

MEMORANDUM



TO: Scituate Planning Board
CC: Kevin Cafferty – Scituate Director of Public Works
Sean McCarthy – Scituate Engineering Supervisor
FROM: Vincent Grassi
DATE: August 15th, 2023
RE: Green House Gas Emissions

The following memorandum details the estimated greenhouse gas (GHG) emissions from the proposed Stearns Meadow Water Treatment Plant facility's HVAC system to quantify the climate and air quality impacts of the facility. The HVAC system can be electric heating via an air source heat pump or natural gas-powered heating. The GHG emissions for both power sources are detailed below.

Using Trane Trace 3D Plus modeling software, the heating loads to service the entire building for the natural gas and electric-powered systems were estimated at 16.4 MMBtu and 10.4 MMBtu respectively. Utilizing the estimated heating loads, the annual emissions (pounds per year) of carbon dioxide (CO₂) were calculated for comparison. The calculations sourced emissions factors and unit conversions from the EPA's Center for Corporate Climate Leadership Emissions Factors from March 2023. The CO₂ emissions from the entirely natural gas HVAC system is 6,534 lb/yr compared to the entirely electric HVAC system emissions of 5,595 lb/yr.

The proposed HVAC system will be selected based on factors such as installation/operational costs and performance. It is important to select systems that are best suited to the environments that they are serving. As such, the operational offices are proposed to be served by an electric-powered system while the process areas will be served by a natural gas-powered system. Using this combined HVAC system, the overall GHG emissions will likely reside within the range of 5,595-6,534 lb/yr CO₂.

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