly draining into a storm sewer.
Non-Residential:		
Peak / Rate Controls -10-year event = 10% credit -25-year event = 20% credit -50-year event = 30% credit -100-year event = 40% credit	10 to 40%	Amount of the credit based on BMPs employed and the impervious area managed. BMPs may include detention basins, infiltration basins, or constructed wetlands. Must be in accordance with CRW code and PADEP Stormwater BMP manual.
Volume control credit	25% Max	Amount of the credit based on BMPs employed and the impervious area managed. BMPs may include infiltration basins, raingardens/bio-retention basins, porous pavement, infiltration trenches, etc. Must be in accordance with CRW code and the PADEP Stormwater BMP manual.
Credit for water quality improvements	25% Max	Amount of the credit based on BMPs employed and the impervious area managed. BMPs may include raingardens, bioretention facilities, constructed wetlands, porous pavement, green roofs, infiltration trenches, etc. Must be in accordance with CRW code and PADEP Stormwater BMP manual.
Credit for education program	10 to 20%	10% credit for schools that provide stormwater education to 50-74% of the grade levels within the school. 20% credit for providing education for 75% to 100% of students.
Credit for Separate MS4 Permit Compliance	25%	For properties that have a separate MS4 permit and are in full compliance, and provide CRW with a copy of the MS4 permit

The stormwater credit options listed above will provide residential stormwater customers with rebate incentives for purchase of rain barrels and credit incentives for disconnection of downspouts from the storm sewer. The proposed stormwater credit options also provide non-residential customers with significant flexibility to implement stormwater mitigation measures that will reduce the rate and volume of stormwater runoff and improve water quality. It is recommended that CRW require property owners to employ stormwater BMPs that are identified in the Pennsylvania Stormwater BMP Manual to be eligible to receive stormwater credits. The program also offers educational institutions the ability to generate credits by incorporating stormwater management as part of their learning curriculum. Prior to implementing a stormwater fee, it is recommended that CRW prepare and adopt a formal stormwater credit policy document. In addition, CRW may also want to consider entering into inter-governmental agreements with schools and other governmental institutions whereby CRW would be granted access to the property to implement stormwater mitigation measures, and the property owners would receive a reduction in their stormwater bills by allowing CRW to install and maintain these mitigation measures.

5.0 Appeals and Exemptions

5.1 Introduction

It is recommended that CRW implement a stormwater appeals process to provide stormwater customers with the opportunity to appeal their stormwater fee calculation. The appeal could be related to the calculated amount of impervious area, parcel classification, or changing the distribution of the stormwater charges among multiple accounts on a parcel. There are several reasons why a customer's appeal for a change to the stormwater fee may be warranted. These reasons include:

- Incorrect Parcel
 - The customer does not own the parcel for which they are being billed. This may be due to an incorrect mailing address, recent property sale, or the water and sewer account is not associated with the correct parcel.
- Inaccurate Property Classification
 - Residential vs. non-residential classification or other.
- Inaccurate Impervious Area
 - The total impervious area being billed for the parcel is incorrect. This may be due to recent development or redevelopment activity not reflected on CRW's land cover data or portions of the parcel consisting of pervious gravel cover not reflected in CRW's land cover data.
- Reallocation of Stormwater Charge among Multiple Water Accounts on a Single Parcel
 - When a parcel is served by multiple water accounts, CRW will compute a stormwater charge for the parcel and then allocate that charge equally among the accounts. However, a parcel owner may request a different allocation of impervious area for the stormwater charge.

5.2 Legal Precedent for Limiting Stormwater Fee Exemptions

Most stormwater fee systems do not exempt or waive charges for tax-exempt properties. The rationale is that the stormwater fee is a fee for service. This is similar to other utility services, such as water and sewer service. It is typically only when state legislation requires specific properties to be exempt or waived from paying a stormwater fee that stormwater fee programs provide exemptions. Further, stormwater fee programs could face legal challenges if they chose to treat classes of properties differently because it could reduce the equitability of the user charge structure.

For stormwater fees implemented in Pennsylvania, there is no state legislation that excludes tax-exempt, state, or federal properties from paying the stormwater fee. Section 313 of the Federal Clean Water Act, which pertains to pollution control related to Federal government facilities, provides a rationale for charging Federal properties a stormwater fee:

(a) "Each department, agency, or instrumentality of the executive, legislative, and judicial branches of the Federal Government (1) having jurisdiction over any property or facility, or (2) engaged in any activity resulting, or which may result, in the discharge or runoff of pollutants, and each officer, agent, or employee thereof in the performance of his official duties, shall be subject to, and comply

with, all Federal, State, interstate, and local requirements, administrative authority, and process and sanctions respecting the control and abatement of water pollution in the same manner, and to the same extent as any nongovernmental entity including the payment of reasonable service charges.”

In addition, Senate Bill 3481 (2011), which amended the Clean Water Act, further clarified the Federal government’s position on paying its proportionate share of stormwater management costs. The bill amended Section 313 of the Clean Water Act by stating that reasonable service charges shall include all non-discriminatory fees, charges, or assessments that are:

(c) (1) (B) “Used to pay or reimburse the costs associated with any stormwater management program (whether associated with a separate storm sewer system or a sewer system that manages a combination of stormwater and sanitary waste), including the full range of programmatic and structural costs attributable to collecting stormwater, reducing pollutants in stormwater, and reducing the volume and rate of stormwater discharge, regardless of whether that reasonable fee, charge, or assessment is denominated a tax.”

At the state level, the Pennsylvania Municipal Authorities Act provides the powers that authorities may exercise to carry out the purposes set for in the Act:

“In the case of an authority that performs storm water planning, management, and implementation, reasonable and uniform rates may be based in whole or in part on property characteristics, which may include installation and maintenance of best management practices approved and inspected by the authority.”

While this does not convey a defined position for or against the payment of stormwater management, it does recognize the cost recovery mechanism to be employed by authorities to recover costs incurred as a result of stormwater management activities as “rates” rather than a tax.

While the Pennsylvania Municipal Authorities Act authorizes a stormwater authority to assess reasonable and uniform rates, the Second-Class Township Code does not do the same for second class townships within the state. However, the Second-Class Township Code was recently amended to authorize these towns to assess reasonable and uniform stormwater fees without having to establish a municipal authority. Specifically, the amendment stated that:

“...a township may assess reasonable and uniform fees based in whole or in part on the characteristics of the property benefited by the facilities, systems and management plans.” The rates and fees charged “...may not exceed the amount necessary to meet the minimum requirements of the Federal Water Pollution Control Act, and federal or state laws governing the implementation of the Federal Water Pollution Control Act.” Furthermore, in establishing the rates or fees, “...the township shall consider and provide appropriate exemptions or credits for properties which have installed and are maintaining storm water facilities that meet best management practices and are approved or inspected by the township.”

Finally, the Water Environment Federation's publication on user fee funded stormwater programs was also reviewed for guidance regarding property exemptions. This publication identifies several main criteria that have historically been considered by courts of law in determining whether charges assessed by stormwater utilities are user fees, or property-based taxes or assessments. The criteria include:

- Whether the fees or charges originate from costs incurred to meet some type of regulation.
- Whether the fees or charges relate to the benefit received by the fee payer. In other words, have the fees or charges been structured so that property owners with more impervious area, and thus more stormwater runoff, pay more than property owners with less impervious area?
- Whether credit options or other offsets are available to property owners for reducing or independently managing their stormwater runoff.
- The extent to which revenues generated by the fees or charges match the costs incurred to provide stormwater management services.

The publication was noted that utilities that consider these factors and incorporate them into their stormwater fee structure will be more likely to withstand challenges to the legality of their stormwater fee.

5.3 Appeals and Exemption Recommendations

It is recommended that all tax-exempt and non-tax-exempt properties within CRW's service area be charged a stormwater fee in accordance with their property impervious area and the recommended fee structure. Additional billing policy recommendations are provided in Appendix B. Furthermore, it is recommended that CRW formally adopt and implement an appeal process to provide a mechanism for stormwater customers to appeal their bills and correct any erroneous information. CRW should clearly define what can be appealed and when in its appeals process. What can be appealed is typically limited to the impervious area calculation, a customer's tier assignment, and the calculation of a stormwater credit. The basis for an appeal may include incorrect parcel information, inaccurate impervious area calculation, inaccurate tier category assignment, or a mathematical error.

Appeals are typically allowed to be submitted once per year, well in advance of the stormwater fee calculation for the upcoming year. The appeals process typically begins with the customer completing an appeals application form and providing supporting information. CRW would then review the information and provide a written approval or denial of the appeal application.



APPENDIX A:
**Summary of O&M Labor and Equipment
Allocations to Regulatory Activities**

Table A-1. Summary of O&M Labor and Equipment Allocations to Regulatory Activities (prepared by CDM Smith)

CRW O&M Labor / Equipment Allocations During the Remedial Maintenance Backlog Period (Through 2024)*

Asset Type	Quantity	Units	O&M Function	NMC-Compliant Preventative Maintenance			Remedial Maintenance Backlog Per CRW CityWorks				Supporting Equipment	
				Units/Year	FTE/Year	%/Year	Units/Year	FTE/Year	%/Year	Complete By	Type	Quantity
Inlets / Catch Basins	4,200	Structure	Inspection	40	0.04	1%	840	0.76	20%	end of 2021		
			Cleaning	36	0.2	1%	756	4.6	18%	end of 2021	Vactor Truck	1.4
			Repair	8	0.15	0.2%	420	3.0	10%	end of 2021		
Collection System Sewers/Manholes	124	Miles	CCTV	0	0	0.0%	12	1.6	10%	end of 2024	CCTV Truck	1.0
			Cleaning	0	0	0.0%	10.8	1.3	9%	end of 2024	Vactor Truck	0.6
			Inspection	0	0	0.0%	5	0.3	4%	end of 2024	Pole Camera	1.0
CSO Regulators, Outfalls, Flap Gates	59	Structure	Inspection Responsive Maintenance	21,535	0.8	100% every day	0	0	Required remedial maintenance will be implemented by outside contractors			
			Preventative Maintenance	59	1.2	100%	0	0				
Interceptor Sewers	14	Miles	Inspection	0	0.0	0%	0	0	Required remedial maintenance along the interceptor system will be implemented by outside contractors			
			CCTV	14 mi. every 5 years	contract inspection assumed	100% every 5 years	0	0				
			Cleaning	8.4 mi. every 5 years	contract cleaning assumed	60% every 5 years	0	0				
Pump Stations	3	Pump Stations	Operation		3.2		Rehabilitation and enhancement of the Front Street and Spring Creek pump stations will be implemented by outside contractors as part of the LTCP					
			Responsive Maintenance	as needed every day	0.7	as needed every day						
			Preventative Maintenance	per CityWorks	0.7	per CityWorks						
AWTP	1	Plant	Operation		12.8		0	0				
			Maintenance		5.6		0	0				
Staffing Totals (FTEs)	Staff Category				Subtotal FTEs	Annual Cost		Subtotal FTEs	Annual Cost	Total Annual Cost	Equipment Totals	
	Collection System O&M				2.4	\$120,019		11.6	\$459,381	\$579,400	CCTV Truck	1
	WWTP & Pump Station Operation				16	\$705,000		0	\$0	\$705,000	Vactor Truck	2
	WWTP & Pump Station Maintenance				7	\$320,300		0	\$0	\$320,300	Pole Camera	1

*Note: Assumptions made to allocate labor and equipment resources are documented separately



APPENDIX B:
Stormwater Billing Policy
Recommendations

Capital Region Water

Draft Stormwater Billing Policies

Definition of Impervious Area

Raftelis recommends that CRW define impervious area in the ordinance. Here is an example definition:

Impervious area means any surface that does not allow water to infiltrate into the ground. Typical examples include: building roof tops and canopies; concrete and asphalt pavement; structural decks and patios (e.g., wood, metal, natural stone, concrete); brick, concrete, and natural stone pavers; and gravel used for vehicular or pedestrian traffic and vehicle parking.

Definition of Residential vs. Other Ratepayer Classes

Residential properties include single family detached residential properties, multifamily properties, condominiums, and other dwellings as determined by the Dauphin County parcel land use code (see Table 1 below). All other property land use types not considered residential are defined as nonresidential.

Residential Class Example 1 - The parcels on both sides of the street are classified as 3 story residences and are considered to be residential properties.

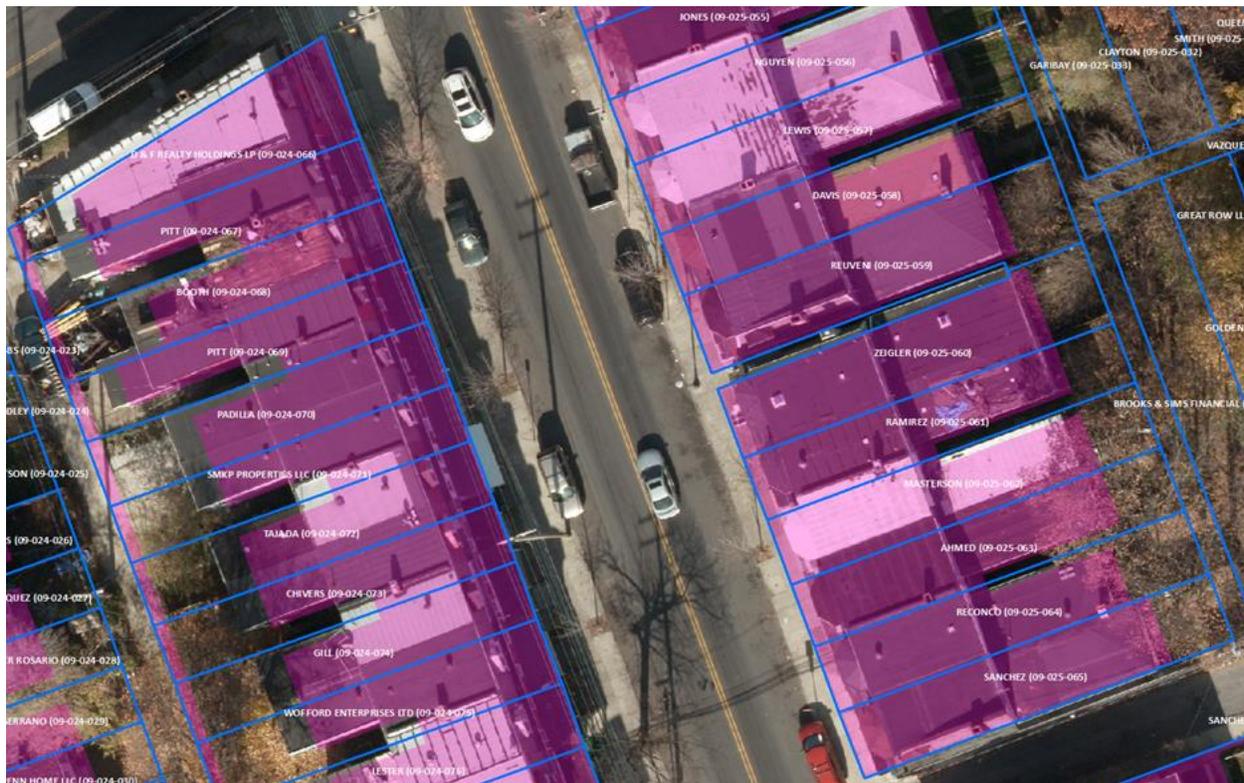


Table 1. Dauphin County Property Land Uses and Stormwater Bill Class

DC_TAX_LANDUSE_CODES		
Land Use	Land Use Description	Stormwater Bill Class
C01	OFFICE	Nonresidential
C02	STORE/RETAIL	Nonresidential
C03	SHOPPING CENTER	Nonresidential
C04	STORE/OFFICE WITH APTS	Nonresidential
C05	MEDICAL OFFICE	Nonresidential
C06	FINANCIAL INSTITUTION	Nonresidential
C07	CONDOMINIUM OFFICE	Nonresidential
C08	RESTAURANT/TAVERN	Nonresidential
C09	FAST FOOD RESTAURANT	Nonresidential
C10	GAS STATION	Nonresidential
C11	COMM GARAGE/AUTO DEALER	Nonresidential
C12	LODGING FACILITY	Nonresidential
C13	PRIVATE EDUC FACILITY	Nonresidential
C14	MOBILE HOME PARK	Nonresidential
C15	PARKING LOT/GARAGE	Nonresidential
C16	COMMUNICATIONS FACILITY	Nonresidential
C17	PVT CARE/NURSING HOME	Nonresidential
C18	FUNERAL HOME	Nonresidential
C19	THEATRE	Nonresidential
C20	RACE TRACK	Nonresidential
C21	TRUCK TERMINAL	Nonresidential
C22	WHSE/IND TO 10000 SQ FT	Nonresidential
C23	WHSE/IND TO 10-50000 SQ FT	Nonresidential
C24	WHSE/IND TO 50000-UP SQ FT	Nonresidential
C25	COMMERCIAL/INDUST MISC	Nonresidential
C26	DINER	Nonresidential
C27	CARWASH	Nonresidential
C28	LAUNDROMAT	Nonresidential
C29	HOSPITAL/CLINIC	Nonresidential
C30	UNUSABLE COMMERCIAL	Nonresidential
C31	ELECTRIC GENERATING CO	Nonresidential
C32	CELL/COMMUNICATION TOWER	Nonresidential
C33	TAX INCREMENT FINANCING OFFICE	Nonresidential
C34	TAX INCREMENT FINANCING SHOPPING CENTER	Nonresidential
E01	CHURCH EXEMPT	Nonresidential
E02	HOSPITAL/CLINIC EXEMPT	Nonresidential
E18	STATE/GOVT BLDGS EXEMPT	Nonresidential
E17	WASTE TREATMENT EXEMPT	Nonresidential
E16	POST OFFICE EXEMPT	Nonresidential

DC_TAX_LANDUSE_CODES		
Land Use	Land Use Description	Stormwater Bill Class
E15	AIRPORT EXEMPT	Nonresidential
E14	FAIRGROUND/HALL EXEMPT	Nonresidential
E13	RESIDENTIAL EXEMPT	Nonresidential
E12	PARK/RECREATION EXEMPT	Nonresidential
E11	LIBRARY EXEMPT	Nonresidential
E10	MISC EXEMPT	Nonresidential
E09	EXTENED CARE EXEMPT	Nonresidential
E08	MUNICIPAL EXEMPT	Nonresidential
E07	LEGION/VFW/CLUB EXEMPT	Nonresidential
E06	FIRE HOUSE EXEMPT	Nonresidential
E05	PARKING LOT EXEMPT	Nonresidential
E04	VACANT EXEMPT	Nonresidential
E03	EDUCATIONAL EXEMPT	Nonresidential
E19	DWELLING DISABLE VET	Residential
E20	CEMETARY	Nonresidential
E21	REDEVELOPMENT AUTHORITY	Nonresidential
E22	GROUP RESIDENCE	Residential
E23	EMERGENCY MEDICAL	Nonresidential
E24	HISTORIC SITE	Nonresidential
E25	COMMUNITY CENTER	Nonresidential
E26	MUNICIPAL WATER	Nonresidential
E27	STATE GAMLAND	Nonresidential
E28	RAILROAD RIGHT OF WAY	Nonresidential
L01	BLDG LOT UNDER 1 ACRE	Nonresidential
L02	BLDG LOT 1 TO 5 ACRES	Nonresidential
L03	BLDG LOT OVER 5 ACRES	Nonresidential
L04	RESIDENTIAL DEV LAND	Nonresidential
L05	COMMERCIAL LAND	Nonresidential
L06	INDUSTRIAL LAND	Nonresidential
L07	FARM LAND UNIMPROVED	Nonresidential
L08	FARM LAND WITH BUILDINGS	Nonresidential
L09	MOUNTAINLAND/TIMBERLAND	Nonresidential
L10	QUARRY/MINERAL LANDS	Nonresidential
L11	LANDFILL	Nonresidential
L12	MISCELLANEOUS LAND	Nonresidential
L13	MOBILE HOME SITE	Nonresidential
L14	UNBUILDABLE LOT	Nonresidential
L15	PRD COMMON AREA	Nonresidential
L16	AIR RIGHTS	Nonresidential
P01	CABIN/COTTAGE	Nonresidential

DC_TAX_LANDUSE_CODES		
Land Use	Land Use Description	Stormwater Bill Class
P02	GOLF COURSE	Nonresidential
P03	CAMP SITES	Nonresidential
P04	RECREATIONAL PARKS	Nonresidential
P05	SWIM CLUBS	Nonresidential
P06	MARINA	Nonresidential
P07	INDOOR SPORTS FACILITY	Nonresidential
P08	MISC RECREATIONAL	Nonresidential
R01	1 STORY RESIDENCE	Residential
R02	1.5 STORY RESIDENCE	Residential
R03	2 STORY RESIDENCE	Residential
R04	3 STORY RESIDENCE	Residential
R05	SPLIT LEVEL RESIDENCE	Residential
R06	BI LEVEL RESIDENCE	Residential
R07	CONDOMINIUM	Residential
R08	MODULAR RESIDENCE	Residential
R09	MOBILE HOME	Residential
R10	COUNTRY EST TO 10 ACRES	Residential
R11	APTS 4 OR LESS UNITS	Residential
R12	APTS 4 TO 10 UNITS	Residential
R13	APTS OVER 10 UNITS	Residential
R14	MISC RESIDENTIAL	Residential
R15	MULTIPLE DWELLINGS	Residential
R16	UNHABITABLE DWELLING	Residential
R17	GROUP RESIDENCE	Residential
R18	TIME SHARE CONDOMINIUM	Residential
U01	WATER COMPANY	Nonresidential
U02	GAS COMPANY	Nonresidential
U03	ELECTRIC COMPANY	Nonresidential
U04	TELEPHONE/TELEGRAPH COMPANY	Nonresidential
U05	OIL COMPANY	Nonresidential
U06	RAILROAD	Nonresidential
U07	MISC PUBLIC UTILITY	Nonresidential
U08	PIPELINE	Nonresidential

Residential Tiers

It is recommended that the residential stormwater fee structure be segregated into three tiers corresponding to residential properties with low, medium, and high amounts of impervious area, and non-residential properties be charged based on their individual property impervious area.

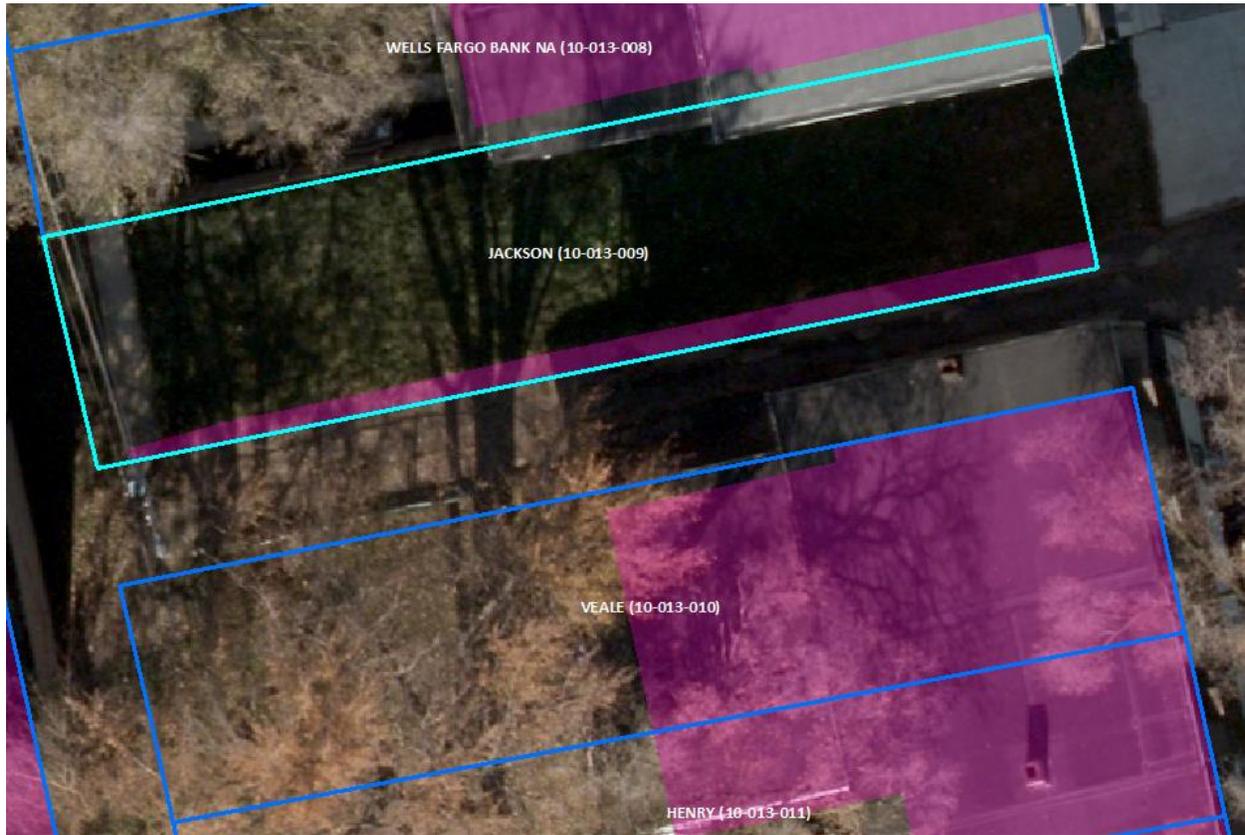
Tier	Total Impervious Area (ERUs)	Number of Residential Properties	Fee Multiplier
Tier 1 (≥ 400 and ≤ 700 SF)	948.5	1,897	0.5
Tier 2 (> 700 and $\leq 2,200$ SF)	11,565	11,565	1.0
Tier 3 ($> 2,200$ SF)	4,826.3	941	N/A (Individualized)

It is recommended that four hundred (400) square feet of impervious area per parcel as the minimum residential and non-residential impervious area that triggers a stormwater fee. There are approximately 2,400 residential and non-residential properties that have less than 400 square feet of impervious area.

Minimum Impervious Area Example 1 – The three non-residential properties below have less than 400 square feet of impervious area each, and would not be charged a stormwater fee.



Minimum Impervious Area Example 2 – The residential property highlighted below has less than 400 square feet of impervious area, and would not be charged a stormwater fee.



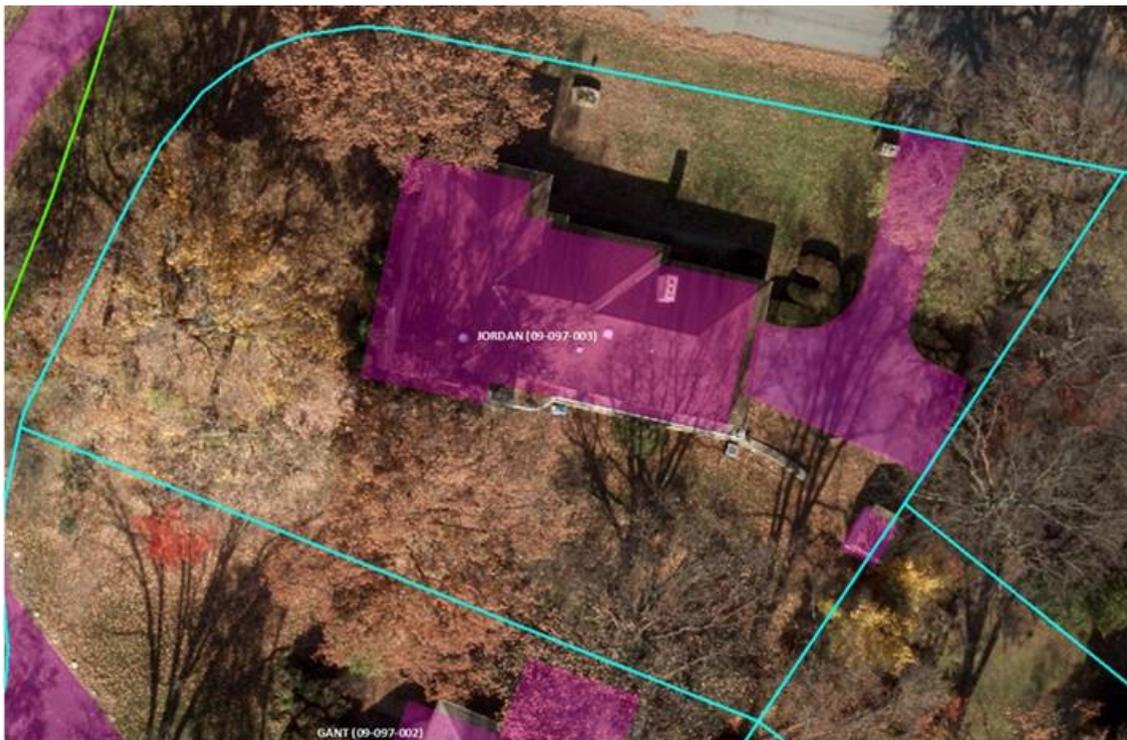
Residential Tier 1 Example – The two residential properties below have 550 square feet (parcel 04-037-005 on the left) and 586 square feet of impervious area (parcel 04-037-004 on the right), and each would be charged a fee of 0.5 ERU.



Residential Tier 2 Example – This residential property has 1,064 square feet of impervious area and would have a fee of 1 ERU.



Residential Tier 3 Example 1 – This residential property has 5,178 square feet of impervious area and would have an individualized charge based on 5.1 ERUs.



Residential Tier 3 Example 2 – This residential property is classified as an apartment property with over 10 units. It has 42,407 square feet of impervious area and would have an individualized charge based on 41.5 ERUs.



ERU Billing

For nonresidential properties and residential properties in Tier 3, it is recommended that CRW bill on ERUs rounded to the nearest tenth of an ERU for each property.

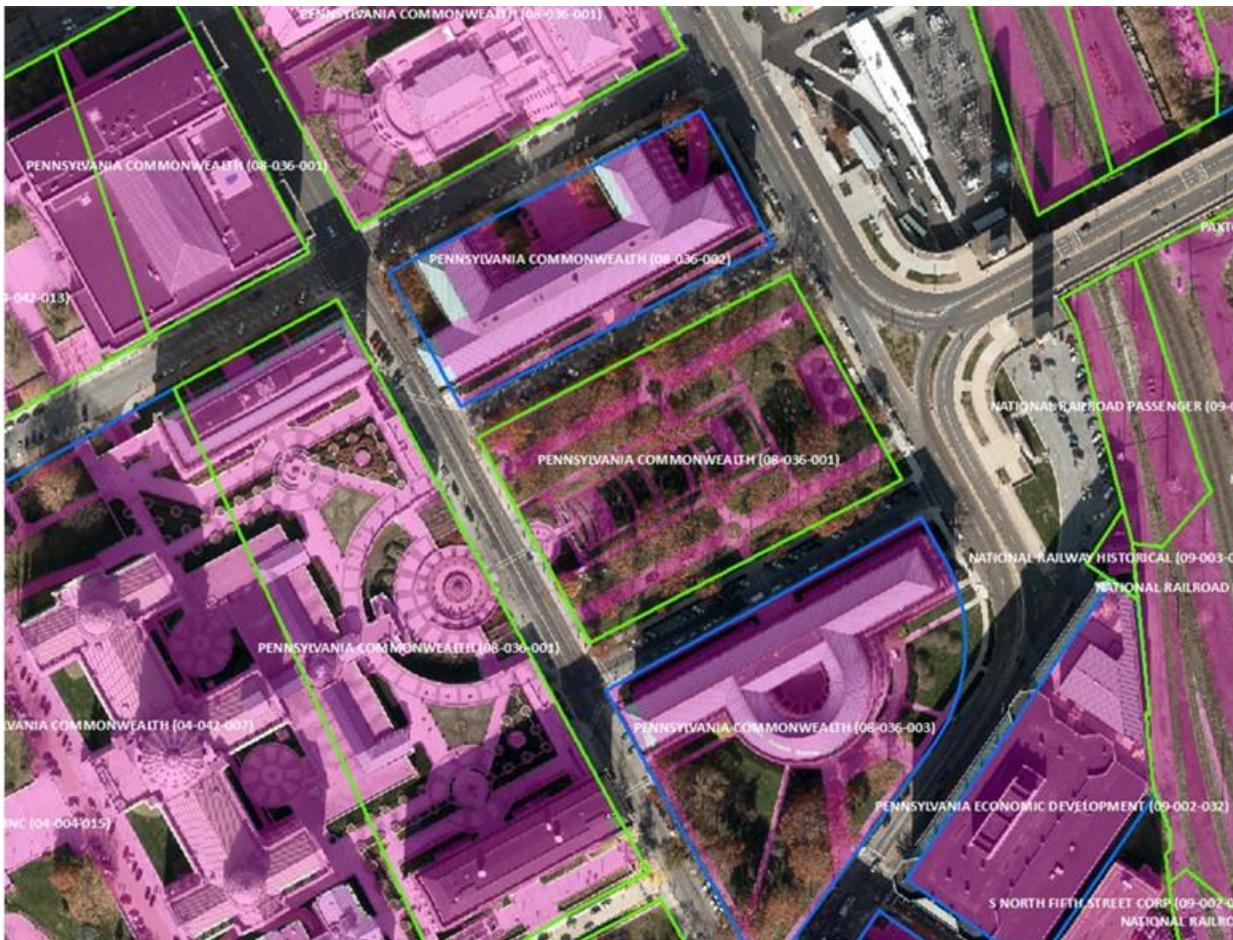
Minimum Charge

Nonresidential properties with more than four hundred (400) square feet of impervious area and less than or equal to seven hundred (700) square feet of impervious area will be assessed a minimum charge of 0.5 ERUs.

Aggregation

It is recommended that CRW aggregate bills for multiple parcels to be billed on a single water account under the following circumstances: 1) as a courtesy to large ratepayers with multiple accounts and multiple parcels; and 2) where condo or townhome complexes are master-metered and individual residential or commercial parcels would otherwise be stormwater only accounts. Only as a last resort will stormwater only accounts be created and billed to the parcel owner. (Disaggregation will be allowed under written direction of the owner.)

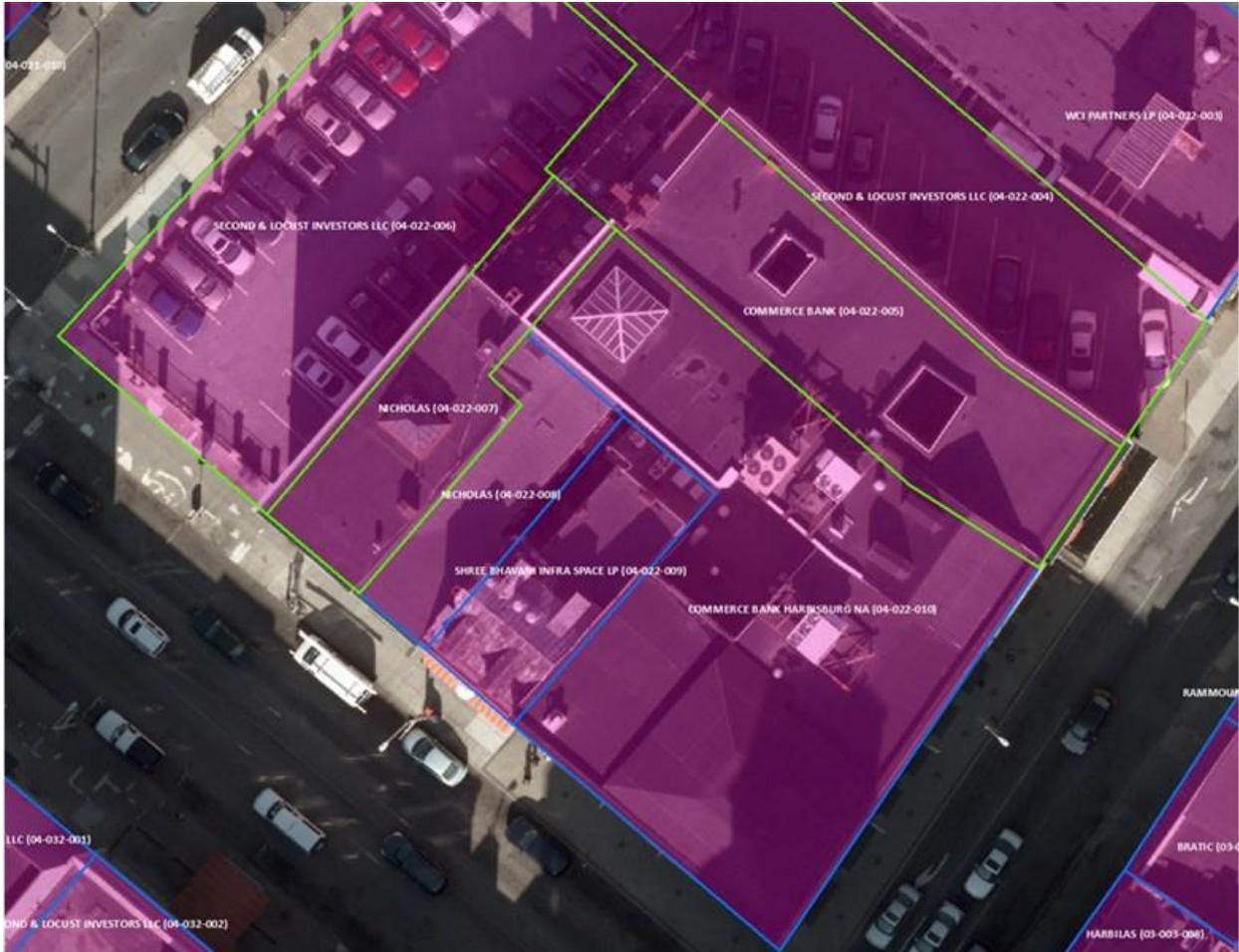
Aggregation Example 1 – As shown below, some ratepayers with multiple parcels include the Pennsylvania Commonwealth, Norfolk Southern Corporation, and National Railroad Passenger. Their properties are often but not always adjacent to each other. Properties with water accounts matched to them are outlined blue, while properties without accounts matched are outlined in green. (Commonwealth parcel with water account PID: 08-036-002)



Aggregation Example 2 – Two adjacent residential properties owned by Baltozer that can be aggregated for stormwater billing. Properties with water accounts matched to them are outlined blue, while properties without accounts matched are outlined in green. (Baltozer parcel with water account: 02-012-017)



Aggregation Example 3 – Two adjacent nonresidential properties owned by Nicholas and two adjacent nonresidential properties owned by Commerce Bank. We recommend aggregating the properties for each owner since each owner has a water account matched to one property but not the other. (Nicholas parcel with water account matched: 04-022-008)



Aggregation Example 4 – The Harrisburg YMCA spans three adjacent parcels. We recommend aggregating the parking lot parcels with no water accounts (outlined in green) to the main YMCA building parcel (outlined in blue) for stormwater billing. (YMCA parcel with water account: 04-024-001)



Apartments

Apartments are defined as residential properties and are assigned a tiered fee based on the amount of measured impervious area.

If a single, active master meter is available for an apartment property, it is recommended that the stormwater fee be assigned to that account. If more than one active account is available, the default policy is for the bill to be split equally among the meters. However, property owners may notify CRW that they would like to reapportion the bill among accounts and CRW will do so.

Apartments Example 1 – The Pennsylvania Place Association apartment buildings on the parcel below are matched to a master meter that would be billed the stormwater fee. (03-002-012)



Apartments Example 2 – The apartment parcel owned by JR River LP below that has 4 to 10 units is matched to a master meter that would be billed the stormwater fee. (04-033-005)



Condominiums

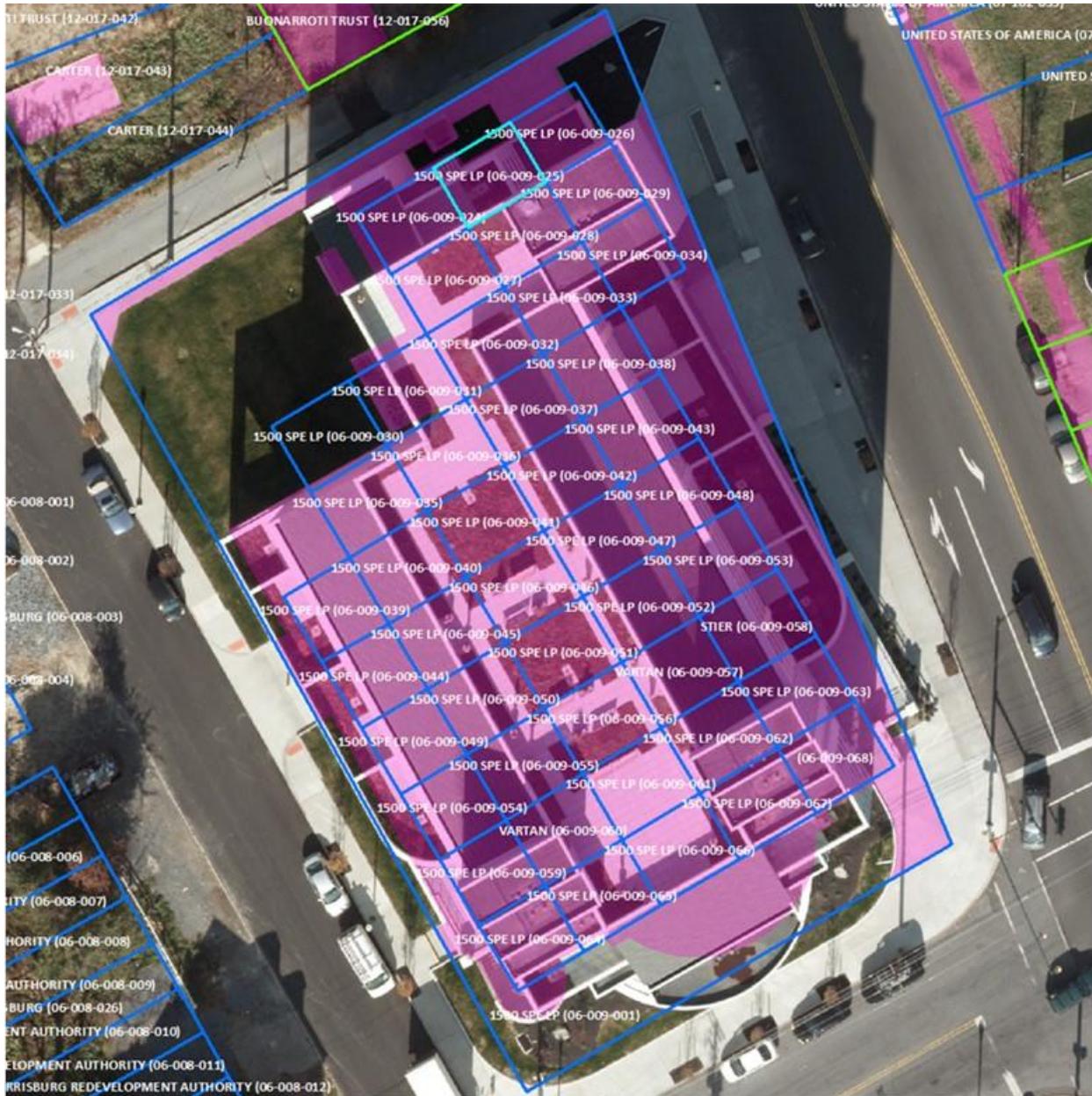
Condominiums are defined as residential properties and are assigned a tiered fee based on the amount of measured impervious area.

Condominium complex fees will be assigned to a master meter where available. Stormwater fees will be assigned as residential bills to individual units where there are individual parcels delineated and where the parcels are individually metered. For a master metered complex with individual parcels that are unmetered, the aggregated bill will be assigned to the master meter account.

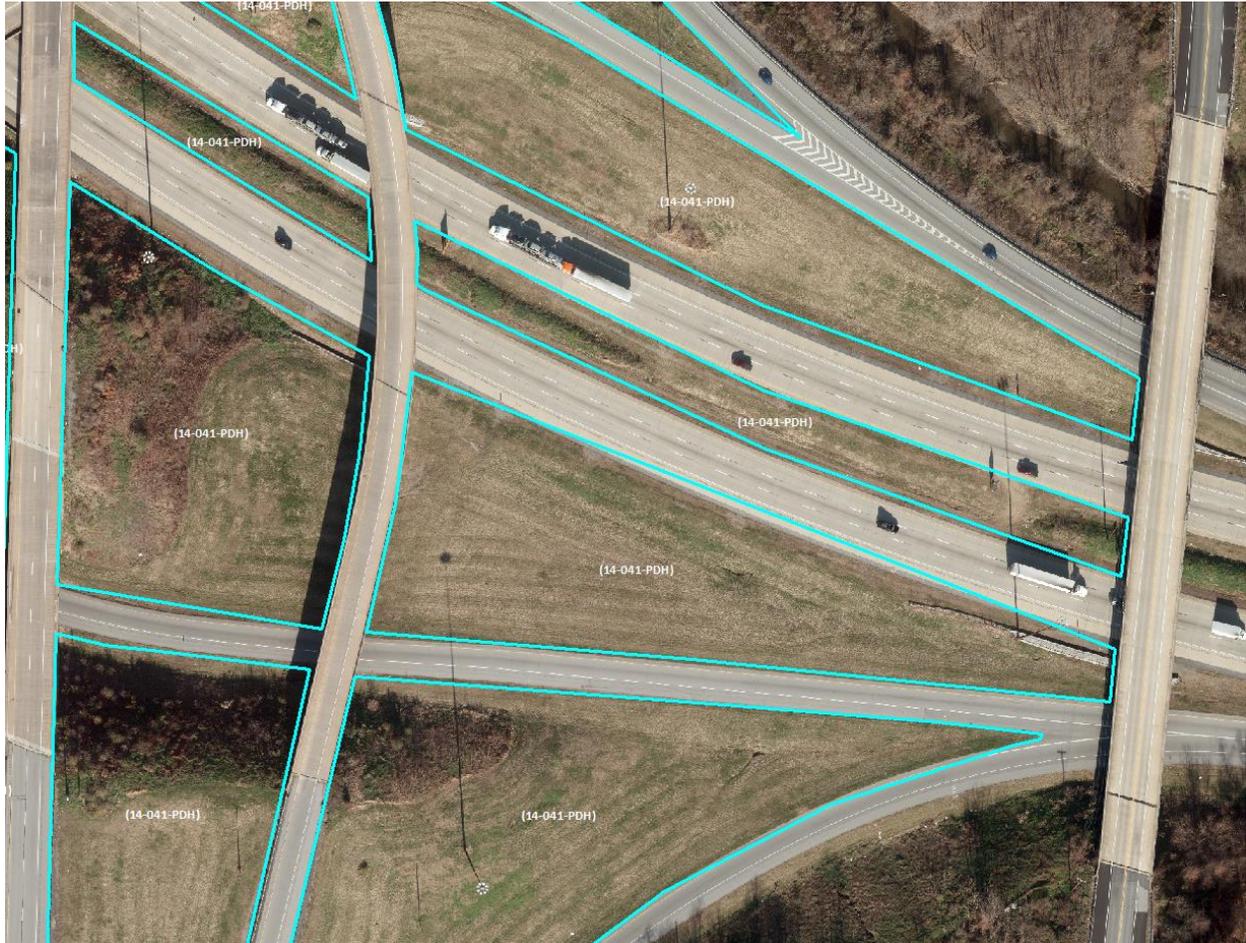
Condominium Example 1 – There is one water account matched to the rightmost parcel (10-063-031). Since the other individual parcels are unmetered, we would aggregate all the parcels and assign the stormwater fee to the main water account on parcel 10-063-031.



Condominium Example 2 – All the properties below (starting from 06-009-025) have matched water accounts, including the base property. We would aggregate all the individual parcels with the base property, and bill the combined stormwater fee to the master meter. (In this case, all individual parcels and the base parcel are owned by 1500 SPE LP.)



Roadways Example 1 – Public roadway parcels that are not billable for stormwater (14-041-PDH)



Roadways Example 2 – Private roadway on a multifamily parcel that is considered billable impervious area (01-024-001)



Note that there are not many private roadways (such as subdivision streets) captured in the impervious area data.

Shopping Centers and Offices

If a single, active master meter is available, the fee will be assigned to that account. If more than one active account is available, the default policy is for the bill to be split equally among the meters. However, property owners may notify CRW that they would like to reapportion the bill among accounts and CRW will do so.

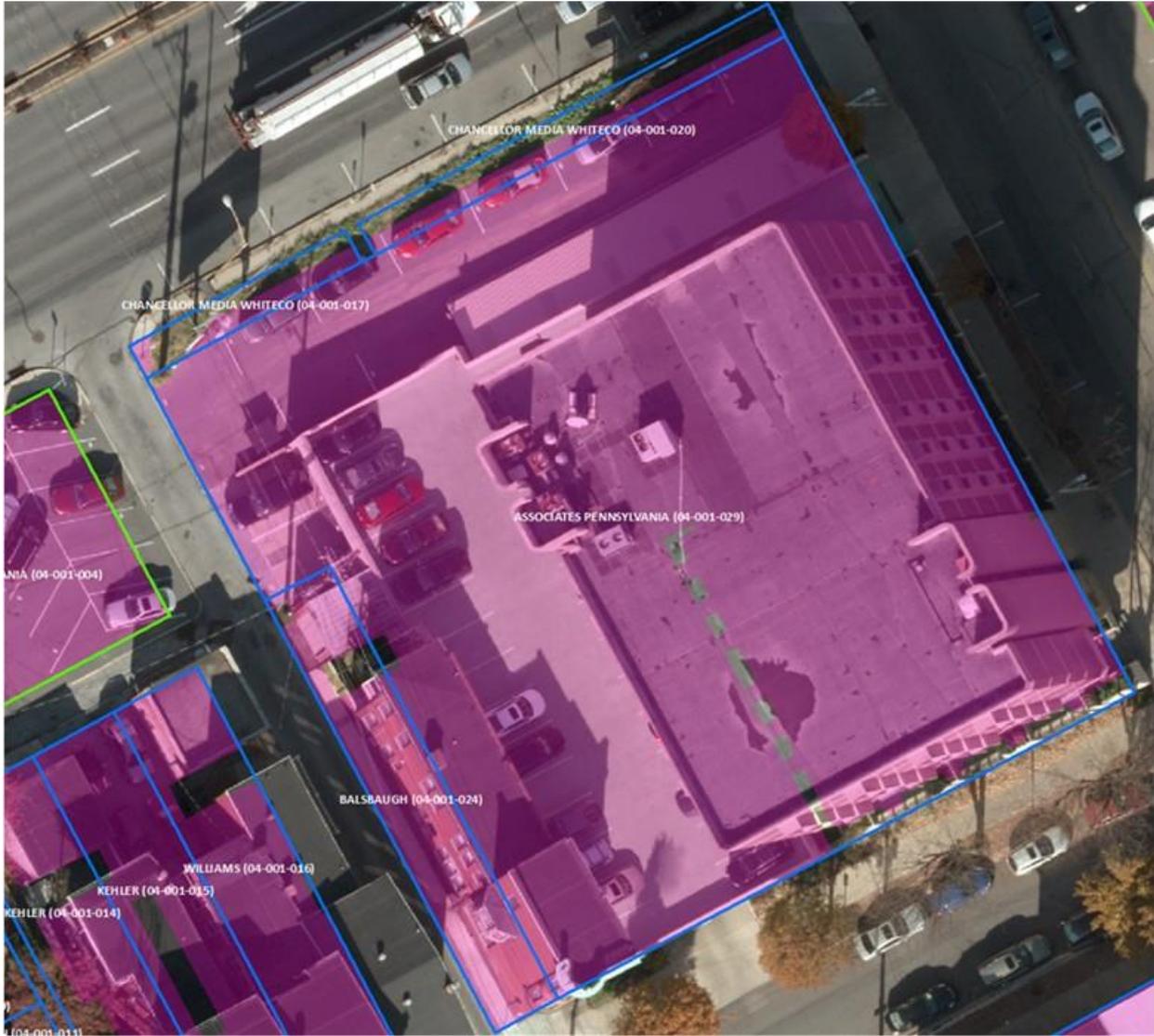
Shopping Center Example 1 – The two shopping center parcels owned by Kline Plaza, LLC have three matched water accounts that could be billed the stormwater fee. It is recommended that stormwater fee be billed to the master meter for each parcel. If the owner requests that both properties' fee be billed to one master meter account, CRW can also aggregate the properties and bill both fees to one account. (Left parcel: 09-101-003; right parcel: 09-101-004)



Shopping Center Example 2 – This parcel owned by Town Associates currently does not have a water account matched to it. We recommended billing the stormwater fee to the master meter when the master meter for the shopping center is identified. (14-040-003)



Office Example 3 -- This office parcel owned by Associates Pennsylvania has one matched water account that would be billed the stormwater fee. (04-001-029)



Office Example 4 – This office building that has a parking deck underneath has been split into many smaller parcels that have been matched to water accounts. We would aggregate all the parcels and bill the stormwater fee to the master meter for the building.



(Office Example 4 continued)



Treatment of Railroad Parcels

Gravel used as ballast for railroads is not considered to be impervious surface. (Raftelis removed ballasts from the impervious area data that was provided in 2017). It is recommended that parcels with the property type of railroad right-of-way are not excluded from the stormwater fee. Some of these parcels have billable impervious area on them and are similar to other railroad parcels that are considered billable property types.

Railroad Example 1 - Parcels classified as railroad right-of-way (highlighted in teal) with billable impervious area on them. Note that we have reviewed the railroad right-of-way parcels and edited the billable impervious area data to include only rooftops, parking lots, and paved surfaces.



Minimum Impervious Area Measurements

The following are recommendations for future data maintenance of impervious area. Since the stormwater fee is based on the amount of impervious surface area on a parcel, CRW will need to delineate the minimum impervious area measurements for digitization and fee calculation for future billing data maintenance. Below a certain width, linear polygonal features cannot be reliably measured because the resolution of source imagery is insufficient. Similarly, below a set dimension, called the minimum mapping unit, non-linear polygonal features cannot be measured reliably because of shadows or other data noise that may prevent accurate measurement.

In addition to minimum mapping units for hand measuring impervious area, CRW should define the amount of impervious area that is allowable on a parcel before that parcel is considered billable rather than vacant. Right-of-way impervious area is not captured and is not billable impervious area. Raftelis recommends that CRW defined one hundred (100) square feet as the minimum area for stand-alone polygonal features that will be hand measured as impervious surface area for inclusion in stormwater fees. These represent the minimum size of each object included in the total calculation of impervious surface area.

Raftelis also recommends that CRW use four hundred (400) square feet per parcel as its minimum residential and non-residential impervious area that triggers a stormwater fee.

Initial Data Conditions and Development

Sources

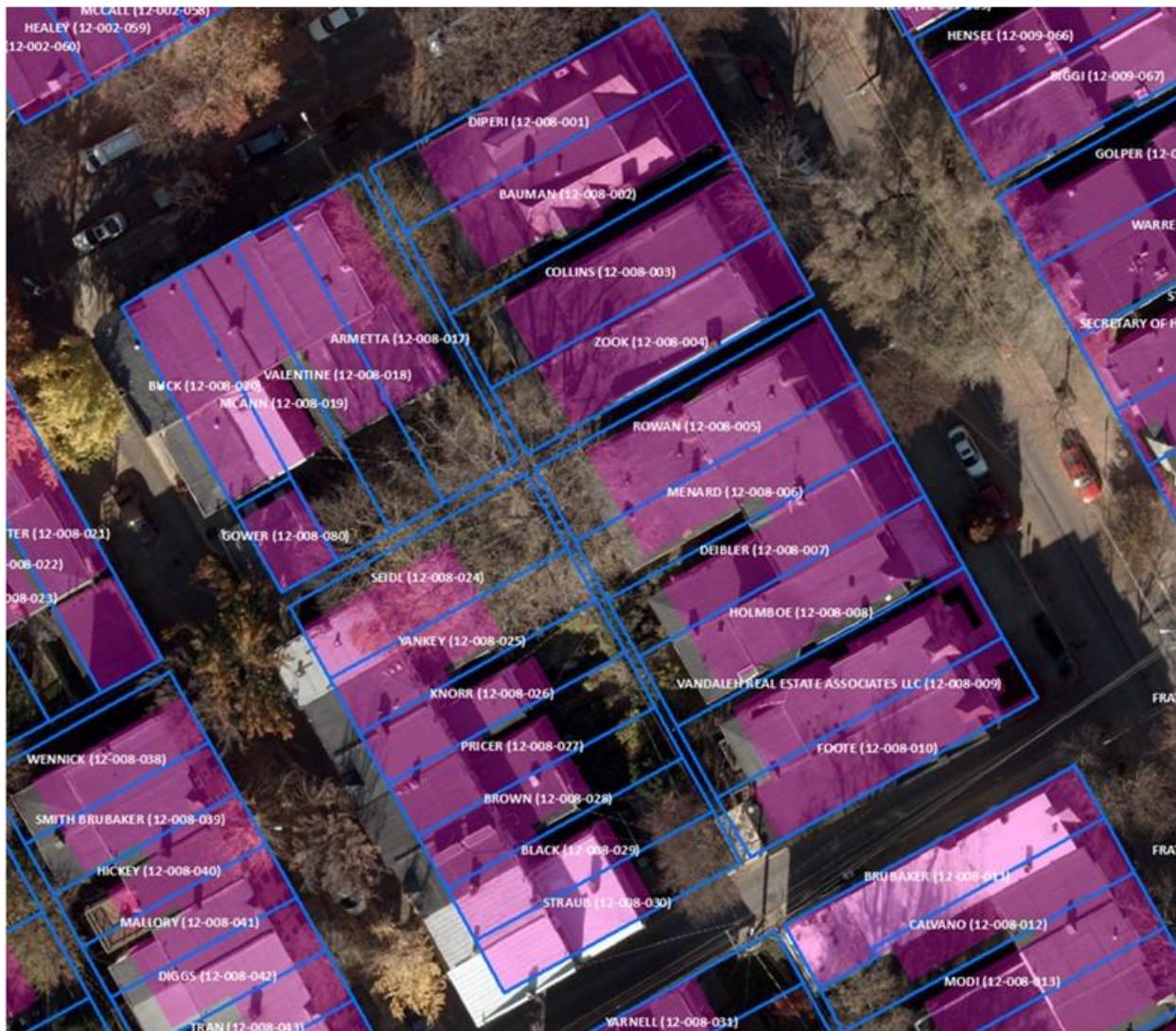
The following GIS data was provided by CRW in 2017:

- Impervious area data from 2013
- Aerial orthophotography from 2017 or earlier

Raftelis downloaded the following data from the Dauphin County GIS site, and analyzed the parcels in the City of Harrisburg to determine the stormwater ratepayer classes and impervious area for each property.

- March 2019 Dauphin County Parcel Boundaries at https://data-dauphinco.opendata.arcgis.com/datasets/3acd069a407f4799a86eb401f155edb1_0
- March 2019 Dauphin County Tax Roll Table at <https://data-dauphinco.opendata.arcgis.com/datasets/tax-roll-table>

Source Example 1 - GIS source data used for Fee Implementation tasks.





APPENDIX C:
Examples of Stormwater Fee Credits
in Pennsylvania

Table C-1 Examples of Stormwater Fee Credits in Pennsylvania

Description	Derry Township	Ebensburg Borough	Hampden Township	Jonestown Borough	City of Lancaster	City of Meadville	Mt. Lebanon Township	City of Philadelphia	Radnor Township	West Chester Borough
Maximum Credit Allowed	45%	40%	50%	50%	50%	40% / \$30,000 max	50%	80% of IA managed	n/a	60%
Credit Term	5 years	3 years	3 years	4 years	2 years, education is 1 year	1 year	Automatic renewal, except education credit is annual	4 years	n/a	3 years
Credit Application Fee	0%	\$125 for peak flow credits only	n/a	\$0.00 for Res. \$150 for application, \$50 for renewal	n/a	2500%	\$25 per ERU, max of \$1,000 for peak flow, \$250 for education	\$150 for application, \$50 for renewal	n/a	0%
Residential Credits			None		50% max for GI	Yes, eligible			Rebate program	Credits and rebates
Low Impact Parcel	45% max. (Not connected to a storm sewer and IA of 10%)	None	None	None	Not specified	None	None	n/a	n/a	n/a
Public Participation	15% max. 1 credit hour = \$0.50/month	None	None	None	Not specified	None	None	n/a	n/a	n/a
Public Participation Credit Donation	Can be donated to a non-profit.	None	None	None	Not specified	None	None	n/a	n/a	n/a
Rain Barrels	20% max based on % of roof captured	10% max for a barrel capacity of 100 gallons	None	Yes. Amount not specified.	Not specified	Not specified	25% of rain barrel cost, or a min of \$25 or a max of \$50.	n/a	\$50 each, up to 5	\$30 rebate per barrel, no credit
Cistern			None					n/a	10000%	Yes
Downspout Disconnection	20% max	10% max for dry well	None	None	Not specified	Not specified	None	n/a	\$50 max	\$25 rebate, \$5 credit
Turf & Landscape Management	15% max	None	None	None	Not specified	None	None	n/a	n/a	
Riparian Buffer	45% max	None	None	None	Not specified	Yes. See below	None	n/a	n/a	Yes
Stream Restoration	45% max	None	None	None	Not specified	Not specified	None	n/a	n/a	Yes
BMP Easement	45% max	None	None	None	Not specified	Yes. See below	None	n/a	n/a	
Urban Tree Canopy Expansion	45% max	None	None	None	Not specified	Not specified	None	n/a	n/a	\$50 rebate, no credit
Perious Pavement	45% max	None	None	None	50% max	Yes. See below	None	n/a	n/a	\$100 rebate, \$20 credit
Green Roofs	45% max	None	None	None	50% max	Yes. See below	None	n/a	n/a	
Innovation Credit	45% max.	None	None	None	Not specified	Not specified	None	n/a	n/a	
Rain Garden / Bioretention	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	\$250 max	\$100 rebate, \$20 credit
Infiltration Trench	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		Yes
Non-Residential Credits										
Structural BMPs										
Rate Controls	10% max	10% max for 10-yr event 20% max for 25-yr event 30% max for 50-yr event 40% max for 100-yr event	25% x impervious area captured	50% max for managing peak flows from a two-yr storm	25% max	10% max - 10-yr event 20% max - 25-yr event 30% max - 50-yr event 40% max - 100-yr event	50% max based on % of IA served, must meet 25 yr storm	n/a	n/a	30% max. Varies from 1-yr to 100-yr storm
Volume Controls	10% max	15% max	Lesser of 25% and 25% x 1.5x IA captured	None	50% max	15% max	None	n/a	n/a	60% max
Water Quality	25% max	10% max	n/a	50% max for managing first 1", 50% x % IA managed	25% max	10% max	None	n/a	n/a	30% max
Non-Structural					15% max			n/a	n/a	15% max
Education Program	10-20% depending on % of school grades participating	10-20% based on % of school participating	n/a	n/a	10-20% based on % of school participating	n/a	Up to 20% credit	n/a	n/a	15% max
Fertilizer Management Program	None	Up to 15% credit	None	None	None	None	None	n/a	None	
Institutional Credits	20% max for separate MS4 permit	50% max for parcels w/ separate MS4 permit	None	None	None	None	None	87% of IA managed for NPDES permit areas	None	15% max for NPDES permit area

