

# Ambient air monitoring data summary report

## Commerce City at Night

Air Toxics and Ozone Precursor Program  
[ATOPs]

12.08.2025



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# 1. Executive Summary

## 1.1. Report Purpose

The purpose of this report is to describe measurements of hydrogen sulfide (H<sub>2</sub>S), methane (CH<sub>4</sub>), and other air toxics measured in ambient air by the CDPHE Emissions Monitoring Utility (EMU) mobile laboratory in Commerce City on the night of December 8, 2025.

## 1.2. Background Information

From February 2023 to December 2025, CDPHE APCD conducted three-hundred and thirty-nine (339) routine mobile laboratory deployments measuring benzene (C<sub>6</sub>H<sub>6</sub>), hydrogen sulfide (H<sub>2</sub>S), hydrogen cyanide (HCN), and other air toxics across disproportionately impacted (DI) communities in Commerce City, Henderson, and Pueblo. These mobile laboratory measurements are mandated by Colorado House Bill 21-1189, also known as the “Regulate Air Toxics” Act. Without exception, all 339 of these mobile laboratory deployments have been conducted between the hours of 8 a.m. and 6 p.m. local time.

In early October 2025, CDPHE APCD began continuous, 24/7 measurements of hydrogen sulfide (H<sub>2</sub>S), benzene (C<sub>6</sub>H<sub>6</sub>), and meteorological parameters in ambient air at the Adams County Birch Street site (39.828106 N, 104.936467 W), which is a fixed stationary air quality monitoring site located directly across the street from Adams City Middle School (4451 E 72nd Ave, Commerce City, CO 80022). These were the first measurements conducted for the newly-established Municipality-Tied Ground-based Observations of Air Toxics (MT GOAT) network. The first two months of MT GOAT measurements at the Adams County Birch Street site reveal hydrogen sulfide (H<sub>2</sub>S) concentrations which are consistently elevated above the odor threshold (>10 ppbv) between the hours of 6 p.m. and 8 a.m. local time. The elevated hydrogen sulfide (H<sub>2</sub>S) concentrations observed overnight at the Adams County Birch Street site are corroborated by hydrogen sulfide (H<sub>2</sub>S) measurements conducted by Montrose Environmental Group, Inc. at Adams City Middle School as part of the Suncor Energy’s Commerce City - North Denver Air Monitoring (CCND) program.

On November 17, 2025, Adams County staff informed CDPHE APCD that numerous Commerce City residents had expressed concerns about the presence of foul odors overnight. Adams County staff requested that CDPHE APCD conduct a late-night mobile laboratory deployment to investigate the source of these odors.

## 1.3. Key Findings

On December 8, 2025, between 6:45 p.m. and 9:45 p.m. MST, the EMU mobile laboratory consistently observed hydrogen sulfide (H<sub>2</sub>S) concentrations above the odor threshold of 10 ppbv while downwind of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216). The EMU mobile laboratory also consistently observed methane (CH<sub>4</sub>) concentrations elevated above background levels (>2 ppmv) while downwind of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022). The observed elevations in methane (CH<sub>4</sub>) were not correlated in time or location with the observed elevations in hydrogen sulfide (H<sub>2</sub>S).

It should be noted that these measurements were conducted on a relatively cold winter night; warmer temperatures may induce larger emissions of hydrogen sulfide (H<sub>2</sub>S) due to increased bacterial decomposition.

## 2. Introduction

The EMU mobile laboratory was deployed to the area surrounding the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) and the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) from ~6:30 p.m. to ~9:45 p.m. MST on December 8, 2025. The EMU mobile laboratory was operated by two scientists from the CDPHE APCD Air Toxics & Ozone Precursor (ATOPs) program.

## 3. Methods

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

The EMU is a Mercedes Sprinter van equipped with four instruments for 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, and a Gill Instruments MaxiMet meteorological station. All four of these instruments were fully operational for the duration of the deployment at Platte River Biogas. The parameters measured by these four instruments are summarized in Table 1.

**Table 1.** EMU instrumentation summary

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

Instrument	Measured parameters	Time resolution
Picarro Cavity Ring-Down Spectroscopy (CRDS) instrument	Hydrogen sulfide (H <sub>2</sub> S) Methane (CH <sub>4</sub> ) Water vapor (H <sub>2</sub> O)	4 seconds
Gill Instruments Maximet GMX500	Pressure Temperature Relative humidity Wind speed & direction GPS location, speed, heading	1 second

### 3.2. Data Processing

All data analysis was performed using IGOR Pro 9.05 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 below the MDL. For methane, all measurements were assumed to be above the MDL, since the regional background signal is ~2 ppbv.

### 3.3. Quality Control & Assurance

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 (H<sub>2</sub>S), with a percent recovery ranging from 73.5% to 86.2% when tested with 50 ppbv of hydrogen sulfide (H<sub>2</sub>S).

During an internal audit on June 26, 2025, the EMU Picarro CRDS instrument was challenged with 5 ppbv of methane (CH<sub>4</sub>) which resulted in a percent recovery ranging from 96.4 to 97.8% .

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 (C<sub>6</sub>H<sub>6</sub>), with a percent recovery ranging from 81.5% to 117.3% when tested with 6 ppbv of benzene (C<sub>6</sub>H<sub>6</sub>). 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 0.67 ppbv for hydrogen cyanide (HCN), with a percent recovery ranging from 89.8% to 115.4% when tested with 10 ppbv of hydrogen cyanide (HCN). The EMU Vocus “B” CI-ToF-MS was directly calibrated for hydrogen cyanide and toluene using a compressed gas cylinder containing known concentrations of these compounds on December 8, 2025. 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.

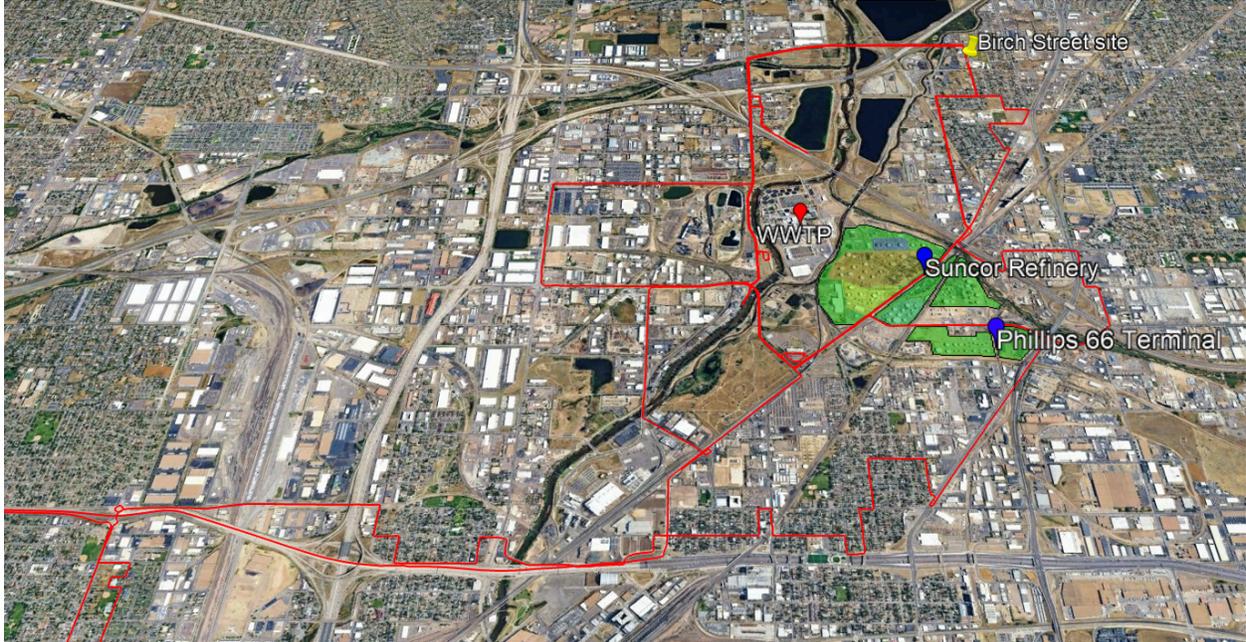
## 4. Deployment Summary

The EMU arrived at the area surrounding the Robert W. Hite wastewater treatment facility and the Suncor oil refinery at approximately 6:30 p.m. MST. From 7:51 p.m. MST until 9:45 p.m. MST, the EMU repeatedly drove in a loop around the Robert W. Hite wastewater treatment facility and through the Suncor oil refinery. The complete EMU drive path is shown in Figure 1.

While downwind of the Robert W. Hite wastewater treatment plant, the EMU consistently observed hydrogen sulfide ( $H_2S$ ) concentrations above the odor threshold of 10 ppbv. The maximum four-second hydrogen sulfide ( $H_2S$ ) concentration observed downwind of the Robert W. Hite wastewater treatment plant was 15 ppbv.

While downwind of the Suncor oil refinery, the EMU consistently observed methane ( $CH_4$ ) concentrations elevated above the background concentration of ~2 ppmv. The maximum four-second methane ( $CH_4$ ) concentration observed downwind of the Suncor oil refinery was 9.2 ppbv.

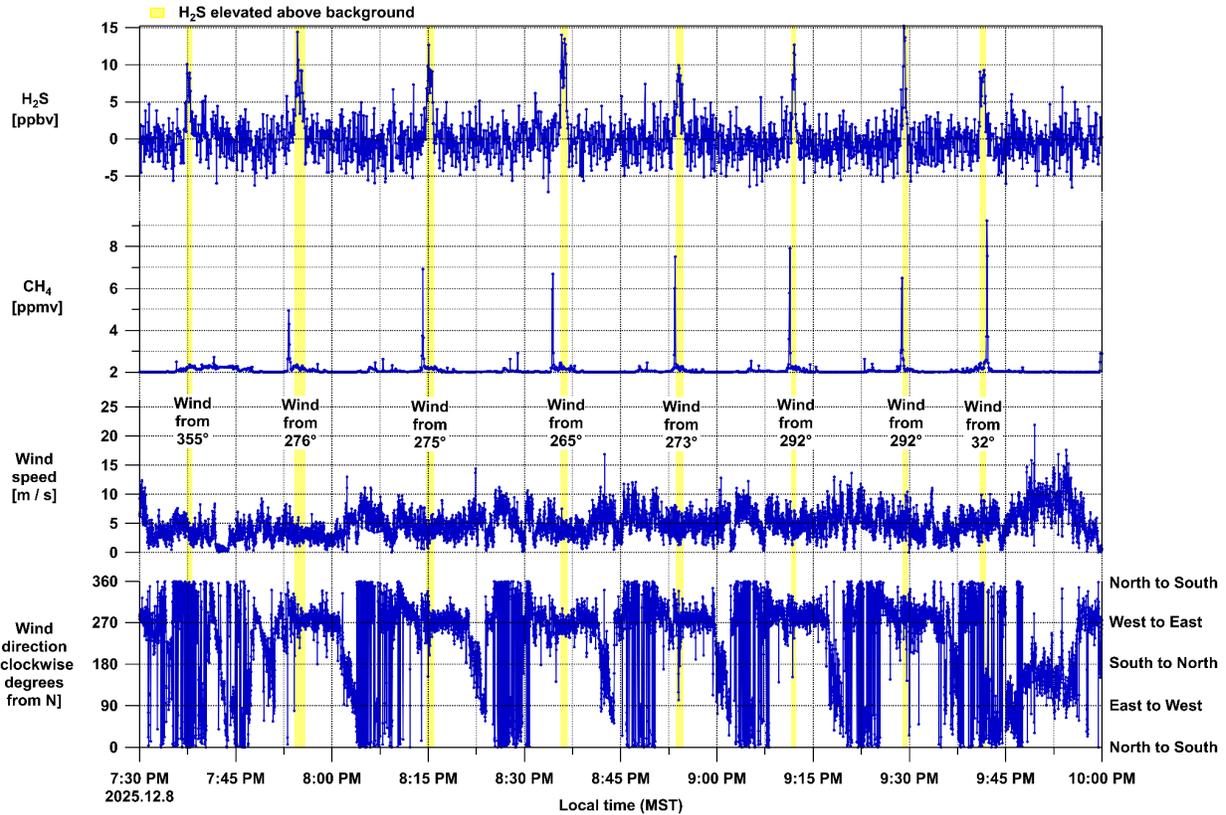
Table 2 shows measurement statistics for hydrogen sulfide ( $H_2S$ ) and methane ( $CH_4$ ) observed on December 8, 2025. Figure 2 shows a time series of hydrogen sulfide, methane, wind speed, and wind direction. Figures 3 through 17 show the hydrogen sulfide ( $H_2S$ ) and methane ( $CH_4$ ) concentrations observed downwind of the two facilities.



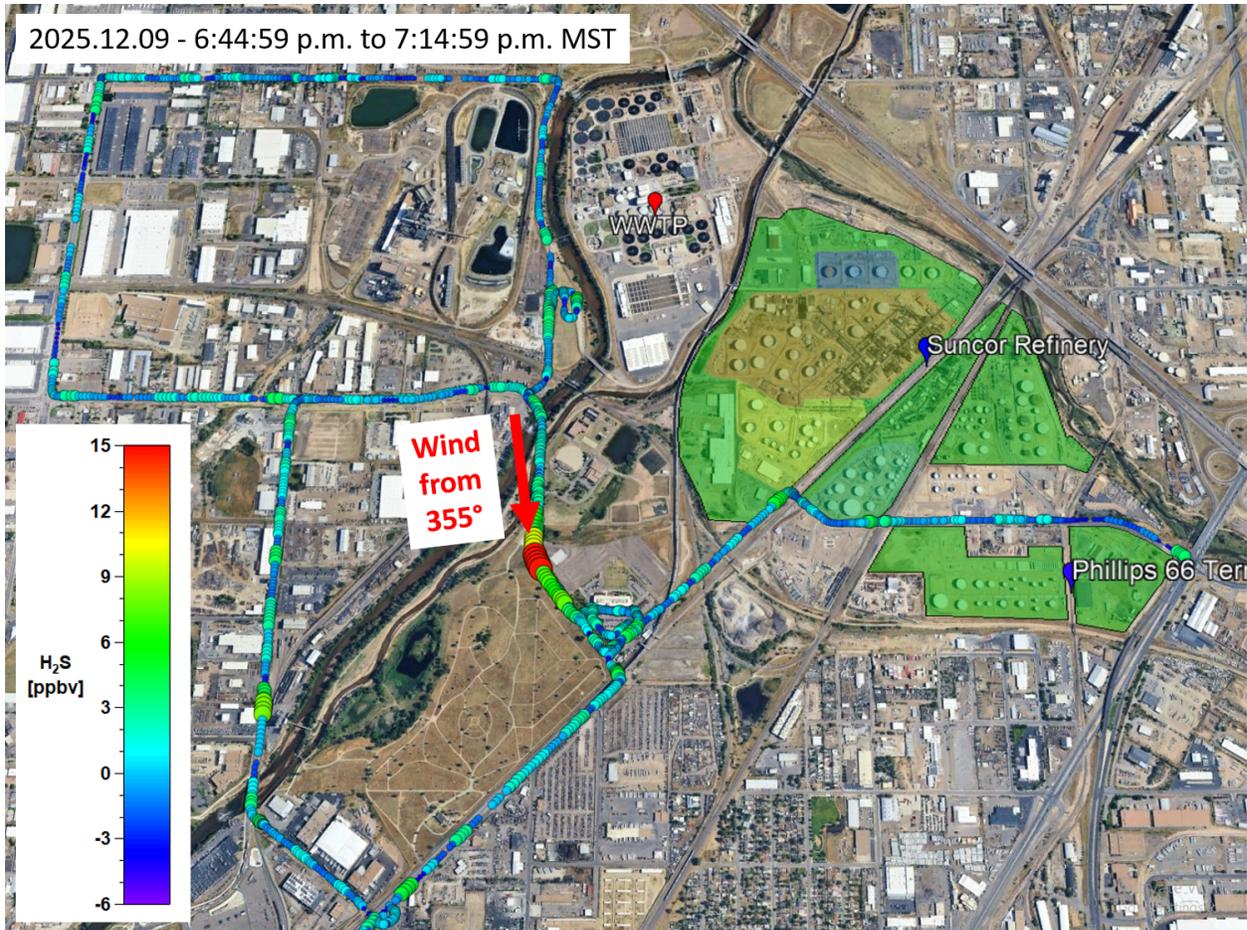
**Figure 1.** Map showing the complete EMU mobile laboratory drive path on December 8, 2025. The red line indicates the EMU drive path. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the MT GOAT Adams County Birch Street site (39.828106 N, 104.936467 W) is indicated by the labeled yellow pushpin marker.

**Table 2.** Measurement statistics for hydrogen sulfide (H<sub>2</sub>S) and methane (CH<sub>4</sub>) observed by the EMU mobile laboratory on December 8, 2025

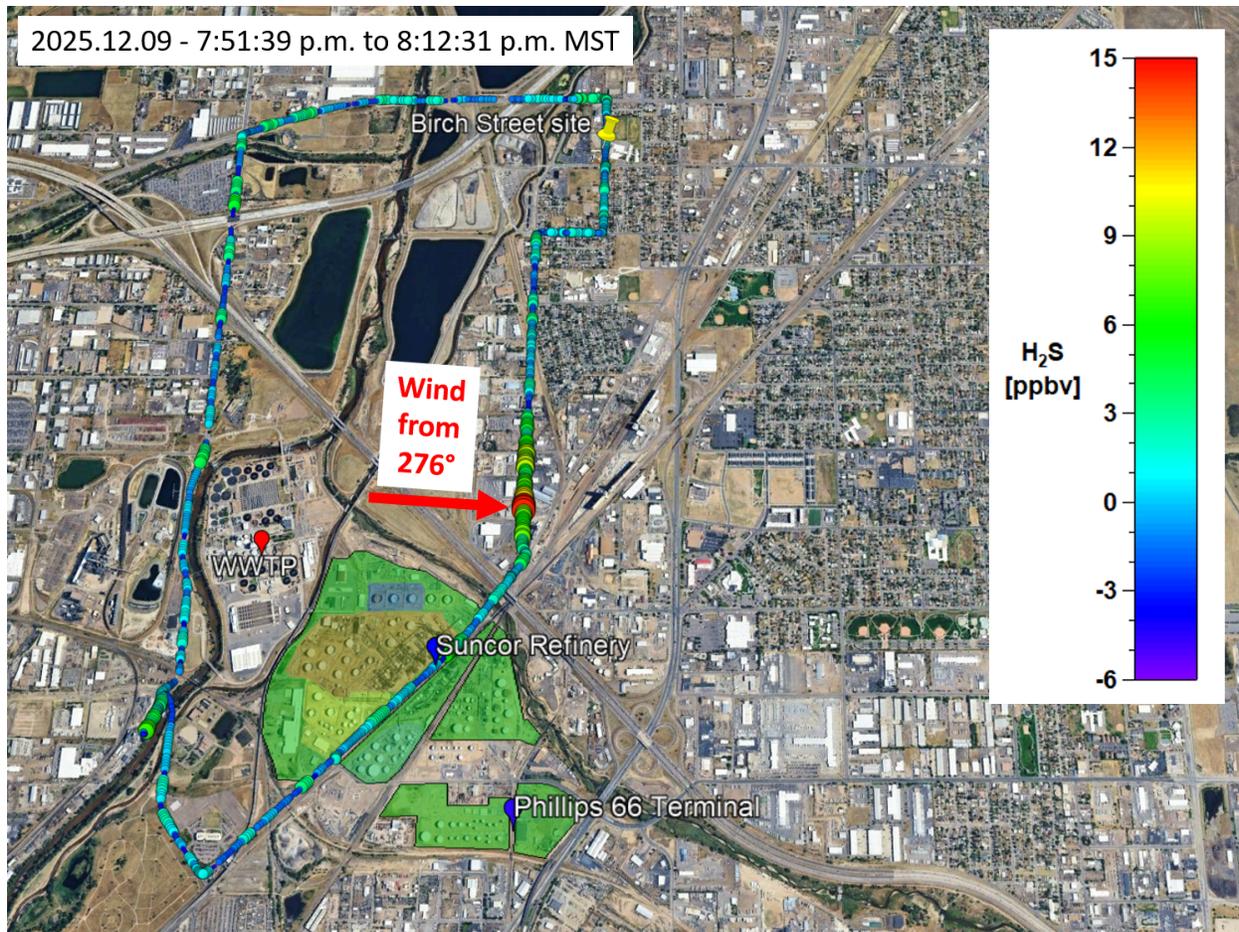
Statistic	Hydrogen sulfide (H <sub>2</sub> S)	Methane (CH <sub>4</sub> )
Maximum	15 ppbv	9.2 ppmv
Minimum	Non-detect	2.0 ppmv
Average	< MDL	2.1 ppmv
Median	< MDL	2.0 ppmv
Standard deviation	< MDL	0.3 ppmv
Method detection limit (MDL)	3.19 ppbv	-



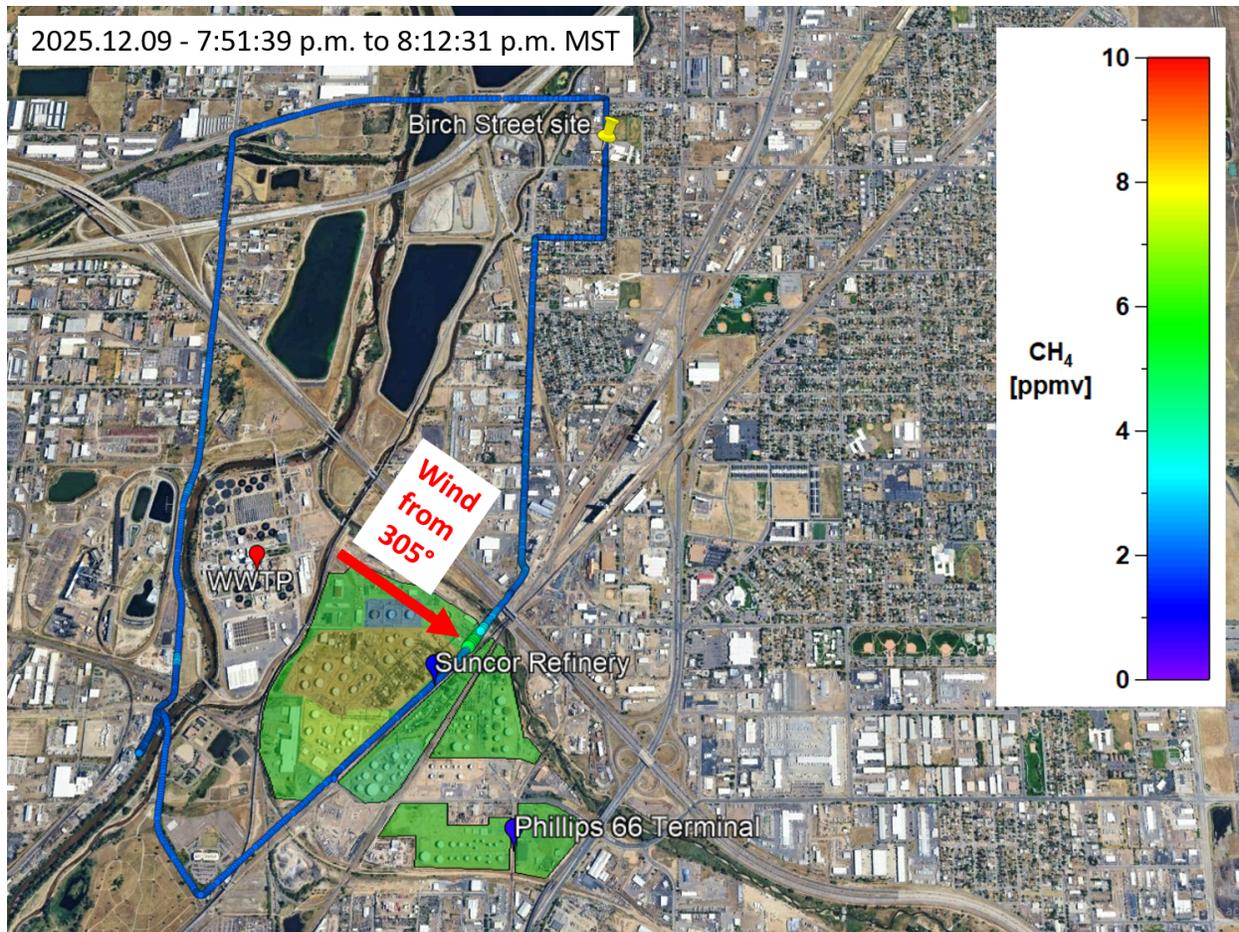
**Figure 2.** Time series of hydrogen sulfide (H<sub>2</sub>S) concentrations, methane (CH<sub>4</sub>) concentrations, wind speed, and wind direction measured by the EMU mobile laboratory in the area surrounding the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) and the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) from 7:30 p.m. to 10:00 p.m. on December 8, 2025. The yellow shading indicates periods when hydrogen sulfide (H<sub>2</sub>S) concentrations elevated above background were observed downwind of the Robert W. Hite wastewater treatment facility. The vector-averaged wind direction during the yellow shaded periods is indicated by text labels.



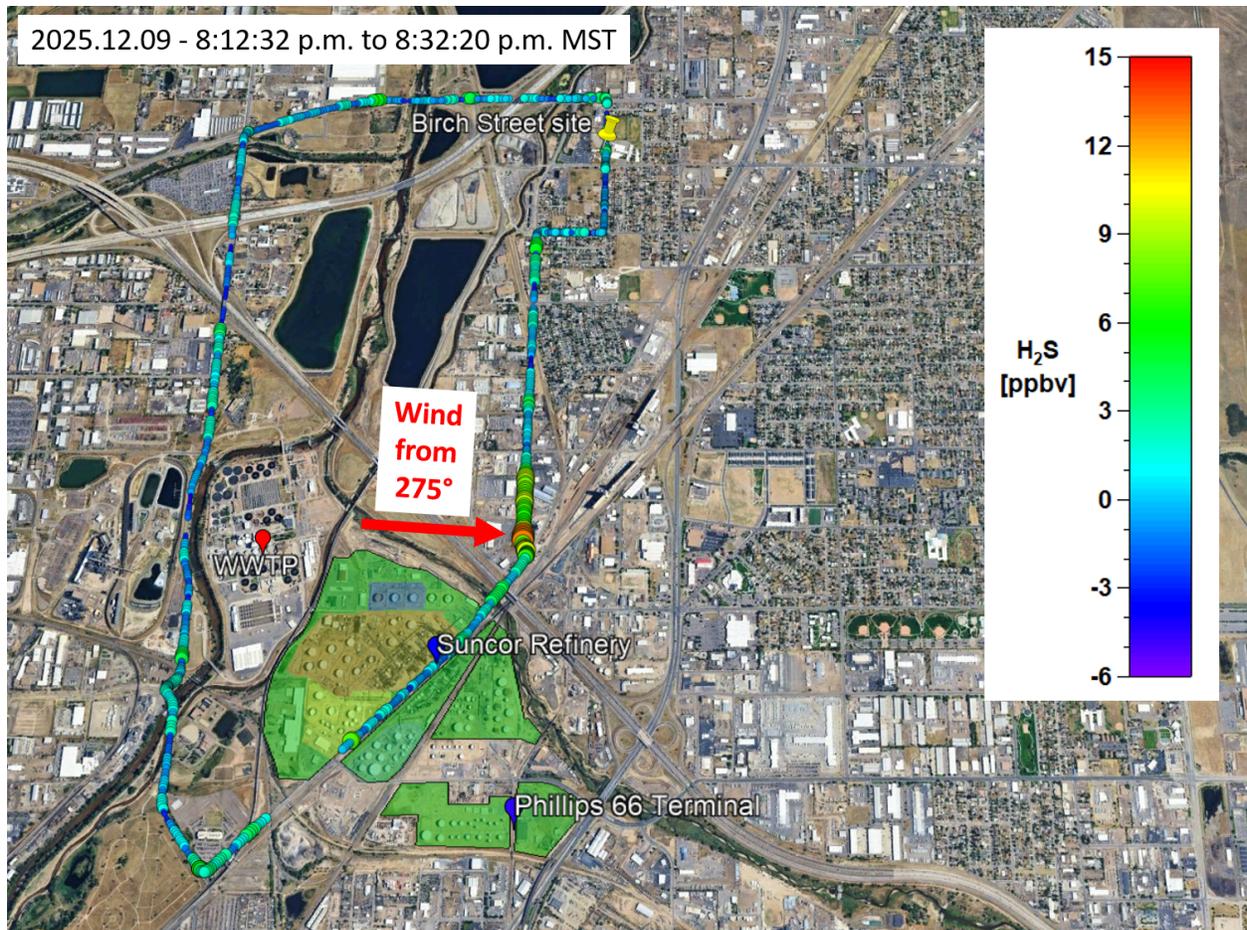
**Figure 3.** Map of hydrogen sulfide (H<sub>2</sub>S) concentrations observed downwind of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) from 6:45 p.m. to 7:15 p.m. MST on December 8, 2025 by the EMU mobile laboratory. The observed hydrogen sulfide (H<sub>2</sub>S) concentrations are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while the hydrogen sulfide (H<sub>2</sub>S) concentration was elevated above background is indicated by the red arrow. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region.



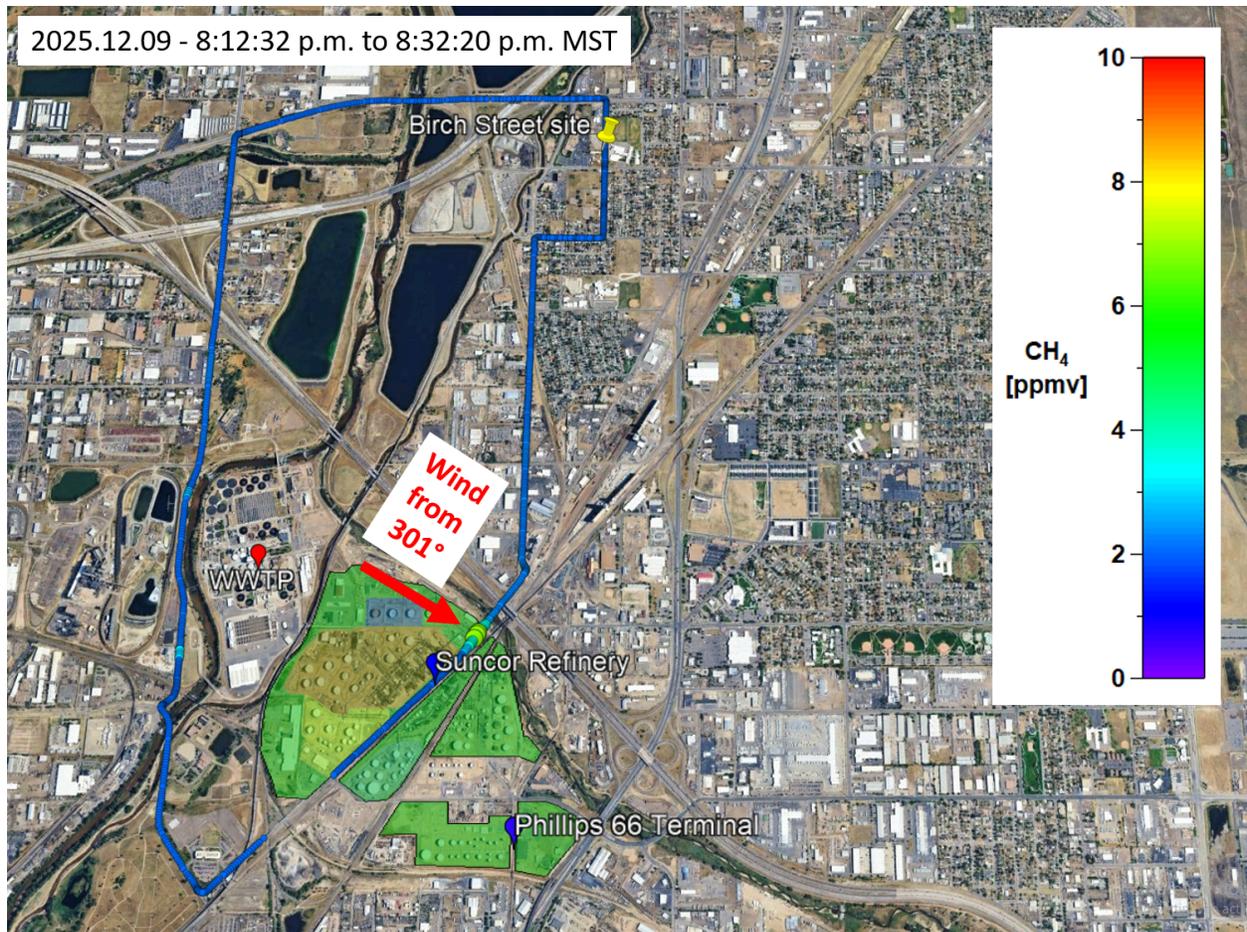
**Figure 4.** Map of hydrogen sulfide (H<sub>2</sub>S) concentrations observed downwind of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) from 7:52 p.m. to 8:13 p.m. MST on December 8, 2025 by the EMU mobile laboratory. The observed hydrogen sulfide (H<sub>2</sub>S) concentrations are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while the hydrogen sulfide (H<sub>2</sub>S) concentration was elevated above background is indicated by the red arrow. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the MT GOAT Adams County Birch Street site (39.828106 N, 104.936467 W) is indicated by the labeled yellow pushpin marker.



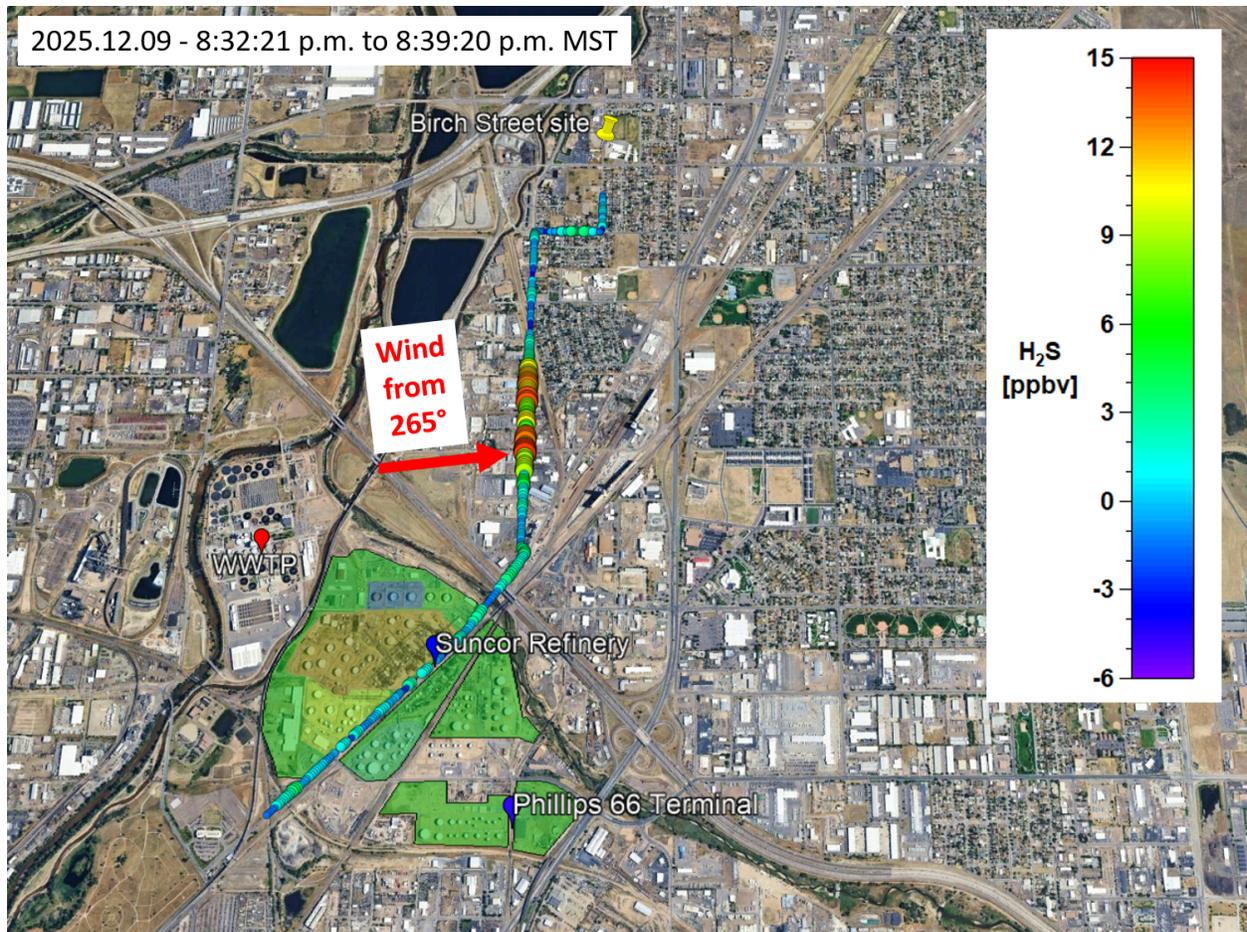
**Figure 5.** Map of methane (CH<sub>4</sub>) concentrations observed downwind of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) from 7:52 p.m. to 8:13 p.m. MST on December 8, 2025 by the EMU mobile laboratory. The observed methane (CH<sub>4</sub>) concentrations are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while the methane (CH<sub>4</sub>) concentration was elevated above background is indicated by the red arrow. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the MT GOAT Adams County Birch Street site (39.828106 N, 104.936467 W) is indicated by the labeled yellow pushpin marker.



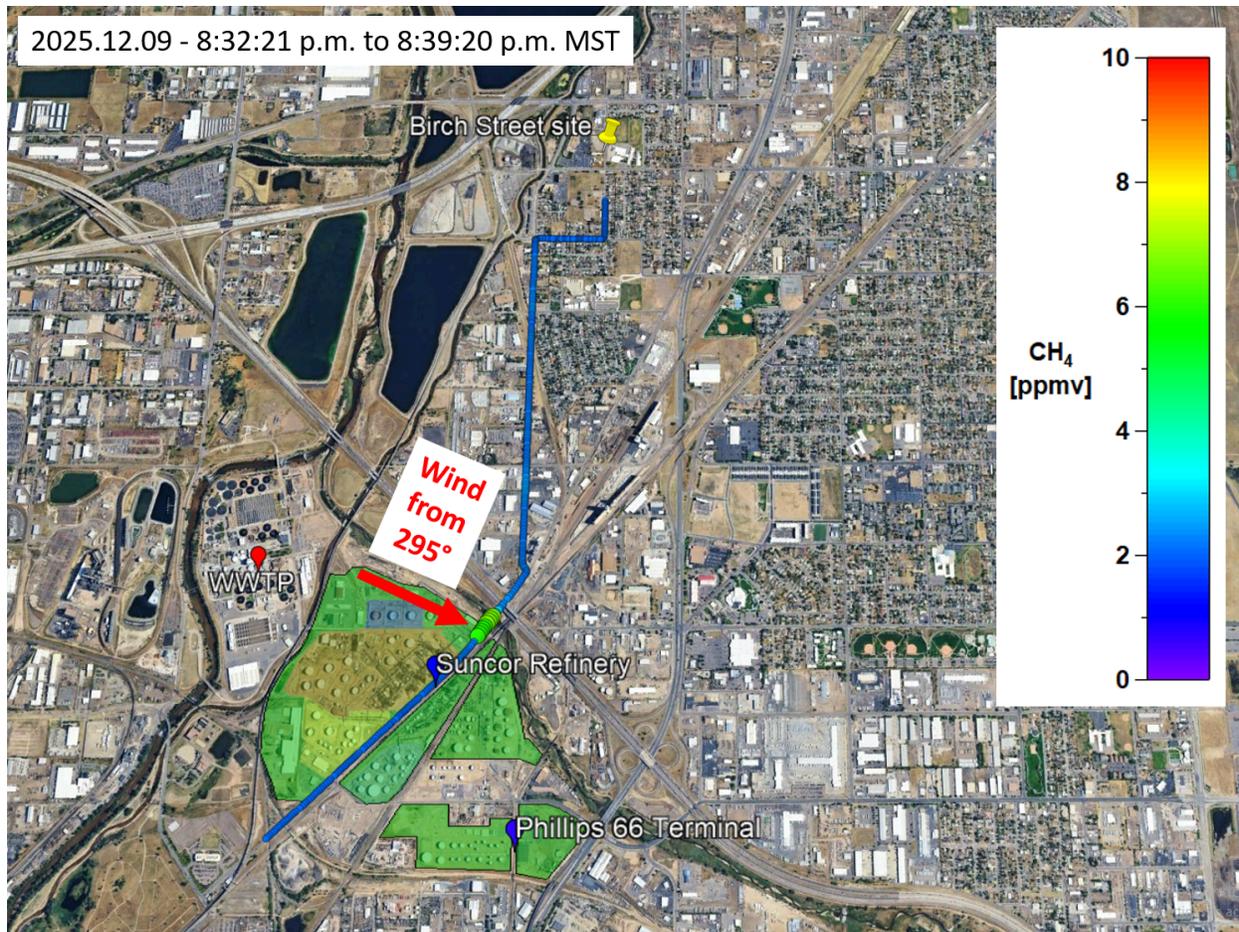
**Figure 6.** Map of hydrogen sulfide (H<sub>2</sub>S) concentrations observed downwind of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) from 8:13 p.m. to 8:32 p.m. MST on December 8, 2025 by the EMU mobile laboratory. The observed hydrogen sulfide (H<sub>2</sub>S) concentrations are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while the hydrogen sulfide (H<sub>2</sub>S) concentration was elevated above background is indicated by the red arrow. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the MT GOAT Adams County Birch Street site (39.828106 N, 104.936467 W) is indicated by the labeled yellow pushpin marker.



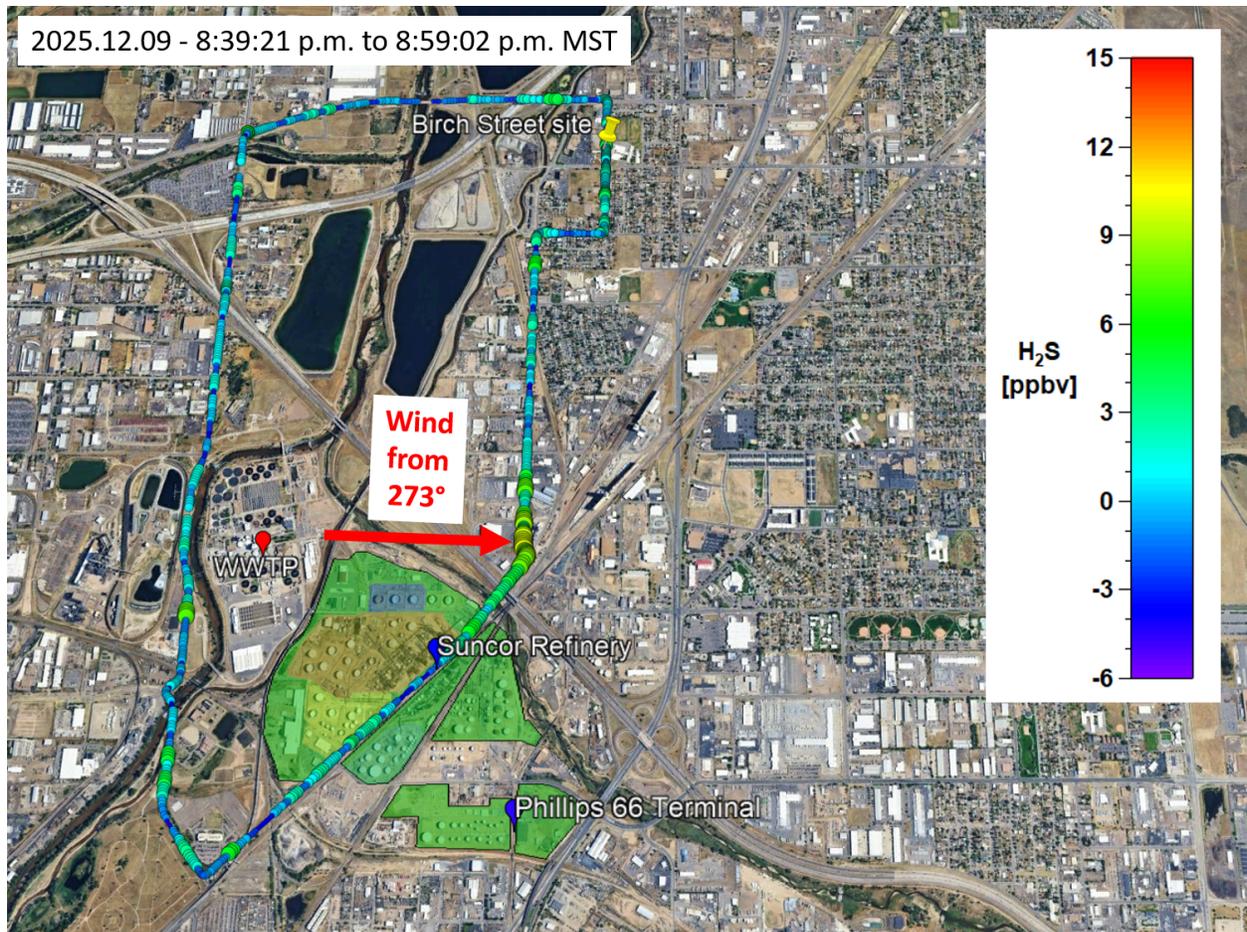
**Figure 7.** Map of methane (CH<sub>4</sub>) concentrations observed downwind of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) from 8:13 p.m. to 8:32 p.m. MST on December 8, 2025 by the EMU mobile laboratory. The observed methane (CH<sub>4</sub>) concentrations are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while the methane (CH<sub>4</sub>) concentration was elevated above background is indicated by the red arrow. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the MT GOAT Adams County Birch Street site (39.828106 N, 104.936467 W) is indicated by the labeled yellow pushpin marker.



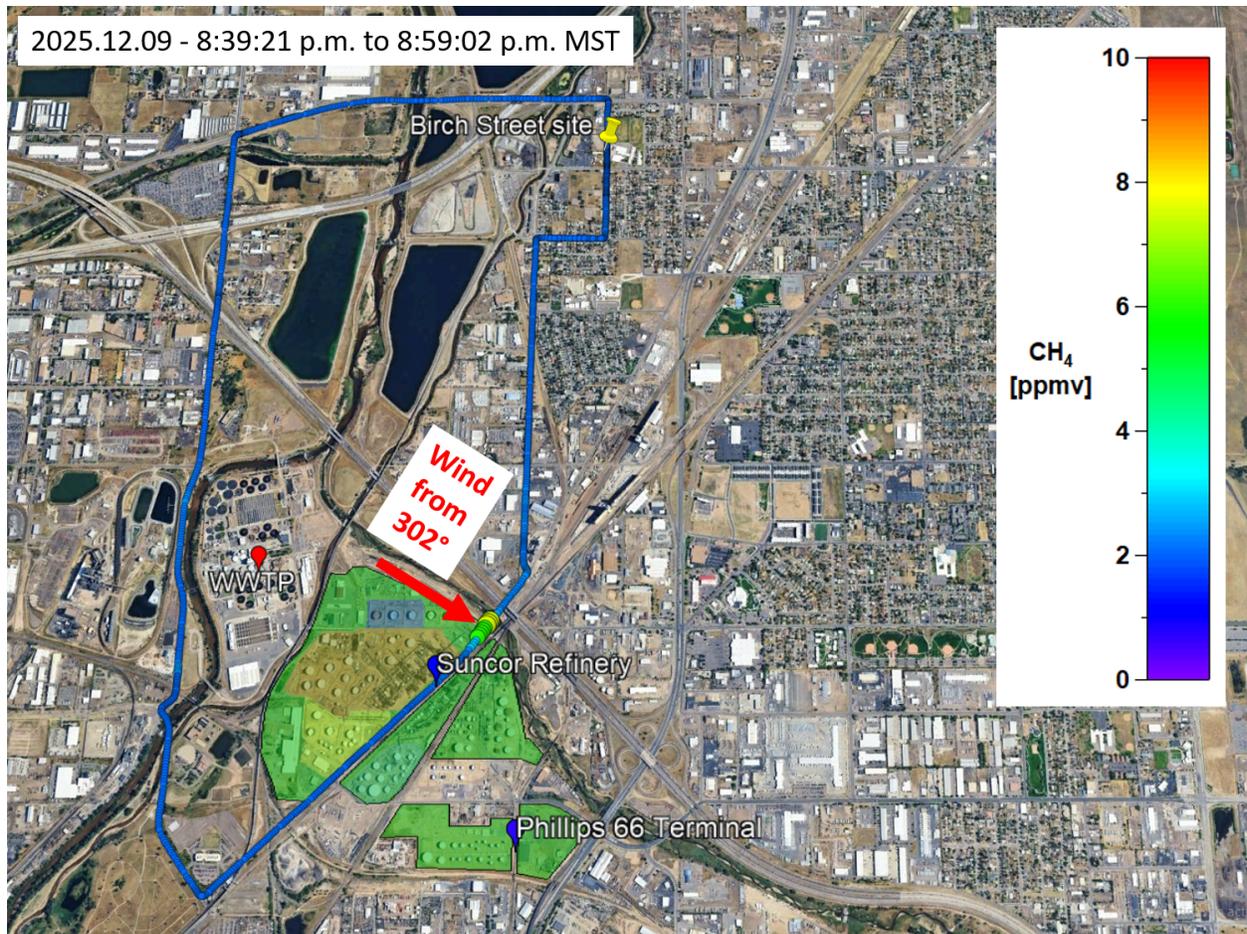
**Figure 8.** Map of hydrogen sulfide (H<sub>2</sub>S) concentrations observed downwind of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) from 8:32 p.m. to 8:39 p.m. MST on December 8, 2025 by the EMU mobile laboratory. The observed hydrogen sulfide (H<sub>2</sub>S) concentrations are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while the hydrogen sulfide (H<sub>2</sub>S) concentration was elevated above background is indicated by the red arrow. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the MT GOAT Adams County Birch Street site (39.828106 N, 104.936467 W) is indicated by the labeled yellow pushpin marker.



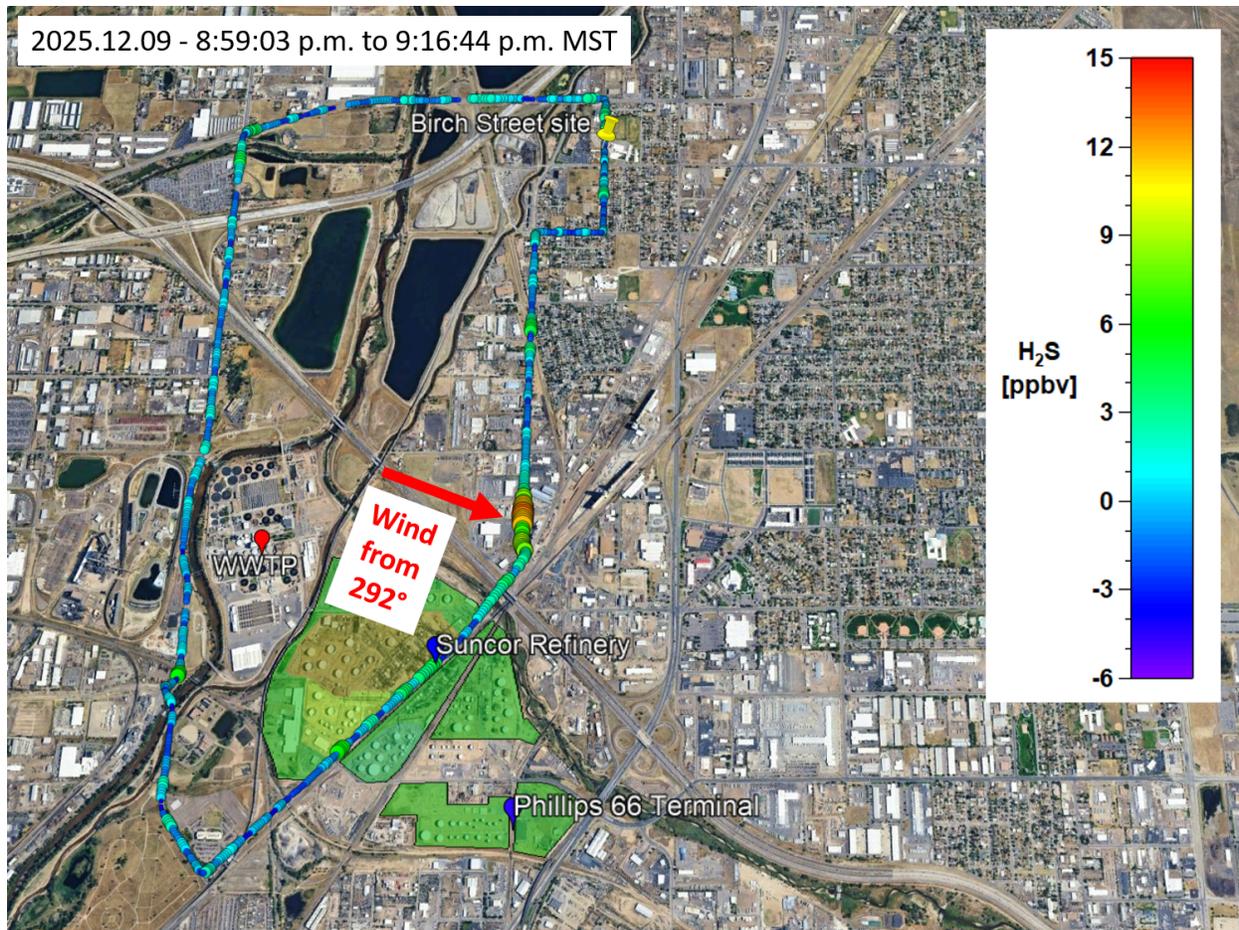
**Figure 9.** Map of methane (CH<sub>4</sub>) concentrations observed downwind of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) from 8:32 p.m. to 8:39 p.m. MST on December 8, 2025 by the EMU mobile laboratory. The observed methane (CH<sub>4</sub>) concentrations are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while the methane (CH<sub>4</sub>) concentration was elevated above background is indicated by the red arrow. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the MT GOAT Adams County Birch Street site (39.828106 N, 104.936467 W) is indicated by the labeled yellow pushpin marker.



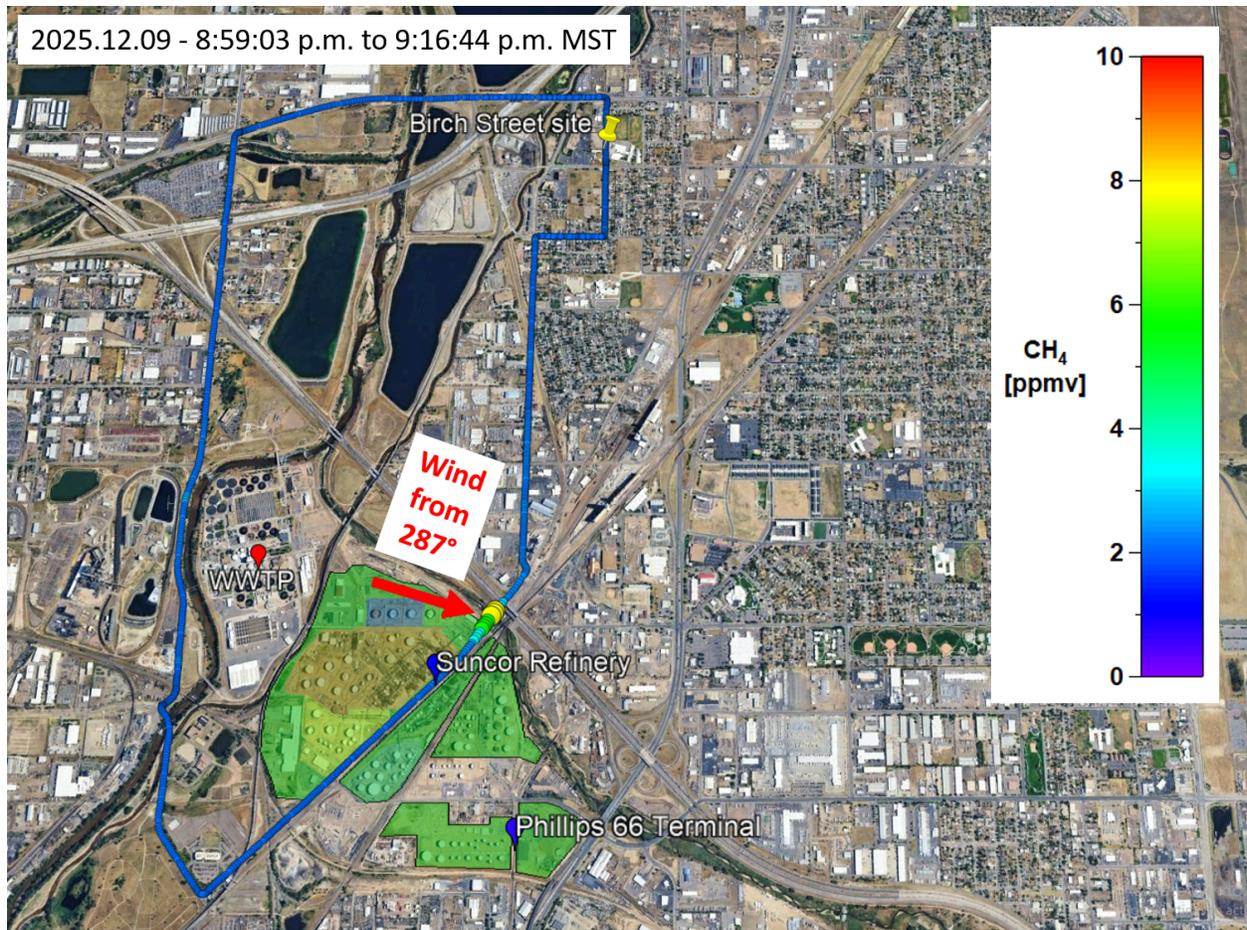
**Figure 10.** Map of hydrogen sulfide (H<sub>2</sub>S) concentrations observed downwind of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) from 8:39 p.m. to 8:59 p.m. MST on December 8, 2025 by the EMU mobile laboratory. The observed hydrogen sulfide (H<sub>2</sub>S) concentrations are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while the hydrogen sulfide (H<sub>2</sub>S) concentration was elevated above background is indicated by the red arrow. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the MT GOAT Adams County Birch Street site (39.828106 N, 104.936467 W) is indicated by the labeled yellow pushpin marker.



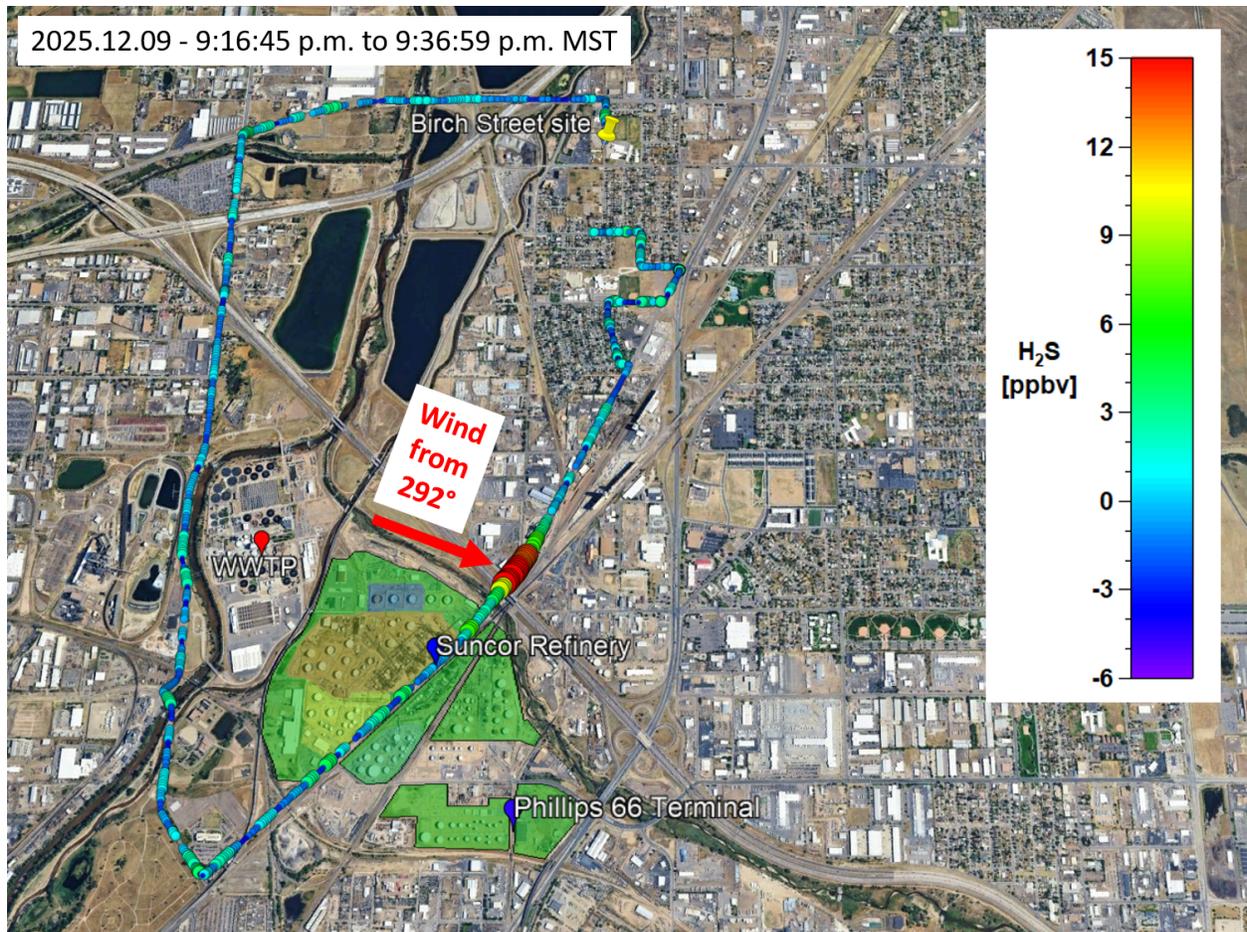
**Figure 11.** Map of methane (CH<sub>4</sub>) concentrations observed downwind of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) from 8:39 p.m. to 8:59 p.m. MST on December 8, 2025 by the EMU mobile laboratory. The observed methane (CH<sub>4</sub>) concentrations are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while the methane (CH<sub>4</sub>) concentration was elevated above background is indicated by the red arrow. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the MT GOAT Adams County Birch Street site (39.828106 N, 104.936467 W) is indicated by the labeled yellow pushpin marker.



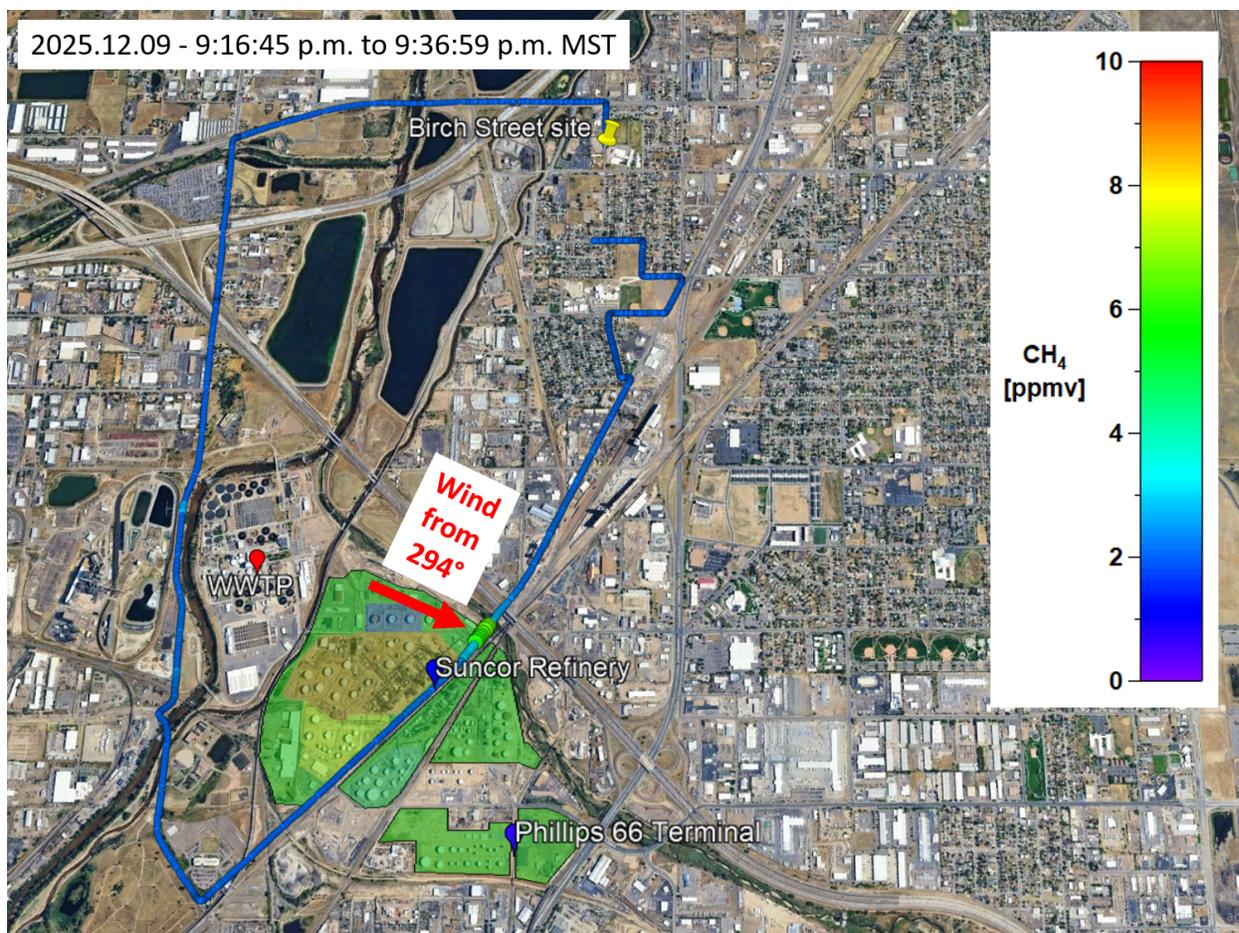
**Figure 12.** Map of hydrogen sulfide (H<sub>2</sub>S) concentrations observed downwind of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) from 8:59 p.m. to 9:17 p.m. MST on December 8, 2025 by the EMU mobile laboratory. The observed hydrogen sulfide (H<sub>2</sub>S) concentrations are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while the hydrogen sulfide (H<sub>2</sub>S) concentration was elevated above background is indicated by the red arrow. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the MT GOAT Adams County Birch Street site (39.828106 N, 104.936467 W) is indicated by the labeled yellow pushpin marker.



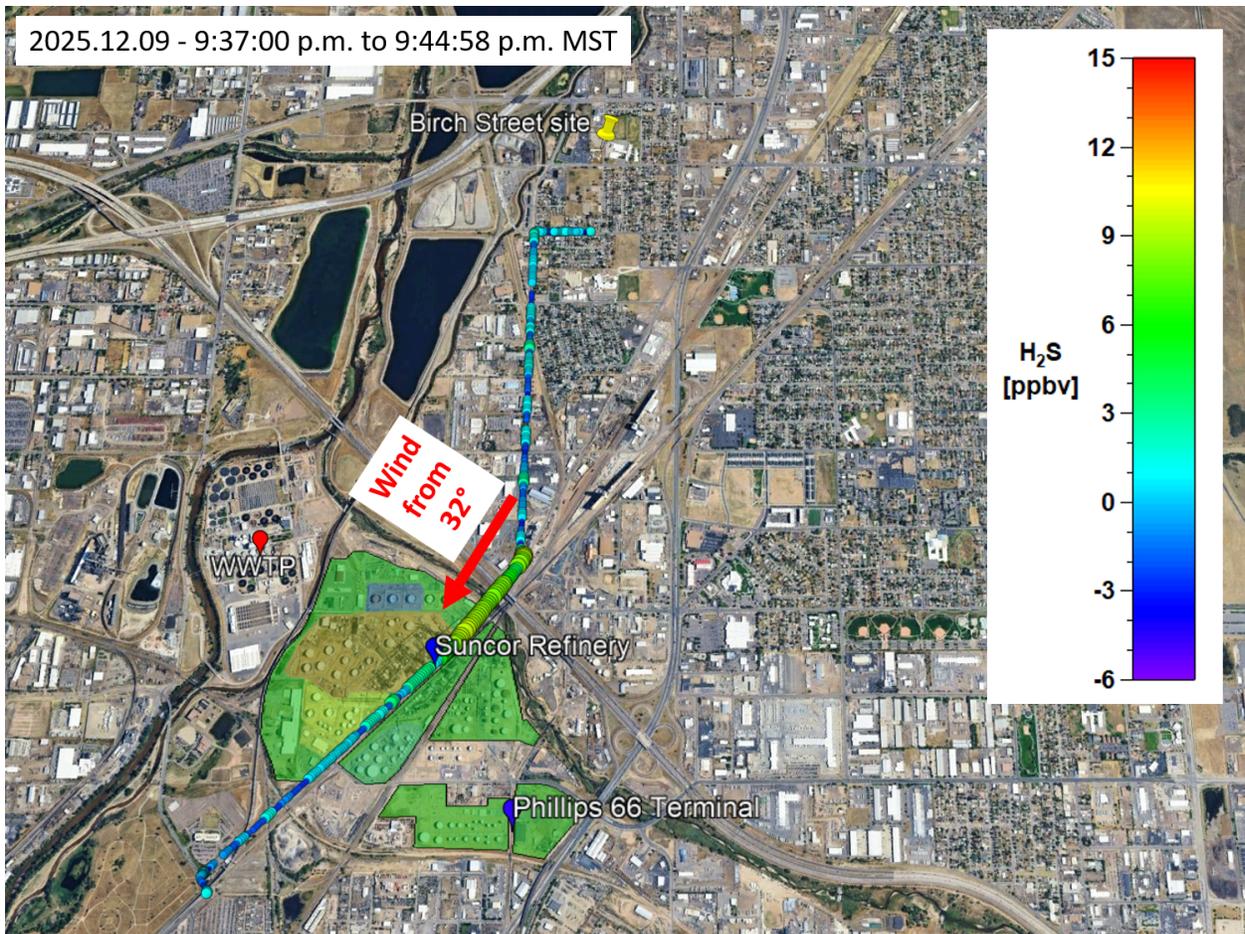
**Figure 13.** Map of methane (CH<sub>4</sub>) concentrations observed downwind of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) from 8:59 p.m. to 9:17 p.m. MST on December 8, 2025 by the EMU mobile laboratory. The observed methane (CH<sub>4</sub>) concentrations are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while the methane (CH<sub>4</sub>) concentration was elevated above background is indicated by the red arrow. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the MT GOAT Adams County Birch Street site (39.828106 N, 104.936467 W) is indicated by the labeled yellow pushpin marker.



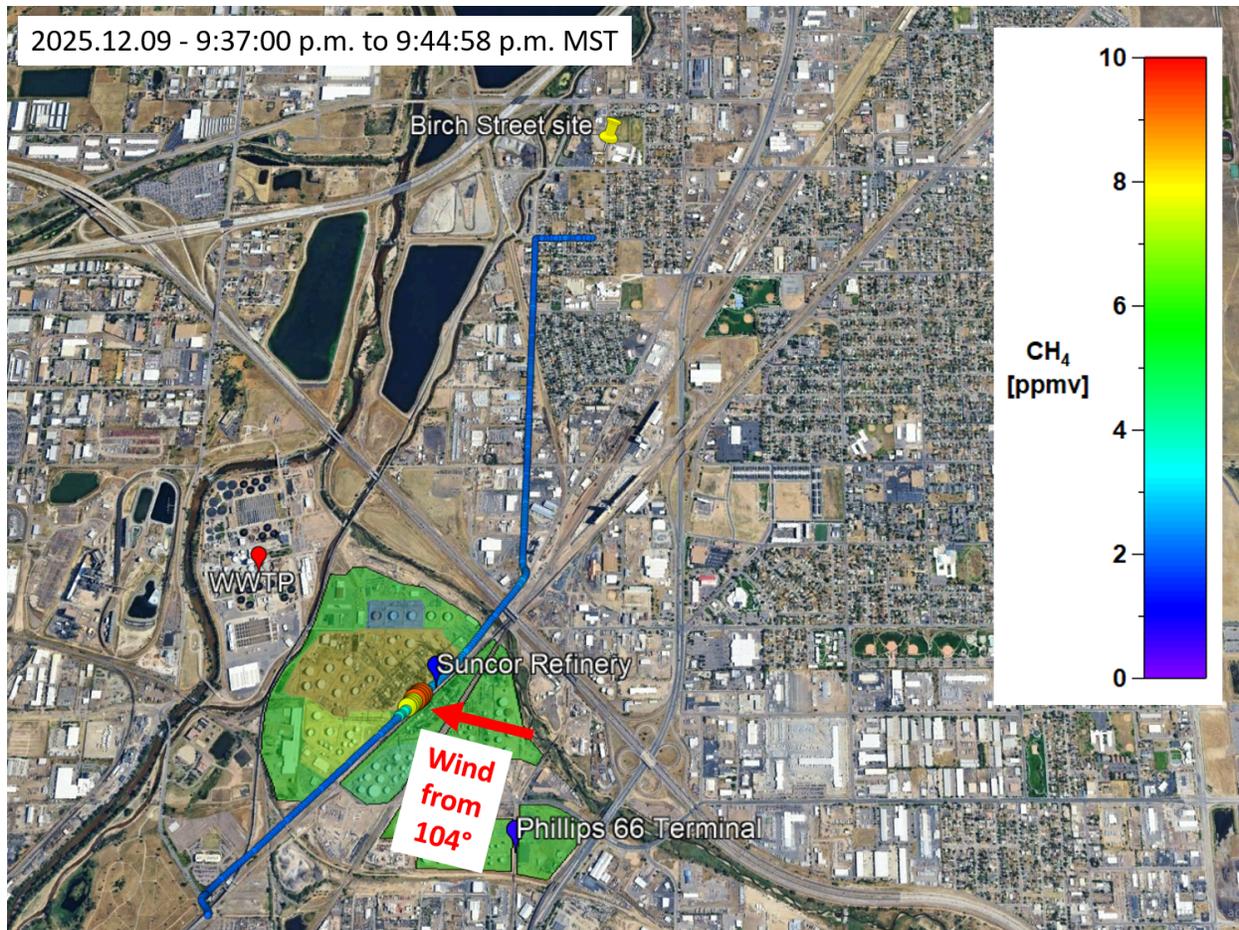
**Figure 14.** Map of hydrogen sulfide (H<sub>2</sub>S) concentrations observed downwind of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) from 9:17 p.m. to 9:37 p.m. MST on December 8, 2025 by the EMU mobile laboratory. The observed hydrogen sulfide (H<sub>2</sub>S) concentrations are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while the hydrogen sulfide (H<sub>2</sub>S) concentration was elevated above background is indicated by the red arrow. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the MT GOAT Adams County Birch Street site (39.828106 N, 104.936467 W) is indicated by the labeled yellow pushpin marker.



**Figure 15.** Map of methane (CH<sub>4</sub>) concentrations observed downwind of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) from 9:17 p.m. to 9:37 p.m. MST on December 8, 2025 by the EMU mobile laboratory. The observed methane (CH<sub>4</sub>) concentrations are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while the methane (CH<sub>4</sub>) concentration was elevated above background is indicated by the red arrow. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the MT GOAT Adams County Birch Street site (39.828106 N, 104.936467 W) is indicated by the labeled yellow pushpin marker.



**Figure 16.** Map of hydrogen sulfide (H<sub>2</sub>S) concentrations observed downwind of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) from 9:37 p.m. to 9:45 p.m. MST on December 8, 2025 by the EMU mobile laboratory. The observed hydrogen sulfide (H<sub>2</sub>S) concentrations are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while the hydrogen sulfide (H<sub>2</sub>S) concentration was elevated above background is indicated by the red arrow. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the MT GOAT Adams County Birch Street site (39.828106 N, 104.936467 W) is indicated by the labeled yellow pushpin marker.



**Figure 17.** Map of methane (CH<sub>4</sub>) concentrations observed downwind of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) from 9:37 p.m. to 9:45 p.m. MST on December 8, 2025 by the EMU mobile laboratory. The observed methane (CH<sub>4</sub>) concentrations are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while the methane (CH<sub>4</sub>) concentration was elevated above background is indicated by the red arrow. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the MT GOAT Adams County Birch Street site (39.828106 N, 104.936467 W) is indicated by the labeled yellow pushpin marker.