I-45 VRA Air Quality Mitigation
Analysis of One Month of Air Monitoring Data

A requirement of the I-45 Voluntary Resolution Agreement (VRA) was that TxDOT must place one air monitor in each project Segment of the North Houston Highway Improvement Project (NHHIP) for one year before construction can begin on the corresponding Segment.

The first air monitor was placed in August 2023, in Segment 3, at the southern tip of the entire project, at 2014 Cleburne Street as "Near Road Air Quality Monitoring Site (NR-AQM-01)." To date, TxDOT has made one month of data (December 2023) from the monitor available to the public. *Below is our review of the monitor's results:*

Particulate Matter in the Project Area
Particulate Matter 2.5 (PM2.5) measurements are only presented as daily readings, and data at a more granular level are not presented or available for public viewing. While we do realize that daily averaging helps with comparison to the EPA's NAAQS for PM2.5, which is a 24-hour standard, this averaging of measurements over an entire day glosses over any spikes in pollution that may have occurred over a shorter period, including at the hourly and sub-hourly level. Particle pollution occurring at these shorter-term levels still poses risks to human health.

Considering TxDOT's disclaimer on their webpage states that *"the NR-AQM-01 is not a regulatory monitor that TCEQ/EPA uses for regional reporting…Therefore, although criteria pollutants (i.e., PM2.5, NO2, and CO) may be approaching or exceeding the NAAQS at this site, they should not be construed as an immediate health concern or as actual exceedance of the NAAQS…"* gives us another reason why data should not be averaged but rather presented as raw measurements at their most granular, so that the public may view the pollution captured by monitors continuously, in real-time.

The lack of PM10 measurements from the monitor also represents a gap in air monitoring, as vehicular traffic is a significant source of PM10 pollution as well. Only recording PM2.5 fails to capture the true extent of particle pollution in the project area. Similar to how the NOx data presented includes concentrations from all subsets of NOx (i.e., NO2 *and* NO), the PM data should also include all subsets of particle air pollution (i.e., PM2.5 and PM10).

NOx in the Project Area
Concentrations of nitrogen oxides (NOx) over the one-month period present significant concerns. In particular, the frequency and intensity of the shown spikes, even reaching as high as 228 ppb, exceed EPA hourly standards. Even short-term exposures like this have been consistently linked to aggravating respiratory diseases as well as an increased risk of asthma exacerbations, particularly in children and the elderly.

The irregularity of these spikes is also of concern as it suggests that the NOx is not attributable to routine/background pollution but to additional pollution sources already present.
Furthermore, and reiterating prior concerns, the lack of raw, granular NOx data and concentrations below the hourly level is a significant gap as pollution occurring at shorter

(sub-hourly) term levels still poses risks to human health. Averaging should still be conducted and made available but only alongside the most granular data recorded so that the public may view the data at the level of their choice and in real-time.

VOCs in the Project Area
These data should be available more consistently than every three days. This monitoring cadence once again glosses over high pollution levels that may have occurred over a shorter period, which still poses risks to human health, especially when dealing with extremely hazardous air pollutants like benzene and 1,3-butadiene, which are known carcinogens.

Furthermore, the data presented should be visualized similar to the other pollutants, with horizontal lines indicating their respective thresholds and readings from each VOC present on separate graphs. Inserting every measured VOC onto a single graph when each possesses its own health-based Air Monitoring Comparison Values (AMCV) is not helpful for understanding these results.

While providing a graph that presents VOC concentrations as percentages of their AMCV is marginally better, it still is not as visually helpful as viewing pollutant concentrations with horizontal threshold limits.

Wind Speed and Direction Hourly Measurements
These data should be presented geographically, utilizing wind-roses on a map alongside monitor locations, so the public may more easily identify sources and destinations of prevailing winds and where the pollutant concentrations recorded and presented are being picked up. While *technically* useful in their present form, they are virtually useless for the *public* to understand since it is much harder to visualize wind direction in compass degrees without a wind-rose.

Final Thoughts
- The hazardous air pollutants measured by this air monitor will be the by-products of Segment 3 construction in the short-term, and its increased car volume in the long-term. PM lodges in the lungs and bloodstream, causing respiratory and cardiac events, while exposure to VOCs like benzene and 1,3-butadiene is linked to cancer. Even short-term exposures to pollutants such as NOX are consistently linked to respiratory diseases. It is essential for public health that these pollutants be monitored before and during the NHHIP.

- As discussed in the [VRA Progress Report: Summary and Analysis](#) released by partners on December 6, 2023, the location of this first and only air monitor for Segment 3 will be insufficient to assess background level air pollution and the impact on people's air quality for Segment 3 since the monitor is located far from Downtown and surrounding neighborhoods where a majority of Segment 3 construction will occur and where people actually live, work, learn, and play.

- This first data set has multiple notable gaps (as described in detail here), which hinders a complete analysis. The closest regulatory air monitors* are too far from the project site to provide additional local insights and do not measure all pollutants of concern. The delay in publication of these data also warrants concern; at this rate, there will not be 12 months of air monitoring data to review at the one-year mark required by the VRA, and the data presented will be grossly inadequate to draw conclusions. We are concerned that construction will begin before a complete or useful data set is acquired.

- Furthermore, without a thorough modeling of the air pollution to be generated by Segment 3 construction in the short-term, and its increased car volume in the long-term, these air monitoring data cannot accurately predict the change in air pollution that the project will cause except that by all reasonable accounts, it will increase. Moreover, acceptable levels of increased pollution have not been established by TxDOT, TCEQ, or VRA. Certainly, Segment 3 and the entire NHHIP will negatively impact the region's air quality and its attainment of NAAQS. We are currently in severe nonattainment for ozone, which VOC and NOx emissions contribute to. This alone is cause for concern about the project.

- In summary, very little can be gleaned from this first look at baseline air quality data in Segment 3, and no project decisions should be made based on it.

Questions for TxDOT
1. If these are continuous stationary air monitors, where can the public view the data from (1) August to December 2023 and (2) from January 2024 to February 2024?
2. What is the cause of the delay in the public presentation of air monitoring data?
3. How will these data be applied to decisions related to Segment 3?

*Closest TCEQ regulatory air monitors:
1) UH Moody Tower: (482010695): Ozone and SOX
2) UH Launch Trailer: (482011611): Ozone

About Air Alliance Houston

Air Alliance Houston is a non-profit advocacy organization working to reduce the public health impacts of air pollution and advance environmental justice through applied research, education, and advocacy. For more information and resources, please visit www.airalliancehouston.org.