COMMUNITY GREENHOUSE GAS EMISSIONS INVENTORY METHODOLOGY

All of Mountain View's greenhouse gas emissions (GHG) inventories have been prepared using a national standard developed by ICLEI—Local Governments for Sustainability (formerly International Council for Local Environmental Initiatives). This standard, the U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions (the Protocol), establishes reporting requirements and accounting guidance for quantifying GHG emissions. The Protocol examines emissions in five sectors: energy use, transportation (on-road vehicles and Caltrain), waste (solid waste facilities and organic material sent to the landfill), water (potable water use and wastewater treatment), and off-road mobile sources (construction and commercial/industrial equipment). Metric Tons of Carbon Dioxide-equivalent (MT CO_2e) are estimated from energy and water use, waste and wastewater generation, and the closed Shoreline Landfill. For mobile-source emissions, such as transportation and off-road equipment, where measured data is not available, standardized GHG accounting methodologies are used to estimate emissions at the County level and then adjusted to a City scale.

Although the Protocol provides a common framework for calculating community emissions, any GHG inventory represents an estimate that is subject to change as better data and calculation methodologies become available. Global warming potentials represent one set of metrics subject to change over time and are used to convert the quantity of methane and nitrous oxide emissions to MT CO_2e, and as a result, past inventories may be updated from time to time to reflect more accurate data.

For the 2022 and 2023 inventories, staff included emissions from Caltrain travel and the closed Shoreline Landfill. These emission sources were not included within previous inventories. The methodology for calculating these emission sources is described in later sections.

The Protocol does not fully account for lifecycle emissions from food, air travel, and purchased goods and services, which are accounted for in a Consumption-Based Emissions Inventory (CBEI). In response to community interest, CBEI was analyzed for use in Mountain View and presented was presented to Council on December 3, 2019. The report recommended not conducting ongoing City-level CBEIs for Mountain View due to: (1) the challenges in obtaining necessary and accurate data; (2) the staff time and expense involved; and (3) the fact that a CBEI would not account for the impact of initiatives in Mountain View.

The following sections provide additional information on methodology used to estimate emissions from each sector as well as explanations for any differences in methodology across inventory years.

TRANSPORTATION

To estimate emissions from on-road transportation, staff uses standardized GHG accounting methodologies to estimate emissions at the County level and then adjusts them to a City scale.

The California Air Resources Board's (CARB) provides a tool, referred to as EMFAC2021 (Emissions Factor) that calculates air pollution emissions factors for passenger cars, trucks, motorcycles, motor homes, and buses. The City receives County-level EMFAC2021 emissions data that is downscaled based on Mountain View's per-capita vehicle miles traveled (VMT), service population, and share of the County's freight jobs.

Estimating VMT is a complicated process and is one of the few emissions sources that the City does not estimate annually. The 2017-2019 Inventories used a per-capita VMT metric calculated from the City's 2018 travel demand model, created by Fehr & Peers, that used many inputs on land use and population changes and did not consider the impacts of the COVID-19 pandemic.

For the 2021-2023 Inventories, per-capita VMT metrics from the Metropolitan Transportation Commission (MTC) were used and adjusted with a reduction factor based on Caltrans traffic data to reflect post-COVID-19 conditions. For consistency, 2020 emissions data was updated based on MTC's data. Staff continues to evaluate opportunities to use Big Data (vehicle navigation data from built-in GPS and location-based services data from cell phones) to validate transportation emission results and travel demand model outputs. Staff debated between using MTC and Google's data for calculating VMT, but found Google's Environmental Insights Explorer (EIE) estimates unexpectedly low and inconsistent with prior analyses, receiving mixed feedback from stakeholders. The 2023 Inventory uses the 2022 jobs ratio data because it is the most recent data available from the Census Bureau.

For the 2022 and 2023 inventories, staff included emissions from Caltrain travel. Emissions were estimated by applying emissions factors to Caltrain's fuel usage and then downscaling based on Mountain View's share of Caltrain ridership. The 2023 inventory uses 2022 fuel usage because that was the most recent data reported (as seen in Caltrain's 2023 Sustainability Report). Mountain View's share of Caltrain ridership in 2023, or "local attribution," was estimated based on ridership ratios from 2024 since the data was not available for 2023 or 2022.

ENERGY

Emissions from building energy use, which includes electric vehicle charging and light rail service in Mountain View, are estimated by applying emission factors associated with the type of energy provided (e.g., natural gas and electricity). Silicon Valley Clean Energy (SVCE) provides the City with the aggregate electricity use emissions and total natural gas usage (therms) for residential and nonresidential sectors. Residential and nonresidential natural gas is currently combined in both the 2022 and 2023 Inventories due to the California Public Utility Commission's 15/15 rule regarding customer confidentiality. This rule requires that any publicly disclosed energy usage data must be aggregated so that it has 15 or more customers, with no single customer's usage constituting more than 15% of the total consumption reported.

For previous inventories, staff had used a statewide average emissions factors published by the U.S. Environmental Protection Agency to calculate emissions from Direct Access customers. Direct Access electricity is any electricity that is purchased directly from competitive electric

service providers rather than from a utility, and typically they are customers that fall under the 15/15 rule. For 2020-2023, SVCE adjusted the Direct Access emissions factors based on the knowledge that SVCE territory has several large Direct Access customers that publicly report purchasing 100% carbon-free electricity. SVCE's electricity emission estimates for these years assume that about 62% of the Direct Access load is carbon-free for 2023 and about 40.3% is carbon-free for the years 2020-2022.

Due to the 15/15 rule, staff was unable to retrieve nonresidential electricity usage data for 2023. The nonresidential emissions were calculated by SVCE using 2022 electricity usage and applying 2023 emissions factors with SVCE's carbon-free direct access assumption of 62%. It is unclear if the City will be able to obtain nonresidential electricity usage for future years, and staff is working with SVCE to resolve the issue.

OFF-ROAD MOBILE EQUIPMENT

Emissions from off-road mobile equipment are estimated by downscaling County-level data provided by CARB's tool, EMFAC2021. Staff downscaled County-level emissions data by using three scale factors: the ratio of new housing permits (to calculate construction equipment emissions), the households' ratio (to calculate lawn and garden equipment emissions), and the jobs ratio (to calculate commercial, industrial, and other equipment emissions). The City's estimated off-road emissions are correlated with the amount of housing construction, job growth, and population growth in Mountain View. Inventories from 2019 and earlier used CARB's earlier tool, EMFAC2017, which has been discontinued. The Preliminary 2023 Inventory uses the 2022 jobs ratio data because it is the most recent data available from the Census Bureau.

WASTE

Solid waste emissions are dependent on both the total amount of solid waste sent to landfills and the percentage of organic material in the waste stream. Organic material, such as yard trimmings, food scraps, and food-soiled paper, is the primary contributor of emissions from solid waste due to the release of methane as these materials decompose.

The 2017-2021 Inventories use the same 2017 waste characterization study data to estimate the percentage of organic material sent to landfill after trash has been sorted at the SMaRT® Station. Therefore, these inventories do not capture any additional organic waste diversion from the City's residential food scraps collection program, implemented in July 2017 and expanded to multi-family residences in 2021. The 2022 and 2023 inventories use updated waste characterization data from October 2022.

To improve alignment with the U.S. Community Protocol, staff included emissions from the Shoreline Landfill in the 2022 and 2023 Inventories. The Shoreline Landfill has been closed since the early 1990s. As organic matter in the landfill decays, it produces methane, a potent greenhouse gas. Methane and other landfill gases are expected to be generated through about 2042 at gradually decreasing levels. The Shoreline Landfill has a highly efficient landfill gas

collection system, which captures 93.7% of the methane produced. Microturbines collect some of this gas to generate on-site power for the City's sewage pump station, flare station, and irrigation pump station. The remainder of the collected methane is combusted through flaring, significantly reducing the resulting emissions.

WATER

This sector includes emissions from the energy used to treat wastewater and extract, convey, treat, and distribute potable water. These emissions are estimated by applying energy intensity values, specific to the local water supply, to each step of the water and wastewater process. Inventories prior to 2017 used average estimates for energy intensity, which were higher than those specific to the local water supply. For the charts within the "Water" section of the Council Sustainability Committee memo, the total emissions from water and wastewater have been updated to reflect current methodology.