Exhibit A

High Efficiency Sweeper Areas
Zones 13S and 14
Watershed and Postal Zip Codes*

*Note: For clarity, only postal zip codes and watersheds intersecting with Road Maintenance zones 13 and 14 are shown.
**EXHIBIT B: HIGH EFFICIENCY SWEEPER CURB MILES AND SSC POINT - TABULATION**

<table>
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<tr>
<th>1st HE Sweeper Pass</th>
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<tr>
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<tr>
<td>4th Pass Zone 13S</td>
<td>227.0</td>
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<td>4th Pass Zone 14</td>
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<td>10th Pass Little Bear Creek</td>
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<tr>
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**NOTES:**

(1) Figures are rounded. Data are are provisional, from mid-December 2021 and will be updated for year-end data when available, and pending further review.

(2) Adjustments:
   a. New curbing since 1st pass were omitted from sweeper mileage calculations.
   b. Sweeper passes with erroneous task descriptions removed.
      Adjustments reduced curb mile total by 9.8 curb miles (rounded).
Exhibit C: Street Sweeping Program Statement

During 2021, Snohomish County swept curbed streets in the South County area, in the Little Bear Creek, North Creek, and Swamp Creek watersheds, and accumulated 547 SSC program points. Data are provisional and subject to update and refinement. Operational aspects and data are being reviewed, and cost and other data will be provided when available.

Program points were calculated based on the following:

- Only using high efficiency sweepers were used, from curb mileage in each cycle of sweeping after the first cycle of sweeping.
- Sweeping routes were in MS4 service areas.
- Sweeping routes were tracked using the County’s Cartegraph database to record each work order for route sweeping. Routes were pre-cleaned for larger debris such as branches before HE Sweeping operations. When parked cars were encountered on certain road segments, several sweeping passes were made on subsequent days to allow the HE Sweepers access to locations previously not accessible due to parked cars and to ensure that all portions of curbed roadway were swept. The total curb length of the swept road segment was recorded for SSC program point tabulation, which represented one complete pass, as composited from the multiple passes that may have occurred.
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Map B4: Little Bear Creek Sub-Basin Area .......................................................................... 19
Introduction and Purpose

Snohomish County is proud to implement the Snohomish County High Efficiency Sweeping Operations and Maintenance Plan (HESOMP). This plan will provide operational information and instructions to the program leaders, sweeper operators, fleet mechanics, and administrative staff involved in the day-to-day operations of the Road Maintenance (RM) High Efficiency (HE) fleet. The HESOMP will help to ensure that the HE program is carried out with optimal efficiency using a base implementation and continuous improvement model. This plan is intended to be evolutionary and will be modified as the program develops. While the plan will provide comprehensive operational procedures. The HESOMP is not intended to be a comprehensive maintenance manual for Fleet based mechanical services, equipment maintenance, or repairs.

The purpose of the RM High Efficiency Sweeping Operations and Maintenance Plan (HESOMP) is to establish and maintain procedures, guidance and standards that will provide consistent, repeatable, and measurable actions during HE Sweeping operations. HE Sweeping removes waste solids including litter, sand, rubber tire particles, and many other substances that can have a negative impact on water quality and roadway safety. HE Sweeping is a sub-program of the RM Countywide sweeping program. This plan is to be used in conjunction with the Snohomish County Enhanced Maintenance Plan (SCEMP). HESOMP objectives include public safety improvements, high quality, cost effective street sweeping services, and to reduce pollutants entering the storm water system. RM will utilize HE Elgin Waterless Eagle Sweepers and Best Management Practices (BMP’s) to meet these objectives. This plan and program support Snohomish County’s NPDES Phase I program and provide NPDES permit and Clean Water Act (CWA) compliance. Sweeping operations will be scheduled and organized in a manner that satisfies this agreement and sufficiently supplements the Phase 1 program requirements.
Responsible Parties

Program management will be the responsibility of the RM District 2 Operations Manager with supplemental oversight from the District 1 Operations Manager and Division Director. Project and task management will be executed by the District 2 Sweeping Program Supervisor, with supplemental task management from the District 1 Sweeping Program Supervisor.

Operations Managers will manage all non-HE related sweeping activities within their own Districts.

Outside of normal working hours, the on-call Supervisor will be the designated person in charge of all Emergency Sweeping requests. Non-Emergency requests outside of working hours will be reviewed the next business day. Emergency response must meet the criteria for HE Sweeping in order to qualify for NPDES point accruals or grant deliverables.

Sweeping vehicle operators will be responsible for operation and routine functional maintenance of street sweeper equipment. This includes daily equipment safety inspections and reporting of all equipment deficiencies to Fleet for maintenance and repair.

The Snohomish County Fleet Maintenance Division will work with the RM Division to maintain the street sweepers in a state of readiness and in accordance with manufacturer specifications and recommendations.

Refer to Figure 1.1 for an organizational structure of the HE Sweeping program responsibilities.
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<thead>
<tr>
<th>Role</th>
<th>Name</th>
<th>Details</th>
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<tbody>
<tr>
<td>Road Maintenance Director</td>
<td>James Parker</td>
<td>Road Maintenance Director</td>
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<tr>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Email: <a href="mailto:james.parker@snoco.org">james.parker@snoco.org</a></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Phone: 425-388-7541</td>
</tr>
<tr>
<td>Project Manager</td>
<td>Robert Partridge</td>
<td>Project Manager</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Cell Phone: 425-348-1438</td>
</tr>
<tr>
<td>District 1 Operations Manager</td>
<td>Melvin Reitz</td>
<td>D1 Operations Manager</td>
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<tr>
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<td>Phone: 425-388-7112</td>
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<tr>
<td>District 2 Operations Manager</td>
<td>Thomas Moff (Temporary Assignment)</td>
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<tr>
<td>Fleet Services Supervisor</td>
<td>Michael Bronn</td>
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</tr>
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2021 HE Street Sweeper Budget

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Training

**Equipment Use (Operator Training)**

HE Sweeper Operators will be trained on the operational tasks and safety functions and features of current model mobile mechanical sweepers. Training includes proper sweeping techniques such as unloading the hopper into a dump truck, sweeping around curbing, obstacles and catch basins, dust control, and sweeping in winter conditions. Refer to Appendix A to review operational and certification training.

Operators will be given an overview of the NDPES Phase 1 Permit requirements in relation to the HESOMP. In addition, the training will cover other environmental considerations and proper disposal of debris in compliance with the NPDES and Clean Water Act. All operators will participate in the Snohomish County Risk Management’s Incidental Spill Response training which covers the containment, clean up, and disposal of materials in the event of an incidental spill.

After receiving the training operators will be tested on pre-operational, operational, and post-operational procedures. Employees who pass this exam will be certified to operate all mobile sweepers within the RM Division. Operators will be provided additional training for HE and newer model sweepers, and on any sweepers with additional features or operational functions.
Safety

Sweeper Operators will be trained in accordance with current applicable safety guidelines as set forth in the Snohomish County Health and Safety Policy and Procedures.

Equipment Maintenance

Snohomish County Fleet mechanics will be trained by the vendor or designee to properly inspect RM HE sweeper models, identify maintenance deficiencies, and either correct the deficiencies or procure services to correct repair the issue(s). Fleet will ensure any additional training necessary as a result of equipment upgrades or modifications that requires additional mechanical skills or certifications.

Cartegraph

HE Sweeper activity and production information will be captured in the Road Maintenance Operations Management System (OMS). Currently, RM uses the software system Cartegraph as the primary OMS. Operators will be trained to enter the appropriate information into the OMS in order to capture the information required for reporting program status and NPDES Phase 1 Permit compliance to the Department of Ecology (DOE).

Area of Operations

Snohomish County conducts sweeping operations across nearly 1,600 miles of roadway. The Area of Operations (AO) for the HE Sweeping program is in Road Maintenance District 2, operational zones 13N, 13S, 14, and 15. Priority focus will be placed in zones 13S, 14, and the Little Bear Creek Sub-Basin located partially within zone 13S.

MAPS

Refer to Appendix B for HESOMP Area of Operations maps.

Map B1: Priority Route Overview: Provides a high-level snapshot of Snohomish County Road Assets that are 50% or more curbed. These routes, depicted in red on the map, were selected to achieve a high rate of roadway pollutant reduction from routine HE Sweeping.

Map B2: Primary Zones: Depicts, in red, the Snohomish County Road Assets that are 50% or more curbed within response Zones 13N, 13S, 14, and 15. Zones outlined in purple have been targeted for the HE Sweeping Program because of their level of environmental impact, potential continued impact, and curbing density.

Map B3: HE Zones 13s, 14: Provides a closer perspective of priority zones 13s and 14.

Map B4: Little Bear Creek Sub-Basin Area: Identifies the area of focus for the Little Bear Creek Sub-Basin
water quality study.

**Secondary Sweeping Areas**

HE Sweepers may be used in areas and on streets that are outside of the scope of the DOE Grant Agreement. As it is the intention of Road Maintenance to replace mechanical sweepers at the end of their service life with High Efficiency Sweepers, and as three (3) mechanical sweepers have recently been replaced with HE Sweepers; this overlap is incidental and has no effect on the County’s ability to meet the requirements of the Agreement.

Sweeping performed outside of the scope of the Agreement will continue to be accomplished and tracked, similarly to the manner it has been in recent years, with only a few differences:

- A sweeping task will be applied to each road asset not designated as an HE priority route. Tasks are marked completed in the OMS as soon as the route has been swept.
- Subsequent sweeping tasks will be applied to each of these road assets after the previous task has been Completed.
- This process is to be repeated to accomplish a quarterly schedule and to accommodate cleanup after weather events. Scheduling will remain flexible for non-HE routes and may fluctuate based on service requests, storm activity, projects, seasonal changes, and the needs of the Division.

**HE Sweeping Schedule**

Road Maintenance sweeping activities are scheduled within the OMS system using a mixture of repeating and ad-hoc task assignments. For the purposes of this agreement, each sweeper operator will be assigned to a specific zone and set of routes. When the operator is performing sweeping work, they will be scheduled to work entirely within their zone for the duration of their workday. While this method represents the scheduling concept in general, Snohomish County reserves the right to utilize its employees in accordance with County policy, procedure, contractual, seasonal and business needs. It is the County’s responsibility to ensure the work is scheduled in a manner that will meet the obligations of the Grant Agreement.

**Resources Required**

**Labor**

At a minimum, the following labor resources are required during HE operations:

- (1) HE Sweeper certified operator per sweeper
- (1) Double Axle Truck Driver (services multiple sweepers)
- (1) Program Lead Worker
- (1) Program Supervisor
Equipment

At a minimum, the following equipment resources are required during HE operations:

- (1) DOE approved HE mobile sweeper per zone
- (1) Double-axle dump truck (services several sweepers)
- Onboard Inventory (per sweeper):
  - (1) Grease gun
  - (1) Fire extinguisher
  - (1) First aid kit
  - (1) Spill kit
  - (1) Emergency warning reflectors

Operating Procedures

Road Maintenance will utilize existing operational procedures for mechanical street sweeping, and modify the procedures as needed to accommodate HE Sweeping processes and requirements.

Startup/Walkaround

Sweeper operators will conduct a daily walk-around inspection on their assigned vehicle prior to mobilization. The inspection is performed to ensure safe and productive operation of the machine. In addition to standard walk-around procedures, operators will conduct the manufacturer’s recommended daily service checklist procedures shown in Figure 1.2: HE Elgin Waterless Eagle Mobile Sweeper.
Figure 1.2 HE Elgin Waterless Eagle Mobile Sweeper Daily Service Checklist

HE ELGIN WATERLESS EAGLE MOBILE SWEeper
OPERATOR'S MANUAL

MAINTENANCE

DAILY SERVICE CHECKLIST

- CHECK ENGINE OIL LEVEL – OIL DIPSTICK
- CHECK HYDRAULIC OIL LEVEL – SIGHT TUBE
- CHECK RADIATOR COOLANT LEVEL
- CHECK TIRE INFLATION LEVEL
- SPECT PRE-CLEANER – AIR FILTER
- DRAIN WATER SEPARATOR – ENGINE
- WASH DOWN ENTIRE MACHINE – FLUSH OUT LOWER CONVEYOR ROLLER
- CHECK WINDSHIELD WASHER FLUID LEVEL
- GREASE LOWER CONVEYOR ROLLER BEARINGS (2)
- GREASE UPPER CONVEYOR ROLLER BEARINGS (2)
- GREASE DIRT SHOE PIVOT (2)
- CHECK SIDE BROOM CONTACT PATTERN
- CHECK MAIN BROOM CONTACT PATTERN
- INSPECT WATER FILTER
- SERVICE TRUCK CHASSIS

NOTE ANY DEFICIENCY:

EQUIPMENT NUMBER: DATE/TIME:

OPERATOR’S SIGNATURE AND EMPLOYEE NUMBER:
Functions checks

In addition to the walk-around and daily service checks, and prior to mobilization, the operator will verify proper operation of each of the machine’s functions. This includes main and gutter broom checks, water spray, hydraulic components, cameras, and any other function of the machine controlled in some manner by the operator.

Sweeping Procedures

Notes about gutters in the median:

All curbs contained in a Road Asset will be completed when the Road Asset is completed.

Documentation Procedures

Documenting work within the OMS

A sweeping task will be assigned to each road segment included in the HESOMP. Pre-assigned work orders will be used to group HE Sweeping tasks by zone, 13s, 14, and Little Bear Creek Sub-Basin, by year. Work order grouping, attribution, and application filters can be used to extract data in various configurations for analysis and reporting on metrics such as program costs and waste materials.

Operators will use the activity of HE Sweeping – with a task description notation of first pass for the first sweeping pass, and a task description notation of qualifying pass for subsequent passes.

Road Assets with 50% or greater curbed value in Zones 13S, 14, and Little Bear Creek Sub-Basin area will be designated high priority for the first and subsequent qualifying passes.

Road Assets less than 50% curbed value in Zones 13S, 14, and Little Bear Creek Sub-Basin area will be designated medium priority for the first and subsequent qualifying passes.

After road assets have been swept and the HE Sweeper is full, the sweeper will offload material. The net weight of the material offloaded, from the collection of road assets, is recorded on a transport task.

Once a road asset has been fully swept and the necessary attributes have been captured the task will be marked as completed in the OMS.
HE Task Renewal

Completed HE Sweeping qualifying pass tasks will be renewed in a manner which generates approximately 12 sweeper passes per calendar year per asset. The number of sweeping passes per year and the specific frequency may change depending on weather, onsite conditions, and adaptive management.

Sweeping the headwaters of the Little Bear Creek Sub-Basin focus area will be a parallel priority for the program. The focus area is marked on map C4: Little Bear Creek Sub-Basin Area. Road asset routes in this area will be swept approximately 24 times per year, depending on weather, onsite conditions, and adaptive management.

Attributes captured:

Relevant data is calculated and imported to the Road Assets and updated quarterly by the Road Maintenance Sr GiS Analyst and Road Maintenance Business Technology Analyst or their assignees.

OMS tasks will contain the attribute fields:

- **Curb Miles** – Total applicable curb length in miles (number).
- **Calc Sweep mi** – Calculated estimate in miles that the sweeper must actively travel sweeping to complete a sweeping task for this road. This allows for some of the longer stretches of road with more than 2 lanes. (number).
- **Percent curbed** – Percent of the road that is curbed in a more easily read format, (for prioritization) example; 83.22 (%).
- **Percent curb decimal** – Percent of the road that is curbed expressed in decimal form (for easy calculations and reporting) example; 0.8322. This calculated attribute requires an automation that populates a Percent Curb Decimal field within HE Sweeping tasks using attribution from the Road Assets. Material weight values must also be populated and accessible to the export process.
- **Labor and Equipment** – After a sweeper operator finishes sweeping each road asset, they will enter the total labor time (hrs.), equipment time (hrs.).
- **Sweeping Waste** – A transport task is created for offloaded waste. Sweeping waste (lbs.) is recorded under the resource section of each transport task. Transport tasks will be completed at the end of each shift.
- **Material weight** – Will be multiplied by the Percent Curb Decimal. The result will be imported back to the source HE Sweeping tasks as Qualifying Material Weight.

Reporting data generated from this process will be available to any user of the OMS and may be used for query and reporting functions. This process and plan are open to improvement based on quarterly progress review.
Loadout procedure

Material collected during HE Sweeping operations will be hauled to a Snohomish County facility and weighed. Liquids will be tested, pretreated, and decanted to the sanitary sewer system. Extracted solids will be transferred to an Ecology-approved landfill.

Offloading

Collected waste material may be offloaded into a dump truck or bin for transport to an Ecology-approved waste disposal facility or offloaded directly from the sweeper hopper to an approved facility. For direct disposal, the sweeper will position in a designated decanting area. Liquids will be decanted first, and then solids will be dumped from the hopper using the vibration function of the hopper if necessary. If the dumping area functions as a wash area, the hopper will be washed and cleaned before stowing.

Post-Op Procedures

After the last hopper load of collected materials has been offloaded, the sweeper operator will perform a series of post-operation procedures. The hopper and debris body must be cleaned at a designated wash facility with adequate filtration capability. All other sweeper components that have collected waste material or debris from the operation must also be cleaned using high pressure water and soap if necessary.

Cold-weather Storage

HE Sweepers are stored in a heated warehouse at end of shift.
Appendix A: Equipment Certification Training

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<td>1. Perform vehicle pre-op walk-around</td>
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<td>2. Inspect critical components (hopper, gutter &amp; main brooms)</td>
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<td>3. Inspect water spray system</td>
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<td>4. Lubricate critical components</td>
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</tr>
<tr>
<td>5. Check gutter &amp; main broom patterns</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>OPERATION PROCEDURES</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Safely operate vehicle from right seat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Properly service water system from hydrant</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Perform proper sweeping techniques</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Perform proper dumping techniques into dumptruck</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>POST-OPERATIONAL MAINTENANCE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Equipment clean-up</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Paperwork/Maint. History forms/crewsheets etc.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discuss/demonstrate:
1. Citizen contacts
2. Adjusting gutter & main broom patterns
3. Using water as dust control
4. Clearing debris from hopper and or belt conveyor system

**CERTIFICATION:**  
- APPROVE ☐  
- DENY ☐

**AREA SUPERVISOR:** ________________________________________

**INSTRUCTOR SIGNATURE:** ________________________________

**TRAINEE SIGNATURE:** ________________________________

**TOTAL TRAINING TIME**

SEND COMPLETED COPY TO TRAINING COORDINATOR

Mobile Sweeper Operator RMW 3  Revised 04/18
Map B1: Priority Route Overview

Snohomish County Public Works Road Maintenance
APPENDIX B: MAPS

Map B1: Priority Route Overview

Snohomish County
Overview Map

May 2020

Sources: Esri, HERE, Garmin, USGS, Intermap, Increment P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, i-c
OpenStreetMap contributors, and the GIS User Community

APPENDIX B: MAPS

Snohomish County
Public Works
Road Maintenance

Page | 16
APPENDIX B: MAPS

Map B2: Primary Zones
Map B3: HE Zones 13S, 14

APPENDIX B: MAPS

Snohomish County
Public Works
Road Maintenance

Sweeping Up Snohomish County
Road Maintenance
Zones 13S, 14

- County Jurisdiction Roads 50% or more curbed
- County Jurisdiction Roads less than 50% curbed, part of sweep to get to the curbed
- Other Roads
- Road Maintenance Zones 13S, 14
- Cities

May 2020

Document Path: C:sers\john\Documents\Road\Sweeping\Shaping\Sweeping\sweepingRoads\Sweeping\Roads\Snohomish\County\HE\Zones13S14.mxd
Map B4: Little Bear Creek Sub-Basin Area
<table>
<thead>
<tr>
<th>#</th>
<th>Project Name</th>
<th>Project Type</th>
<th>Status</th>
<th>Cost Estimate ($K)</th>
<th>Basin Area (ac)</th>
<th>LID Equivalent Area</th>
<th>LID Point Factor</th>
<th>RT Equiv. Area</th>
<th>RT Point Factor</th>
<th>FC Equiv. Area</th>
<th>FC Point Factor</th>
<th>Other Project - ac. or mi.</th>
<th>Other Point Factor</th>
<th>Total SSC Points</th>
<th>Receiving water body name</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>WC8882-Stormwater Facility Retrofit - Meadow Creek Park</td>
<td>4</td>
<td>Complete</td>
<td>$1450</td>
<td>64.0</td>
<td>20.68</td>
<td>1</td>
<td>1.90</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>22.58</td>
<td>Swamp Creek/ Lake Washington</td>
<td>Costs includes final construction cost</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>WM656, ROSWP-Sweeping Up Snohomish County(2)</td>
<td>11</td>
<td>Maintenance</td>
<td>2187.8</td>
<td>547.00</td>
<td>(see attached Exhibit A)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>547.00</td>
<td>Little Bear Creek, North Creek</td>
<td>Data are being reviewed and pending.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td><strong>$1,450</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>569.58</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
(a) Lat/Long coordinates in this table are for nearest street location or subdivision centroid.
(b) HE Sweeping operations began in 2021. Data are provisional and subject to update and refinement. Operational aspects and data are being reviewed, and cost and other data will be provided when available.
Sweeping operations occurred in Zones 13S and 14, including portions of the Little Bear Creek, North Creek, and Swamp Creek basins.
See Exhibit A (High Efficiency Sweeper Areas), Exhibit B (High Efficiency Sweeper Curb Miles and SSC Point Tabulation), Exhibit C (Street Sweeping Program Statement), and Exhibit D (Operations and Maintenance Plan)