

Ambient air monitoring data summary report

Core Civic Adams Transitional Center

Air Toxics and Ozone Precursor Program
[ATOPs]



1. Executive Summary.....2

 1.1. Report Purpose.....2

 1.2. Background Information.....2

 1.3. Key Findings.....2

2. Introduction.....3

3. Methods.....3

 3.1. The Emissions Monitoring Utility (EMU) Mobile Laboratory..... 3

 3.2. Data Processing..... 4

 3.3. Quality Control & Assurance.....4

4. Deployment Summary.....5

References..... 23



1. Executive Summary

1.1. Report Purpose

The purpose of this report is to present measurements of benzene (C₆H₆), hydrogen cyanide (HCN), hydrogen sulfide (H₂S), and other air toxics measured in ambient air by the APCD Emissions Monitoring Utility (EMU) mobile laboratory at/near the Core Civic Adams Transitional Center (1450 E 62nd Ave, Denver, CO 80216).

1.2. Background Information

On November 22, 2025, a resident of Core Civic Adams Transitional Center, contacted the Water Quality Control Division via email requesting air toxics monitoring at this residence. The Water Quality Control Division forwarded this request to the Mobile Air Toxics (MAT) unit within the Air Toxics and Ozone Precursors (ATOPs) program.

On January 6, 2026, the Mobile Air Toxics unit contacted the resident and facility director and confirmed that benzene, H₂S, and HCN could be measured with the Emissions Monitoring Utility (EMU) mobile laboratory. An ATOPs mobile laboratory deployment was scheduled for January 26, 2026.

In this deployment, we evaluated the amounts of compounds measured in ambient air to Colorado's acute [health guideline values \(HGVs\)](#),¹ which represent the concentrations of pollutants in air below which no harmful health effects are expected to occur, even with continual exposure to potentially sensitive individuals. If a pollutant is measured above a HGV, it does not mean that harmful health effects will occur, but that more investigation is needed.

We also evaluated the amounts of compounds measured according to the Environmental Protection Agency's [Acute Exposure Level Guidelines \(AEGs\)](#),² which are used by emergency planners and responders worldwide as guidance for dealing with rare, usually accidental, releases of chemicals into the air. AEGs are expressed as specific concentrations of airborne chemicals at which health effects may occur. They are designed to protect the elderly and children, and other individuals who may be susceptible. AEGs are calculated for five relatively short exposure periods – 10 minutes, 30 minutes, 1 hour, 4 hours, and 8 hours – as differentiated from air standards based on longer or repeated exposures. AEG "levels" are dictated by the severity of the toxic effects caused by the exposure, with Level 1 being the least and Level 3 being the most severe.

1.3. Key Findings

During one hour of continuous ambient measurements in the parking lot on the south side of Core Civic Adams Transitional Center, the measured one-hour average concentrations did not exceed the acute Colorado HGV for benzene (C₆H₆) (9 ppbv) or the EPA AEG Level 1



1-hour values for hydrogen sulfide (H₂S) or hydrogen cyanide (HCN) (510 ppbv and 2,000 ppbv, respectively).

However, 2-second measurements of H₂S ranging from 30 to 40 ppbv, were detected approximately one mile southeast of the facility and downwind of the Robert W. Hite wastewater treatment facility (6450 York St, Dever, CO 80216). The odor threshold of H₂S is 10 ppbv.

2. Introduction

The EMU mobile laboratory was deployed to Core Civic Adams Transitional Center on Friday, January 16, 2026. Prior to the deployment, a request was submitted from a resident to measure air toxics both at the facility and the surrounding neighborhood. The EMU was operated by two scientists from the CDPHE APCD Air Toxics & Ozone Precursors program (ATOPs).

3. Methods

3.1. The Emissions Monitoring Utility (EMU) Mobile Laboratory

The EMU is a Mercedes Sprinter van equipped with five instruments to aid in measuring air toxics: a ToFwerk Vocus Eiger Proton-Transfer-Reaction Time-of-Flight Mass Spectrometer (PTR-ToF-MS), a ToFwerk Vocus B AIM Chemical Ionization Time-of-Flight Mass Spectrometer (CI-ToF-MS), a Picarro Cavity Ringdown Spectroscopy (CRDS) instrument, a Gill Instruments MaxiMet meteorological station, and a VectorNav high performance GNSS-Aided Inertial Navigation System. All five of these instruments were fully operational for the duration of the deployment. The parameters measured by these four instruments are summarized in Table 1.

Table 1. EMU mobile laboratory instrumentation summary.

Instrument	Measured parameters	Time resolution
ToFwerk Vocus Eiger Proton-Transfer-Reaction Time-of-Flight Mass Spectrometer (PTR-ToF-MS)	Benzene (C ₆ H ₆) Toluene (C ₇ H ₈) Xylenes (C ₈ H ₁₀) Methanethiol / Methyl mercaptan (CH ₃ SH) Acetone (C ₃ H ₆ O) Acetonitrile (CH ₃ CN) Acetaldehyde (CH ₃ CHO) Methyl ethyl ketone / Butanone (C ₄ H ₈ O) Hexene (C ₆ H ₁₂) Tetrachloroethylene (C ₂ Cl ₄) Trimethylbenzene (C ₉ H ₁₂)	2 seconds
ToFwerk Vocus B AIM Chemical Ionization Time-Of-Flight Mass Spectrometer (CI-ToF-MS)	Hydrogen cyanide (HCN) 1,3-Butadiene (C ₄ H ₆)	2 seconds

Picarro Cavity Ring-Down Spectroscopy (CRDS) instrument	Hydrogen sulfide (H ₂ S) Methane (CH ₄) Water vapor (H ₂ O)	4 seconds
Gill Instruments Maximet GMX500	Pressure Temperature Relative humidity Wind speed & direction GPS location, speed, heading	1 second
VectorNav VN-200	GPS position (latitude, longitude), velocity, altitude	0.5 seconds

3.2. Data Processing

All data analysis was performed using Igor Pro 9 and Google Earth. Instrument background data and calibration data were excluded from the analysis. Statistics were calculated by substituting zero for non-detects and substituting 1/2 the method detection limit (MDL) for measurements between \pm the MDL (minimum concentration of a compound that can be measured with 99% confidence). For methane, all measurements were assumed to be above the MDL, since the regional background signal is \sim 2 ppmv.

3.3. Quality Control & Assurance

During an internal audit on September 25, 2025, the EMU Vocus Eiger PTR-ToF-MS was determined to have a 2-second MDL of 0.79 ppbv for benzene, with a percent recovery ranging from 81.5% and 117.3 % when tested with 6 ppbv of benzene. Immediately prior to and hourly throughout the deployment, the EMU Vocus Eiger PTR-ToF-MS was directly calibrated for benzene, toluene, xylene, methanethiol, acetone, acetonitrile, acetaldehyde, methyl ethyl ketone, hexene, tetrachloroethylene, and trimethylbenzene using a compressed gas cylinder containing known concentrations of these compounds. During each calibration, the EMU Vocus Eiger PTR-ToF-MS background signal was characterized by overflowing the sample inlet with zero air from a zero air generator.

During an internal audit on September 25, 2025, the EMU Vocus B CI-ToF-MS was determined to have a 2-second MDL of 1.37 ppbv for hydrogen cyanide, with a percent recovery ranging from 89.8% to 115.4% when tested with 10 ppbv of hydrogen cyanide. The EMU Vocus B CI-ToF-MS was directly calibrated for hydrogen cyanide using a compressed gas cylinder containing known concentrations of these compounds on January 12, 2026. Every 30 minutes throughout the deployment, the EMU Vocus B CI-ToF-MS background signal was characterized by overflowing the sample inlet with ultra high purity nitrogen gas.

During an internal audit on September 25, 2025, the EMU Picarro CRDS instrument was determined to have a 4-second MDL of 3.19 ppbv for hydrogen sulfide, with a percent recovery ranging from 73.5% to 86.2% when tested with 25 ppbv of hydrogen sulfide.

The 2-second MDLs for toluene, trimethylbenzene, and xylenes were most recently determined on May 20, 2024. The MDL for each of the above compounds is shown in Table 2.

Table 2. Method detection limit (MDL) for benzene, hydrogen cyanide, hydrogen sulfide, toluene, trimethylbenzene, and xylenes.

Chemical compound	Date [YYYY.MM.DD]	MDL [ppbv]
Benzene	2025.09.25	0.79
Hydrogen cyanide	2025.09.25	0.67
Hydrogen sulfide	2025.09.25	3.19
Toluene	2024.05.20	0.21
Trimethylbenzene	2024.05.20	0.45
Xylenes	2025.05.20	0.29

4. Deployment Summary

The EMU mobile laboratory arrived at Core Civic Adams Transitional Center at approximately 9:55 a.m. MST on Friday, January 16, 2026. The complete drive path is shown in Figures 1 and 2, where the red trace represents the drive path and the yellow pin represents Core Civic Adams Transitional Center.

From 9:55 a.m. to 11:45 a.m. MST, the EMU mobile laboratory parked in the south parking lot of the Core Civic Adams Transitional Center building while the mobile laboratory instruments were being prepared to conduct measurements, the time period highlighted in the gray-shaded region in Figure 3.

From 11:45 a.m. to 1:08 p.m. MST, the EMU mobile laboratory began measuring air toxics from the south parking lot of Core Civic Adams Transitional Center. The data from this time period are shown in the orange-shaded region in Figure 3. While at this location, the EMU mobile laboratory did not observe benzene, hydrogen sulfide (H₂S), hydrogen cyanide (HCN), toluene, xylenes, or trimethylbenzene (TMB) concentrations that exceeded the acute Colorado HGVs or the one-hour EPA AEGL Level 1 values, as summarized in Table 3. The one-hour average concentrations of benzene, H₂S, HCN, and TMB did not exceed the instrument MDL and thus are reported in Table 3 as 0.5 × MDL, as described above in Quality Control & Assurance.

The maximum ambient concentrations of benzene (4.6 ppbv), toluene (18.8 ppbv), xylenes (15.1 ppbv), and trimethylbenzene (7.5 ppbv) measured while the EMU mobile laboratory was parked on the south side of Core Civic Adams Transitional Center was detected between 12:00 p.m. and 12:15 p.m. MST with a southeast wind, as shown in the orange-shaded region in Figure 3 and listed in Table 3. The map in Figure 4 shows the ambient concentrations of benzene at respective latitude and longitude points, where the highest detected ambient concentrations are shown in red. The arrow indicates the average wind direction at the maximum detected ambient benzene concentration. A concrete supplier, asphalt contractor, Suncor oil refinery, among others are located downwind of this benzene plume.

From 1:08 p.m. to 2:15 p.m. MST, the EMU mobile laboratory was driven in three large loops around Core Civic Adams Transitional Center in an approximately one-mile radius and three small loops around the facility in an approximately half-mile radius. These large and small driving path loops are shown in the magnified drive path in Figure 2. The measured data are shown in the unshaded region in Figure 3.

While driving along the larger one-mile radius loop, H₂S was detected at concentrations ranging from 30–40 ppbv, which is above the odor threshold of 10 ppbv, when downwind of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) at 1:13 p.m., 1:34 p.m., and 2:10 p.m. MST, as shown in Figures 5–8. Figure 5 shows the concentration of H₂S along the drive path for all three passes along this one-mile radius loop. Figures 6–8 show the concentration of H₂S for each pass along this one-mile radius loop.

Methane concentrations above typical ambient background levels (~2 ppmv) were detected at various locations along the EMU drive path, as shown in Figures 9–13. The maximum detected concentration was 3.0 ppmv at two unique locations. The first location was northwest of Core Civic Adams Transitional Center with wind coming from the north, as shown in Figure 10, where the red arrow indicates the average wind direction for the period where methane concentrations were elevated above typical ambient background levels. A number of lumber, landscaping, and equipment facilities are located north, upwind of this methane plume.

The second maximum detection location of methane was directly west of Core Civic Adams Transitional Center with wind coming from the east, as shown in Figure 11, where the red arrows indicate the average wind direction of each of the two methane plumes detected at this location. A number of facilities are located in this region, including but not limited to an asphalt specialist facility, waste service facility, a demolition service, and others.

Methane was also detected above typical ambient concentrations southeast of Core Civic Adams Transitional Center and downwind of the Robert W. Hite Wastewater Treatment facility and Suncor oil refinery, as shown in Figure 12. Because of the proximity of these two locations and the average wind direction, it is difficult to pinpoint the source of methane.

Northeast of Core Civic Adams Transitional Center, methane plumes were detected at two locations straddling and downwind from an industrial area, as shown in Figure 13. This industrial area includes an asphalt mixing plant, an automobile auction lot, and others.

Concentrations of HCN, toluene, xylenes, and trimethylbenzene during this time period from 1:08 p.m. to 2:15 p.m. MST are comparable to typical ambient background concentrations and maximum detected concentration values remained below acute Colorado HGVs and AEGL Level 1 1-hour exposure values.

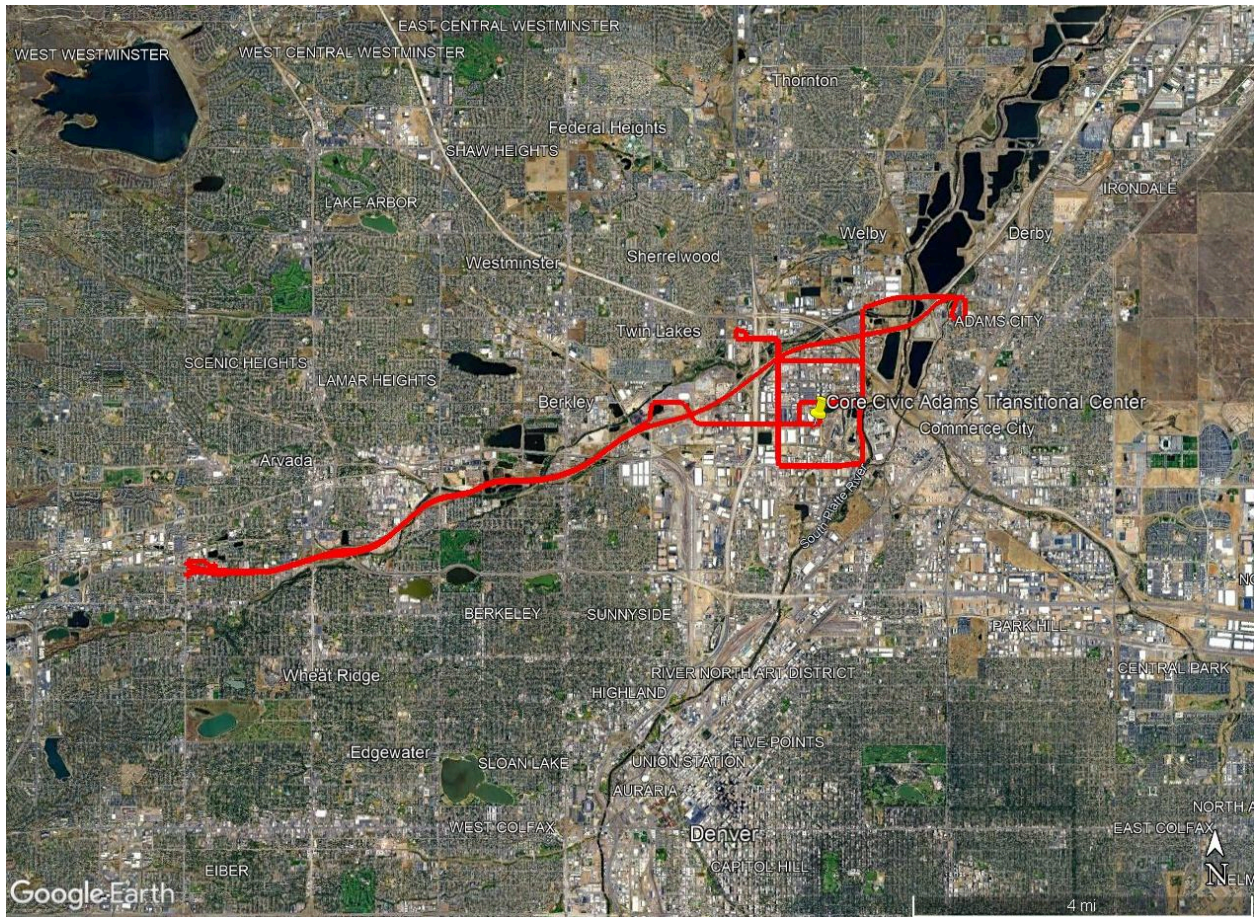


Figure 1. Map of the EMU drive path for the deployment to Core Civic Adams transitional Center on January 16, 2026. The EMU drive path is shown as a red line. The location of Core Civic Adams transitional Center is denoted by a yellow pin marker.



Figure 2. Magnified map of the EMU drive path for the deployment to Core Civic Adams Transitional Center on January 16, 2026. The EMU drive path is shown as a red line. The location of Core Civic Adams Transitional Center is denoted by a yellow pin marker.

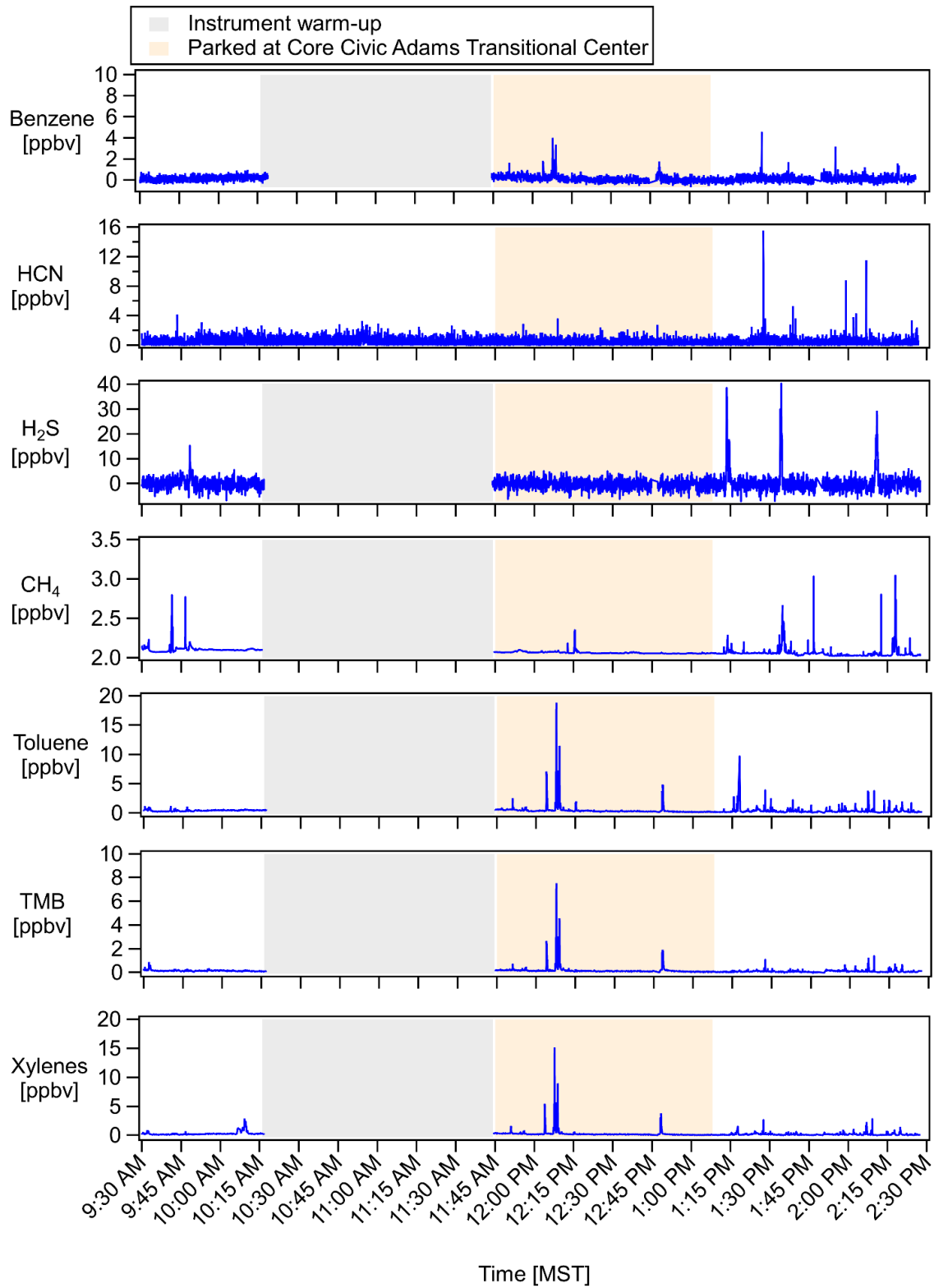


Figure 3. Time profiles of benzene, hydrogen sulfide (H_2S), hydrogen cyanide (HCN), toluene, xylenes, trimethylbenzene (TMB), and methane (CH_4) as measured by the EMU mobile

laboratory at/or near the Core Civic Adams Transitional Center on January 16, 2026. The gray shaded region indicates the period when the PTR-ToF-MS was warming up due to cold outdoor temperatures. The orange shaded region indicates the period when the EMU mobile laboratory was sampling ambient air from the parking lot south of the facility.

Table 3. The 1-hour average ambient measured concentrations, the maximum 2-second ambient detected concentrations, and acute Colorado Health Guideline Values (CO HGV) or EPA AEGL Level 1 1-hour exposure values of benzene, hydrogen sulfide (H₂S), hydrogen cyanide (HCN), toluene, xylenes, trimethylbenzene, and methane.

Air toxic compound	1-hour average concentration [ppbv]	Maximum 2-second detected concentration [ppbv]	Acute CO HGV ^a or AEGL Level 1 1-hour exposure ^b [ppbv]
Benzene	0.4*	4.6	9 ^a
Hydrogen cyanide	0.3*	15.5	2000 ^b
Hydrogen sulfide	2*	40	510 ^b
Methane	2.1	3.0	N/A
Toluene	0.6	18.8	2,000 ^a
Trimethylbenzene	0.2*	7.5	3,000 ^a
Xylenes	0.4	15.1	2,000 ^a

*The measured 1-hour average concentration was below the MDL and is reported as 0.5 × MDL.



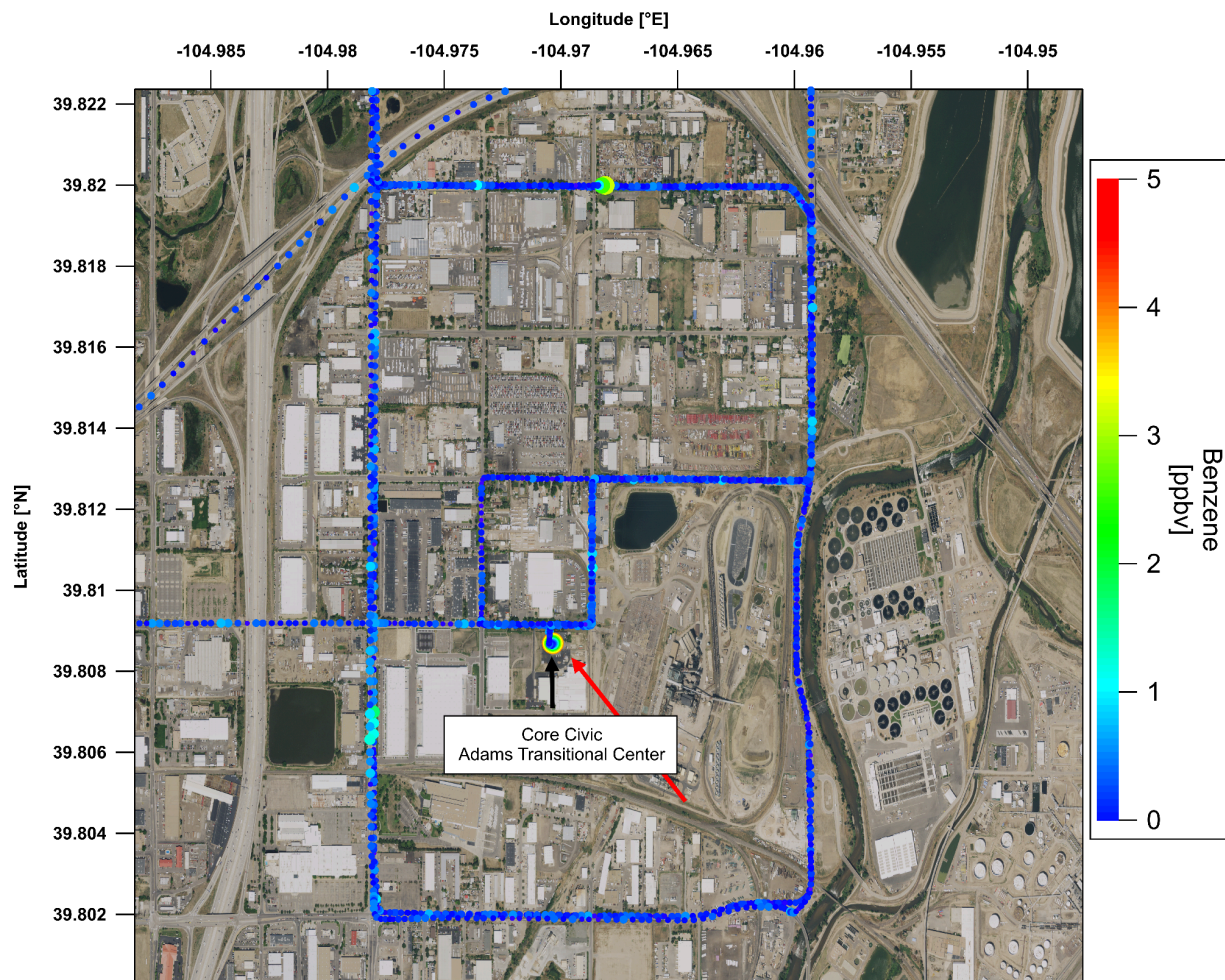


Figure 4. Map of ambient benzene measurements in the area surrounding Core Civic Adams Transitional Center 1450 E 62nd Ave on January 16, 2026. The circular marker size and color indicates the ambient concentration of benzene, where red is the highest and blue is the lowest detected concentration. The red arrow indicates the average wind direction when the maximum concentration of benzene was detected.

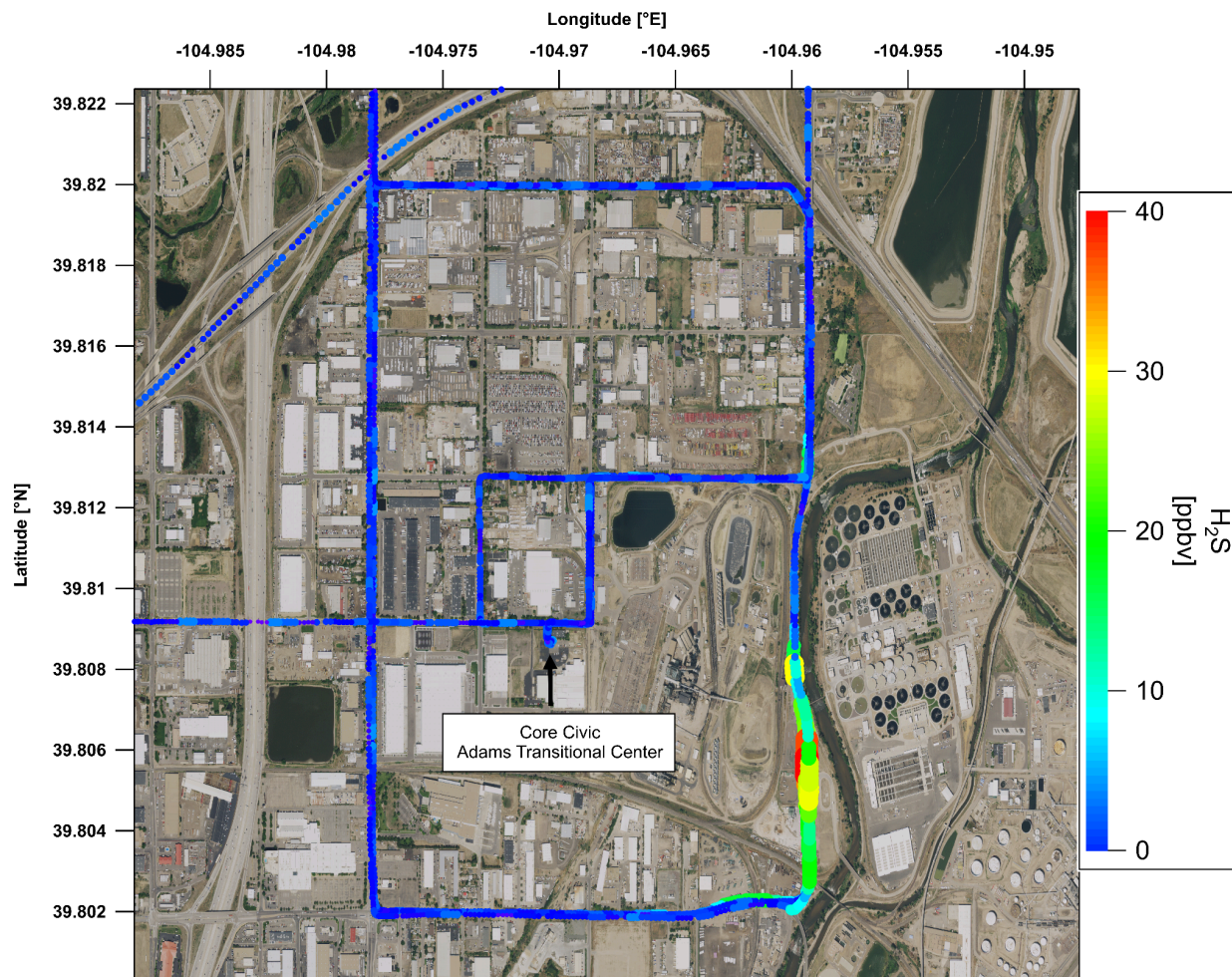


Figure 5. Map of ambient hydrogen sulfide (H_2S) measurements in the area surrounding Core Civic Adams Transitional Center on January 16, 2026 for the entirety of the drive path at/near the facility. The circular marker size and color indicates the ambient concentration of H_2S , where red is the highest and blue is the lowest detected concentration.

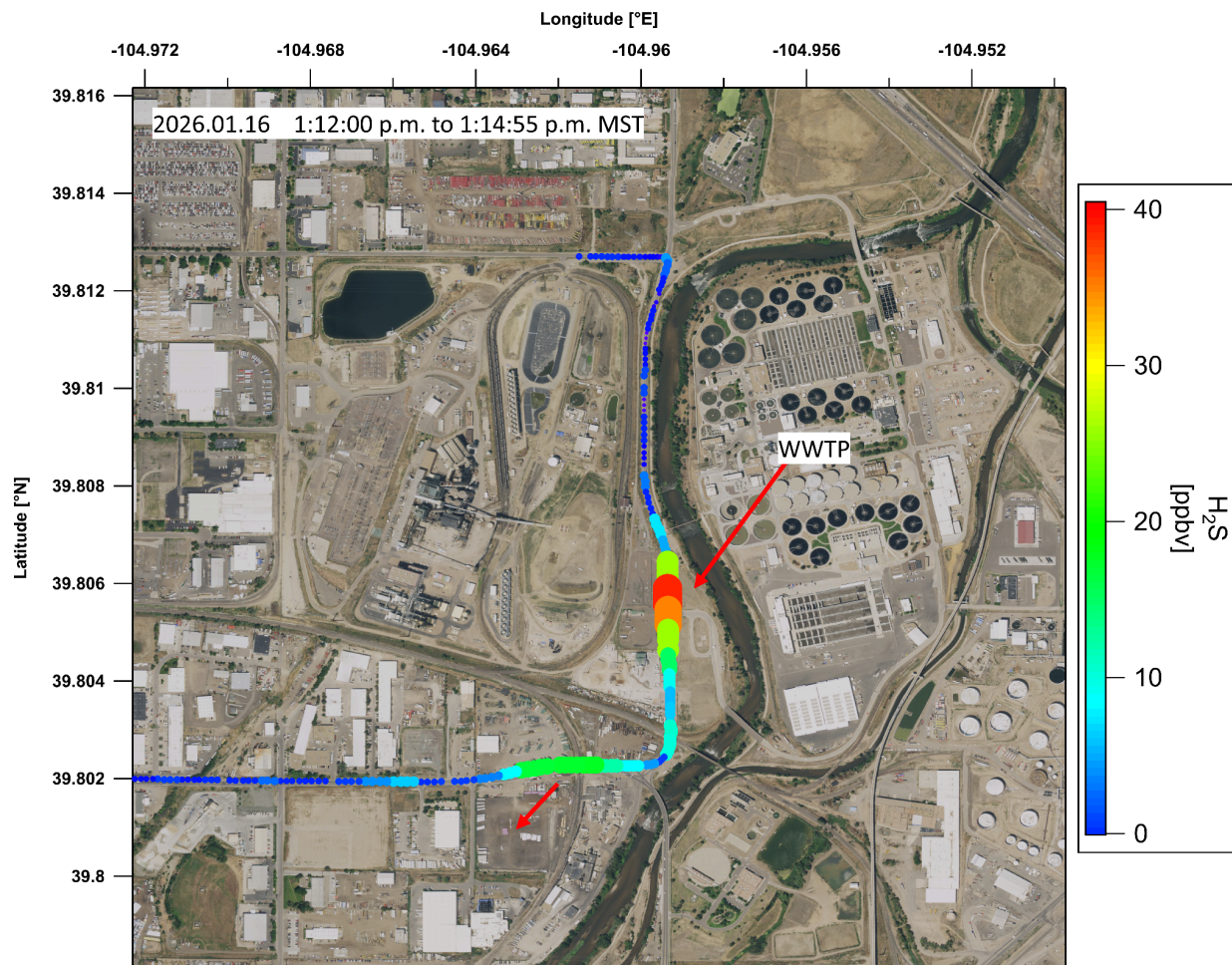


Figure 6. Map of ambient hydrogen sulfide (H_2S) measurements in the area southeast of Core Civic Adams Transitional Center during the first pass along this one-mile radius loop from 1:12:00 to 1:14:55 p.m. MST. The circular marker size and color indicates the ambient concentration of H_2S , where red is the highest and blue is the lowest detected concentration. The red arrows indicate the average wind direction when the maximum concentration of H_2S in each plume was detected. The Robert W. Hite Wastewater treatment facility is noted by the WWTP marker.

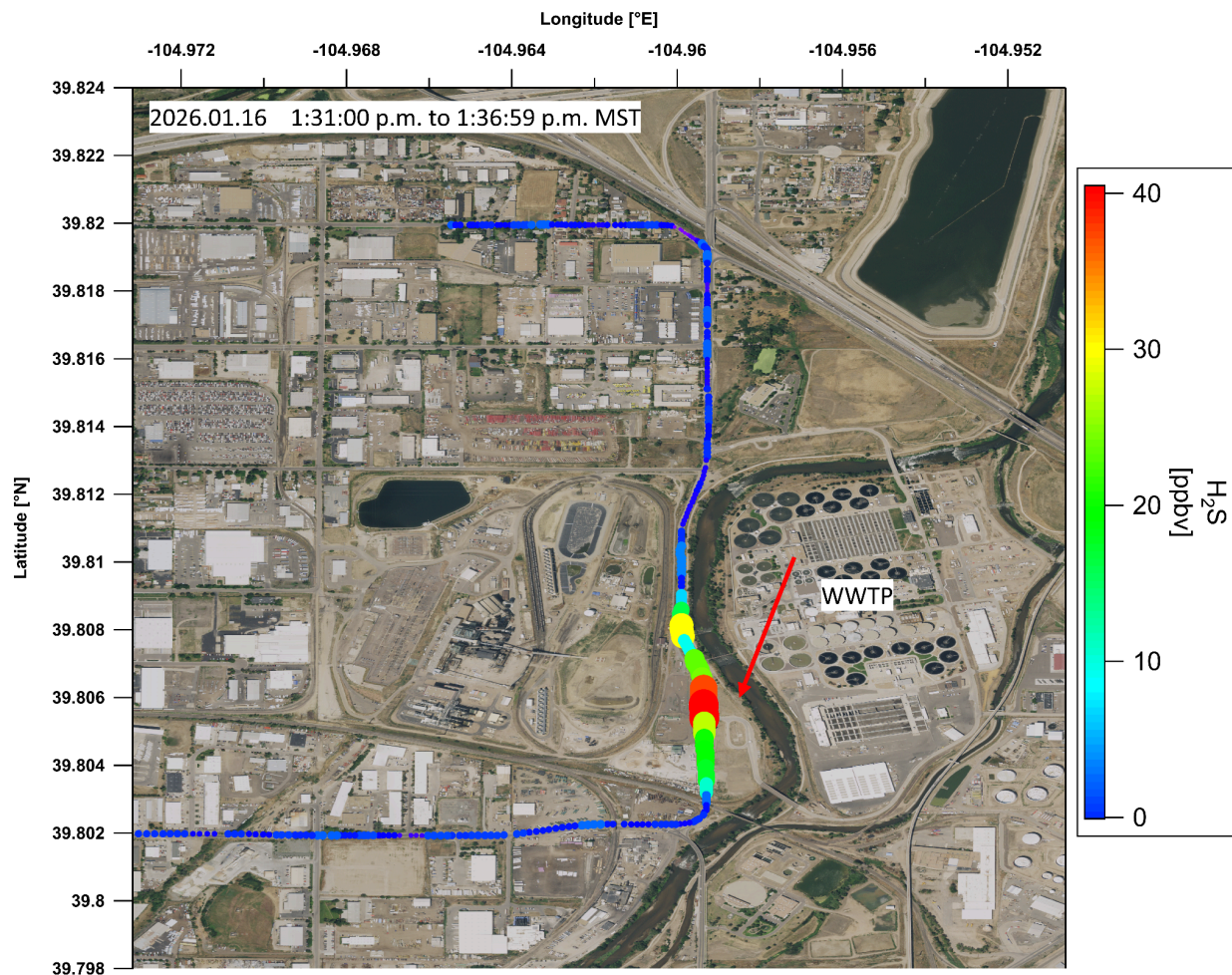


Figure 7. Map of ambient hydrogen sulfide (H₂S) measurements in the area southeast of Core Civic Adams Transitional Center during the second pass along this one-mile radius loop from 1:31:00 to 1:36:59 p.m. MST. The circular marker size and color indicates the ambient concentration of H₂S, where red is the highest and blue is the lowest detected concentration. The red arrow indicates the average wind direction when the maximum concentration of H₂S in the plume was detected. The Robert W. Hite Wastewater treatment facility is noted by the WWTP marker.

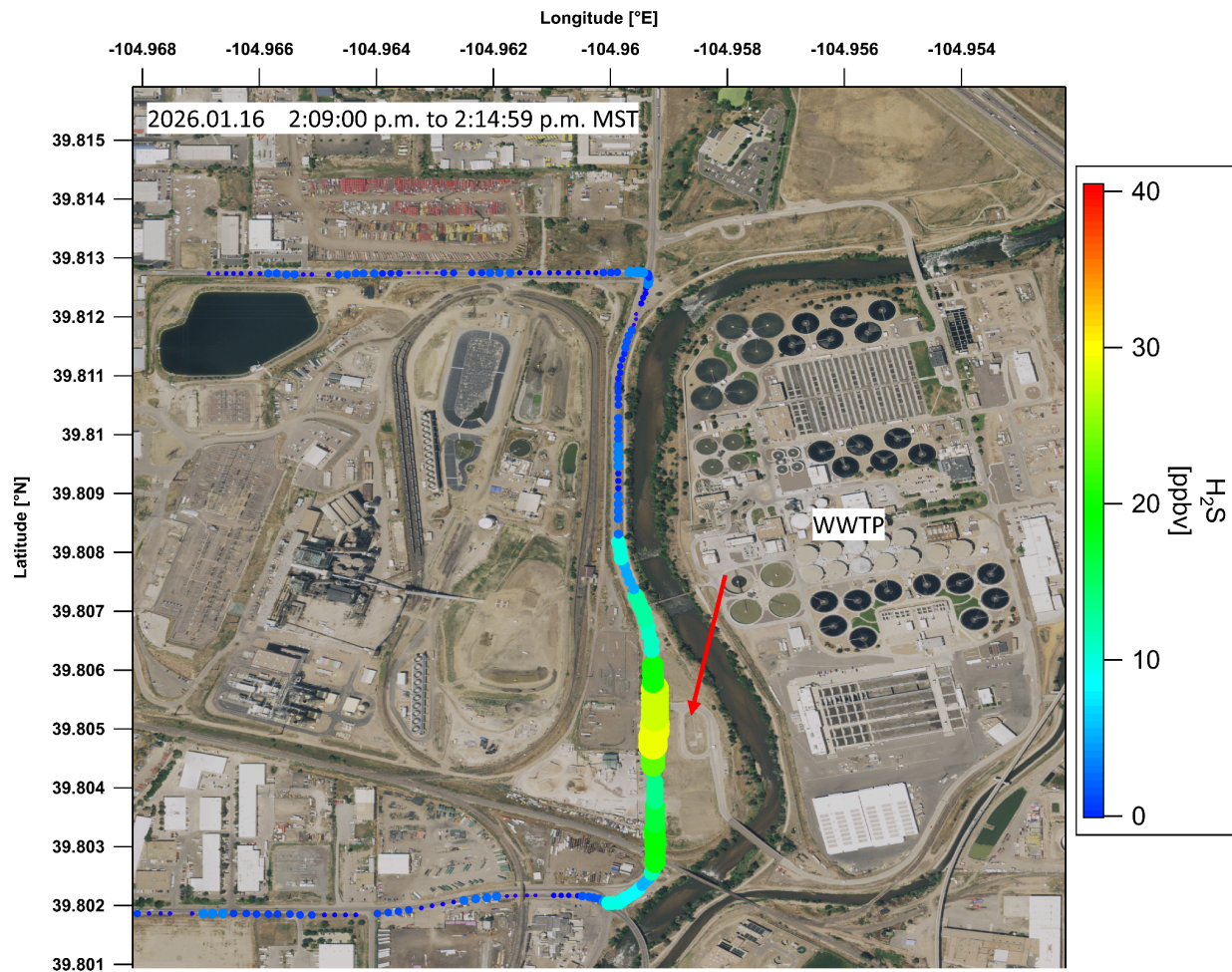


Figure 8. Map of ambient hydrogen sulfide (H₂S) measurements in the area southeast of Core Civic Adams Transitional Center during the third pass along this one-mile radius loop from 2:09:00 to 2:12:59 p.m. MST. The circular marker size and color indicates the ambient concentration of H₂S, where red is the highest and blue is the lowest detected concentration. The red arrow indicates the average wind direction when the maximum concentration of H₂S in the plume was detected. The Robert W. Hite Wastewater treatment facility is noted by the WWTP marker.

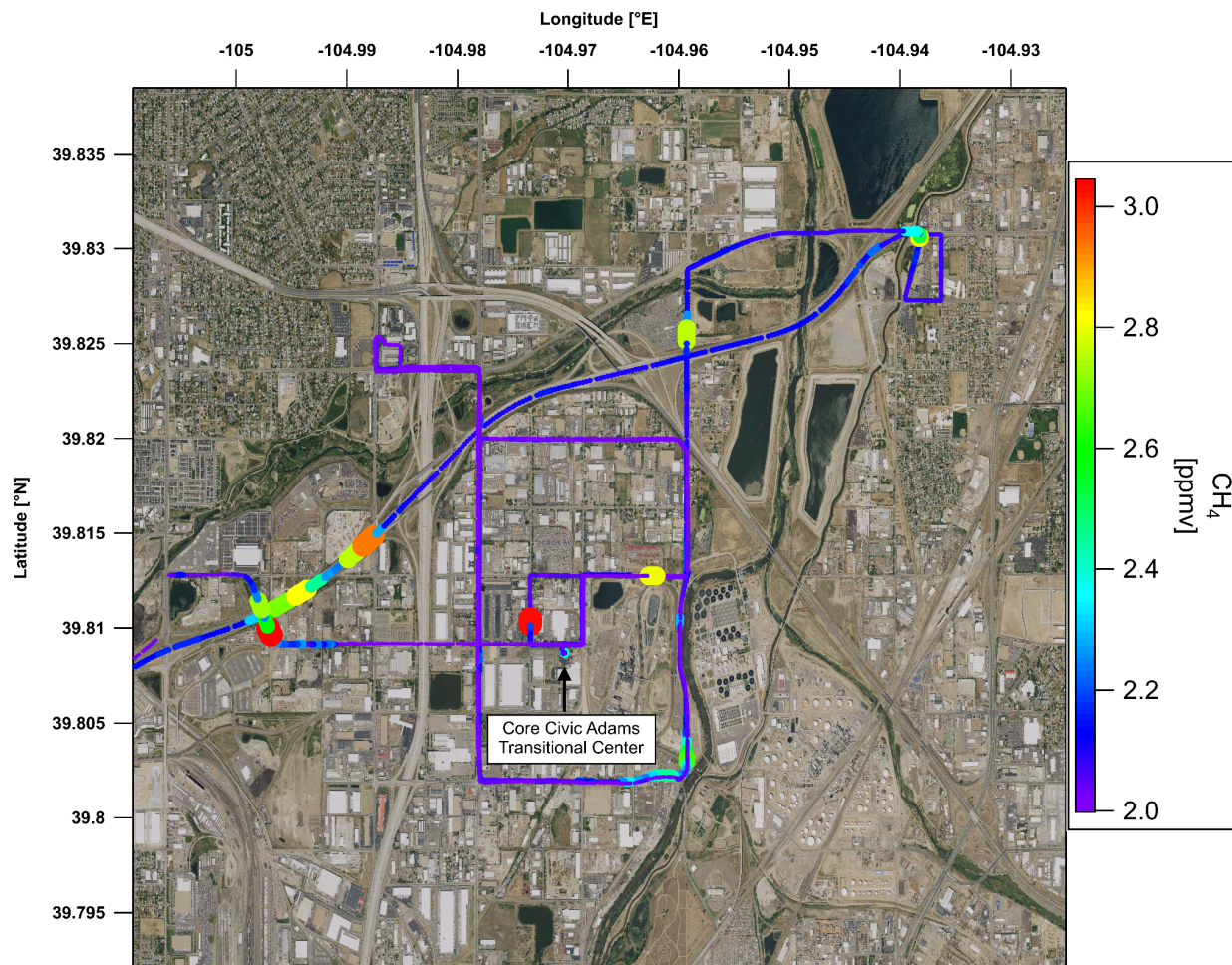


Figure 9. Map of ambient methane (CH₄) measurements along the drive path at/near Core Civic Adams Transitional Center on January 16, 2026. The circular marker size and color indicates the ambient concentration of CH₄, where red is the highest and blue is the lowest detected concentration.

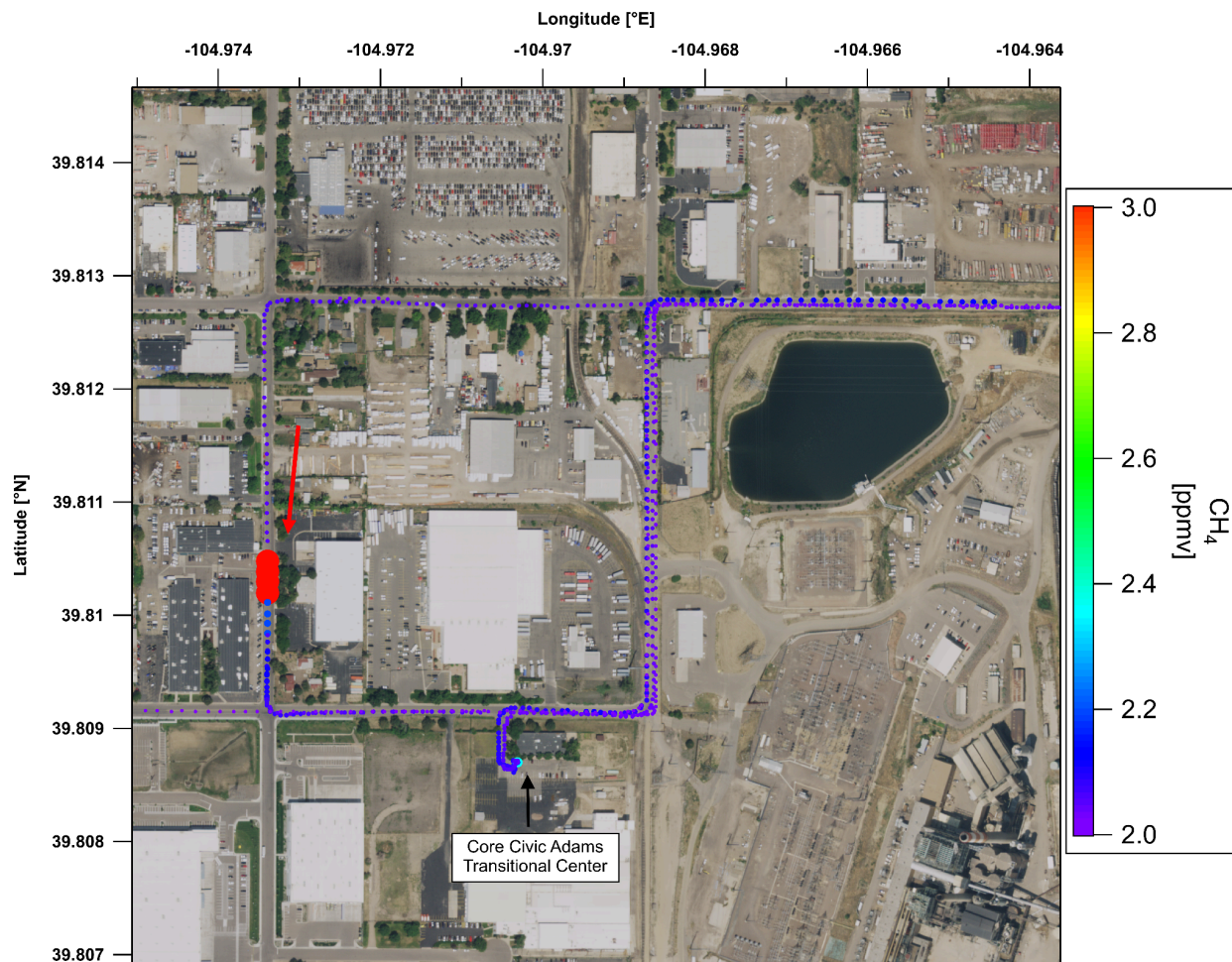


Figure 10. Map of ambient methane (CH_4) measurements northwest of Core Civic Adams Transitional Center on January 16, 2026. The circular marker size and color indicates the ambient concentration of CH_4 , where red is the highest and blue is the lowest detected concentration. The red arrow indicates the average wind direction when the maximum concentration of CH_4 in the plume was detected.

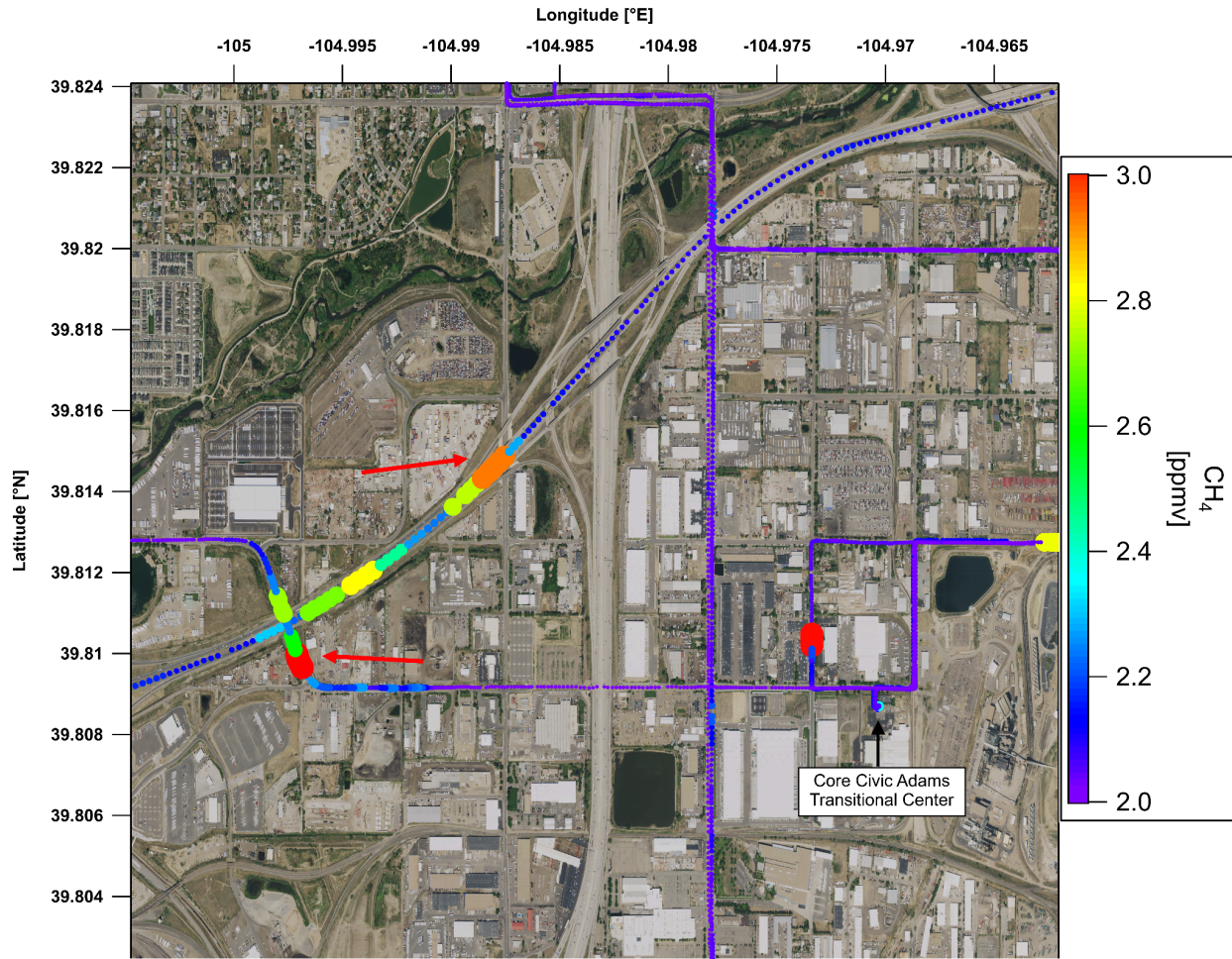


Figure 11. Map of ambient methane (CH₄) measurements in the area west of Core Civic Adams Transitional Center on January 16, 2026. The circular marker size and color indicates the ambient concentration of CH₄, where red is the highest and blue is the lowest detected concentration. The red arrows indicate the average wind direction when the maximum concentration of CH₄ in each plume was detected.

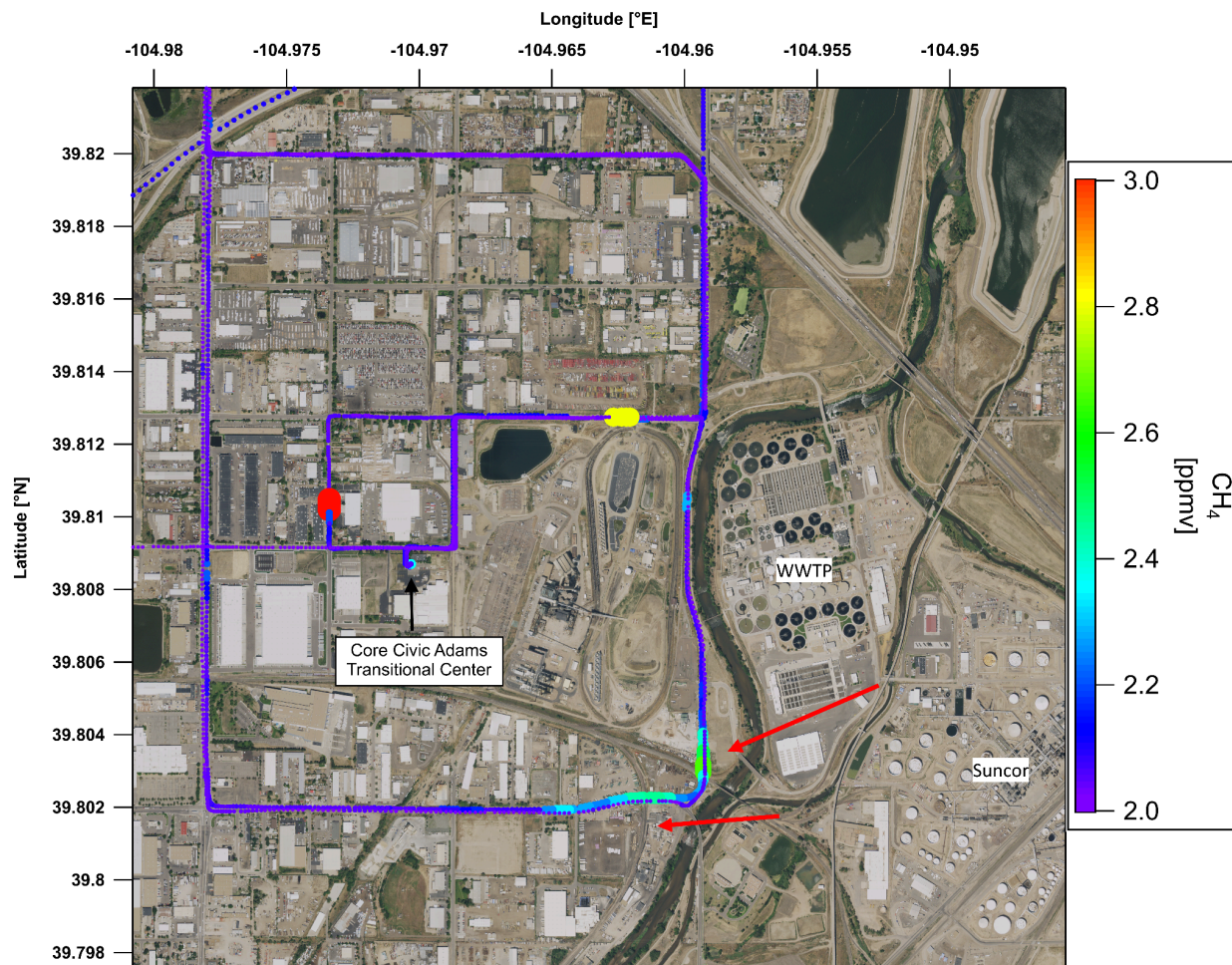


Figure 12. Map of ambient methane (CH_4) measurements in the area southeast of Core Civic Adams Transitional Center on January 16, 2026. The circular marker size and color indicates the ambient concentration of CH_4 , where red is the highest and blue is the lowest detected concentration. The red arrows indicate the average wind direction when the maximum concentration of CH_4 in each plume was detected, with the Robert W. Hite Wastewater Treatment facility (WWTP) and Suncor labeled upwind.

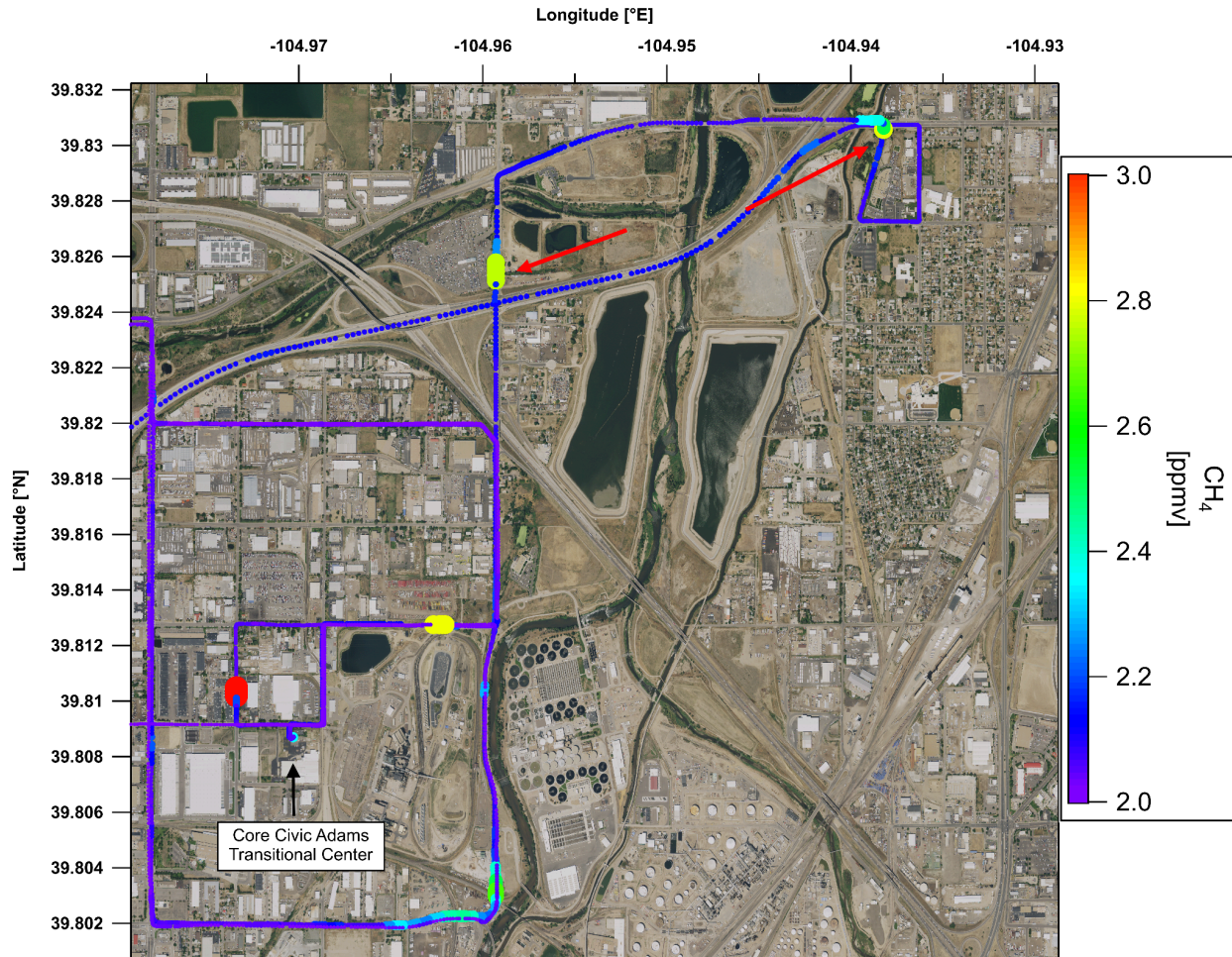


Figure 13. Map of ambient methane (CH_4) measurements in the area northeast of Core Civic Adams Transitional Center on January 16, 2026. The circular marker size and color indicates the ambient concentration of CH_4 , where red is the highest and blue is the lowest detected concentration. The red arrows indicate the average wind direction when the maximum concentration of CH_4 in each plume was detected.

References

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2. Environmental Protection Agency. (2025, May 14). About Acute Exposure Guideline Levels (AEGLs). EPA.
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