# Appendix C1

Technical support document for the development of MOVES5 nonroad mobile (except marine, airport, and railroad) emissions inventories for 2017, 2022, 2032, and 2038

## Base Year 2017, Attainment Year 2022, Interim Year 2032, and Maintenance Year 2038 Inventories

Emissions inventories for the nonroad sources for 2017, 2022, 2032 and 2038 were created using EPA's MOVES5.0.0 model except for locomotives, marine diesel vessels, and airports.

Model runs were made for the nonattainment area for July/Weekday for all three milestone years, which represented an average ozone season weekday.

Methodology to prepare inputs for the ozone season weekday runs is provided below.

## Meteorology

Meteorology data used earlier for developing the base year 2017 nonroad model emissions inventory using MOVES2014b was used for updating the 2017 nonroad model inventory and for developing new inventories for 2022, 20232, and 2038 using MOVES5.0.0 for this plan. These meteorology data were acquired from the National Climatic Data Center (NCDC). Hourly average temperature and dew point temperature data were collected from the Dulles airport (IAD) weather station for July 2017. Hourly relative humidity data was calculated using these two parameters. The same meteorology data were used for developing both MOVES5.0.0 based nonroad and onroad model inventories for the four milestone years for this plan.

## Fuel Parameters

Fuel parameters values were supplied by the District of Columbia, Virginia, and Maryland. There are a few fuel parameters that are common inputs for developing nonroad and onroad model inventories. The same values were used for those common fuel parameters for developing both MOVES5.0.0 based nonroad and onroad model inventories for the four milestone years for this plan. The MOVES5.0.0 nonroad input, output, and runspec files are being provided in Appendix C2.

Meteorology and fuel parameter data are provided in the following spreadsheets:

District of Columbia: NR_Input_DC_2017.22.32.38_MOVES5.0.0.xlsx

Maryland: NR_Input_MD_2017.22.32.38_MOVES5.0.0.xlsx

Virginia: NR_Input_VA_2017.22.32.38_MOVES5.0.0.xlsx

Table 1 provides a summary of nonroad model emissions for each jurisdiction in the area.

MOVES5.0.0 generated Ground Support Equipment (GSE) emissions for all counties and cities in the nonattainment area (except for the District of Columbia). Andrews Air Force Base, Reagan

National Airport, and Dulles International Airport are located in Prince George's county, Arlington County, and Loudoun County respectively. GSE emissions for the above facilities together with other types of emissions there are kept in a separate source category called quasi-point sources. Therefore, emissions in this table do not include MOVES5.0.0 based GSE emissions for the above three counties. MOVES5.0.0 based GSE emissions were deleted in model outputs for the above three countries for all four milestone years. Instead, GSE emissions provided by EMP 2022v1 database were used for developing quasi-point source emissions for those three facilities for 2022 and then kept at the same level for 2032 and 2038.

**Table 1: MOVES5.0.0 Nonroad Model Emission (Tons per day)**

| **Jurisdiction** | | | **NOx** | | | | | **VOC** | |
|---|---|---|---|---|---|---|---|---|---|
| | **2017** | **2022** | **2032** | **2038** | | **2017** | **2022** | **2032** | **2038** |
| District of Columbia | 1.60 | 1.35 | 1.01 | 1.06 | | 2.06 | 1.38 | 1.34 | 1.39 |
| Calvert | 1.00 | 0.45 | 0.37 | 0.37 | | 0.58 | 0.75 | 0.59 | 0.58 |
| Charles | 1.52 | 0.74 | 0.57 | 0.57 | | 1.01 | 1.18 | 0.98 | 0.98 |
| Fredrick | 2.39 | 1.26 | 0.99 | 1.01 | | 1.70 | 2.32 | 2.41 | 2.49 |
| Montgomery | 8.71 | 3.62 | 3.10 | 3.20 | | 4.62 | 8.60 | 9.04 | 9.35 |
| Prince George's | 5.11 | 2.70 | 2.20 | 2.27 | | 3.65 | 4.93 | 5.11 | 5.29 |
| Arlington | 1.00 | 1.42 | 0.80 | 0.76 | | 2.40 | 0.88 | 0.78 | 0.78 |
| Fairfax County | 9.69 | 4.72 | 3.52 | 3.51 | | 6.48 | 9.28 | 9.08 | 9.03 |
| Loudoun County | 4.76 | 3.16 | 2.00 | 1.91 | | 4.82 | 4.54 | 4.36 | 4.31 |
| Prince William County | 3.01 | 2.05 | 1.32 | 1.28 | | 3.08 | 2.79 | 2.64 | 2.60 |
| Fairfax City | 0.68 | 0.23 | 0.22 | 0.24 | | 0.26 | 0.66 | 0.66 | 0.66 |
| Falls Church City | 0.32 | 0.10 | 0.09 | 0.09 | | 0.12 | 0.32 | 0.32 | 0.32 |
| Manassas City | 0.20 | 0.06 | 0.05 | 0.05 | | 0.06 | 0.19 | 0.19 | 0.19 |
| Manassas Park City | 0.13 | 0.08 | 0.09 | 0.11 | | 0.10 | 0.13 | 0.14 | 0.14 |
| Alexandria City | 0.18 | 0.06 | 0.05 | 0.05 | | 0.06 | 0.18 | 0.18 | 0.18 |
| NAA Total | 40.29 | 22.01 | 16.40 | 16.48 | | 30.99 | 38.13 | 37.82 | 38.30 |