

## EXECUTIVE SUMMARY

The Maryland State Highway Administration (SHA) Headquarters is located in downtown Baltimore and occupies two office buildings, 707 and 211, which were both originally built in 1959. This report's focus is on the 707 N. Calvert Street building, a 6 story office building with two levels of parking in the Basement and Subbasement; the Basement level also includes a print shop as well as some office space. With each floor approximately 29,000 square feet, the total renovation cost is \$4,435,500.

The objective of Technical Report III is to analyze the existing conditions of the complete heating, ventilating, and air conditioning systems there were installed in the 707 Building. Each system was analyzed, including the two low pressure central station air handling units (AHUs) serving the central core of the building and one high pressure central station AHU serving the central core of the building. Another analysis, the Leadership in Energy and Environmental Design (LEED), a subsidiary of the United States Green Building Council (USGBC), was also performed in Technical Report III.

In Technical Report II, Trane TRACE 700 Version 6.2 was utilized to calculate the office building load data, as well as the yearly energy consumption, of the 707 building. TRACE inputs were selected from the building design specifications and drawings as well as additional information provided by the design engineer. The generated block load energy model for the 707 building calculated the total annual energy consumption for cooling and heating loads to be 44.305 MBtu/year. The annual utility cost, that was totaled in Technical Report II, for the consumed electricity and natural gas was \$200,808 or 1.17 \$/sf. In order to provide a redesigned mechanical system with reduced energy consumptions, the current features of the building's utility usage must be analyzed. The operating history of the 707 Building's system was not available. Therefore, it was not possible to obtain annual energy utilization data – electric power (kWh) and fossil fuel (therms of natural gas). As SHA receives one single energy bill for the entire state, which includes over 400 buildings, there is no way to compare the actual energy usage to the estimated values.

A ventilation estimation was performed in Technical Report I, and since 707 is solely an office building, the inputs for CFM per person and floor area were the same throughout. The building was analyzed using the ventilation rate procedure, and in the majority of cases, 707 exceeded the minimum ventilation rates required due to the overestimated occupancy.