

# MEMO



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**CC:** n/a

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**SUBJECT:** Background Ambient Air Quality for Gardiner Expressway and Lakeshore Boulevard Reconfiguration

**PROJECT NO:** 091405

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## 1. INTRODUCTION

On November 30, 2009, the Minister of the Environment approved the Terms of Reference (ToR) for the Gardiner Expressway and Lakeshore Boulevard Reconfiguration (GELBR) Environmental Assessment (EA) that was submitted jointly by Waterfront Toronto and the City of Toronto. The approved ToR includes a high-level work plan for the Air Quality component of the EA (i.e., the Air Quality Impact Assessment (AQIA)).

Through consultation with the Ministry of the Environment (MOE), the agreed upon indicator compounds to be included in the AQIA are:

- Carbon monoxide (CO);
- Nitrogen oxides (NO<sub>x</sub> (focus on NO and NO<sub>2</sub>));
- Total suspended particulate (TSP);
- Particulate matter with aerodynamic diameter <10µm (PM<sub>10</sub>);
- Particulate matter with aerodynamic diameter <2.5µm (PM<sub>2.5</sub>);
- Benzene;
- 1,3-Butadiene;
- Formaldehyde;
- Acetaldehyde;
- Acrolein; and,
- Benzo(a)pyrene (BaP).

This memo documents the approach to be used in characterizing ambient air quality within the Study Area for the GELBR EA.

## 2. AMBIENT AIR QAULITY DATA REVIEW

Background concentrations for TSP, PM<sub>2.5</sub>, NO<sub>2</sub> and CO, were reviewed based on the data collected from the MOE ambient air quality monitoring stations as listed in Table 1. Ambient air quality monitoring data for PM<sub>10</sub> was not available. PM<sub>10</sub> was estimated assuming that PM<sub>2.5</sub> accounts for ~60% of PM<sub>10</sub>, which is based on a research conducted by the MOE in Ontario (“A Compendium of Current Knowledge on Fine Particulate Matter in Ontario”, dated March 1999).

The Volatile Organic Compounds (VOCs) and BaP background concentrations were reviewed based on the ambient air quality data collected from Environment Canada’s (EC) National Air Pollution Surveillance (NAPS) stations as listed in Table 2. The geographic locations of these stations are illustrated in Figures 1 & 2. Data were collected for the most recent available consecutive 3 years (2012 and prior). Analysis of 3 consecutive years of ambient air quality data was done based on this approach being aligned with the methodologies for assessing achievement of the Canada-Wide Standards (CWSs).

CACs monitored at the MOE’s stations are sampled every hour, and the hourly averages are the integration of continuous readings taken over a 1-hour period. VOCs and BaP at EC’s NAPS stations are typically continuously sampled for a period of 24 hours on a 6-day cycle.

**Table 1: List of the MOE’s CACs Monitoring Stations Reviewed**

| Station ID | Name             | Address                      | Latitude (°N) | Longitude (°W) | Elevation (m) |
|------------|------------------|------------------------------|---------------|----------------|---------------|
| 35125      | Toronto West     | 125 Resources Road           | 43.709        | 79.544         | 141           |
| 31103      | Toronto Downtown | Bay St./Wellesley St. W.     | 43.663        | 79.388         | 105           |
| 33003      | Toronto East     | Kennedy Rd./Lawrence Ave. E. | 43.748        | 79.274         | 168           |
| 34020      | Toronto North    | Hendon Ave./Yonge St.        | 43.782        | 79.418         | 190           |

**Table 2: List of the EC’s NAPS Monitoring Stations Reviewed**

| Station ID | Name     | Address                | Contaminants Monitored                                       | Latitude (°N) | Longitude (°W) | Elevation (m) |
|------------|----------|------------------------|--|---------------|----------------|---------------|
| 60413      | Toronto  | Elmcrest Rd.           | Benzene, 1,3-Butadiene                                       | 43.651        | 79.592         | 137           |
| 60427      | Toronto  | 223 College St.        | Benzene, 1,3-Butadiene, BaP                                  | 63.658        | 79.397         | 122           |
| 60428      | Brampton | 525 Main St. N.        | Benzene, 1,3-Butadiene                                       | 43.700        | 79.783         | 228           |
| 60429      | Toronto  | Judson St. & Etona Ct. | Benzene, 1,3-Butadiene, BaP                                  | 43.614        | 79.508         | 90            |
| 60435      | Toronto  | 461 Kipling Ave        | Benzene, 1,3-Butadiene, BaP                                  | 43.606        | 79.521         | 92            |
| 60403      | Toronto  | Evans & Arnold Ave.    | BaP  | 43.619        | 79.518         | 101           |
| 60418      | Toronto  | Ruskin & Perth St.     | BaP  | 43.667        | 79.450         | 119           |
| 60211      | Windsor  | College & South St.    | Benzene, 1,3 Butadiene, Formaldehyde, Acetaldehyde, Acrolein | 42.292        | 83.073         | 184           |
| 62601      | Simcoe   | Experimental Farm      | Benzene, 1,3 Butadiene, Formaldehyde, Acetaldehyde, Acrolein | 42.850        | 80.267         | 236           |

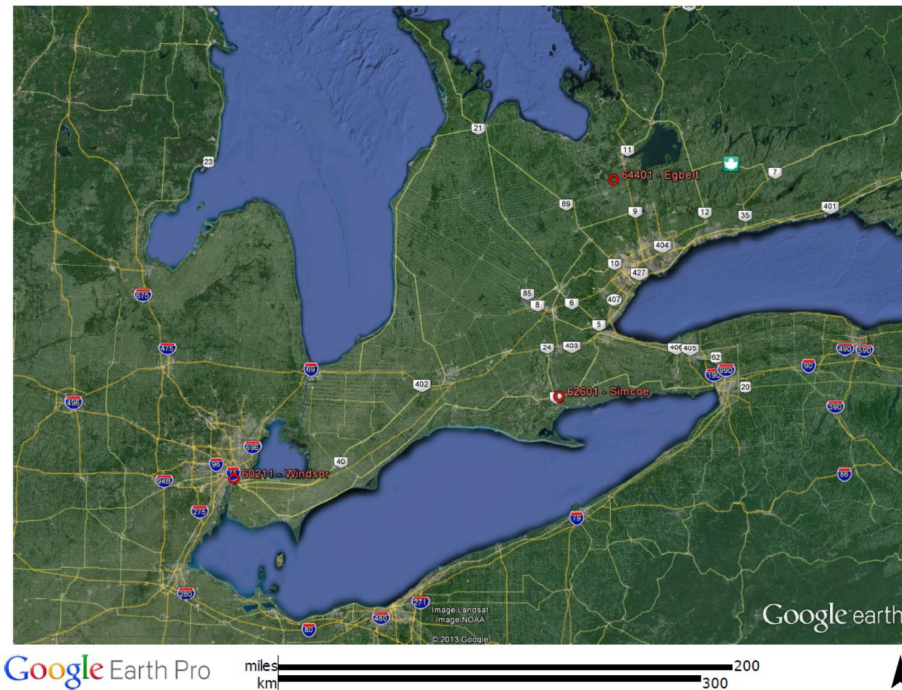
**Table 2: List of the EC's NAPS Monitoring Stations Reviewed (continued)**

| Station ID | Name   | Address | Contaminants Monitored                             | Latitude (°N) | Longitude (°W) | Elevation (m) |
|------------|--------|---------|--|---------------|----------------|---------------|
| 64401      | Egbert | Egbert  | Benzene, 1,3 Butadiene, Formaldehyde, Acetaldehyde | 44.233        | 79.781         | 253           |

**Figure 1: MOE's /EC's Stations Analyzed within the Toronto Area**



**Figure 2: EC's NAPS Stations Analyzed Outside of the Toronto Area**



### 3. CHARACTERIZATION OF BACKGROUND AIR QUALITY FOR THE EA

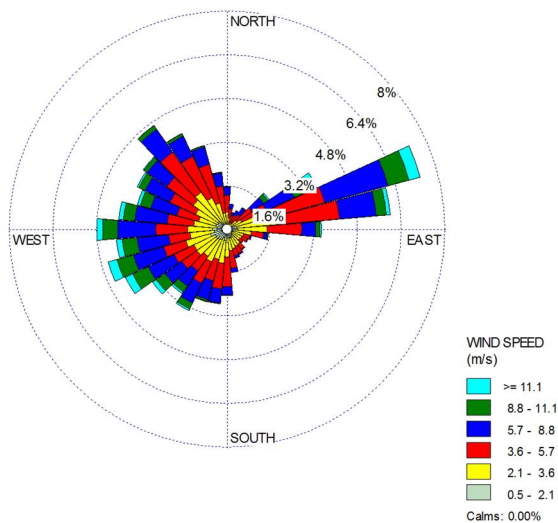
#### 3.1 Selection of Representative Stations

By definition, background concentrations include sources that affect air quality in the project area other than the project itself, i.e., the emissions from the project itself are excluded<sup>1</sup>. Accordingly, selecting representative ambient monitoring stations for the AQIA was based on the following considerations:

- Proximity to the project area;
- Not mainly influenced by the emissions from the Gardiner Expressway and Lake Shore Boulevard;
- Not influenced by other significant emissions sources that would not also be present within the Study Area;
- Data availability (data capture >80% of the time); and
- Similarity in background emission settings.

As shown in Figure 3, the prevailing wind directions are dominant in an east-west orientation, i.e., the winds blows almost in parallel with the Gardiner Expressway and Lake Shore Boulevard the majority of the time.

**Figure 3: Wind Rose at Toronto Island Airport (2008 -2012)**



<sup>1</sup> United States Environmental Protection Agency, Transportation Conformity Guidance for Quantitative Hot-spot Analyses in PM<sub>2.5</sub> and PM<sub>10</sub> Nonattainment and Maintenance Areas, EPA-420-B-10-040, December 2010.

Based on this wind regime, as well as the considerations mentioned above, the MOE's downtown station (station ID 31103) monitoring CACs and EC's NAPS station at College Street (station ID 60427) monitoring VOCs and BaP would be the most representative stations for establishing the background ambient air quality for the AQIA. The rationale for this is as follows:

- These two stations are the closest stations, located about 2 km to the north of the Project area;
- As the prevailing wind directions are east-west oriented, the impact of emissions from the Gardiner Expressway and Lake Shore Boulevard on these two stations should be minor;
- There are no significant sources located close to these stations that would bias the monitoring data;
- These two stations have acceptable data availability; and
- These two stations are located in a similar urban setting to the Project.

Formaldehyde, Acetaldehyde and Acrolein are not monitored at EC's NAPS station at College Street or at other stations in the Toronto area. They are, however, monitored at the NAPS Simcoe, Egbert and Windsor stations. Because the urban setting in Windsor is closest to that of the project area (versus the more rural settings of the Egbert and Simcoe stations) the monitoring data at the Windsor station for these three contaminants were used.

### **3.2 Data Completeness and Calculating Averages**

Ambient air quality criteria (AAQC) or standards are based on different averaging periods (e.g., ½-hour, 1-hour, 8-hour, 24-hour and annual) for different contaminants. For 8-hour averages, rolling 8-hour averages were calculated and deemed to be valid only if hourly records were available for more than 6 hours (80% of the time) within any 8-hour window.

Similarly, the 24-hour averages were calculated only if valid hourly records were available for more than 80% of the time per calendar day. The annual averages were deemed to be valid only if more than 80% of the valid 24-hour averages were available.

Acetaldehyde has a ½-hour AAQC and acrolein has a 1-hour AAQC while they are sampled at EC's NAPS stations at a 24-hour averaging period on a 6-day cycle. The 24-hour concentration was converted to ½-hour and 1-hour data using a conversion factor of 2.96 and 2.43, respectively, determined using Equation 1 of the MOE's "Air Dispersion Modelling Guideline for Ontario", dated March 2009.

### **3.3 Background Ambient Air Quality to Be Used**

As per the Ministry of Transportation's *Environmental Guide for Assessing and Mitigating the Air Quality Impacts and Greenhouse Gas Emissions of Provincial Transportation Projects*, the 70<sup>th</sup> percentile of the most recently measured and complete concentration data from the nearest MOE or Environment Canada air quality monitoring station will be accepted as the background concentration levels to be used in the comprehensive air quality analysis, and 90<sup>th</sup> percentile in the credible worst-case analysis. Both 70<sup>th</sup> and 90<sup>th</sup> percentiles are presented in Table 3. For the annual average background concentrations, the average of 3-year measurements was used.

The concentrations at other stations are also summarized in Appendix A for comparison purposes. The differences in the background air quality levels between the selected stations and others that were reviewed are not significant.

**Table 3: Background Concentrations to Be Used in the AQIA**

| Pollutant         | Averaging Period | Data Period | 70th Percentile              | 90th Percentile              | Criteria ( $\mu\text{g}/\text{m}^3$ ) |                                       |
|-------------------|------------------|-------------|------------------------------|------------------------------|---------------------------------------|---------------------------------------|
|                   |                  |             | ( $\mu\text{g}/\text{m}^3$ ) | ( $\mu\text{g}/\text{m}^3$ ) |                                       |                                       |
| PM <sub>2.5</sub> | 24-hour          | 2010-2012   | 7                            | 12                           | 30                                    | Canada-Wide Standard;<br>Ontario AAQC |
| PM <sub>10</sub>  | 24-hour          | 2010-2012   | 12                           | 21                           | 50                                    | Ontario AAQC                          |
| NO <sub>2</sub>   | 24-hour          | 2010-2012   | 32                           | 43                           | 200                                   | Ontario AAQC                          |
|                   | 1-hour           | 2010-2012   | 32                           | 51                           | 400                                   | Ontario AAQC                          |
| CO                | 8-hour           | 2008-2010   | 259                          | 356                          | 15700                                 | Ontario AAQC                          |
|                   | 1-hour           | 2008-2010   | 252                          | 366                          | 36200                                 | Ontario AAQC                          |
| Benzene           | Annual           | 2009-2012   | 0.69                         | 0.69                         | 0.45                                  | Ontario AAQC                          |
|                   | 24-hour          | 2009-2012   | 0.80                         | 1.08                         | 2.3                                   | Ontario AAQC                          |
| Acrolein          | 24-hour          | 2008-2010   | 0.04                         | 0.07                         | 0.4                                   | Ontario AAQC                          |
|                   | 1-hour           | 2008-2010   | 0.10                         | 0.18                         | 4.5                                   | Ontario AAQC                          |
| 1,3 Butadiene     | Annual           | 2009-2012   | 0.07                         | 0.07                         | 2                                     | Ontario AAQC                          |
|                   | 24-hour          | 2009-2012   | 0.08                         | 0.12                         | 10                                    | Ontario AAQC                          |
| Formaldehyde      | 24-hour          | 2008-2010   | 1.46                         | 2.51                         | 65                                    | Ontario AAQC                          |
| Acetaldehyde      | 24-hour          | 2008-2010   | 3.48                         | 5.12                         | 500                                   | Ontario AAQC                          |
|                   | ½ hour           | 2008-2010   | 10.31                        | 15.16                        | 500                                   | Ontario AAQC                          |
| BaP               | Annual           | 2008-2010   | 0.000088                     | 0.000089                     | 0.00001                               | Ontario AAQC                          |
|                   | 24-hour          | 2008-2010   | 0.000093                     | 0.000153                     | 0.00005                               | Ontario AAQC                          |

#### 4. CONCLUSION

It is recommended that approach documented within this memorandum be used to characterize ambient air quality within the Study Area for the GELBR EA, and that this approach be forwarded to the MOE for review.

**Appendix A**  
**Summary of the Ambient Air Quality Data Analyzed**

### NO<sub>2</sub> Summary

| Station | Most Recent Available Years | 1 - hour                     |                              |                              | 24-hour                      |                              |                              | Data Availability |        |        |       |
|---------|-----------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|-------------------|--------|--------|-------|
|         |                             | 70%ile                       | 90%ile                       | Max                          | 70%ile                       | 90%ile                       | Max                          | Year 1            | Year 2 | Year 3 | Total |
|         |                             | ( $\mu\text{g}/\text{m}^3$ ) | ( $\mu\text{g}/\text{m}^3$ ) | ( $\mu\text{g}/\text{m}^3$ ) | ( $\mu\text{g}/\text{m}^3$ ) | ( $\mu\text{g}/\text{m}^3$ ) | ( $\mu\text{g}/\text{m}^3$ ) | %                 | %      | %      | %     |
| 35125   | 2010-2012                   | 43.24                        | 62.04                        | 133.48                       | 41.28                        | 51.47                        | 82.41                        | 99.3%             | 99.2%  | 99.1%  | 99.2% |
| 31103   | 2010-2012                   | 31.96                        | 50.76                        | 129.72                       | 32.34                        | 43.24                        | 77.71                        | 99.6%             | 99.3%  | 99.0%  | 99.3% |
| 33003   | 2010-2012                   | 31.96                        | 52.64                        | 125.96                       | 32.35                        | 43.08                        | 76.77                        | 96.9%             | 99.2%  | 98.1%  | 98.1% |
| 34020   | 2010-2012                   | 33.84                        | 54.52                        | 122.20                       | 33.29                        | 46.00                        | 81.94                        | 99.7%             | 98.7%  | 99.8%  | 99.4% |

### CO Summary

| Station | Most Recent Available Years | 1 - hour                     |                              |                              | 8 - hour                     |                              |                              | Data Availability |        |        |       |
|---------|-----------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|-------------------|--------|--------|-------|
|         |                             | 70%ile                       | 90%ile                       | Max                          | 70%ile                       | 90%ile                       | Max                          | Year 1            | Year 2 | Year 3 | Total |
|         |                             | ( $\mu\text{g}/\text{m}^3$ ) | ( $\mu\text{g}/\text{m}^3$ ) | ( $\mu\text{g}/\text{m}^3$ ) | ( $\mu\text{g}/\text{m}^3$ ) | ( $\mu\text{g}/\text{m}^3$ ) | ( $\mu\text{g}/\text{m}^3$ ) | %                 | %      | %      | %     |
| 35125   | 2010-2012                   | 286.25                       | 400.75                       | 2026.65                      | 286.25                       | 373.56                       | 1402.63                      | 99.0%             | 97.8%  | 99.1%  | 98.6% |
| 31103   | 2008-2010                   | 251.90                       | 366.40                       | 1740.40                      | 259.06                       | 356.38                       | 1239.46                      | 99.0%             | 98.0%  | 98.4%  | 98.4% |
| 33003   | <i>n/a</i>                  |                              |                              |                              |                              |                              |                              |                   |        |        |       |
| 34020   | <i>n/a</i>                  |                              |                              |                              |                              |                              |                              |                   |        |        |       |

### PM<sub>2.5</sub> Summary

| Station | Most Recent Available Years | 24 - hour                    |                              |                              | Data Availability |        |        |       |
|---------|-----------------------------|------------------------------|------------------------------|------------------------------|-------------------|--------|--------|-------|
|         |                             | 70%ile                       | 90%ile                       | Max                          | Year 1            | Year 2 | Year 3 | Total |
|         |                             | ( $\mu\text{g}/\text{m}^3$ ) | ( $\mu\text{g}/\text{m}^3$ ) | ( $\mu\text{g}/\text{m}^3$ ) | %                 | %      | %      | %     |
| 35125   | 2010-2012                   | 8.17                         | 13.00                        | 26.25                        | 99.0%             | 98.2%  | 97.8%  | 98.3% |
| 31103   | 2010-2012                   | 7.46                         | 12.43                        | 29.38                        | 98.7%             | 98.6%  | 98.2%  | 98.5% |
| 33003   | 2010-2012                   | 7.54                         | 12.19                        | 32.17                        | 98.8%             | 98.6%  | 98.1%  | 98.5% |
| 34020   | 2010-2012                   | 8.70                         | 14.75                        | 29.54                        | 99.2%             | 97.7%  | 98.8%  | 98.6% |



### Benzene Summary

| Station | Most Recent Available Years | 24 - hour                    |                              |                              | Annual                       |                              |                              | Data Availability |        |        |        |        |        |
|---------|-----------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|-------------------|--------|--------|--------|--------|--------|
|         |                             | 70%ile                       | 90%ile                       | Max                          | Min                          | Max                          | Mean                         | Year 1            | Year 2 | Year 3 | Year 4 | Year 5 | Total  |
|         |                             | ( $\mu\text{g}/\text{m}^3$ ) | ( $\mu\text{g}/\text{m}^3$ ) | ( $\mu\text{g}/\text{m}^3$ ) | ( $\mu\text{g}/\text{m}^3$ ) | ( $\mu\text{g}/\text{m}^3$ ) | ( $\mu\text{g}/\text{m}^3$ ) | %                 | %      | %      | %      | %      | %      |
| 60413   | 2008-2012                   | 0.66                         | 0.89                         | 2.28                         | 0.4975                       | 0.6593                       | 0.5567                       | 75.0%             | 100.0% | 95.0%  | 18.3%  | 95.0%  | 76.0%  |
| 60427   | 2009-2012                   | 0.80                         | 1.08                         | 1.57                         | 0.5915                       | 0.7691                       | 0.6878                       | 100.0%            | 95.0%  | 100.0% | 93.3%  |        | 96.3%  |
| 60428   | 2008-2012                   | 0.65                         | 0.99                         | 1.76                         | 0.5429                       | 0.6024                       | 0.5665                       | 68.3%             | 100.0% | 98.3%  | 23.3%  | 93.3%  | 75.7%  |
| 60429   | 2006-2008                   | 0.87                         | 1.26                         | 4.09                         | 0.6603                       | 0.8839                       | 0.7666                       | 80.0%             | 100.0% | 95.0%  |        |        | 81.9%  |
| 60435   | 2009-2012                   | 0.61                         | 0.90                         | 1.56                         | 0.5129                       | 0.5742                       | 0.5485                       | 80.0%             | 98.3%  | 25.0%  | 95.0%  |        | 73.7%  |
| 60211   | 2008-2012                   | 0.81                         | 1.08                         | 2.33                         | 0.5582                       | 0.7648                       | 0.7007                       | 65.0%             | 93.3%  | 100.0% | 23.3%  | 78.3%  | 71.7%  |
| 62601   | 2008-2012                   | 0.47                         | 0.66                         | 1.08                         | 0.3034                       | 0.5141                       | 0.4076                       | 68.3%             | 88.3%  | 85.0%  | 46.7%  | 90.0%  | 74.7%  |
| 64401   | 2008-2010                   | 0.36                         | 0.50                         | 1.15                         | 0.2611                       | 0.2835                       | 0.2740                       | 100.0%            | 100.0% | 100.0% |        |        | 100.0% |

### 1,3-Butadiene Summary

| Station | Most Recent Available Years | 24 - hour                    |                              |                              | Annual                       |                              |                              | Data Availability |        |        |        |        |        |
|---------|-----------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|-------------------|--------|--------|--------|--------|--------|
|         |                             | 70%ile                       | 90%ile                       | Max                          | Min                          | Max                          | Mean                         | Year 1            | Year 2 | Year 3 | Year 4 | Year 5 | Total  |
|         |                             | ( $\mu\text{g}/\text{m}^3$ ) | ( $\mu\text{g}/\text{m}^3$ ) | ( $\mu\text{g}/\text{m}^3$ ) | ( $\mu\text{g}/\text{m}^3$ ) | ( $\mu\text{g}/\text{m}^3$ ) | ( $\mu\text{g}/\text{m}^3$ ) | %                 | %      | %      | %      | %      | %      |
| 60413   | 2008-2012                   | 0.057                        | 0.094                        | 0.221                        | 0.043                        | 0.057                        | 0.050                        | 75.0%             | 100.0% | 95.0%  | 18.3%  | 95.0%  | 76.0%  |
| 60427   | 2009-2012                   | 0.081                        | 0.116                        | 0.188                        | 0.063                        | 0.082                        | 0.070                        | 100.0%            | 95.0%  | 100.0% | 93.3%  |        | 96.3%  |
| 60428   | 2008-2012                   | 0.062                        | 0.108                        | 0.219                        | 0.047                        | 0.057                        | 0.053                        | 68.3%             | 100.0% | 98.3%  | 23.3%  | 93.3%  | 75.7%  |
| 60429   | 2006-2008                   | 0.085                        | 0.128                        | 0.602                        | 0.062                        | 0.101                        | 0.079                        | 80.0%             | 100.0% | 95.0%  |        |        | 81.9%  |
| 60435   | 2009-2012                   | 0.057                        | 0.089                        | 0.281                        | 0.048                        | 0.057                        | 0.052                        | 80.0%             | 98.3%  | 25.0%  | 95.0%  |        | 73.7%  |
| 60211   | 2008-2012                   | 0.063                        | 0.097                        | 0.318                        | 0.046                        | 0.060                        | 0.055                        | 65.0%             | 93.3%  | 100.0% | 23.3%  | 78.3%  | 71.7%  |
| 62601   | 2008-2012                   | 0.018                        | 0.025                        | 0.048                        | 0.010                        | 0.017                        | 0.014                        | 68.3%             | 88.3%  | 85.0%  | 46.7%  | 90.0%  | 74.7%  |
| 64401   | 2008-2010                   | 0.006                        | 0.013                        | 0.083                        | 0.005                        | 0.005                        | 0.005                        | 100.0%            | 100.0% | 100.0% |        |        | 100.0% |

### Benzo (a) Pyrene Summary

| Station | Most Recent Available Years | 24 - hour            |                      |                      | Annual               |                      |                      | Data Availability |        |        |        |        |       |
|---------|-----------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|-------------------|--------|--------|--------|--------|-------|
|         |                             | 70%ile               | 90%ile               | Max                  | Min                  | Max                  | Mean                 | Year 1            | Year 2 | Year 3 | Year 4 | Year 5 | Total |
|         |                             | (ng/m <sup>3</sup> ) | (ng/m <sup>3</sup> ) | (ng/m <sup>3</sup> ) | (ng/m <sup>3</sup> ) | (ng/m <sup>3</sup> ) | (ng/m <sup>3</sup> ) | %                 | %      | %      | %      | %      | %     |
| 60427   | 2008-2010                   | 0.093                | 0.153                | 1.082                | 0.0608               | 0.1168               | 0.0888               | 93.3%             | 83.3%  | 63.3%  |        |        | 79.1% |
| 60429   | 2004-2008                   | 0.082                | 0.145                | 0.718                | 0.0585               | 0.1290               | 0.0844               | 60.0%             | 20.0%  | 50.0%  | 86.7%  | 30.0%  | 48.7% |
| 60435   | 2009-2010                   | 0.070                | 0.121                | 0.204                | 0.0545               | 0.0604               | 0.0574               | 63.3%             | 60.0%  | 61.7%  |        |        | 61.7% |
| 60403   | 1998-2000                   | 0.201                | 0.396                | 0.989                | 0.1719               | 0.1932               | 0.1851               | 43.3%             | 86.7%  | 80.0%  | 69.2%  |        | 69.2% |
| 60418   | 2000-2004                   | 0.138                | 0.290                | 0.624                | 0.1222               | 0.1965               | 0.1473               | 80.0%             | 73.3%  | 93.3%  | 20.0%  | 30.0%  | 58.6% |

### Acrolein Summary

| Station | Most Recent Available Years | 1 - hour             |                      |                      | 24 - hour            |                      |                      | Data Availability |        |        |       |
|---------|-----------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|-------------------|--------|--------|-------|
|         |                             | 70%ile               | 90%ile               | Max                  | 70%ile               | 90%ile               | Max                  | Year 1            | Year 2 | Year 3 | Total |
|         |                             | (µg/m <sup>3</sup> ) | (µg/m <sup>3</sup> ) | (µg/m <sup>3</sup> ) | (µg/m <sup>3</sup> ) | (µg/m <sup>3</sup> ) | (µg/m <sup>3</sup> ) | %                 | %      | %      | %     |
| 60211   | 2008-2010                   | 0.107                | 0.180                | 0.324                | 0.043                | 0.072                | 0.130                | 35.0%             | 41.7%  | 100.0% | 58.2% |
| 62601   | 2008-2010                   | 0.082                | 0.151                | 0.312                | 0.033                | 0.061                | 0.125                | 6.7%              | 50.0%  | 83.3%  | 46.2% |

### Acetaldehyde Summary

| Station | Most Recent Available Years | 1/2 - hour           |                      |                      | 24 - hour            |                      |                      | Data Availability |        |        |       |
|---------|-----------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|-------------------|--------|--------|-------|
|         |                             | 70%ile               | 90%ile               | Max                  | 70%ile               | 90%ile               | Max                  | Year 1            | Year 2 | Year 3 | Total |
|         |                             | (µg/m <sup>3</sup> ) | (µg/m <sup>3</sup> ) | (µg/m <sup>3</sup> ) | (µg/m <sup>3</sup> ) | (µg/m <sup>3</sup> ) | (µg/m <sup>3</sup> ) | %                 | %      | %      | %     |
| 60211   | 2008-2010                   | 3.48                 | 5.12                 | 8.18                 | 1.16                 | 1.71                 | 2.73                 | 35.0%             | 41.7%  | 100.0% | 58.2% |
| 62601   | 2008-2010                   | 3.12                 | 4.76                 | 6.28                 | 1.04                 | 1.59                 | 2.09                 | 6.7%              | 50.0%  | 83.3%  | 46.2% |
| 64401   | 2008-2010                   | 2.73                 | 4.41                 | 8.90                 | 0.91                 | 1.47                 | 2.97                 | 60.0%             | 55.0%  | 90.0%  | 67.6% |

## Formaldehyde Summary

| Station | Most Recent Available Years | 24 - hour                    |                              |                              | Data Availability |        |        |       |
|---------|-----------------------------|------------------------------|------------------------------|------------------------------|-------------------|--------|--------|-------|
|         |                             | 70%ile                       | 90%ile                       | Max                          | Year 1            | Year 2 | Year 3 | Total |
|         |                             | ( $\mu\text{g}/\text{m}^3$ ) | ( $\mu\text{g}/\text{m}^3$ ) | ( $\mu\text{g}/\text{m}^3$ ) | %                 | %      | %      | %     |
| 60211   | 2008-2010                   | 1.46                         | 2.51                         | 5.37                         | 35.0%             | 93.3%  | 100.0% | 75.3% |
| 62601   | 2008-2010                   | 3.47                         | 5.94                         | 9.15                         | 6.7%              | 50.0%  | 83.3%  | 46.2% |
| 64401   | 2008-2010                   | 3.06                         | 4.61                         | 7.44                         | 60.0%             | 55.0%  | 90.0%  | 67.6% |