1. Purpose

Alaska Pollutant Discharge Elimination System (APDES) Permit No. AKS-052558, Section 3.4.5.4 requires the permittees, the Municipality of Anchorage (MOA) and the State of Alaska Department of Transportation and Public Facilities (ADOT&PF), to inventory and designate arterial and residential streets and large parking lots within the Anchorage Municipal Separate Storm Sewer System (MS4) for sweeping maintenance; to record and report sweeping performed along these systems on an annual basis; and to annually assess these sweeping practices relative to minimization of pollutant discharges from these systems into receiving waters. Specifically, permittees are required to submit:

- Sweeping maps: each year permittees must submit maps of the streets and parking lots that have been designated for sweeping that year and their proposed sweeping frequency relative to the frequencies specified in this permit. Permittees must also designate those streets that they deem 'technically infeasible' for sweeping.

- Sweeping records: permittees must submit annual records of the sweeping practices used, and the curb miles and volumes of materials swept for street and parking lots organized by sweeping event, general location, and sweeping frequency class. Analyses of particle size distributions for samples representative of swept materials must also be submitted.

- Sweeping assessment: permittees must annually prepare an assessment on the basis of submitted sweeping records of the effectiveness of MS4 sweeping completed that year in minimizing pollutant discharges to storm drains and receiving waters.

ADOT&PF have completed and compiled these inventories, records and assessments and submitted summaries of these data and findings in this report in compliance with this permit part. The report is organized into five major sections. Section 1.0 summarizes the purpose of this report. Section 2.0 identifies 2019 swept streets and large public parking lots as well as those streets designated infeasible for sweeping. Section 3.0 summarizes sweeping records for 2019. Section 4.0 summarizes an assessment of the permittees' sweeping effectiveness for this year. Section 5.0 includes maps and additional summary tables described in Sections 2.0 through 4.0.

2. Streets and Parking Lots Designated for Sweeping

Permit Section 3.4.5.1 requires permittees to map all streets and large public parking lots to be swept in the coming year and designate their assigned sweeping frequency relative to permit requirements. Further, Section 3.4.5.3 requires that permittees designate streets that are technically infeasible for sweeping and specify why. Finally, Section 3.4.5.4.1 requires that permittees annually '..identify any significant changes..' in mapping of '..residential, arterial, and public parking lots..' subject to regular sweeping under the permit and '..the basis for those changes.' The following section summarizes this information. Section 2.1 identifies types of streets deemed technically infeasible for sweeping by the permittees. Section 2.2 identifies streets designated for sweeping within each of the permittees' jurisdictions, and the sweeping management areas ('general locations') that the permittees' use to organize sweeping efforts. Section 2.3 identifies the public parking lots designated as large and swept by the permittees. Any changes in swept features and the basis for those changes are also summarized in Section 2.2 and 2.3.

2.1 Technical Feasibility for Sweeping

Permittees must document areas where street sweeping is technically infeasible and why (Part 3.4.5.3). The permittees specify the technical infeasibility of regularly sweeping a street based on two factors: surface type and cases where the combined character of speed, access and drainage type make regular sweeping unnecessary, disruptive and/or dangerous.

Unpaved road surfaces are not technically feasible for sweeping. Such surfaces of course will include dirt and gravel roadways but include as well those whose surfaces have been treated with applications of chemicals or asphaltic or other mixtures to create a smooth and temporarily hardened surface. Treatment typically results in only a short-term hardening of the road surface with a primary intent of smoothing the road surface for traffic over the summer season. However, the treatment also serves to temporarily bind particles to reduce dust and erosion. Sweeping can speed deterioration of these surfaces and increase mobilization of fines during runoff. Therefore, these roads are not swept but may be periodically re-graded or re-treated to reduce erosion and dust generation.

High-speed, high-traffic roadways (freeways and expressways), where access is limited and drainage is provided by open channels on both sides of the road, are also not regularly swept. Regular sweeping along these street segments is considered both technically infeasible and unnecessary. Regular sweeping is technically infeasible along these roadway segments because of the speed and volume of the traffic. Regular sweeping activity along these segments would present unpredictable danger to traffic as a slow-speed obstruction. It would also limit for prolonged periods of time the utility of these roadways as high-speed throughways. From a more practical standpoint, regular sweeping along these segments is also generally unnecessary. Winter traction sand applications along these segments is less frequently done, significantly reducing sediment loading on the roadway. The sediment that does accumulate is rapidly removed by high-speed traffic along these segments. Wind and wheel energy generated by traffic very effectively move particulates off the paved surface and onto vegetated shoulder and median areas where these materials are collected on a seasonal or as-needed basis during shoulder maintenance.

2.2. Designated Streets for 2019 Sweeping

Permittees are required to identify and map all streets designated for sweeping and provide maps of streets swept in an annual report of these activities (3.4.5.1 and 3.4.5.4.1). Any changes in swept features and the basis for those changes must also be summarized. Maps of the Anchorage MS4 streets and public parking lots are compiled and available in Section 5. ADOT&PF divides this region into three smaller operational areas, and these operational areas are used in this document as a basis for permit-required sweeping reporting.

Operational areas are shown in Figure 5-1 and streets that were designated for sweeping in 2019 are shown in Figures 5-2 through 5-8 in Section 5.1 for each of the primary maintenance administrative agencies for the Anchorage MS4.

In 2019, there were no changes in management practices or streets designated for sweeping from its 2018 reporting period.

2.3. Designated Large Public Parking Lots

Section 3.4.5 specifies that permittees must identify and designate those large parking lots for sweeping that serve schools, cultural facilities, plazas, sports and event venues and similar facilities. The permittees have interpreted a large public parking lot to be any such lot that has a total exposed parking footprint within a single parcel or a complex of closely associated parcels of 2 acres or larger (see the Anchorage MS4 Sweeping Plan, p4).

ADOT&PF owns no public parking lots that meet these criteria.

3. 2019 Sweeping Performance Reports

Permit Part 3.4.5.4 requires permittees to report sweeping performance annually in terms of specific factors and to assess sweeping effectiveness in minimizing discharge of pollutants to storm drains and creeks based on those factors. Sweeping performance reports must at minimum identify and map the actual streets and parking lots that were swept in the reporting year. In addition, permittees must compile and report specific sweeping performance factors including dates of sweeping, completeness, sweeping practices used, interference from parked vehicles or construction activities, other relevant qualitative information such as 'visually clean' evaluation, volume or weight of swept materials, and particle size distributions of representative swept materials.

The permit specifies that sweeping performance information is to be organized and reported, in some respect, by date, general location, and sweeping 'frequency category' (defined in the permit as Arterial or Residential streets, and Parking). All these factors are specifically to be used in assessing the effectiveness of MS4 sweeping on limiting discharge of pollutants to the MS4 and receiving waters. This section summarizes sweeping performance records sorted for streets (Subsection 3.1). Subsection 3.2 describes particle size distribution measures for street materials collected during the 2019 sweep periods. In Section 4, we use these performance records, along with other information, to assess effectiveness of the 2019 MS4 sweeping program and the 'visually clean' standard.

3.1. Street Sweeping Performance Reports for 2019

The sweeping performance data has been organized to reflect both significant differences in drainage types across the MS4 and variations in street sediment loading between those drainage types. As described in the MS4 Sweeping Plan, the permittees may use different sweeping practices for streets having curb and gutter (CG) drainage as opposed to those having open channel (OC) or ditch drainage. For streets with curb and gutter drainages, sediments are concentrated along the gutter pan and readily available for mobilization in washoff events. For these streets, swept materials are always collected during sweeping, and the removed volumes can be readily inventoried. Sediments from streets with open channel drainages tend to become concentrated onto the adjacent vegetated shoulders where runoff events are much less likely to mobilize them. Along these streets, the materials are removed in the same manner as the streets with CG and volumes are inventoried the same. The material that, prior to sweeping, may leave the road and end up in the vegetated shoulder will eventually be removed during later shoulder maintenance and ditch 'dressing'. As a result, inventories of the volumes of sediment swept from a

large portion of open channel street segments may not be as reliable in determining the sediment loading on these segments.

Given these practices, reporting sweeping information for curb miles alone, as the permit specifies, is problematic. Reporting only those streets having 'curb miles' (i.e., curb and gutter type streets) as specified in the permit would obviously bias measurement of total Anchorage MS4 sweeping performance. Similarly, using total street miles when assessing the total volume of swept materials will bias loading and efficiency estimates when the only swept sediment volumes recorded are for curb and gutter streets but open channel street miles are included in the analysis. Finally, potential for biasing analysis is even further compounded considering differences in sediment loading between drainage types (and sweeping frequency categories).

To control for these sweeping practices and characteristics, sweeping performance information for Anchorage MS4 streets is collected and sorted by a number of factors. These include sweeping frequency type and drainage type, the sweeping event (measured by the sweeping completion date range; spring, summer, fall), and the operational area ('general locations' in the permit language). Sweeping frequency types include 'Arterial' and 'Residential' categories as already described in the permittees MS4 Sweeping Plan.

Sweeping performance information reported for the Anchorage MS4 includes total swept volumes (in cubic yards) referenced to operational areas and to 'Street Miles', 'Curb Miles', and/or 'Pick Up Miles'. 'Street Miles' for all designated swept streets are included in this performance report and are calculated as the total centerline lengths of swept street segments. Where a 'kick' type of sweeping practice is used along open channel roads (i.e., swept sediments are not completely collected), total swept volume will not be known and Street Miles is the only sweeping information reported. Any estimate of swept volumes for these streets must be calculated using the swept mileage and an estimate of street sediment loading present at the time of the sweeping event for the particular sweeping frequency category (arterial or residential).

Because sweep practices that collect swept material (i.e., swept volumes are inventoried) are used on both curb and gutter and open channel drainage type roads, the term 'Pick Up Miles' is more appropriate and used in place 'Curb Miles' for this report. Pick Up Miles optimally represent the total actual length of road shoulder swept, for the case of open channel road segments, and the actual length of curbed drainage swept, for curb and gutter road segments. Where this is not known, Pick Up Miles are estimated as twice the length of the swept streets along which the sediments are collected. Where possible, the Anchorage MS4 sweeping performance report also includes an estimate of the unit swept volume (cubic yards per Pick Up Mile) for each combination of frequency type and drainage type.

2019 sweeping performance records are summarized for all three sweeping events in Table 3-1 below. Note that the two tandem sweeps required for arterial frequency category streets are summarized under the single spring event shown. Operational areas are as described in Section 2.2 and shown in Figure 5-1. More detailed sweeping summary tables are included in Section 5.2, including all required permit reporting elements.

Sweeping of designated streets was completed in accordance with permit requirements using the various practices as described in the previously published MS4 Sweeping Management Plan.

Table 3-1 Anchorage MS4 Sweeping Summary, 2019

Spring 2019

EPA Category	Drainage Type	Street Miles	Pick Up Miles	Total Volume* (CY)	Unit Volume (CY/mile)
Arterial	OC	5.1	25.5	128.5	5.0
	CG	43.9	198.8	2725.1	13.7
	Mixed	48.5	188.2	3114.7	16.5
	Total	97.5	412.5	5968.4	14.5
Residential	OC	55.8	146.4	760.4	5.2
	CG	3.7	21.5	157.2	7.3
	Mixed	26.9	107.7	493.4	4.6
	Total	86.3	275.6	1411.0	5.1

Summer 2019

EPA Category	Drainage Type	Street Miles	Pick Up Miles	Total Volume* (CY)	Unit Volume (CY/mile)
Arterial	OC	5.1	25.5	39.3	1.5
	CG	43.9	198.8	696.4	3.5
	Mixed	48.5	188.2	546.7	2.9
	Total	97.5	412.5	1282.4	3.1
Residential	OC	55.8	146.4	265.9	1.8
	CG	3.7	21.5	91.4	4.2
	Mixed	26.9	107.7	169.3	1.6
	Total	86.3	275.6	526.5	1.9

Fall 2019

EPA Category	Drainage Type	Street Miles	Pick Up Miles	Total Volume* (CY)	Unit Volume (CY/mile)
Arterial	OC	5.1	25.5	39.6	1.6
	CG	43.9	198.8	779.2	3.9
	Mixed	48.5	188.2	745.6	4.0
	Total	97.5	412.5	1564.3	3.8
Residential	OC	55.8	146.4	277.9	1.9
	CG	3.7	21.5	69.3	3.2
	Mixed	26.9	107.7	190.8	1.8
	Total	86.3	275.6	538	2.0

* Volumes represent only swept materials collected along reported/estimated Curb/PickUp Miles
OC = Open Channel Drainage
CG = Curb and Gutter Drainage

For 2019, ADOT&PF reported 100% completeness for all road segments and operational areas for the spring, summer, and fall sweep periods.

3.3. Particle Size Distributions for Swept Materials

Permit requirements at 3.4.5.4 require that particle size distribution be evaluated for a representative sample of swept materials. Representative samples of swept street materials were collected by subsampling temporary sweeping storage piles built up by MS4 operators and the samples were then submitted to DOT's Materials section for analysis. Particle size distributions representative of samples collected during 2019 sweeping events are included in Table 3-2 below.

Table 3-2 – Representative Particle Size Distribution

	% Smaller Than Sieve Size			
Sieve Size	**Arterial A**	**Arterial B**	**Residential A**	**Residential B**
1.5"	100	100	100	100
1"	100	100	99	100
3/4"	100	99	99	100
1/2"	99	96	98	99
3/8"	98	93	96	97
1/4"	94	86	90	69
#4	91	81	84	50
#8	80	68	61	32
#10	76	65	56	30
#16	67	60	47	27
#30	48	52	33	22
#40	37	46	26	20
#50	27	37	18	17
#100	15	22	10	12
#200	8.8	11.6	5.8	9.3
0.02 mm	4.3	3.4	3.1	4.9
0.002 mm	1.2	0.8	1.0	1.3

Table 3-2 includes particle size distributions (PSDs) of samples collected from temporary storage piles generated from street sweeping.

The sampled material shows that approximately half of the material on the Arterial routes was smaller than 600 micron (#30) and on the residential routes approximately half of the material was smaller than 1180 micron (#16) in area A and 4750 micron (#4). There is a noticeable discrepancy between the Arterial and Residential routes. The discrepancy may be due to sample error. Overall, the particle size distribution appears similar to the previous year, and should allow for a year to year analysis of the material in next year's report.

4. 2019 Sweeping Performance Assessment

Section 3.4.5.4 requires the permittees to 'perform annual assessments of street sweeping effectiveness to minimize pollutant discharges to storm drains and receiving waters on the basis of the performance factors required to be reported under the permit. To help in this assessment, the permittees completed additional sampling of street sweeping activities in 2019 and compared that data to sampling performed in previous years.

Section 4.1 provides a comparison of unit loads (cubic yards per pick up mile) for swept dirt for the past four years (2016-2019). Based on both this additional information and current performance reports, Section 4.2 summarizes the effectiveness of the 2019 sweeping program as required under Part 3.4.5.4.

4.1. Unit Load Comparison 2016-2019

Swept volume data, collected over the past four years, have been analyzed and where possible have been converted to unit load values (cubic yards/pick up mile), to give a measure of what volume of dirt is being swept up per pick up mile for each different operator and sweep frequency category. Table 4.1 shows unit load in cubic yards per pick up mile for the spring, summer, and fall sweep periods for 2016-2019.

Table 4-1 2016-2019 Unit Load Comparison

Spring Sweeps					
EPA Category	Drainage Type	Spring 2019 (CY/mi)	Spring 2018 (CY/mi)	Spring 2017 (CY/mi)	Spring 2016 (CY/mi)
Arterial	OC	5.0	5.2	5.1	5.1
	C&G	13.7	14.3	13.9	13.9
	Mixed	16.5	17.2	16.7	16.7
	All	14.5	15.2	14.4	14.4
Residential	OC	5.2	5.4	5.3	5.2
	CG	7.3	7.6	7.8	7.8
	Mixed	4.6	4.8	4.6	4.6
	All	5.2	5.3	5.2	5.2

Summer Sweeps					
EPA Category	Drainage Type	Summer 2019 (CY/mi)	Summer 2018 (CY/mi)	Summer 2017 (CY/mi)	Summer 2016 (CY/mi)
Arterial	OC	1.5	1.6	1.3	1.1
	C&G	3.5	3.6	2.9	2.9
	Mixed	2.9	3.0	2.9	2.9
	All	3.1	3.2	2.8	2.8
Residential	OC	1.8	1.9	1.6	1.5
	CG	4.2	4.3	2.0	2.0
	Mixed	1.6	1.6	1.3	1.3
	All	1.9	2.0	1.5	1.5

Fall Sweeps					
EPA Category	Drainage Type	Fall 2019 (CY/mi)	Fall 2018 (CY/mi)	Fall 2017 (CY/mi)	Fall 2016 (CY/mi)
Arterial	OC	1.6	1.6	1.3	1.6
	C&G	3.9	4.1	4.0	4.0
	Mixed	4.0	4.1	4.0	4.0
	All	3.8	4.0	3.8	3.8
Residential	OC	1.9	2.0	1.9	1.9
	CG	3.2	3.3	3.1	3.1
	Mixed	1.8	1.8	1.8	1.8
	All	2.0	2.0	2.0	1.9

2018 sweeping shows similar unit load values from the last two years, with only a slight decrease. Per last year's report, 2017 and 2016 have similar numbers due to the Contractor's method of load counting. 2019 is the fourth year in a row with reduced unit load values, and this may be the normal amount of material that will be picked up. There has been a reduction in the amount of sand putdown, but not enough to justify the decrease. Other factors may be at play, as the overall sweeping quality has not decreased from past years.

4.2. Sweeping Effectiveness Assessment for 2019

Sweeping effectiveness can be related to potential for receiving water impact by a number of relationships illustrated by this data and other data presented in the annual report. The spatial relationship of street drainage to receiving waters and to the total sediment load present on those streets is an important factor. Performance records summarized in Section 3.1 along with operation maps included in Section 5 provide insight to the potential for street sediment loads to wash off into Anchorage storm drains and receiving waters based on these spatial relationships. DOT&PF is responsible for 184 street miles (98 miles arterial and 86 miles residential) spread out over a large geographic area.

Compared to previous years, there was a slight decrease in the unit load volume on average. This may be due to the increased salt usage and slight decrease in sand usage for the 2018/2019 winter. While the vast majority of the material is removed during the spring sweep, displaced sediment loading can finds its way back onto the roadways.

The street sweeping program operates on a visually clean standard for its qualitative assessment of sweeping. This is historically what DOT&PF M&O has used for its inspections. DOT&PF coordinates with the Contractor with immediate inspections after sweeping activities to ensure that all roads meet the visually clean standard, as weather, traffic, and private entities can introduce additional material into the roadway. Figure 4.1 and Figure 4.2 below showcase one specific example of the visually clean standard. Additional photographs are shown in Section 6.

Figure 4.1 – Minnesota Dr before the spring sweep.

Figure 4.2 – Minnesota Dr after the fall sweep.

The sweepers are able to pick up a vast majority of the material from the roadway and sidewalks, which allows for approval on a visual inspection. Past MOA Watershed Management assessments have shown this sweeping to be effective at picking up medium to large sized particulates, but not the fines. Fines prove to be an issue for street sweeping efficiency. Too little water used and the fines create a dust cloud from the sweeping activity, which results in air quality and health issues. Too much water and the sweeping activity is ineffective at sweeping and picking up the water slurry. State and Municipality maintenance forces have determined vacuum trucks to not be effective enough in picking up the fines also.

Samples were taken after roads passed the visually clean standard, to determine how much material was left on the roadway after sweeping. Three roadways were chosen for dry, post-sweep sampling. On each road, a 200-foot segment was chosen and ten samples were taken approximately every twenty feet. The dry material was swept up in a 4 foot long by 1.5 foot wide section. This material was collected and then weighed to determine the amount of material left on the roadways. This length was chosen due to the majority of the debris being distributed towards the curb and gutter of the roadway, so a full lane sample was determined to not be necessary. The results of this sampling are listed in table 4-2 below. Converting the values to the unit load value of cubic yards per pick up mile, the values were compared to Arterial curb and gutter unit load values. Using the 2019 sampling and sweeping results with the same formulas from the 2015 Street Sweeping Report, approximately 0.3% to as much as 4.0% of the debris by weight was left on the roadway. While these percentages are likely not exact due to the pickup methodology not capturing all debris in the sampled sections, but it does provide a good picture of the overall efficiency of the street sweeping program.

Compared to the previous two years, the amount of material present is in line with 2018 data, but higher than 2017. North Eagle River Access Road had much higher leftover mass compared to 2017. During sampling, construction activities were occurring which may have impacting the sampling results. Despite these higher sampling mass numbers, the overall debris left on the roadway was still comparable to previous years. Perhaps this is also due to the higher unit load volume on the arterial roadways or the timing of the sampling pick up.

Table 4-2 2019 Roadway Debris Loading Sampling Results

Post-2nd Sweep Dimond Boulevard			Post-2nd Sweep Intl Airport Rd			Post-2nd Sweep North ER Access Road		
Bag ID	Location	Sample Wt (g)	Bag ID	Location	Sample Wt (g)	Bag ID	Location	Sample Wt (g)
D-1	0+10	28.4	I-1	0+10	79.1	ER-1	0+10	119.9
D-2	0+32	17.2	I-2	0+32	102.3	ER-2	0+32	48.8
D-3	0+50	17.2	I-3	0+50	108.4	ER-3	0+50	54.0
D-4	0+72	17.6	I-4	0+72	129.1	ER-4	0+72	246.8
D-5	0+90	21.4	I-5	0+90	133.7	ER-5	0+90	634.7
D-6	1+12	16.0	I-6	1+12	137.5	ER-6	1+12	325.4
D-7	1+30	21.7	I-7	1+30	128.2	ER-7	1+30	229.7
D-8	1+52	20.9	I-8	1+52	143.3	ER-8	1+52	106.1
D-9	1+70	22.7	I-9	1+70	145.8	ER-9	1+70	121.0
D-10	1+92	25.2	I-10	1+92	161.2	ER-10	1+92	84.2
	Average	**20.8**		**Average**	**126.86**		**Average**	**197.06**

Note – North ER sampling was delayed about 48 hours due to rain and is a current haul route. This likely accounts for the larger sample size.

The full sampling result can be found in Section 5 of this report.

For more information regarding dirt loading and street sweeping performance please see WMS document WMP Apr14001, “Anchorage Street Sweeping and Storm Water Controls: 2013 Performance Evaluation” (Appendix E-2 of the 2013 APDES report).

5. 2019 Maps and Data Tables

Section 5 contains maps and detailed data tables supporting summary information and the sweeping assessment presented in Section 2 through 4 above. Section 5.1 contains maps of swept streets and operational areas. Section 5.2 contains detailed sweeping performance records for each of the Anchorage MS4 operators.

5.1. Designated Streets and General Location Maps

This section contains maps of Anchorage MS4 streets designated for sweeping. The maps also locate sweeping operational areas (‘general locations’) that each operator has used to structure compilation and reporting of 2019 sweeping performance records. The first map in this section, Figure 5-1, provides an overview map. More detailed maps of the areas and designated streets are presented in the following figures.

Figure 5-1 Anchorage MS4 Sweeping 'General Locations' 2019

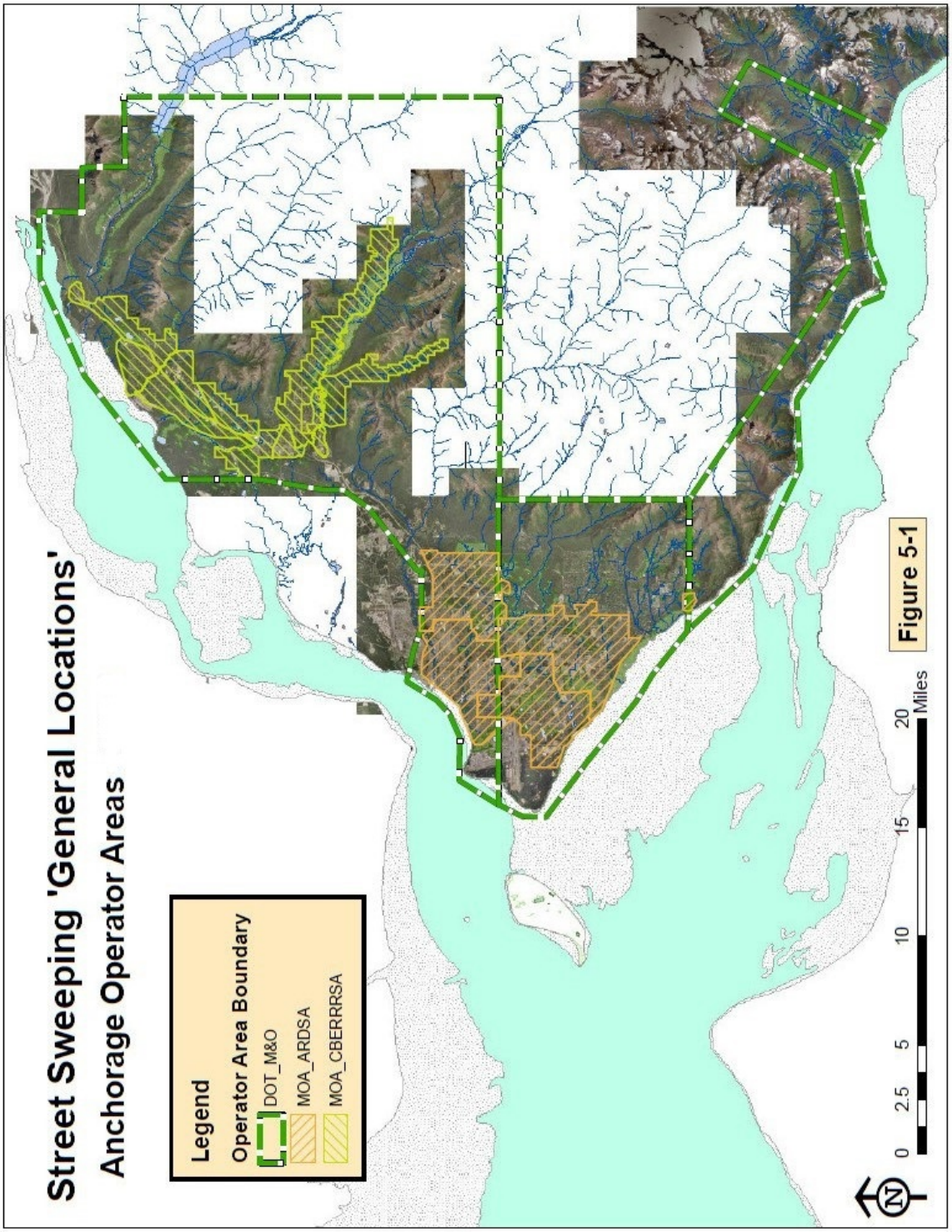


Figure 5-2 ADOT&PF Area A—2019 Designated Swept Streets

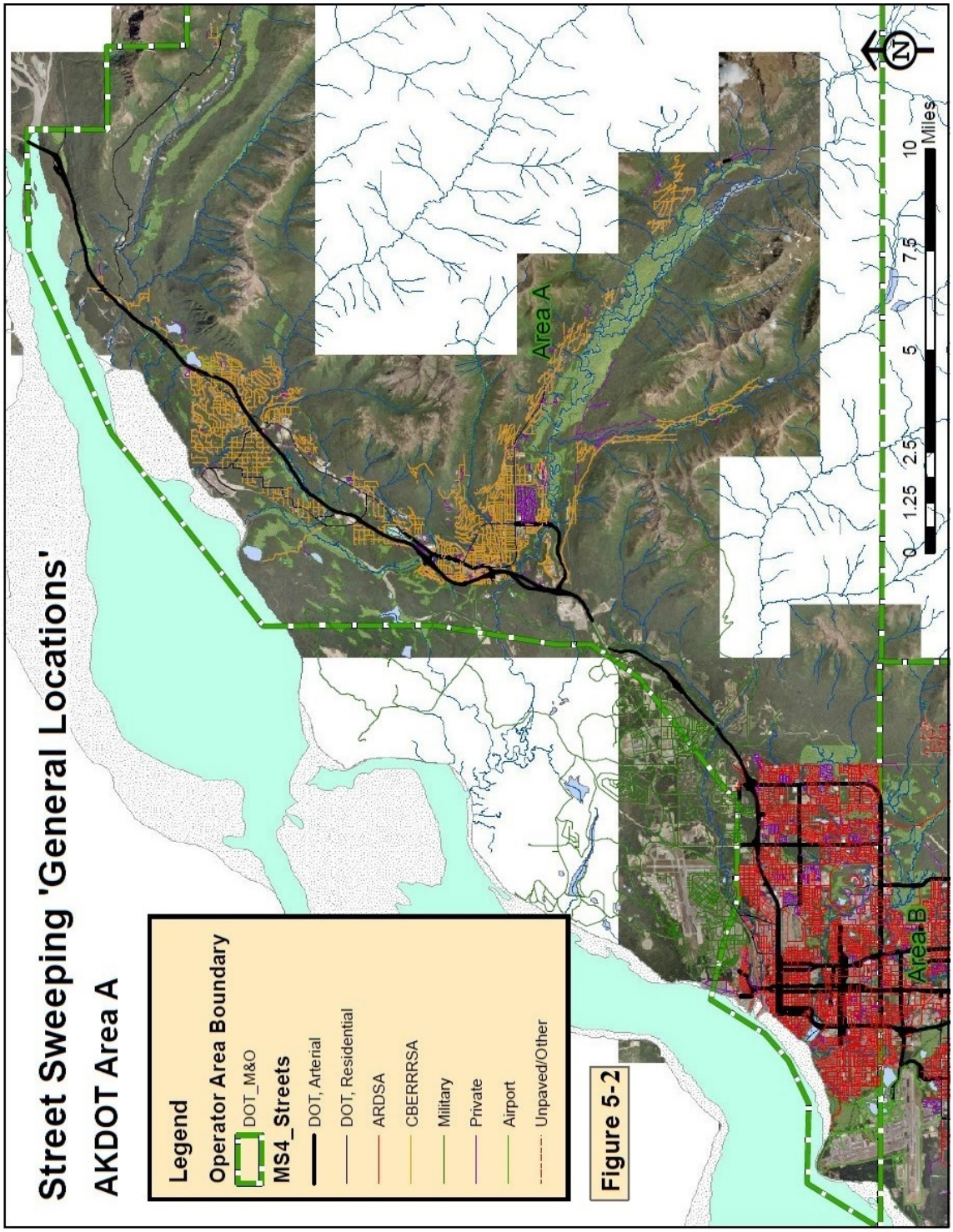


Figure 5-3 ADOT&PF Area B—2019 Designated Swept Streets

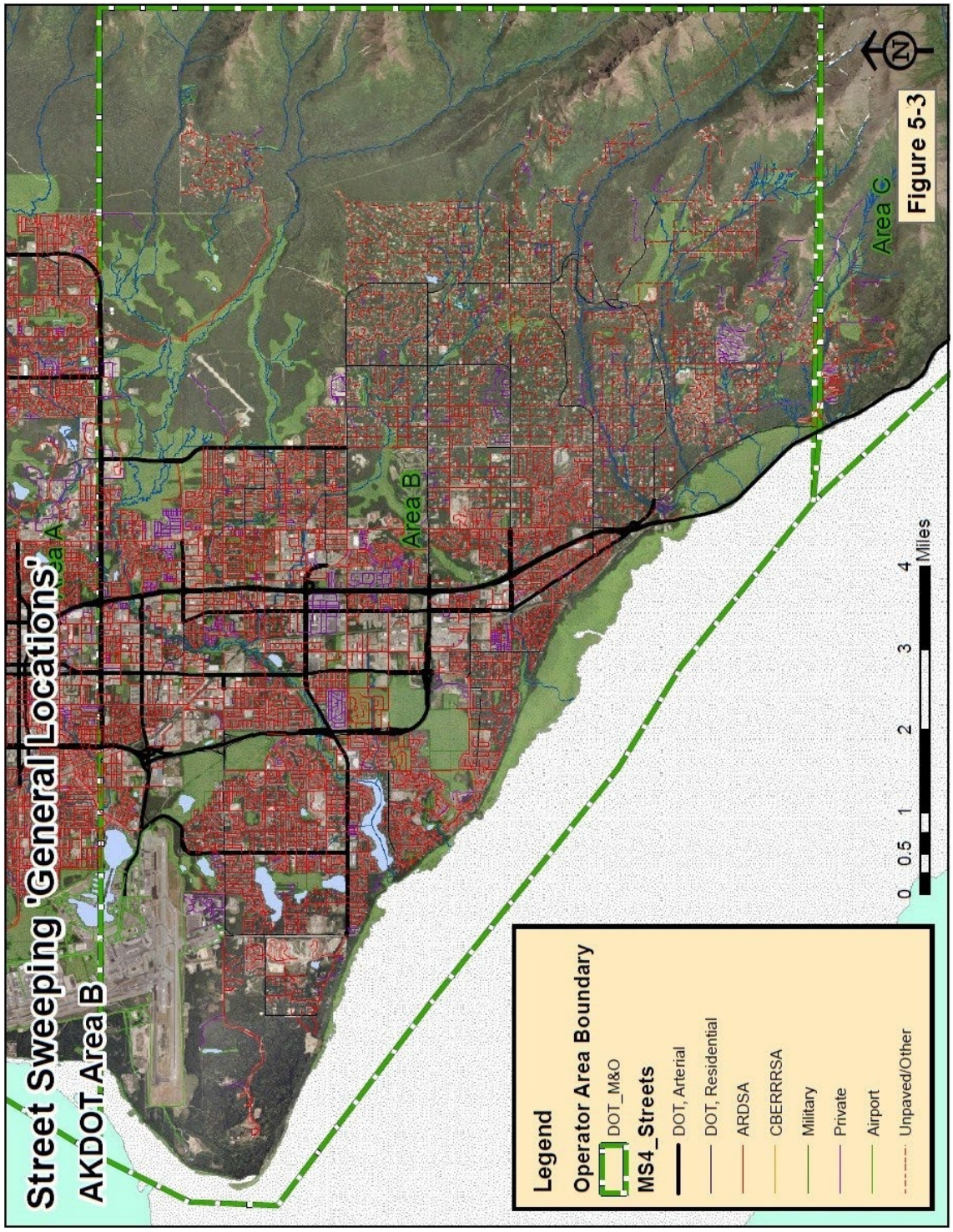
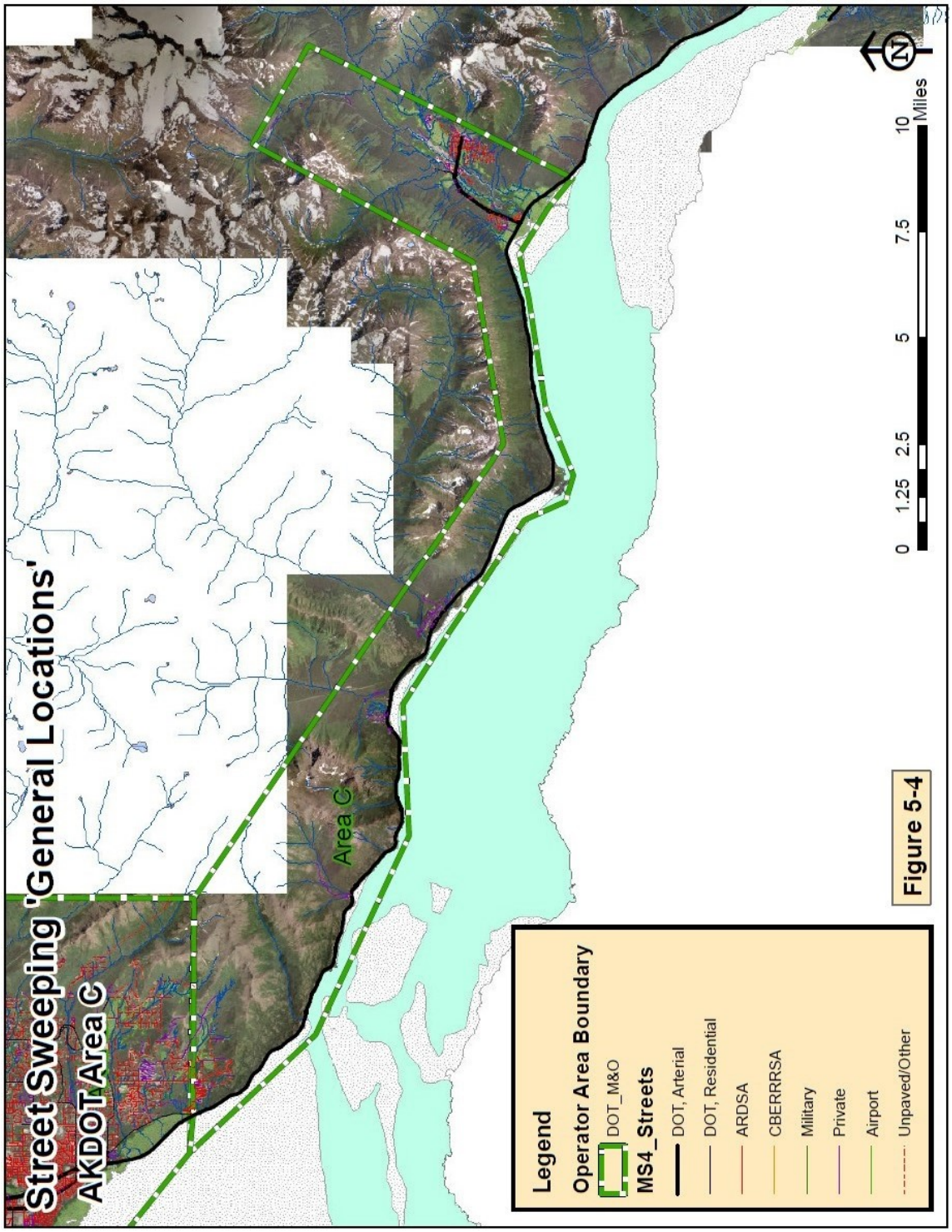


Figure 5-4 ADOT&PF Area C—2019 Designated Swept Streets



5.2. Anchorage MS4 Detailed Sweeping Records for 2019

Section 5.2 contains detailed sweeping records for 2019 for each of the sweep periods, separated by operational areas ('general locations') and by EPA category.

5.2.1. ADOT&PF 2019 Detailed Sweeping Reports

Table 5-1 ADOT&PF Spring 2019 Sweeping Report

Completion Range: 4/9/2019 - 6/15/2019							
Area A	EPA Category	Drainage	Street_Miles	Curb/Pickup Miles	Total Pick up (Cubic Yards)	Unit Pick up (cyds/PU Mile)	Completeness (%)
	Arterial	OC	2.5	16.1	85	5.3	100%
		CG	29.6	137.0	1886	13.8	100%
		Mixed	17.2	81.4	792.0	9.7	100%
	Residential	OC	24.4	60.1	343.1	5.7	100%
		CG	1.1	3.4	53	15.9	100%
		Mixed	11.2	54.9	307	5.6	100%
Totals			86.0	352.8	3465.7		
Area B	EPA Category	Drainage	Street_Miles	Curb/Pickup Miles	Total Pick up (Cubic Yards)	Unit Pick up (cyds/PU Mile)	Completeness (%)
	Arterial	OC	2.6	9.4	44	4.7	100%
		CG	14.3	61.8	839	13.6	100%
		Mixed	31.3	106.8	2323	21.7	100%
	Residential	OC	31.4	86.3	417	4.8	100%
		CG	2.5	18.2	104	5.7	100%
		Mixed	15.7	52.9	187	3.5	100%
Totals			97.8	335.2	3914		
Area C	EPA Category	Drainage	Street_Miles	Curb/Pickup Miles	Total Pick up (Cubic Yards)	Unit Pick up (cyds/PU Mile)	Completeness (%)
	Arterial	OC	2.9	0.0	0	0.0	100%

Table 5-2 ADOT&PF Summer 2019 Sweeping Report

Completion Range: 6/25/19 - 8/19/19							
Area A	EPA Category	Drainage	Street_Miles	Curb/Pickup Miles	Total Pick up (Cubic Yards)	Unit Pick up (cyds/PU Mile)	Completeness (%)
	Arterial	OC	2.5	16.1	27	1.7	100%
		CG	29.6	137.0	525	3.8	100%
		Mixed	17.2	81.4	158	1.9	100%
							1
	Residential	OC	24.4	60.1	135	2.3	
		CG	1.1	3.4	20	5.9	100%
		Mixed	11.2	54.9	106	1.9	100%
Totals			86.0	352.8	971.9		
Area B	EPA Category	Drainage	Street_Miles	Curb/Pickup Miles	Total Pick up (Cubic Yards)	Unit Pick up (cyds/PU Mile)	Completeness (%)
	Arterial	OC	2.6	9.4	12	1.3	100%
		CG	14.3	61.8	171	2.8	100%
		Mixed	31.3	106.8	389	3.6	100%
	Residential	OC	31.4	86.3	131	1.5	100%
		CG	2.5	18.2	72	3.9	100%
		Mixed	15.7	52.9	63	1.2	100%
Totals			97.8	335.2	837.1		
Area C	EPA Category	Drainage	Street_Miles	Curb/Pickup Miles	Total Pick up (Cubic Yards)	Unit Pick up (cyds/PU Mile)	Completeness (%)
	Arterial*	OC	2.9	0.0	0	0.0	100%
Totals			2.9	0.0	0		

Table 5-3 ADOT&PF Fall 2019 Sweeping Report

Completion Range: 9/15/19 - 10/13/19							
Area A	EPA Category	Drainage	Street_Miles	Curb/Pickup Miles	Total Pick up (Cubic Yards)	Unit Pick up (cyds/PU Mile)	Completeness (%)
	Arterial	OC	2.5	16.1	28	1.7	100%
		CG	29.6	137.0	529	3.9	100%
		Mixed	17.2	81.4	158	1.9	100%
	Residential	OC	24.4	60.1	136	2.3	100%
		CG	1.1	3.4	20	5.9	100%
		Mixed	11.2	54.9	107	1.9	100%
Totals			86.0	352.8	977.9		
Area B	EPA Category	Drainage	Street_Miles	Curb/Pickup Miles	Total Pick up (Cubic Yards)	Unit Pick up (cyds/PU Mile)	Completeness (%)
	Arterial	OC	2.6	9.4	12	1.3	100%
		CG	14.3	61.8	250	4.1	100%
		Mixed	31.3	106.8	587	5.5	100%
	Residential	OC	31.4	86.3	141	1.6	100%
		CG	2.5	18.2	50	2.7	100%
		Mixed	15.7	52.9	84	1.6	100%
Totals			97.8	335.2	1124.4		
Area C	EPA Category	Drainage	Street_Miles	Curb/Pickup Miles	Total Pick up (Cubic Yards)	Unit Pick up (cyds/PU Mile)	Completeness (%)
	Arterial	OC	2.9	0.0	0	0.0	100%
Totals			2.9	0.0	0		

5.2.2. ADOT&PF 2019 Post-Sweep Sampling Results

Table 5-4 2019 Post 1st Sweep Roadway Debris Loading Sampling Results

Post-1st Sweep Dimond Boulevard			Post-1st Sweep Intl Airport Rd			Post-1st Sweep North ER Access Road		
Bag ID	Location	Sample Wt (g)	Bag ID	Location	Sample Wt (g)	Bag ID	Location	Sample Wt (g)
D-1	0+10	60.0	I-1	0+10	90.2	ER-1	0+10	85.0
D-2	0+32	36.0	I-2	0+32	144.8	ER-2	0+32	183.2
D-3	0+50	29.6	I-3	0+50	159.4	ER-3	0+50	95.2
D-4	0+72	26.4	I-4	0+72	257.4	ER-4	0+72	169.2
D-5	0+90	34.4	I-5	0+90	164.1	ER-5	0+90	203.1
D-6	1+12	39.9	I-6	1+12	127.3	ER-6	1+12	184.5
D-7	1+30	41.0	I-7	1+30	157.0	ER-7	1+30	145.5
D-8	1+52	56.4	I-8	1+52	185.0	ER-8	1+52	135.6
D-9	1+70	32.9	I-9	1+70	278.9	ER-9	1+70	251.8
D-10	1+92	56.0	I-10	1+92	307.5	ER-10	1+92	132.4
	Average	**41.3**		**Average**	**187.16**		**Average**	**158.55**

Table 5-5 2019 Post 2nd Sweep Roadway Debris Loading Sampling Results

Post-2nd Sweep Dimond Boulevard			Post-2nd Sweep Intl Airport Rd			Post-2nd Sweep North ER Access Road		
Bag ID	Location	Sample Wt (g)	Bag ID	Location	Sample Wt (g)	Bag ID	Location	Sample Wt (g)
D-1	0+10	28.4	I-1	0+10	79.1	ER-1	0+10	119.9
D-2	0+32	17.2	I-2	0+32	102.3	ER-2	0+32	48.8
D-3	0+50	17.2	I-3	0+50	108.4	ER-3	0+50	54.0
D-4	0+72	17.6	I-4	0+72	129.1	ER-4	0+72	246.8
D-5	0+90	21.4	I-5	0+90	133.7	ER-5	0+90	634.7
D-6	1+12	16.0	I-6	1+12	137.5	ER-6	1+12	325.4
D-7	1+30	21.7	I-7	1+30	128.2	ER-7	1+30	229.7
D-8	1+52	20.9	I-8	1+52	143.3	ER-8	1+52	106.1
D-9	1+70	22.7	I-9	1+70	145.8	ER-9	1+70	121.0
D-10	1+92	25.2	I-10	1+92	161.2	ER-10	1+92	84.2
	Average	**20.8**		**Average**	**126.86**		**Average**	**197.06**

Note – North ER sampling was delayed about 48 hours due to rain and is a current haul route. This likely accounts for the larger sample size.

Table 5-6 2019 Post 3rd Sweep Roadway Debris Loading Sampling Results

Post-1st Sweep Dimond Boulevard			Post-1st Sweep Intl Airport Rd			Post-1st Sweep North ER Access Road		
Bag ID	Location	Sample Wt (g)	Bag ID	Location	Sample Wt (g)	Bag ID	Location	Sample Wt (g)
D-1	0+10	32.0	I-1	0+10	208.6	ER-1	0+10	277.2
D-2	0+32	60.7	I-2	0+32	304.5	ER-2	0+32	155.0
D-3	0+50	44.4	I-3	0+50	259.2	ER-3	0+50	199.7
D-4	0+72	56.0	I-4	0+72	290.4	ER-4	0+72	508.1
D-5	0+90	73.2	I-5	0+90	245.4	ER-5	0+90	1222.6
D-6	1+12	82.3	I-6	1+12	392.0	ER-6	1+12	771.0
D-7	1+30	100.3	I-7	1+30	307.4	ER-7	1+30	334.0
D-8	1+52	74.5	I-8	1+52	479.8	ER-8	1+52	211.3
D-9	1+70	56.1	I-9	1+70	435.6	ER-9	1+70	530.5
D-10	1+92	105.0	I-10	1+92	351.4	ER-10	1+92	186.9
	Average	**68.5**		**Average**	**327.43**		**Average**	**439.63**

Note – North ER sampling was delayed about 72 hours due to rain and is a current haul route. This likely accounts for the larger sample size.

6. 2019 Sweeping Photographs

Section 6 contains additional before and after photographs of the sweeping efforts taken by the DOT contractor.

Figure 6.1 – Benson Boulevard before sweeping operations.

Figure 6.2 – Benson Boulevard after sweeping operations

Figure 6.3 – Muldoon Rd before sweeping operations.

Figure 6.4 – Muldoon Rd after sweeping operations.

Figure 6.5 – Northern Lights Boulevard before sweeping operations.

Figure 6.6 – Northern Lights Boulevard after sweeping operations.