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2017 Monitoring Report

Prepared by the Capital Area Council of Governments
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PREPARED UNDER A GRANT FROM THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

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1 Introduction

The Capital Area Council of Governments (CAPCOG) is a regional government agency covering 10 counties in Central Texas – Bastrop, Blanco, Burnet, Caldwell, Fayette, Lee, Llano, Travis, and Williamson Counties. Five of these counties – Bastrop, Caldwell, Hays, Travis, and Williamson Counties – constitute the Austin-Round Rock Metropolitan Statistical Area (MSA). This report documents the ground-level ozone and meteorological monitoring activities conducted by CAPCOG in 2017.

During 2017, CAPCOG contracted with Dios Dado Environmental (DDE) in order to operate and maintain eight Continuous Air Monitoring Stations (CAMS) in the region. Data collected at these stations was electronically transmitted to the Texas Commission on Environmental Quality (TCEQ) Leading Environmental Assessment Display System (LEADS). This report is based on monthly reports provided This report provides details of the activity conducted throughout the 2017 ozone season and key performance metrics.

It's important to note that monitoring activities at CAPCOG's monitoring stations were funded by a variety of sources. The largest of these was CAPCOG's 2016-2017 Rider 7 Local Air Quality Planning Grant. This paid for all monitoring activities up through June 2017 and for site shut-down procedures. Local funding contributed by governments participating in the Central Texas Clean Air Coalition (CAC) provided the funding that was used for all monitoring activities conducted between July and October. This report constitutes a deliverable for both the TCEQ and the CAC. The expenses for the preparation of this report are being charged to CAPCOG's 2016-2017 Rider 7 grant from TCEQ.

CAPCOG also notes that CAPCOG operates and maintains a Tapered Element Oscillating Microbalance (TEOM) instrument to collected continuous fine particulate matter ($PM_{2.5}$) data and operates and maintains the meteorological instrument at its monitoring station in Fayette County (CAMS 601) under a separate contract with TCEQ (582-17-70016). This report does not any information on the $PM_{2.5}$ data collection, but does provide information on the meteorological data collected at CAMS 601 for reference. A map of these monitoring stations is provided below.

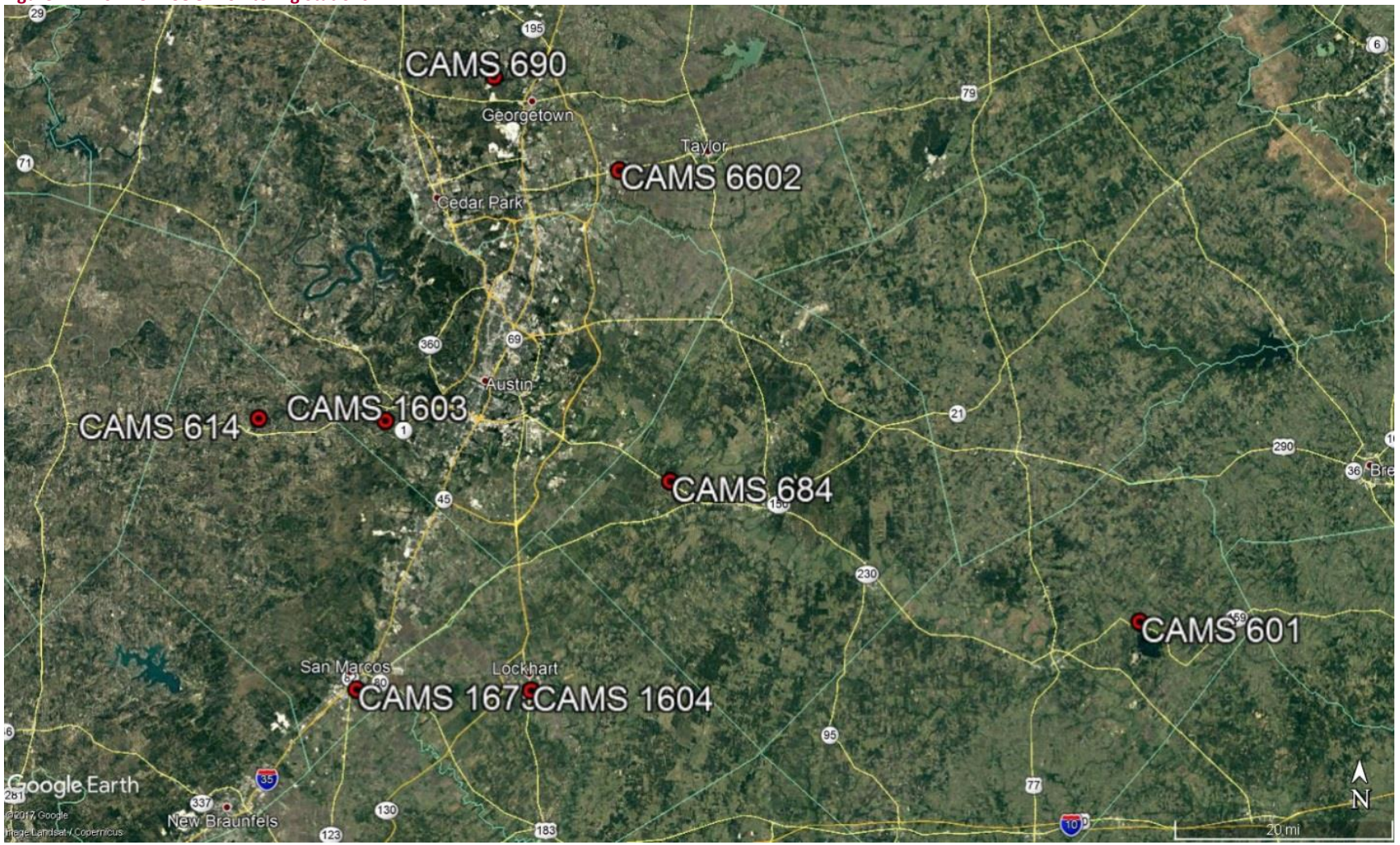
2 Monitoring Stations

The following table provides some key identifying information about the eight CAMS CAPCOG operated in 2017.

Table 2-1. CAPCOG and CAPCOG-Supported Air Quality Monitors Operated in 2017

Station Name	CAMS #	EPA #	County	Start	End
Fayette County	601	481490001	Fayette	2/21/2017	11/7/2017
Dripping Springs School	614	482090614	Hays	2/22/2017	11/9/2017
CAPCOG McKinney Roughs	684	480210684	Bastrop	2/24/2017	11/14/2017
CAPCOG Lake Georgetown	690	484910690	Williamson	2/17/2017	11/13/2017
Gorzycki Middle School	1603	484531603	Travis	2/22/2017	11/9/2017
Lockhart	1604	480551604	Caldwell	2/16/2017	11/10/2017
CAPCOG San Marcos Staples Road	1675	482091675	Hays	2/24/2017	11/10/2017
CAPCOG Hutto College St.	6602	484916602	Williamson	2/17/2017	11/8/2017

Figure 2-1. 2017 CAPCOG Monitoring Stations



3 Monitoring Activity by Station

This section provides details of the monitoring activity for each station apart from the daily data checks. PMI 4-14 is the semi-monthly visits.

3.1 CAMS 601

- 2/20/2017: Picked up instrument to replace old unit
- 2/21/2017: Checked site, installed new instrument
- 2/28/2017: Site startup activities, 5 point calibration
- 3/13/2017: PMI 4-14
- 3/27/2017: 5 point calibration, PMI 4-14
- 4/11/2017: PMI 4-14
- 4/27/2017: 5 point calibration, PMI 4-14
- 5/8/2017: PMI 4-14
- 5/22/2017: 5 point calibration, PMI 4-14
- 6/5/2017: PMI 4-14
- 6/19/2017: 5 point calibration, PMI 4-14
- 7/3/2017: PMI 4-14
- 7/24/2017: 5 point calibration, PMI 4-14
- 8/1/2017: PMI 4-14
- 8/7/2017: Check WS sensor, PMI 4-14
- 8/18/2017: Check LST issue
- 8/22/2017: 5-point calibration, PMI 4-14
- 8/29/2017: Check for storm damage after area lost power for hours due to flooding
- 9/5/2017: PMI 4-14
- 9/18/2017: PMI 4-14
- 10/2/2017: PMI 4-14
- 10/17/2017: PMI 4-14
- 10/30/2017: PMI 4-14
- 11/7/2017: 5-point calibration, site shut-down

3.2 CAMS 614

- 2/22/2017: Completed site startup activities, 5 point calibration
- 3/14/2017: PMI 4-14
- 3/30/2017: 5 point calibration, PMI 4-14
- 4/13/2017: PMI 4-14
- 4/24/2017: 5 point calibration, PMI 4-14
- 5/11/2017: PMI 4-14
- 5/23/2017: 5 point calibration, PMI 4-14
- 6/6/2017: PMI 4-14

- 6/20/2017: 5 point calibration, PMI 4-14
- 7/27/2017: PMI 4-14
- 8/10/2017: PMI 4-14
- 8/25/2017: 5 point calibration, PMI 4-14
- 9/8/2017: PMI 4-14
- 9/19/2017: Check LST condition, PMI 4-14
- 10/5/2017: PMI 4-14
- 10/17/2017: PMI 4-14
- 10/30/2017: PMI 4-14
- 11/9/2017: 5-point calibration, site shutdown
- 11/14/2017: return to download files from logger; phone line issues prevented data download

3.3 CAMS 684

- 2/24/2017: Site startup activities, 5 point calibration
- 3/13/2017: PMI 4-14
- 3/27/2017: 5 point calibration, PMI 4-14
- 4/11/2017: PMI 4-14
- 4/25/2017: 5 point calibration, PMI 4-14
- 5/30/2017: 5 point calibration, PMI 4-14
- 6/19/2017: Monthly 5 point calibration, PMI 4-14
- 7/27/2017: PMI 4-14
- 8/11/2017: PMI 4-14
- 8/24/2017: 5 point calibration, PMI 4-14
- 9/8/2017: PMI 4-14
- 9/20/2017: PMI 4-14
- 10/5/2017: PMI 4-14
- 10/17/2017: PMI 4-14
- 10/30/2017: PMI 4-14
- 11/14/2017: 5-point calibration, site shutdown

3.4 CAMS 690

- 2/17/2017: Started site startup activities, replaced modem
- 2/23/2017: Site startup activities, 5 point calibration
- 3/3/2017: Adjusted station temperature
- 3/16/2017: PMI 4-14
- 3/31/2017: 5 point calibration, PMI 4-14
- 4/14/2017: PMI 4-14
- 4/26/2017: 5 point calibration, PMI 4-14
- 5/11/2017: PMI 4-14
- 5/26/2017: 5 point calibration, PMI 4-14
- 6/5/2017: PMI 4-14

- 6/22/2017: 5 point calibration, PMI 4-14
- 7/3/2017: PMI 4-14
- 8/11/2017: PMI 4-14
- 8/24/2017: 5 point calibration, PMI 4-14
- 9/6/2017: PMI 4-14
- 9/21/2017: PMI 4-14
- 10/3/2017: PMI 4-14
- 10/18/2017: PMI 4-14
- 10/31/2017: PMI 4-14
- 11/13/2017: 5-point calibration, site shutdown, relocate trailer and take down tower

3.5 CAMS 1603

- 2/22/2017: Started site startup activities, 5 point calibration
- 3/21/2017: PMI 4-14
- 3/30/2017: 5 point calibration, PMI 4-14
- 4/13/2017: PMI 4-14
- 4/24/2017: 5 point calibration, PMI 4-14
- 5/11/2017: PMI 4-14
- 5/23/2017: 5 point calibration, PMI 4-14
- 6/6/2017: PMI 4-14
- 6/20/2017: 5 point calibration, PMI 4-14
- 7/27/2017: PMI 4-14
- 8/10/2017: PMI 4-14
- 8/15/2017: 5 point calibration, PMI 4-14
- 9/8/2017: PMI 4-14
- 9/19/2017: PMI 4-14
- 10/5/2017: PMI 4-14
- 10/17/2017: PMI 4-14
- 10/30/2017: PMI 4-14
- 11/9/2017: 5-point calibration, site shutdown

3.6 CAMS 1604

- 2/16/2017: Started site startup activities
- 2/23/2017: Completed site startup activities and ran 5 point calibration
- 3/13/2017: PMI 4-14
- 3/28/2017: 5 point calibration, PMI 4-14
- 4/13/2017: PMI 4-14
- 4/25/2017: 5 point calibration, PMI 4-14
- 5/9/2017: PMI 4-14
- 5/25/2017: 5 point calibration, PMI 4-14
- 6/6/2017: PMI 4-14

- 6/19/2017: 5 point calibration, PMI 4-14
- 7/21/2017: Check AC, changed circuit breaker, PMI 4-14
- 7/25/2017: PMI 4-14
- 8/22/2017: 5 point calibration, PMI 4-14
- 8/30/2017: Check for storm damage, ozone reading zero
- 8/31/2017: Replace ozone instrument after finding water inside due to hurricane
- 9/11/2017: Replace AC unit, PMI 4-14
- 9/12/2017: Check negative O_3 readings, adjust station temp
- 9/20/2017: PMI 4-14
- 10/5/2017: PMI 4-14
- 10/17/2017: Check LST condition, PMI 4-14
- 10/30/2017: PMI 4-14
- 11/10/2017: 5-point calibration, site shutdown

3.7 CAMS 1675

- 2/24/2017: Site startup activities, 5 point calibration
- 3/14/2017: PMI 4-14
- 3/28/2017: 5 point calibration, PMI 4-14
- 4/13/2017: PMI 4-14
- 4/25/2017: 5 point calibration, PMI 4-14
- 5/9/2017: PMI 4-14
- 5/25/2017: 5 point calibration, PMI 4-14
- 6/6/2017: PMI 4-14
- 6/20/2017: 5 point calibration, PMI 4-14
- 7/25/2017: PMI 4-14
- 8/8/2017: PMI 4-14
- 8/24/2017: 5 point calibration, PMI 4-14
- 9/8/2017: PMI 4-14
- 9/20/2017: PMI 4-14
- 10/5/2017: PMI 4-14
- 10/17/2017: PMI 4-14
- 10/30/2017: PMI 4-14
- 11/10/2017: 5-point calibration, site shutdown

3.8 CAMS 6602

- 2/17/2017: Site startup activities
- 2/27/2017: Site startup activities, 5 point calibration
- 3/3/2017: Adjusted station temperature
- 3/16/2017: PMI 4-14
- 3/31/2017: 5 point calibration, PMI 4-14
- 4/12/2017: PMI 4-14, Communications issue

- 4/14/2017: Zeno Issue
- 4/17/2017: Zeno Issue
- 4/26/2017: 5 point calibration, PMI 4-14
- 5/11/2017: PMI 4-14
- 5/26/2017: 5 point calibration, PMI 4-14
- 6/5/2017: PMI 4-14
- 6/22/2017: 5 point calibration, PMI 4-14
- 7/3/2017: PMI 4-14
- 7/28/2017: PMI 4-14
- 8/11/2017: PMI 4-14
- 8/21/2017: 5 point calibration, PMI 4-14
- 8/28/2017: Check flat line readings, UV lamp adjust, 5 point calibration
- 9/6/2017: PMI 4-14
- 9/21/2017: PMI 4-14
- 10/3/2017: PMI 4-14
- 10/18/2017: PMI 4-14
- 10/31/2017: PMI 4-14
- 11/8/2017: 5-point calibration, site shutdown

4 Technical Challenges & Resolutions

This section documents technical challenges and resolutions to those challenges during the 2017 monitoring season at each station. Apart from these monitor-specific challenges, there was also a broader challenge arising from the veto of continued air quality funding by the Texas Governor on June 12, 2017. As a result of this action, CAPCOG decided to partially suspend its monitoring contract with Dios Dado until such time as it could receive commitments from local governments or other organizations to help pay for the remainder of the 2017 monitoring activities. CAPCOG issued this notice on June 13, 2017, with an effective date of June 27, 2017. As a result of CAPCOG's success at securing financial commitments from other organizations to support completion of the 2017 monitoring, on July 18, 2017, CAPCOG issued a partial rescission of the contract suspension which directed DDE as follows:

- Site maintenance could resume immediately and would conclude on 10/31, rather than 11/15
- There would be a single five-point calibration that would be conducted at each monitoring station between 8/7 and 8/25 prior to the final calibrations during site shut-downs
- The time-frame for site shut-downs was moved forward from 11/15 – 11/30 to 11/1 – 11/15

CAPCOG subsequently updated its QAPP to reflect these changes.

4.1 CAMS 601

- February:
    - DDE could not check site status online. DDE staff arrived onsite to check communications problem. All equipment appeared to be functioning and DDE saw no issues. TCEQ identified the Austin modem hub as the problem. Vendor brought in a

replacement O3 instrument (Thermo 49C, CAPCOG# 006595, S/N 1170120014) to replace the Dasibi 1008 unit. DDE started up unit but needed to bring a different connector to attach datalogger leads and indicated that staff would return to perform 5-point calibration. (02/21/2017)
    - Could not check site status online (02/22/2017)
    - 5-point calibration performed on new instrument (02/27/2017)
    - Able to check status online again (02/28/2017)
- March: None
- April: None
- May: None
- June:
    - Air Condition unit had a blown circuit board that was on order so temps fluctuated. (06/05/2017)
    - AC unit still not repaired and temperature was too low inside station. (06/19/2017)
- July:
    - DDE could not checked site status online (08/07/2017)
    - DDE notes that internal bearings of sensor may be wearing out and needed to order another sensor (08/07/2017)
    - DDE could not checked site status online (08/18/2017)
    - DDE could not checked site status online (08/28/2017)
- August:
    - DDE received an email from TCEQ about data being affected by high cabinet temps during previous week's record heat during the day.
- September: None
- October: None

4.2 CAMS 614

- February: None
- March: none
- April: None
- May: None
- June: None
- July: None
- August: None
- September:
    - DDE could not check site status online, entered station and power cycled modem to restore communications (09/19/2017)

4.3 CAMS 684

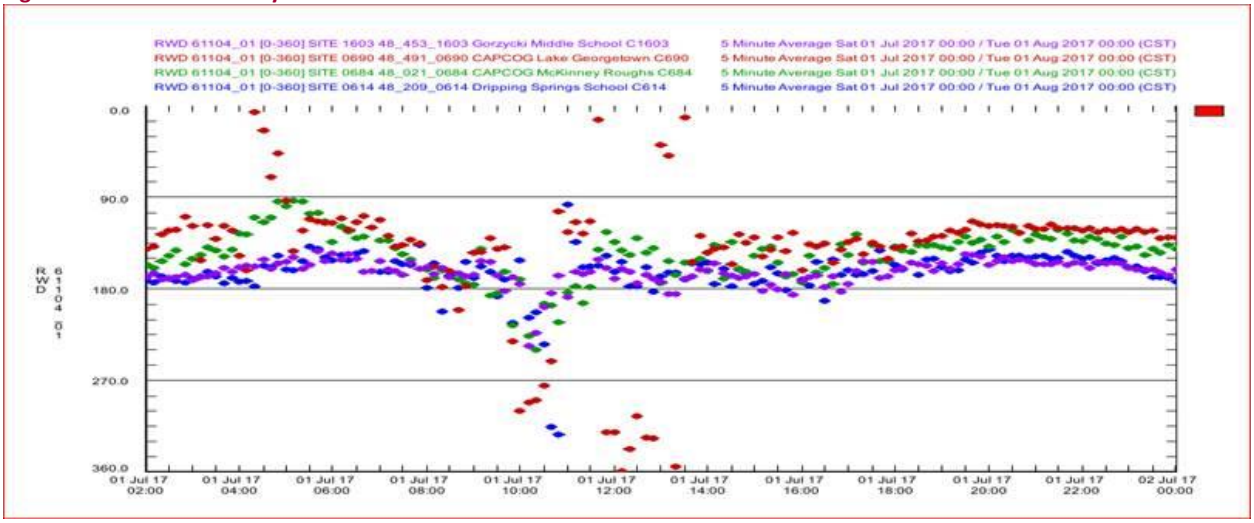
- February: None
- March: None

- April: None
- May: None
- June: None
- July:
    - Sensor locked up and needed to be rebuilt or replaced. The sensor was placed P-code until repairs were made. Sensor was replace and the unit was put back into K-code on 7/21/16
- August:
    - Could not checked site status online (08/07/2017)
- September: None
- October: None

4.4 CAMS 690

- February: None
- March: None
- April: None
- May: None
- June: None
- July:
    - Williamson County Conservation Director Gary Boyd e-mailed Andrew Hoekzema noting that the met tower at CAMS 690 appeared tilted; Andrew Hoekzema forwards info to DDE to investigate (7/30/2017)
    - DDE investigates site (7/31/2017)
- August:
    - DDE sends report to Andrew Hoekzema on site investigation. Report notes that the developed soil erosion problems and should be moved. Report notes that the trailer and tower are located at the top of a sandstone cliff face and the cliff face had significant loss of structure during this last heat spell. This resulted in a shift in the ground above and caused the trailer to lean and the tower to lean and wires to break. The trailer and tower were now less than 10 feet from the edge of the cliff face and that it is now too dangerous to cross the fence to service the tower (8/2/2017).
    - CAPCOG decides to wait until site shut-down to move the equipment and in the mean time put a work order together to authorize the work.
    - CAPCOG e-mails DDE to seek clarification on when this might have occurred, whether the met data should be flagged as problematic for that period, and what the cost would be to perform the equipment move as recommended (8/8/2017).
    - DDE responds to CAPCOG, stating, “looking on the manual validation the wind speed data seems to be unaffected, but the wind direction took a hit on 7/1/2017. But then went back to its normal variances, with maybe a 5 to 10 degree offset. The data has been validated and within reason to keep for modeling and reporting purposes.

Figure 4-1. Wind Data Analyzed Related to CAMS 690 Met Tower Issue



- DDE's report further states: "Without a lot of further research it was probable that ground quakes and heat expansion probably shifted the rocks that day. We visited the site on 7/28/2017 and 7/31/2017 to document and investigate the problem; the parks people had removed rocks from roadway on the 4th weekend [of July] according to one discussion." (8/8/2017)
- September:
  - AC unit appears to be struggling to keep station cool, had same issue with site in Lockhart. (09/21/2017)
- October:
  - Site has been scheduled to be moved.
  - AC unit appears to be struggling to keep station cool, had same issue with site in Lockhart, same model AC unit, probably will need to be replaced soon.
- November:
  - Work order 8 executed to authorize work to move CAMS 690 equipment.
  - Monitoring station moved (11/13/2017).

4.5 CAMS 1603

- February: None
- March:
  - Attempted PMI however school was closed for spring break and the monitor was inaccessible (03/14/2017)
- April: None
- May: None
- June: None
- July: None
- August: None
- September: None

- October: None

4.6 CAMS 1604

- February: None
- March:
  - Leased one 49c ozone analyzer unit to CAPCOG until Nov. 2017.
- April: None
- May: None
- June: None
- July: None
- August:
  - AC unit is not cooling station well which caused instrument to not be very stable during 5 point calibration (08/22/2017)
  - Station AC cover not running, and large amount of water in sample lines, hurricane Harvey rains and wind have damaged equipment (08/30/2017)
- September:
  - Replaced AC unit, then had a power failure. Electric crew found a blown fuse on pole leading to site and replaced it, power restored, all appears to be functioning correctly. (09/11/2017)
  - Found new UPS that instrument had been plugged into was not working, causing instrument to lose power. The vendor plugged the instrument into an older UPS unit and powered it up, let instrument warm up, placed in P code and checked span and zero, instrument was in range. (09/12/2017)
- October:
  - Power out at site, contacted electric department and they discovered blown fuse on the yard power line. They restored power and instruments all came back online (10/17/2017)

4.7 CAMS 1675

- February: None
- March: None
- April: None
- May: None
- June: None
- July: None
- August:
  - Building owner was doing work on power systems in building causing equipment to not be powered up resulting in negative readings (08/03/2017)
  - Found that the build owner's contractor has disconnected instruments (08/08/2017)
- September: None
- October: None

4.8 CAMS 6602

- February: None
- March:
  - Communication Issue (03/06/2017)
- April: None
  - Could not check site status online, ZENO will not allow the vendor to access the datalogger, it may have been damaged during the storms as well (04/12/2017)
  - Could not check site status online, issue with ZENO identified and fixed, it was a power supply issue (04/17/2017)
- May: None
- June: None
- July: None
- August:
  - Found instrument with "O_3 PHOTO GEN" warning. The vendor adjusted the UV lamp and fault cleared (08/28/2017)
- September: None
- October: None

5 Completeness Statistics

This section provides completeness statistics for the hourly ozone and meteorological data collected between 3/1/2017 and 11/15/2017. Meteorological data includes wind speed (WS), wind direction (WD), ambient temperature (Temp.), and relative humidity (RH). All monitoring stations include measurements for O3, WS, WD, and Temp., and all but CAMS 601 include measurements for RH.

The following table provides a season-wide summary. Site-specific data by month are shown in the subsequent tables.

Table 5-1. Completeness Statistics for 3/1/2017 - 11/15/2017 by Monitoring Station and Parameter

CAMS	O_3	WS	WD	Temp	RH
601	96.35%	99.82%	99.82%	99.82%	n/a
614	97.36%	97.50%	97.50%	97.50%	97.50%
684	99.28%	99.34%	99.34%	99.15%	99.39%
690	98.85%	98.99%	98.99%	98.75%	98.99%
1603	97.32%	97.47%	97.47%	97.47%	97.47%
1604	94.49%	97.07%	97.07%	96.84%	97.07%
1605	96.92%	97.00%	97.00%	96.81%	97.02%
1675	95.26%	97.72%	97.72%	97.72%	97.72%
6602	92.21%	94.89%	94.89%	94.94%	94.94%

Table 5-2. CAMS 601 O_3 Completeness Statistics by Month & Parameter

Month	O_3	$PM_{2.5}$	WS	WD	Temp.
March	99.7%	99.6%	100.0%	100.0%	100.0%
April	99.7%	99.7%	100.0%	100.0%	100.0%

Month	O_3	$PM_{2.5}$	WS	WD	Temp.
May	99.7%	99.6%	100.0%	100.0%	100.0%
June	99.7%	99.7%	100.0%	100.0%	100.0%
July	99.7%	99.9%	100.0%	100.0%	100.0%
August	98.3%	98.1%	98.5%	98.5%	98.5%
September	100.0%	81.2%	100.0%	100.0%	100.0%
October	100.0%	81.2%	100.0%	100.0%	100.0%
November	TBD	TBD	TBD	TBD	TBD

Table 5-3. CAMS 614 O_3 Completeness Statistics by Month & Parameter

Month	O_3	WS	WD	Temp.	RH.
March	99.7%	100.0%	100.0%	100.0%	99.7%
April	99.7%	100.0%	100.0%	100.0%	100.0%
May	99.9%	100.0%	100.0%	100.0%	100.0%
June	99.7%	100.0%	100.0%	100.0%	100.0%
July	100.0%	100.0%	100.0%	100.0%	100.0%
August	99.7%	100.0%	100.0%	100.0%	100.0%
September	100.0%	100.0%	100.0%	100.0%	100.0%
October	100.0%	100.0%	100.0%	100.0%	100.0%
November	TBD	TBD	TBD	TBD	n/a

Table 5-4. CAMS 684 O_3 Completeness Statistics by Month & Parameter

Month	O_3	WS	WD	Temp.	RH.
March	99.7%	100.0%	100.0%	98.1%	100.0%
April	99.9%	100.0%	100.0%	100.0%	100.0%
May	99.9%	100.0%	100.0%	100.0%	100.0%
June	99.9%	100.0%	100.0%	100.0%	100.0%
July	100.0%	100.0%	100.0%	100.0%	100.0%
August	99.7%	100.0%	100.0%	100.0%	100.0%
September	100.0%	100.0%	100.0%	100.0%	100.0%
October	100.0%	100.0%	100.0%	100.0%	100.0%
November	TBD	TBD	TBD	TBD	n/a

Table 5-5. CAMS 690 O_3 Completeness Statistics by Month & Parameter

Month	O_3	WS	WD	Temp.	RH.
March	99.7%	100.0%	100.0%	100.0%	100.0%
April	99.7%	100.0%	100.0%	100.0%	100.0%
May	99.7%	100.0%	100.0%	100.0%	100.0%
June	99.7%	100.0%	100.0%	100.0%	100.0%
July	100.0%	100.0%	100.0%	100.0%	100.0%
August	99.7%	100.0%	100.0%	100.0%	100.0%
September	100.0%	100.0%	100.0%	100.0%	100.0%
October	100.0%	100.0%	100.0%	100.0%	100.0%
November	TBD	TBD	TBD	TBD	n/a

Table 5-6. CAMS 1603 O_3 Completeness Statistics by Month & Parameter

Month	O_3	WS	WD	Temp.	RH.
March	99.7%	100.0%	100.0%	98.0%	100.0%
April	99.7%	100.0%	100.0%	100.0%	100.0%
May	99.9%	100.0%	100.0%	100.0%	100.0%
June	99.7%	100.0%	100.0%	100.0%	100.0%
July	100.0%	100.0%	100.0%	100.0%	100.0%
August	99.7%	100.0%	100.0%	100.0%	100.0%
September	100.0%	100.0%	100.0%	100.0%	100.0%
October	100.0%	100.0%	100.0%	100.0%	100.0%
November	TBD	TBD	TBD	TBD	n/a

Table 5-7. CAMS 1604 O_3 Completeness Statistics by Month & Parameter

Month	O_3	WS	WD	Temp.	RH.
March	99.7%	100.0%	100.0%	98.1%	100.0%
April	99.7%	100.0%	100.0%	100.0%	100.0%
May	99.9%	100.0%	100.0%	100.0%	100.0%
June	99.7%	100.0%	100.0%	100.0%	100.0%
July	100.0%	100.0%	100.0%	99.9%	100.0%
August	82.3%	100.0%	100.0%	100.0%	100.0%
September	96.4%	99.3%	99.3%	99.3%	100.0%
October	93.3%	93.4%	93.4%	93.4%	93.4%
November	TBD	TBD	TBD	TBD	n/a

Table 5-8. CAMS 1605 O_3 Completeness Statistics by Month & Parameter

Month	O_3	WS	WD	Temp.	RH.
March	98.5%	100.0%	100.0%	97.0%	98.8%
April	88.1%	91.7%	91.7%	91.7%	91.7%
May	84.3%	84.3%	84.3%	84.3%	84.3%
June	99.9%	100.0%	100.0%	100.0%	100.0%
July	100.0%	100.0%	100.0%	100.0%	100.0%
August	100.0%	99.9%	99.9%	100.0%	100.0%
September	100.0%	100.0%	100.0%	100.0%	100.0%
October	100.0%	100.0%	100.0%	100.0%	100.0%
November	TBD	TBD	TBD	TBD	n/a

Table 5-9. CAMS 1675 O_3 Completeness Statistics by Month & Parameter

Month	O_3	WS	WD	Temp.	RH.
March	99.7%	98.8%	98.8%	100.0%	100.0%
April	99.4%	98.8%	98.8%	99.7%	99.7%
May	99.9%	99.3%	99.3%	100.0%	100.0%
June	99.7%	100.0%	100.0%	100.0%	100.0%
July	100.0%	99.1%	99.1%	100.0%	100.0%

Month	O_3	WS	WD	Temp.	RH.
August	79.7%	99.3%	99.3%	99.3%	99.2%
September	100.0%	100.0%	100.0%	100.0%	99.0%
October	99.9%	99.9%	99.9%	99.9%	99.9%
November	TBD	TBD	TBD	TBD	n/a

Table 5-10. CAMS 6602 O_3 Completeness Statistics by Month & Parameter

Month	O_3	WS	WD	Temp.	RH.
March	99.7%	99.5%	99.5%	100.0%	100.0%
April	80.8%	79.2%	79.2%	81.1%	81.1%
May	99.7%	99.5%	99.5%	100.0%	100.0%
June	99.9%	100.0%	100.0%	100.0%	100.0%
July	100.0%	99.9%	99.9%	100.0%	100.0%
August	78.2%	78.2%	100.0%	100.0%	100.0%
September	100.0%	100.0%	100.0%	100.0%	100.0%
October	100.0%	100.0%	100.0%	100.0%	100.0%
November	TBD	TBD	TBD	TBD	n/a

6 Calibration Statistics

This section provides details for each of the O_3 calibration checks performed by DDE staff at CAPCOG's 8 ozone monitoring stations during the 2017 ozone monitoring season. All checks met the QAPP's data quality objectives for ≤ 5 ppb deviation for the 0 ppb check and ≤ 7% deviation for the 70 ppb, 200 ppb, 300 ppb, and 400 ppb checks.

Table 6-1. CAMS 601 O_3 Calibration Checks Compared to Reference Concentrations (ppb)

Calibration Date	Time (CST)	0 ppb	70 ppb	200 ppb	300 ppb	400 ppb
2/27/2017	11:13:44	2.2	72.3	202.9	302.4	403.1
3/27/2017	11:28:43	2.2	71.0	200.6	301.3	405.7
4/27/2017	10:58:18	2.0	70.4	201.1	300.8	400.9
5/22/2017	11:28:03	1.9	70.8	201.9	302.4	403.5
6/19/2017	10:43:26	1.8	70.9	201.7	301.5	402.9
7/24/2017	10:52:33	1.7	70.6	200.6	300.1	401.7
8/22/2017	10:23:40	1.9	71.1	201.4	301.3	402.2
11/7/2017	13:22:09	2.4	70.6	200.1	301.6	405.4

Table 6-2. CAMS 614 O_3 Calibration Checks Compared to Reference Concentrations (ppb)

Calibration Date	Time (CST)	0 ppb	70 ppb	200 ppb	300 ppb	400 ppb
2/22/2017	19:13:02	1.2	71.0	202.0	303.5	402.6
3/30/2017	12:48:32	1.4	71.5	200.8	301.3	400.9
4/24/2017	13:37:58	1.2	70.4	201.2	300.8	400.5
5/23/2017	13:11:53	1.2	70.6	201.6	301.5	401.6
6/20/2017	12:51:39	1.2	70.9	200.3	301.1	401.7
8/25/2017	5:31:21	1.3	70.6	202.1	300.7	400.8

Calibration Date	Time (CST)	0 ppb	70 ppb	200 ppb	300 ppb	400 ppb
11/9/2017	13:47:36	0.9	70.8	200.7	300.4	400.7

Table 6-3. CAMS 684 O_3 Calibration Checks Compared to Reference Concentrations (ppb)

Calibration Date	Time (CST)	0 ppb	70 ppb	200 ppb	300 ppb	400 ppb
2/24/2017	16:35:37	0.2	70.6	200.7	302.9	400.4
3/27/2017	13:57:50	0.4	70.5	200.9	300.7	401.6
4/25/2017	15:12:02	0.2	70.9	201.0	301.4	401.8
5/30/2017	11:07:40	0.5	71.2	202.0	301.8	401.8
6/19/2017	13:07:47	0.6	70.8	201.1	300.6	401.1
8/24/2017	15:42:04	0.4	71.0	201.5	300.9	401.4
11/14/2017	11:36:32	0.4	70.6	201.7	301.4	400.7

Table 6-4. CAMS 690 O_3 Calibration Checks Compared to Reference Concentrations (ppb)

Calibration Date	Time (CST)	0 ppb	70 ppb	200 ppb	300 ppb	400 ppb
2/23/2017	15:23:27	1.7	72.6	202.9	303.0	403.5
3/31/2017	10:17:12	1.5	70.8	201.6	301.3	402.2
4/26/2017	10:17:08	1.5	70.7	201.1	301.3	400.8
5/26/2017	11:03:59	1.8	70.6	202.2	301.8	401.3
6/22/2017	12:22:58	2.2	71.0	200.8	300.6	401.8
8/24/2017	10:17:50	3.4	70.3	200.9	301.4	401.3
11/13/2017	11:06:50	1.7	70.9	201.8	301.9	401.1

Table 6-5. CAMS 1603 O_3 Calibration Checks Compared to Reference Concentrations (ppb)

Calibration Date	Time (CST)	0 ppb	70 ppb	200 ppb	300 ppb	400 ppb
2/22/2017	16:46:57	1.3	70.5	200.3	300.3	405.8
3/30/2017	10:37:39	0.9	71.0	201.4	300.5	400.7
4/24/2017	11:29:22	1.0	71.0	201.3	300.1	400.9
5/23/2017	11:05:58	1.0	70.6	200.7	301.1	400.8
6/20/2017	10:37:36	0.9	71.0	201.2	301.0	400.7
8/15/2017	10:49:00	1.3	70.7	200.7	300.9	401.1
11/9/2017	11:36:16	0.9	70.6	201.0	302.1	400.3

Table 6-6. CAMS 1604 O_3 Calibration Checks Compared to Reference Concentrations (ppb)

Calibration Date	Time (CST)	0 ppb	70 ppb	200 ppb	300 ppb	400 ppb
2/23/2017	12:08:41	1.2	70.4	200.9	304.0	404.7
3/28/2017	14:52:46	0.7	70.5	200.7	301.6	400.0
4/25/2017	12:56:30	0.4	70.7	200.9	301.9	400.4
5/23/2017	18:06:55	3.1	71.0	202.0	302.5	402.1
6/19/2017	15:25:22	-0.2	70.6	200.6	300.3	401.5
8/22/2017	13:34:35	4.5	70.9	202.8	299.3	406.2
11/10/2017	16:31:38	3.8	70.8	201.0	301.0	400.7

Table 6-7. CAMS 1675 O_3 Calibration Checks Compared to Reference Concentrations (ppb)

Calibration Date	Time (CST)	0 ppb	70 ppb	200 ppb	300 ppb	400 ppb
2/24/2017	13:12:33	0.9	70.9	201.8	300.2	400.5
3/28/2017	11:03:02	1.1	70.5	201.1	300.6	401.6
4/25/2017	10:49:05	0.2	70.2	201.0	300.7	401.5
5/25/2017	16:01:55	0.1	70.9	201.4	301.7	399.2
6/20/2017	15:22:03	0.1	70.9	200.8	300.9	401.0
8/24/2017	13:13:29	0.1	70.5	200.9	300.7	400.7
11/10/2017	11:21:00	0.2	70.7	201.3	300.9	400.7

Table 6-8. CAMS 6602 O_3 Calibration Checks Compared to Reference Concentrations (ppb)

Calibration Date	Time (CST)	0 ppb	70 ppb	200 ppb	300 ppb	400 ppb
2/27/2017	14:43:07	0.9	70.9	201.8	300.2	400.5
3/31/2017	12:27:46	0.6	71.4	200.4	300.8	400.9
4/26/2017	12:22:00	0.8	71.2	202.3	301.1	401.6
5/26/2017	13:17:35	1.0	71.2	200.7	301.0	402.2
6/22/2017	10:06:55	1.2	70.7	201.1	301.3	401.2
8/21/2017	12:37:49	0.8	70.8	203.3	302.2	401.6
8/28/2017	14:31:58	0.8	70.8	201.1	300.9	401.7
11/8/2017	12:43:39	1.2	70.4	200.7	301.3	401.8

7 Costs & Work Orders Issued

The following table shows a summary of the costs for CAPCOG's monitoring contract in 2017. This does not represent all of the costs for conducting monitoring in 2017, however – it does not include the $2,020 for the LEADS licenses paid in the prior year, utility costs, or the costs for CAPCOG's time to manage this monitoring contract. However, as CAPCOG prepares to conduct a procurement for monitoring services in 2018, this information provides a good reference point for estimating potential costs for 2018 monitoring.

Table 7-1. 2017 Monitoring Cost Summary

Monitor/Object	Routine Work Authorized	Work Orders and Incidentals	TOTAL
CAMS 601	$10,092.53	$0.00	$10,092.53
CAMS 614	$10,031.84	$0.00	$10,031.84
CAMS 684	$10,188.06	$0.00	$10,188.06
CAMS 690	$10,001.29	$4,463.20	$14,464.49
CAMS 1603	$13,390.99	$0.00	$13,390.99
CAMS 1604	$10,035.77	$3,759.10	$13,794.87
CAMS 1675	$10,066.25	$0.00	$10,066.25
CAMS 6602	$9,972.31	$0.00	$9,972.31
Network-Wide	$1,170.00	$297.00	$1,467.00
TOTAL	**$84,949.04**	**$8,519.30**	**$93,468.34**

8 Conclusion

This report documents CAPCOG's ground-level ozone and meteorological monitoring efforts in 2017. CAPCOG operated all eight of its CAMS continuously between March 1, 2017, and October 31, 2017, and all of CAPCOG's data quality objectives for this project were met. Supplemental information about CAPCOG's equipment inventory and copies of the monthly monitoring reports submitted by Dios Dado are being provided as supplemental deliverables to TCEQ.