

Report for PM_{2.5} Monitoring in the Joppa Neighborhood of Dallas, Texas

Fine particulate matter (PM_{2.5}) monitoring was conducted in the Joppa neighborhood of Dallas, Texas on Thursday, March 15 and Sunday, March 18, 2018. Sampling periods were from 7:18 to 9:13 (rush hour) and 13:41 to 14:52 (mid-day) on the 15th and 18th, respectively. Sampling was conducted utilizing a portable particulate matter sampler (AEROQUAL Series 500 PM₁₀/PM_{2.5} portable particulate monitor). 133 separate measurements were taken on a north to south transect through the neighborhood, allowing the calculation of one-hour PM_{2.5} concentrations throughout the neighborhood in order to compare with the closest stationary PM monitor from the TCEQ, located at 1415 Hinton St., approximately nine miles from Joppa. Additionally, PM monitoring was conducted throughout the city of Dallas at various DART bus stops and routes for comparison.

Findings showed elevated levels of PM_{2.5} during all monitored periods in the Joppa neighborhood. PM_{2.5} levels in Joppa on 15 March 2018 averaged 38.5 $\mu\text{g}/\text{m}^3$, 55% higher than TCEQ measurements (21 $\mu\text{g}/\text{m}^3$) during the 7:00-8:00 hour and 40% higher than the TCEQ 8:00-9:00 hour average (27 $\mu\text{g}/\text{m}^3$). For 18 March 2018, average PM_{2.5} levels, 23.8 $\mu\text{g}/\text{m}^3$, were 33% greater than TCEQ levels (17 $\mu\text{g}/\text{m}^3$). PM levels in Joppa were also significantly higher than measured concentrations at various DART bus stops and routes throughout Dallas measured during rush hour, mid-day, and evenings. These differences demonstrate the intra-urban variability of PM_{2.5} and highlight the need for a more robust monitoring network across major urban landscapes, such as the DFW Metroplex.

Although monitoring times represent a short time period, the results of this study show elevated levels of PM_{2.5} well above the EPA annual standard of 12 $\mu\text{g}/\text{m}^3$. If the observed levels are indicative of the long-term trends of PM_{2.5} in Joppa, then the annual average would exceed the EPA standard. Long-term monitoring of PM_{2.5} in this area is needed in order to determine the PM_{2.5} burden on an annual basis. Recent studies have shown that exposure to PM_{2.5} levels at or below the EPA annual standard is linked to adverse health effects, including respiratory illness, cardiovascular diseases and heart attacks, and learning disabilities, especially in at-risk populations such as children and the elderly.