

TO:	CHAIR AND MEMBERS CIVIC WORKS COMMITTEE MEETING ON OCTOBER 7, 2013
FROM:	EDWARD SOLDI, P.ENG. DIRECTOR, ROADS AND TRANSPORTATION
SUBJECT:	VETERANS MEMORIAL PARKWAY NOISE STUDY

RECOMMENDATION

That the following actions be taken with respect to the Veterans Memorial Parkway Noise Improvements:

- a) the Civic Administration **BE GIVEN DIRECTION** as to which of the following options is to be implemented to address noise improvements for the Veterans Memorial Parkway:
 - berm improvements along Simpson Crescent by increasing the height of the berm by up to 1 m and at the south ends of the development near Admiral Drive & Trafalgar Street through a combination of soil berm and noise wall panels as necessitated by property constraints at a total cost of \$300,000, which meets the current noise attenuation requirements and City level of service;
 - the introduction of a noise wall along Simpson Crescent and at the south ends of the development near Admiral Drive & Trafalgar Street through a combination of soil berm and noise wall panels as necessitated by property constraints at a total cost \$450,000, noting this is a service level improvement;
 - the introduction of a 1.8 m noise wall along all residential backyards between Trafalgar Street and Dundas Street and at the south ends of the development near Admiral Drive & Trafalgar Street through a combination of soil berm and noise wall panels as necessitated by property constraints at a total cost \$1.2 Million, noting this is a service level improvement;
 - the introduction of a 2.4 m noise wall along all residential backyards between Trafalgar Street and Dundas Street and at the south ends of the development near Admiral Drive & Trafalgar Street through a combination of soil berm and noise wall panels as necessitated by property constraints at a total cost of \$1.7 Million; noting this is a service level improvement.
- b) Civic Administration **BE DIRECTED** to introduce a 2014 Service Improvement budget item for the Veterans Memorial Parkway Noise Berm Improvements based on the preferred option.

PREVIOUS REPORTS PERTINENT TO THIS MATTER

- Environment and Transportation Committee, April 28, 2003 – Environmental Study Report Airport Road Widening – Highway 401 to Oxford Street East.
- Environment and Transportation Committee, January 15, 2007 – Veterans Memorial Parkway Noise Study
- Built and Natural Environment Committee, March 28, 2011 – Veterans Memorial Parkway Noise Study
- Built and Natural Environment Committee, May 16, 2011 – Public Participation Meeting - Veterans Memorial Parkway and Highbury Avenue Noise Study
- Built and Natural Environment Committee, September 26, 2011 – Veterans Memorial Parkway Noise Study
- Civic Works Committee, January 21, 2013 – Veterans Memorial Parkway Noise Study
- Civic Works Committee, April 22, 2013 – Veterans Memorial Parkway Noise Study

BACKGROUND

Purpose:

This report responds to Council's request to consider what might be the optimal mix of noise attenuation measures along the Veterans Memorial Parkway which may include a mix of berms, fences and walls. In addition, monitoring was carried out at two new sites to address concerns issued in April and predicted results of noise wall installations are provided with associated cost estimates.

DISCUSSION

Policy:

The installation of noise attenuation is typically triggered by two mechanisms, during initial land development or adjacent to road widening. The report provides context for this particular location as it compares to developments adjacent to other busy roads in London.

New developments are required to mitigate noise where necessary. Section 19.9.6 of the Official Plan applies to residential land uses adjacent to arterial roads and requires that new developments attempt to avoid the use of noise walls with land use planning or alternative subdivision designs. If noise attenuation is required, it is designed to keep daytime sound exposures in rear yard amenity areas to within 60 dBA. The development policies are intended to provide long-term noise attenuation designed for any future expected road widenings.

For road widening projects, City of London Policy 25(12) states that *“the installation of noise barrier walls is intended to ensure that the existing residential backyards backing onto arterial roads which are widened to four lanes or greater are not subjected to significant noise level increases from levels that exist in the design year.”* This policy assumes that a typical arterial road widening moves the noise source, the travelled lane, closer to the receiver. The road widening policy is not intended to replace or improve previously installed development noise attenuation.

Homeowner, dissatisfaction of noise levels adjacent to busy roads is not uncommon. The City receives complaints and requests for noise mitigation from property owners adjacent to busy road on a regular basis. The City does not have a noise wall retrofit program and has no mechanism to initiate the installation of noise mitigation outside of the development and road widening mechanisms described above.

A Local Improvement process exists for the installation of noise walls but it is rarely used because the noise wall costs are typically not attractive to property owners even with a 1/3 local improvement cost sharing from the City.

Noise complaints and mitigation requests have recently been received from residents on Highbury Avenue South, Highbury Avenue North, Sunningdale Road East, Fanshawe Park Road East, Southdale Road West, Sarnia Road, Wonderland Road South and Wellington Road. These requests originate from locations without *and* with existing mitigation. The frequency of these requests increases when this issue is before Council.

The noise levels adjacent to Veterans Memorial Parkway (VMP) are similar to many of the arterial roads in London. The recent road widening on Wonderland Road North would have increased noise levels up to 65 dBA so mitigation was required to maintain levels of 57 to 59 dBA. The future Sarnia Road Widening east of Wonderland Road will also mitigate the effects of the road widening from potential levels up to 64 dBA down to 56 to 57 dBA.

The 2013 Sarnia Road Widening from Aldersbrook Road to Wonderland Road did not include new noise walls because noise mitigation was previously installed at the time of the adjacent residential development under the same policies that the developments adjacent to VMP were processed. Similar to the 2006 VMP widening EA, this was the recommendation of a thorough project environmental assessment.

Existing Conditions:

Residential lands have been developed along the west side of VMP from Dundas Street southerly to Trafalgar Street primarily with a combination of condominiums and single family



residential properties. Each development was responsible for the extension of the noise attenuation berm, at 3.0 m height above the roadway, to serve as noise attenuation.

VMP (formerly Airport Road) is a four lane divided expressway with a 60 meter right-of-way width. VMP was widened from 2 lanes to 4 lanes in 2005 and the additional lanes were provided on the east side of the roadway. The effect of the road widening on noise levels in the adjacent residential properties was eliminated by moving the noise source (the additional lanes) further from the west side residential developments. A noise *reduction* from the VMP expansion was confirmed via before-and-after noise testing. The average annual daily traffic is 25,000 vehicles per day. There are no plans to further expand VMP with additional lanes; future capacity improvements will be through the implementation of interchanges.

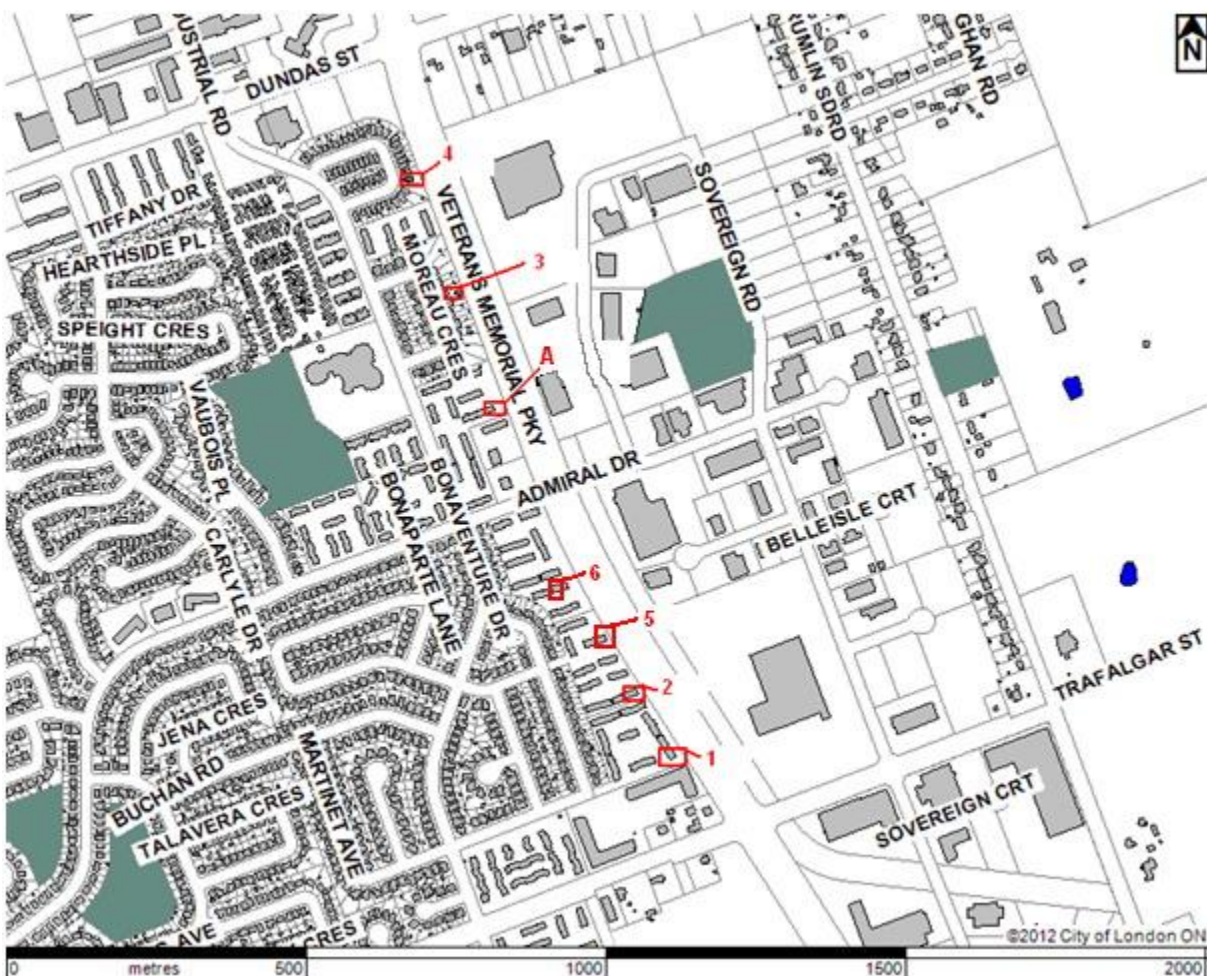
Recent Noise Testing:

2012 Testing

As noted in the January 21, 2013 report to Civic Works Committee, sound exposure monitoring was completed in response to community concerns and readings were taken from within backyards on June 26, 27 & 28, 2012. Four locations were chosen along Veterans Memorial Parkway based on property owner cooperation and distribution along the corridor. The four locations were as listed and shown on Figure 1:

1. 151 Martinet Avenue, Unit 9
2. 217 Martinet Avenue, Unit 27
3. 35 Moreau Crescent
4. 248 Simpson Crescent

Figure 1 – Area Map



In general, the 2012 results indicated the noise attenuation berm is performing as per development standards. The noise levels at Locations 2 and 3 were between 52 and 57 dBA and below the development noise criteria. However noise levels slightly in excess of 60 dBA were encountered at Locations 1 and 4. The noise berm deficiencies are a result of:

- i) the full-height noise berm does not extend to the south ends of the development near Admiral Drive & Trafalgar Street exposing the end unit to a 2 to 3 dB exceedence (Locations 1 and also visually observed at Location A); and,
- ii) although the berm is close to 3.0 m above the road level, elevated backyard grades on Simpson Crescent (Location 4) reduce the effectiveness of the berm such that a 1 dB exceedance was measured two days out of three.

2013 Testing

Additional sound exposure monitoring was carried out on June 25, 26 & 27, 2013 in the following two locations shown on Figure 1:

5. 217 Martinet Avenue, Unit 38
6. 511 Admiral Drive, Unit 49

These two additional locations are south of Admiral Drive, and were selected to address questions raised by Council as follows:

- to determine if properties with chain link fence receive elevated noise levels compared to board fence locations; and,
- to determine if properties near the Admiral Drive intersection receive elevated noise levels.

The location of noise readings is also constrained by the limited number of positive property owner responses to the City’s request for permission to access.

The details of the 2013 testing are provided in the consultant report in Appendix A. The results of the 2013 testing measured daytime noise levels of 56 to 57 dBA at Location 5, and 51 to 52 dBA at Location 6 as detailed in the following table:

	Daytime Noise Levels (L _{eq Day})	
Date	Location 5 (217 Martinet Ave, Unit 38)	Location 6 (511 Admiral Dr. Unit 49)
06/25/13	56	51
06/26/13	57	52 (60) ¹
06/27/13	57	52

1. Elevated levels from a non-road source was audible between 11:00 and 13:00 hours during the measurement period and was excluded from the assessment. The bracketed sound exposures include the two hours when noise resembling construction equipment is included.

The measured sound levels exposures at Location 6 were significantly higher on June 26 than on the other days. Review of the time history shows higher sound levels between 11:00 and 13:00 hours. The audio recording indicates that an unusual non-road noise source resembling construction equipment caused the short-term abnormal results. Ignoring these two hours reduces the daytime sound exposure to 52 dBA which is in line with the results from the other days.

Based on the results presented above, the measured sound exposures at both measurement locations are well below the City development criteria for which a sound barrier is warranted. This testing also reaffirms the previous finding by confirming that typical properties bounded by chain link fence on the noise mitigation berm do not receive elevated noise levels. It also confirms that properties in proximity to the Admiral Drive intersection are not subjected to elevated noise levels.

Noise Wall Scenario:

Even with the noise mitigation berm in place, it has been apparent that members of the community desire the introduction of a noise attenuation wall to provide significant improvement to their rear yards. The noise consultant provided a prediction of the results of introducing a 1.8 m and 2.4 m wall.

Introduction of a 1.8 or 2.4 m noise mitigation wall on the existing noise mitigation berm will result in a system totalling between 4.5 and 5.7 m in height. A 1.8 m noise wall installed on the existing berm is predicted to increase the noise mitigation by 2 to 3 dB. A 2.4 m wall would



provide an additional 1 dB. The resulting noise levels in the closest backyards would range from 50 to 53 dBA. Noise mitigation benefits diminish as the height of the mitigation system increases. Because the noise levels along Simpson Cres are slightly higher than elsewhere due to less effective berm height, more benefit would be realized and noise reductions along Simpson Crescent are predicted to be about 8 dB.

The noise specialist consultant notes that humans do not respond linearly to sound level changes. Changes of 0 to 3 dBA are generally imperceptible to most people, changes of 4 to 5 are considered just noticeable and a reduction of 10 dBA is considered to be half as loud. Therefore, the introduction of noise walls will provide “imperceptible” or “just noticeable” benefit to residences with the exception of Simpson Crescent. MTO requires a minimum 5 dB benefit before a new noise mitigation system will be considered.

Noise Attenuation Cost Estimate Review:

All estimates provided for the potential improvements along Veterans Memorial Parkway are based on estimated quantities and past tender values received for similar projects. The estimated values include allowances for traffic control, engineering and contingencies. The estimates are preliminary as there are no design details available at this time.

During the public participation portion of the Civic Works Committee in April 2013, Mr. Rick Banks, Sales Manager for Design Concrete Systems Ltd. (DCS), suggested lower cost estimates for the placement of the noise attenuation wall.

Staff subsequently met with Mr. Banks to review some of his products and to discuss the estimates created for the noise attenuation wall. DCS do provide noise attenuation walls which are absorptive or reflective in nature. Mr. Banks provided some unit values for estimating, and noted the suggested price near \$900,000 for a noise wall from Trafalgar St to Dundas St was a “bare bones” cost and does not include foundation design, traffic control, engineering required to design and tender and contingencies.

The DCS estimate assumed a stable foundation is available for the wall supporting foundation to be placed within. Minimal construction details are known regarding the existing berm placed by developers. The height of the fill is likely in the range of 3 to 5 meters, and the soil materials or compaction efforts utilized are not known at this time. At the time of construction, it was not intended that the noise berm would support any structures. A detailed geotechnical investigation would be necessary for design purposes and deeper-than-normal noise wall foundations are assumed based on typical soil berm construction techniques.

With the proximity to VMP and limited access to the top of the berm, the discussion with Mr. Banks also identified challenges and additional costs associated with:

- Access challenges as the top platform of the berm is approximately 1.5 m in width. Any vehicles to be utilized for the wall construction will require a 3 to 4 metre width so temporary grading of the berm will be required.
- Vegetation removal and reinstatement is required along the berm.
- Construction staging challenges exist associated with several aspects of any construction with limited access to the top of the berm.

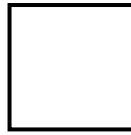
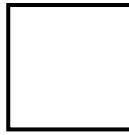
In summary, agreement was reached that the DCS estimate did not include allowance for certain site specific challenges associated with the construction of a noise wall at this location.

The previously provided cost estimate of \$1.7 M for a 2.4 m high noise wall between Dundas and Trafalgar St was reaffirmed. The staff cost estimate for the installation of a 1.8 m high noise wall has been increased slightly to \$1.2 M upon further consideration of the site constructability complexities with DCS.

Noise Attenuation Deficiency Improvements:

As noted earlier, the current noise berm along the west side of Veterans Memorial Parkway does address most of the development noise attenuation requirements between Dundas Street and Trafalgar Street. However, two deficiencies were found and the following improvements are proposed:

1. Extend the length of the noise mitigation berm at 151 Martinet Avenue and 126 Bonaventure Drive to fully serve units at the ends of the berm. A berm extension is



recommended but short sections of noise wall may also be necessary once property constraints are determined during design; and,

2. Increase the height of the noise berm between 244 and 272 Simpson Crescent by up to 1.0 m. The noise berm adjacent to Simpson Crescent can achieve development standard noise levels by increasing the height of the berm by a minimum 0.5 m with a new crest slightly to the east of the existing crest. This improvement can be completed within the Veterans Memorial Parkway right-of-way.

Above are the most cost-effective improvements and are as consistent as possible with the noise mitigation designed and constructed with the development. The estimated construction value of these improvements is \$300,000 plus HST.

The consultant report appended to the January 2013 Civic Work Committee report and shared again in April 2013 raised questions as to the type of noise mitigation being recommended by the consultant. The previous report used some language interchangeably as it relates to noise mitigation – ie. berms/walls/fences. While all are installed for the same purpose, our noise specialist consultant's advice is that berms are more effective than walls due to their increased mass. Noise berms do occupy a larger footprint and are therefore not typically possible on narrower arterial road right-of-ways in London. The VMP Expressway has a wider right-of-way that makes a berm possible at this location. Berms also exist elsewhere in London to protect residences from railway noise.

Other Works Planned:

Parks Planning and Design Division have some tree planting planned along Veterans Memorial Parkway, and there is an awareness of potential improvements to the noise attenuation. Any modifications to the noise attenuation will be coordinated with future tree planting to minimize disruption in the area.

Long Combination Vehicles:

The introduction of Long Combination Vehicles (LCVs) in Ontario is a provincial initiative. The Ministry of Transportation is implementing the program through a stringent set of procedures and operating protocol to maximize road user safety. LCV routes are subject to the approval of the province and all other affected road authorities. The provincial guidelines on route selection require that LCV origins and destination nodes be located within 2 km of an approved provincial LCV freeway (Highway 401).

The subject area is approximately 7 km from Highway 401 and therefore the approval of LCVs on the VMP in this area is not anticipated under current rules.

CONCLUSIONS

Noise complaints adjacent to busy roads are common and originate from properties with and without noise mitigation. However, the City does not have a funded program for the construction of noise mitigation beyond the development and road widening triggers. The Transportation Infrastructure Gap calculations do not include consideration of a Noise Wall Retrofit program and currently cuts have been requested from capital programs that maintain existing assets. Installation of new noise mitigation systems along existing developments would further increase the transportation infrastructure gap by triggering additional capital and operating costs.

Noise mitigation installation was required by the developers at the time of the development. A noise berm was the recommended mitigation due to the space available in the wider-than-typical VMP right-of-way. In 2006, the VMP was expanded with the construction of new lanes on the far side of the right-of-way. Before and after noise testing confirmed noise levels were reduced as a result of the project.

Due to the level of concern at this location, noise testing has been undertaken. Sound level monitoring has been completed at six locations in residential backyards along the Veterans Memorial Parkway between Dundas Street and Trafalgar Street to determine the existing daytime sound exposure levels. The testing has determined that the noise mitigation berm is reducing noise levels below development criteria throughout most of its length. The recent testing has confirmed that the presence of chain-link fence (instead of board fences) on top of



the berm or proximity to the VMP/Admiral Drive intersection do not cause noise level exceedences.

Minor deficiencies in the sound berm were previously identified. No further deficiencies have been identified in the recent testing. There is not a funded program to address residential noise levels adjacent to busy roads or post-development residential deficiencies. However, remedial actions are possible as follows:

- i) The full-height noise berm does not extend entirely to the south ends of the development near Admiral Drive & Trafalgar Street exposing the end unit to higher noise levels. This can be addressed by extending the mitigation with a combination of soil berm and noise wall panels as necessitated by property constraints.
- ii) Elevated backyards on Simpson Crescent reduce the effectiveness of the berm. This can be addressed by increasing the height of the berm by up to 1 m.

These berm improvements would rectify existing deficiencies and the improvement is supported by current policies. The nature of these noise mitigation berm improvements would minimize future operational costs. The associated cost of these improvements is estimated at \$300,000 and the nature of these noise mitigation berm improvements would minimize future operational costs.

Courses of Action:

Civic administration were directed to consider what might be the optimal mix of noise attenuation measures along the Veterans Memorial Parkway, based upon the additional information that has been provided, which measures could include a mix of berms, fences and walls.

The solution which is supported by existing City policies and level of service and meets the noise attenuation requirements is:

- berm improvements along Simpson Crescent by increasing the height of the berm by up to 1 m and at the south ends of the development near Admiral Drive & Trafalgar Street through a combination of soil berm and noise wall panels as necessitated by property constraints at a total cost of \$300,000.

In the case that Civic Works Committee and Council determines that a higher standard of noise mitigation is desired, the following solutions can be considered:

- the introduction of a noise wall along Simpson Crescent and at the south ends of the development near Admiral Drive & Trafalgar Street through a combination of soil berm and noise wall panels as necessitated by property constraints at a total cost \$450,000;
- the introduction of a 1.8 m noise wall along all residential backyards between Trafalgar Street and Dundas Street and at the south ends of the development near Admiral Drive & Trafalgar Street through a combination of soil berm and noise wall panels as necessitated by property constraints at a total cost \$1.2 Million,;
- the introduction of a 2.4 m noise wall along all residential backyards between Trafalgar Street and Dundas Street and at the south ends of the development near Admiral Drive & Trafalgar Street through a combination of soil berm and noise wall panels as necessitated by property constraints at a total cost of \$1.7 Million; noting this is a service level improvement.

Civic Administration has presented the various options for consideration and is seeking direction on which level of service option is to be provided. A 2014 Service Improvement budget item for the Veterans Memorial Parkway Noise Berm Improvements would be introduced based on the preferred option. It should be noted that the base 2014 Capital Budget does not include this additional Service Improvement project and associated cost.

Acknowledgements:

This report was prepared with assistance from Craig Trento, Engineering Intern and Karl Grabowski, Transportation Design Engineer in the Transportation Planning and Design Division.

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REVIEWED & CONCURRED BY:	
JOHN BRAAM, P. ENG. MANAGING DIRECTOR, ENVIRONMENTAL & ENGINEERING SERVICES & CITY ENGINEER	

Attach: Appendix ‘A’ – 2013 Sound Exposure Level Monitoring Results Report

cc: Councilor B. Armstrong

**APPENDIX 'A'**

2013 Sound Exposure Level Monitoring Results

September 12, 2013

City of London
Transportation Planning & Design
P. O. Box 5035
300 Dufferin
Avenue London,
Ontario N6A 4L9

Attention: Mr. Karl Grabowski
kgrabows@london.ca

**Re: 2013 Sound Exposure Level Monitoring Results
Veterans Memorial Parkway between
Dundas Street and Trafalgar Avenue Our File
No.: 110-343-100**

VIA E-MAIL

Dear Mr. Grabowski:

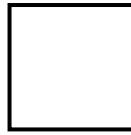
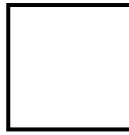
We have completed our analysis of the sound level measurements performed along the above noted section of the Veterans Memorial Parkway. Our findings and recommendations are outlined herein.

Sound level measurements were originally completed in 2012 at four locations to compare backyard sound exposure levels to development criteria along the Veterans Memorial Parkway. This residential area is separated from the road by a noise attenuation berm constructed at the time of development. No further noise mitigation was constructed during the 2005 Veterans Memorial Parkway widening because before and after testing confirmed a sound exposure reduction from the project.

Sound level monitoring was requested to be done at two additional locations. The additional locations were monitored since there is just a chain link fence atop the berm adjacent to Veterans Memorial Parkway. The locations monitored previously had a wooden privacy fence atop the berm, except for 217 Martinet Unit 27 where there was a chain link fence. The 2013 monitoring was done to confirm the existing wood privacy fence was not providing significant acoustical screening and that the sound exposures where there is a chain link fence were not significantly higher. The 2013 monitoring also included a location close to Admiral Drive to measure the influence of the Veterans Memorial Parkway and Admiral Drive intersection.

CITY OF LONDON REQUIREMENTS

City of London Policy 25(12) states that *“the installation of noise barrier walls is intended to ensure that the existing residential backyards backing onto arterial roads which are widened to four lanes or greater are not subjected to significant noise level increases from levels that exist in the design year”*.



Sound barriers are triggered at the time of development where the daytime sound exposures in the rear yard amenity areas are predicted to be greater than 60 dBA. The 60 dBA daytime sound exposure objective is the maximum sound exposure level permitted by the Ministry of the Environment (MOE) and the City of London in the outdoor amenity areas of new residential developments.

Where new noise mitigation is warranted, the mitigation must provide at least 5 dBA of attenuation. This is consistent with the Ministry of Transportation (MTO) requirements for roadway improvement projects. If at least 5 dBA of sound reduction is not provided, the sound barrier will not provide a noticeable reduction in the rear yard sound exposures.

SOUND LEVEL MONITORING

Sound exposure measurements were done at two locations from the morning of Monday, June 24, 2013 to the evening of Friday, June 28, 2013. The measurement period is exactly one year from the 2012 measurements. The sound monitoring was done at:

- 217 Martinet Avenue, Unit 38; and
- 511 Admiral Drive, Unit 49.

The measurement locations were selected by the City of London in consultation with Valcoustics Canada Ltd. based on volunteers who were willing to have sound level monitoring done in their rear yards.

Sound level meters were set up in the rear yard amenity areas of the above two locations, in accordance with where the noise guideline limits are applicable. The measurement location was

1.5 m above grade, 3 m from the rear of the dwelling.

At all of the measurement locations, sound levels were monitored continuously over the measurement duration. The sound level meters were left unattended. However, in addition to monitoring sound levels, audio recordings were also made over the entire measurement duration. Thus, if unusual results were obtained, it would be possible to listen to the actual sounds that were being monitored to try to determine the source of the unusual result.

In accordance with MOE requirements, the sound level meters were calibrated before and after the measurements.

NOISE MONITORING RESULTS

Table 1 below shows the results of the sound level measurements. $L_{eq\ Day}$ is the energy average sound exposure level for the daytime period which extends from 0700 to 2300 hours. L_{24} is the energy average sound exposure level for the entire 24-hour period.

Table 1 – Measured Sound Exposure Levels

Date	217 Martinet Avenue Unit 38		511 Admiral Drive Unit 49	
	L _{eq Day}	L ₂₄	L _{eq Day}	L ₂₄
06/25/13	56	56	51	50
06/26/13	57	56	52 (60 ¹)	50 (58 ¹)
06/27/13	57	57	52	51

1. Heavy equipment operation was audible between 11:00 and 13:00 hours during the measurement period and was excluded from the assessment. The bracketed sound exposures are with the two hours when heavy equipment was operating included.

From the above table, the L₂₄ is lower than the L_{eq Day} since there is significantly less traffic at night.

Results are not provided for 24 June 2013 or for 28 June 2013 since the noise monitoring only captured a portion of these two days. Thus, it is not possible to calculate the L_{eq Day} or the L₂₄ from the measurement data. However, time histories for all of the measurement days are included in Appendix A to this letter report. Review of the time histories indicates that the sound exposure levels were generally consistent with the other days for the Monday and the Friday.

The sound exposures are significantly higher at Unit 49 of 511 Admiral Drive on the 26th than on the other days. Review of the time history shows higher sound levels between 11:00 and 13:00 hours. The audio recording indicates that there was some sort of construction equipment operating that was impacting the sound environment. Ignoring these two hours reduces the daytime and 24 hour sound exposures to 52 and 50, respectively, which are in line with the results from the other days.

The MOE guidelines require that sound monitoring not be done during periods of precipitation or when wind speeds exceed 20 kph as these weather conditions will produce artificially high sound levels. Weather data for the measurement period obtained from the Environment Canada Climate Centre as observed at the London International Airport are included as Appendix B to this letter report. There was some precipitation during the monitoring period. There were also some periods where the wind speeds were above 20 kph. However, review of the sound level results indicates that wind or rain did not significantly impact the measurement data. Thus, no data was excluded from our assessment due to weather.

Based on the results presented in Table 1, the measured sound exposures are well below the City and Provincial criteria for which a sound barrier is needed at both measurement locations.

DISCUSSION AND RECOMMENDATIONS

There is an existing sound barrier berm mitigating the sound exposures in the rear yard amenity areas of residences along the Veterans Memorial Parkway. A berm of the same height is actually slightly more effective (i.e. will provide slightly more sound attenuation) than a sound barrier fence. Sound barrier attenuation calculations assume there is no sound passing through the barrier and it is only the sound over the top of the sound barrier that is accounted for. This is not necessarily true as some



sound will pass through a sound barrier fence. However, a berm is much more massive than a fence and will prevent essentially all sound from passing through. Thus, berms typically provide slightly greater sound attenuation than a sound barrier fence of the same height.

The existing berm is attenuating the sound exposures to below the City of London noise limits at most locations. Localized sound barrier deficiencies were identified in our report dated December 13, 2012. Additional noise mitigation beyond fixing the identified deficiencies is not warranted based on current policies.

As part of this evaluation, the City of London has asked what the resultant daytime sound exposures would be at the residences if a 1.8m (6 foot) or 2.44 (8 foot) high sound barrier fence were constructed atop the existing berm. The existing berm varies in height from approximately 2.7 to

3.3 m in height relative to the roadway centre line elevation. With a 1.8 m high sound barrier fence atop, the total sound barrier height will range from 4.5 to 5.1 m in height. With a 2.44 m high sound barrier fence atop, the total sound barrier height will range from 5.14 to 5.74 m in height.

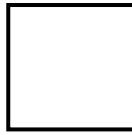
Our analysis indicates that the additional 2.44 m high sound barrier fence atop the berm will generally provide 3 to 4 dB of additional sound attenuation and will reduce the daytime sound exposures in the outdoor amenity areas of the closest residences to between 50 and 53 dBA. The only exception being for the residences on Simpson Crescent where the existing berm is deficient and is providing reduced benefits because of reduced height. Along Simpson Crescent, the 2.44 m sound barrier fence atop the berm is predicted to provide about 8 dB of sound attenuation and reduce the daytime sound exposure to the 52 to 53 dBA range. The 1.8 m high sound barrier is predicted to provide about 1 dB less sound attenuation than the 2.44 m high sound barrier.

It must be noted that humans do not respond linearly to sound level changes. Changes of 0 to 3 dBA are generally imperceptible to most people, changes of 4 to 5 are considered just noticeable while a reduction of 10 dBA is considered to be half as loud.

Based on the above, the benefit from the addition of a 1.8 m or 2.44 m high sound barrier atop the existing berm is not warranted based on the City and Provincial development standards. If implemented, the benefit would be questionable based on the 2 to 4 dBA of expected additional sound attenuation. The reduction in sound exposure will be perceived as being “*just noticeable*” to most of the residents. The only significant benefit will along Simpson Crescent where the additional sound barrier is predicted to reduce the existing sound environment in half.

CONCLUSIONS

Sound level monitoring completed at two locations along the Veterans Memorial Parkway between Dundas Street and Trafalgar Avenue confirm that existing daytime sound exposure levels are within the City of London requirements with the existing berm, regardless of a wood fence or chain link fence. The monitoring also confirms that the existing berm mitigates sound levels created from the Veterans Memorial Parkway and Admiral Drive intersection to within the City of London requirements.



Deficiencies in the sound barrier at the southern and northern ends as well as at 126 Bonaventure Drive have been observed and have been recommended for improvement to mitigate existing sound exposure levels to within City of London and MOE noise development guideline limits as outlined in our December 12, 2012 report.

The acoustical benefit of constructing a 1.8 to 2.44 m high sound barrier fence atop the existing berm is questionable given that the expected 2 to 4 dB of additional attenuation will be just noticeable to most people. Adding to the existing sound barrier is in the area where the returns are diminishing. The greatest benefit is achieved when a sound barrier is provided versus there being no sound barrier. However, as there is a maximum to the total amount of sound attenuation as barrier can provide, as the height of the barrier increases, less and less attenuation is provided for similar height increases. Thus, a 4.0 m high sound barrier will provide only marginally more sound attenuation than what a 2.0 m high sound barrier will provide

If there are any questions or if additional information is needed, please do not hesitate to call.
Yours truly,

VALCOUSTICS CANADA LTD.

Per:

John Emeljanow, B.Eng., P.Eng.

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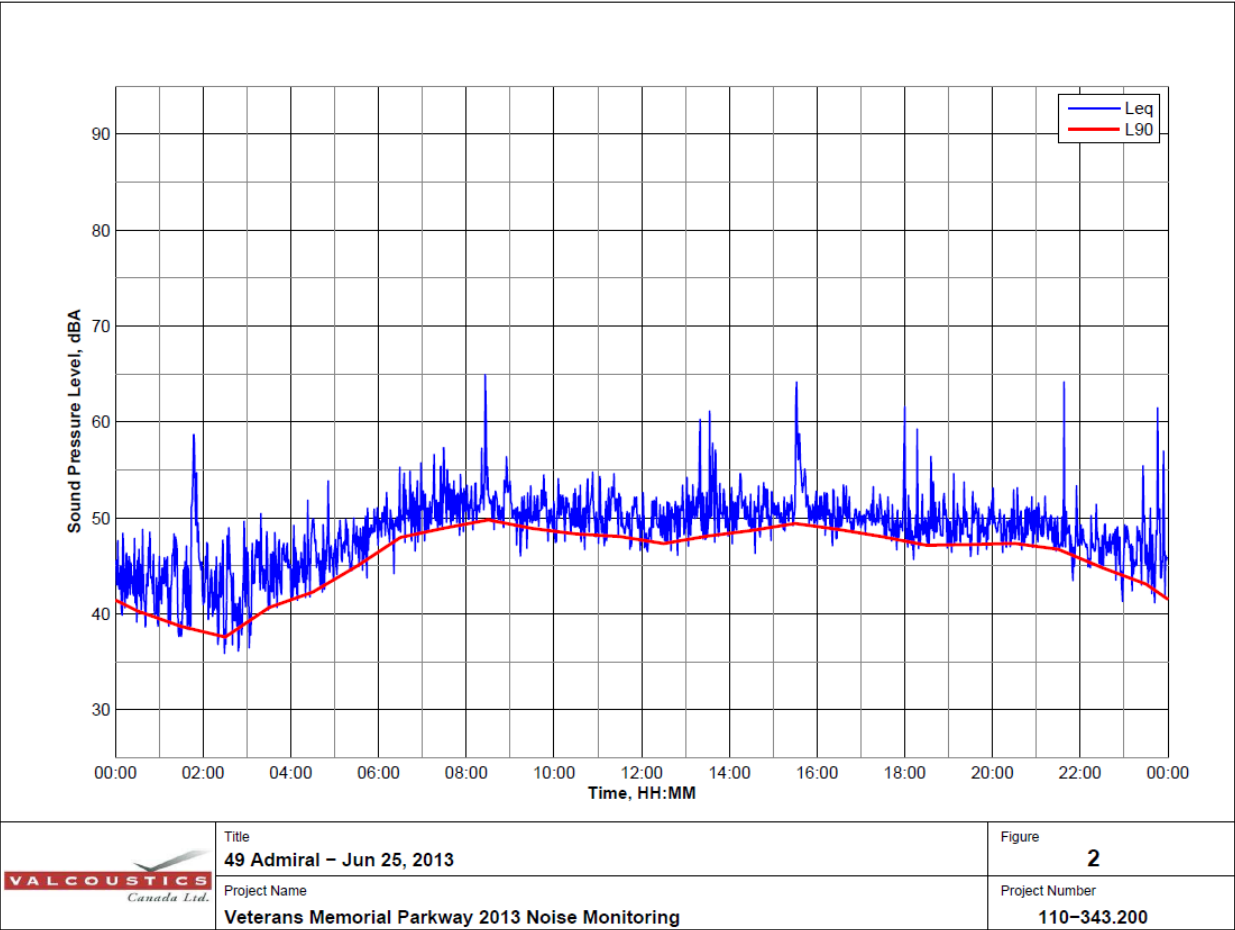
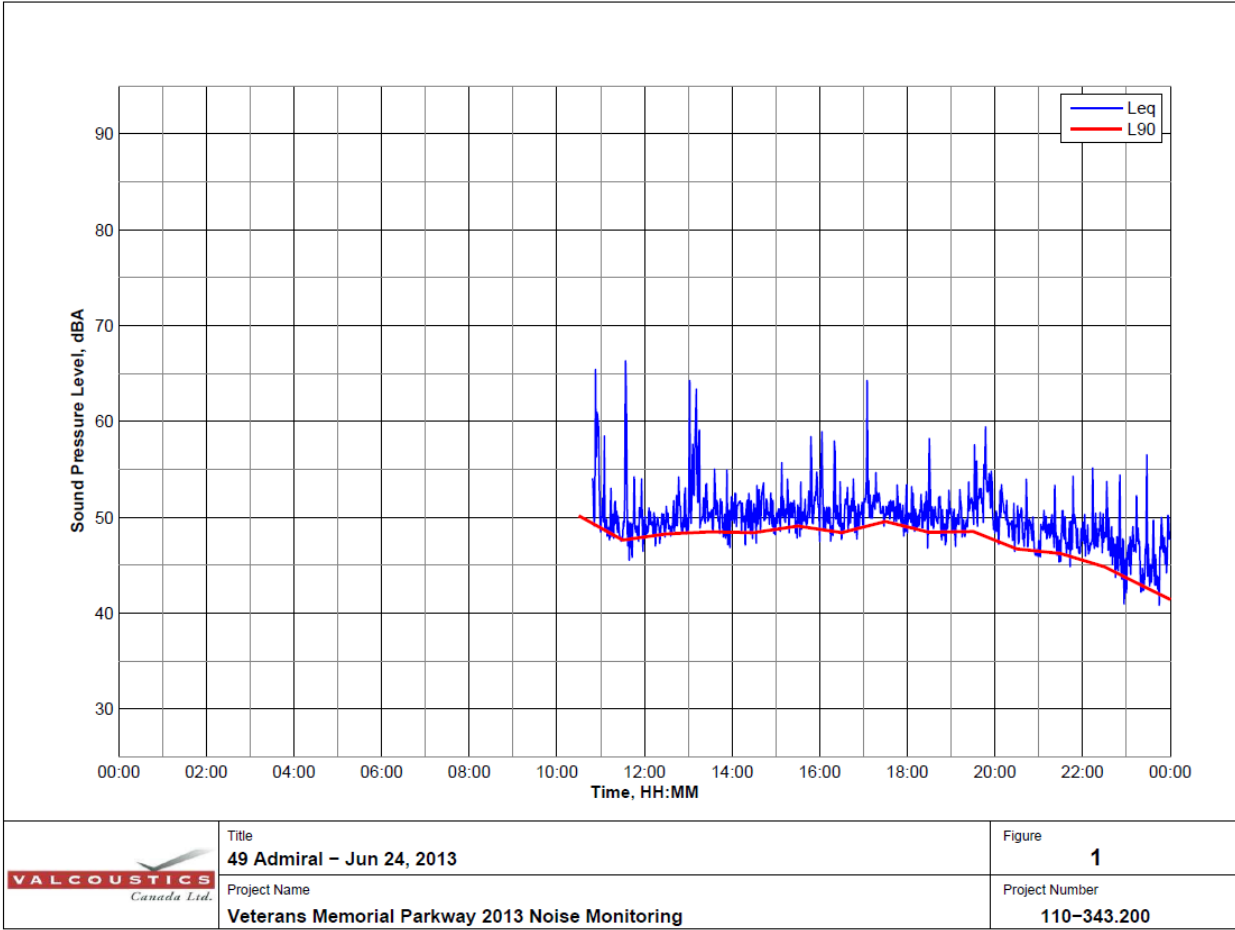
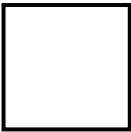
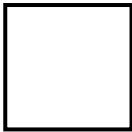
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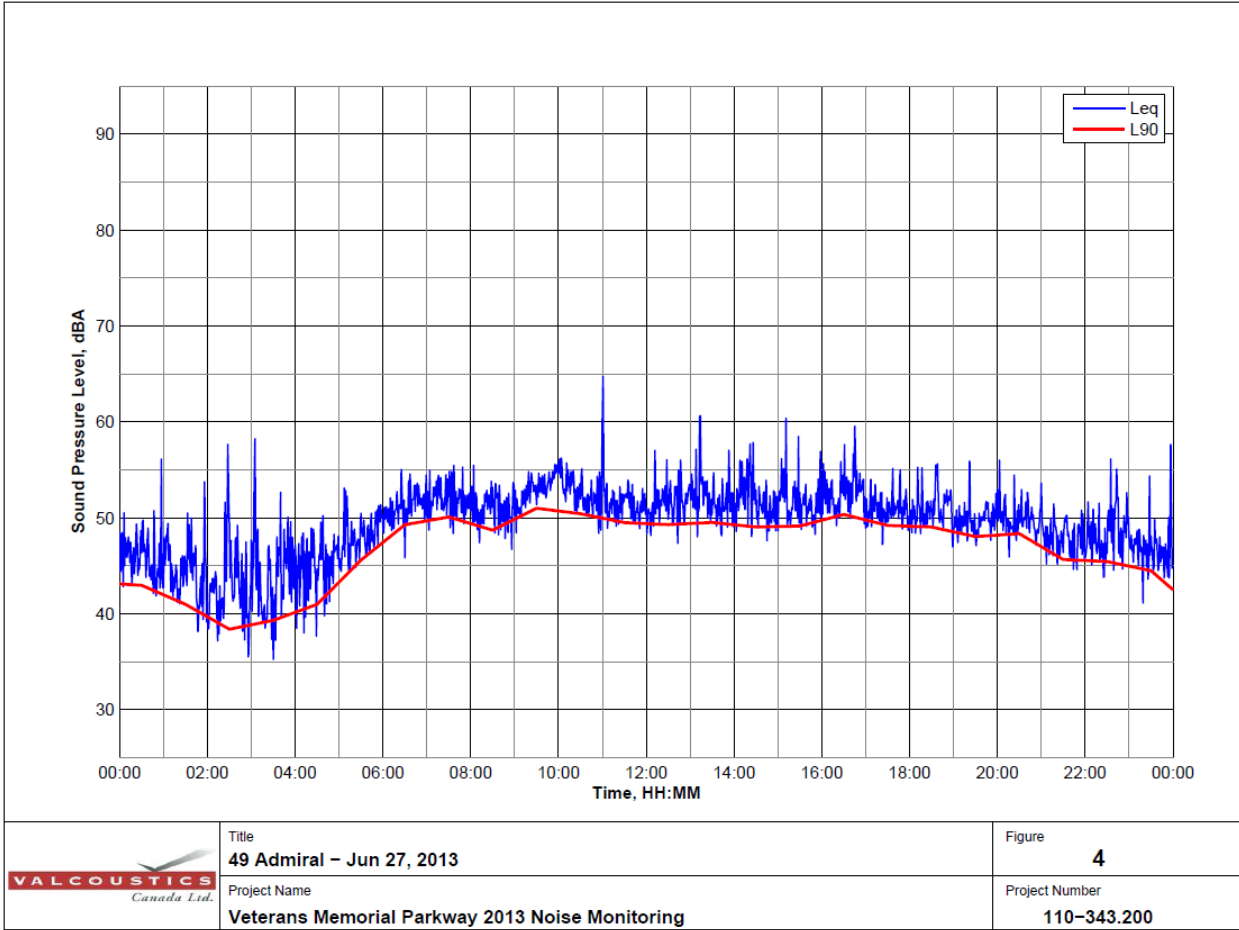
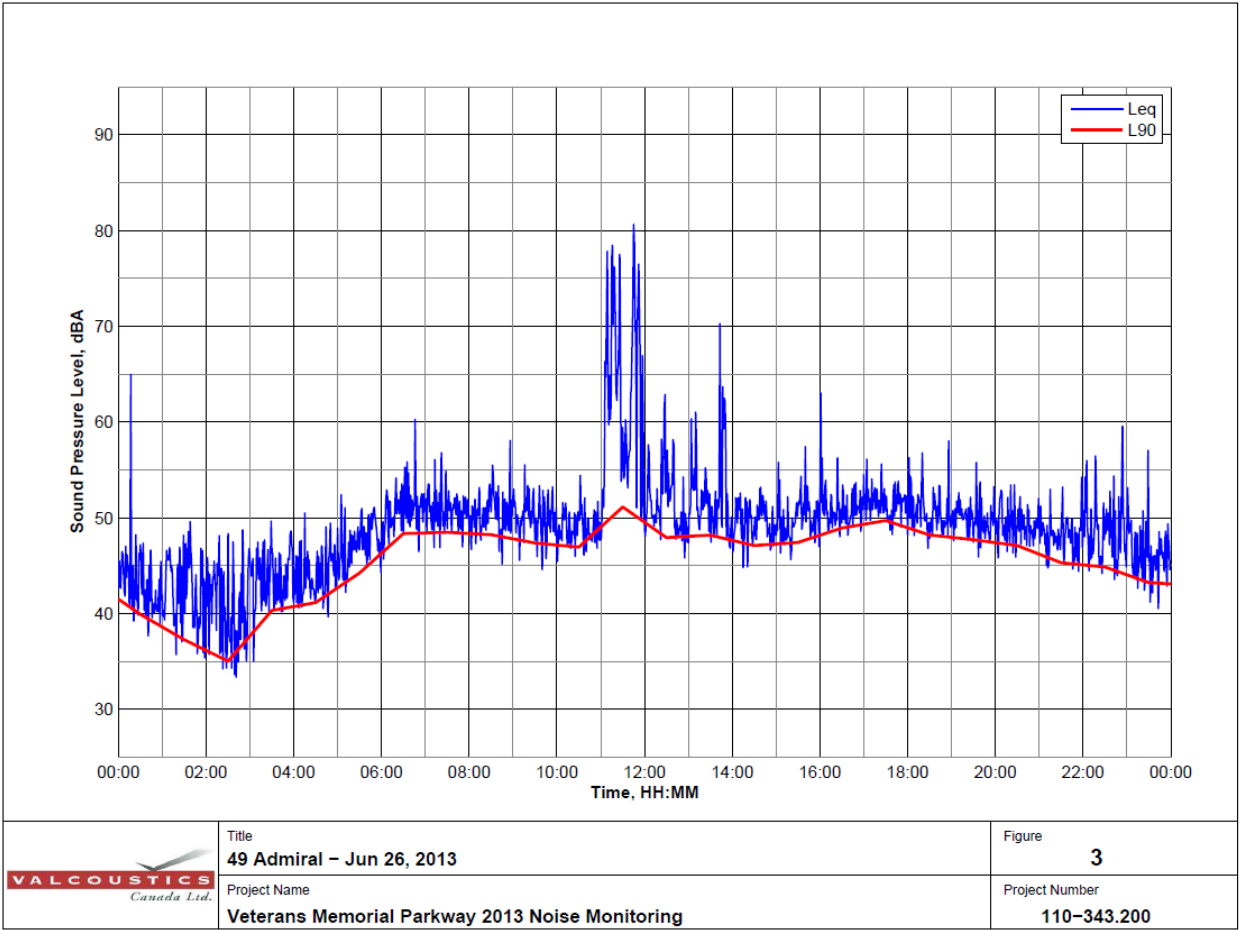
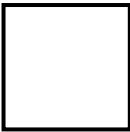
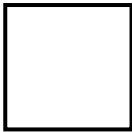
cc Craig Trento, City of London Transportation Planning & Design Department
(ctrento@london.ca)

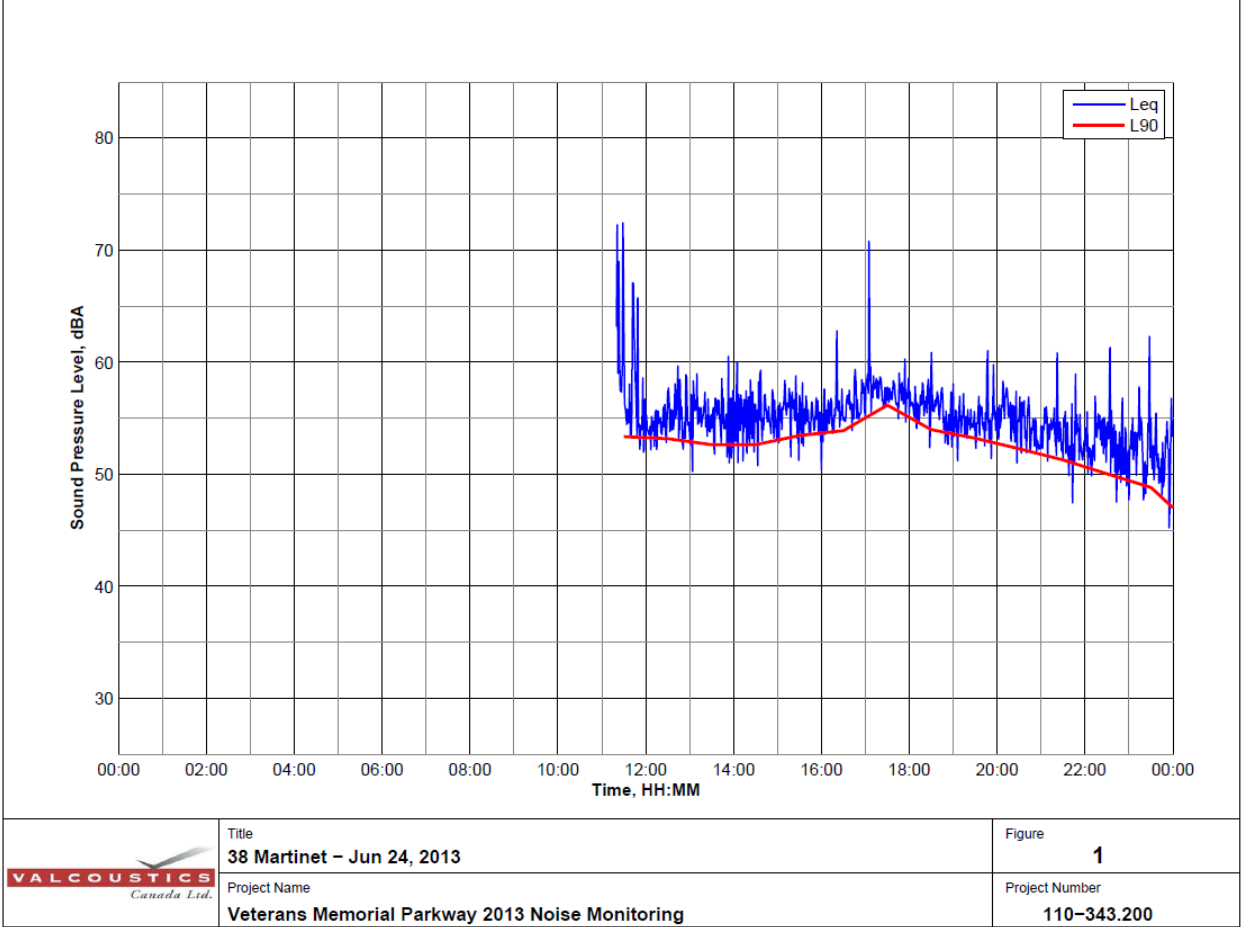
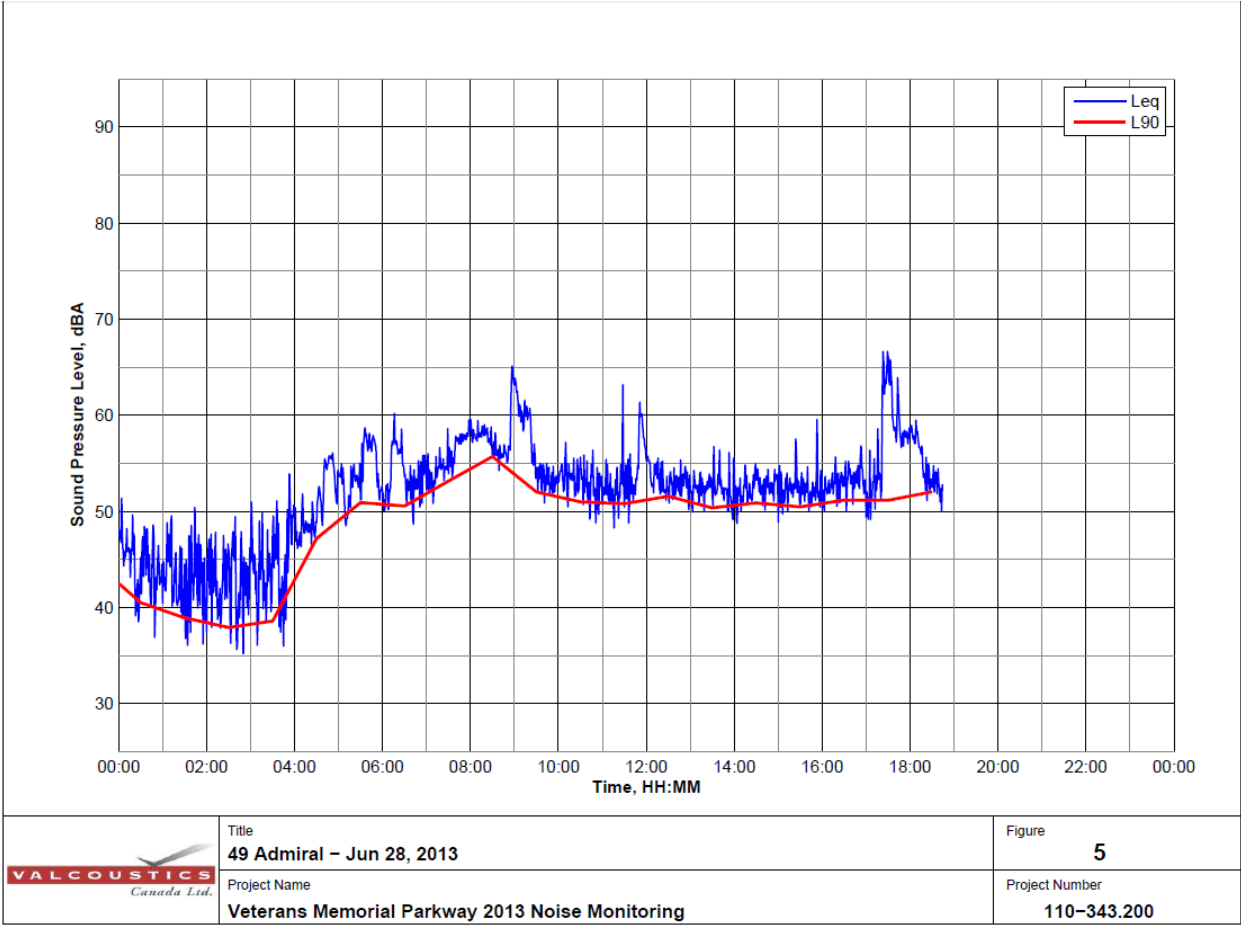
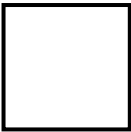
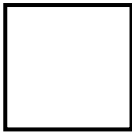
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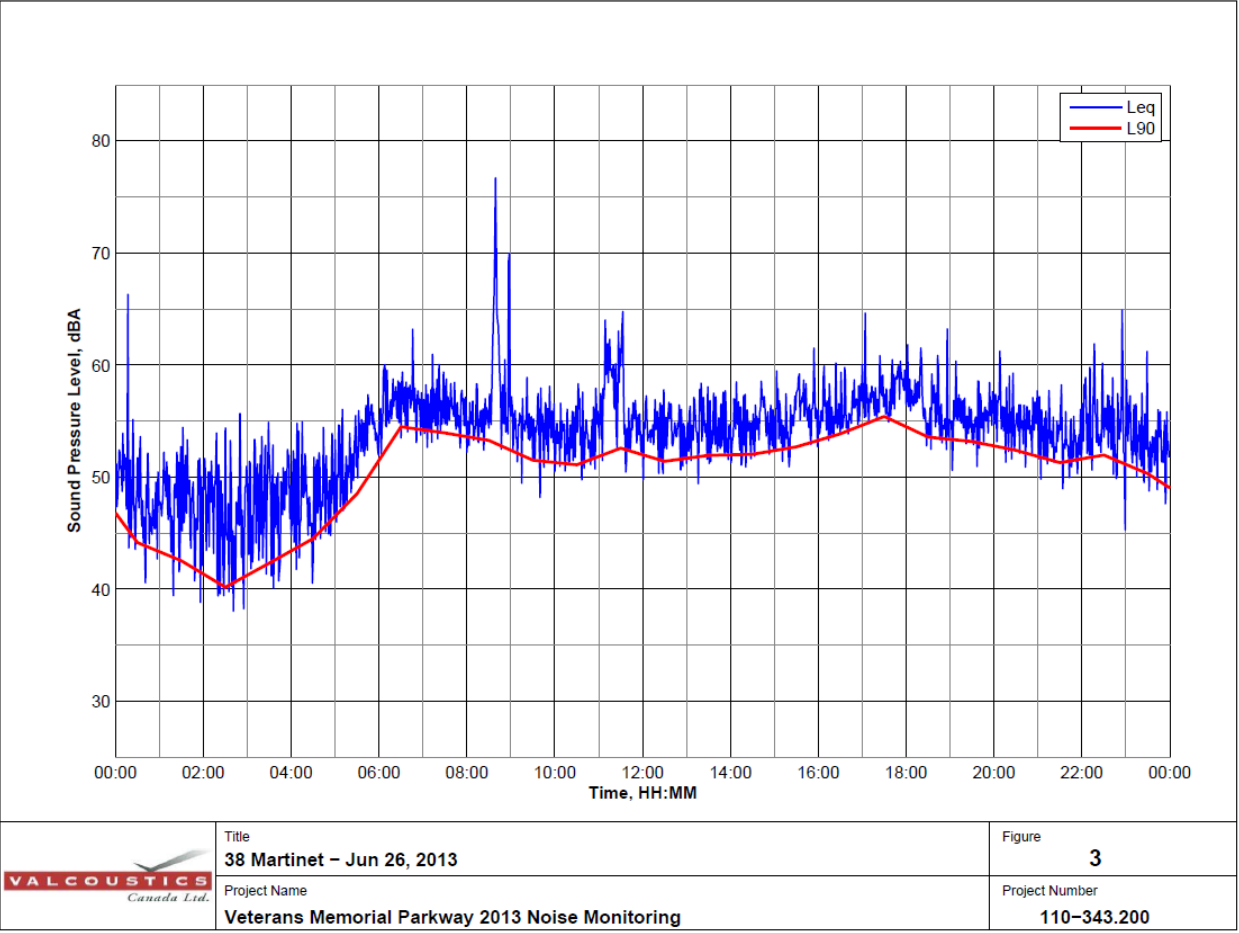
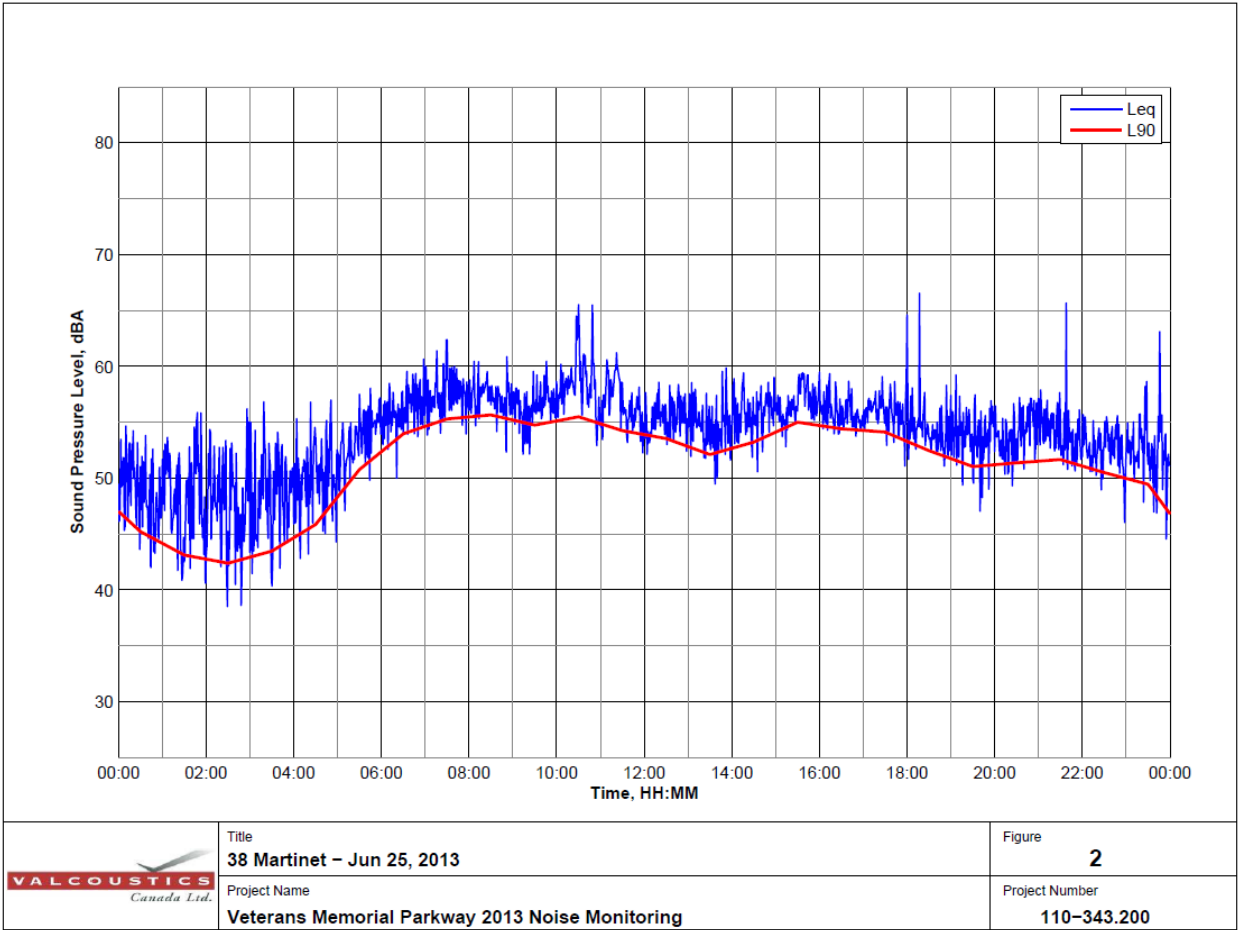
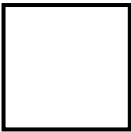
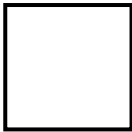
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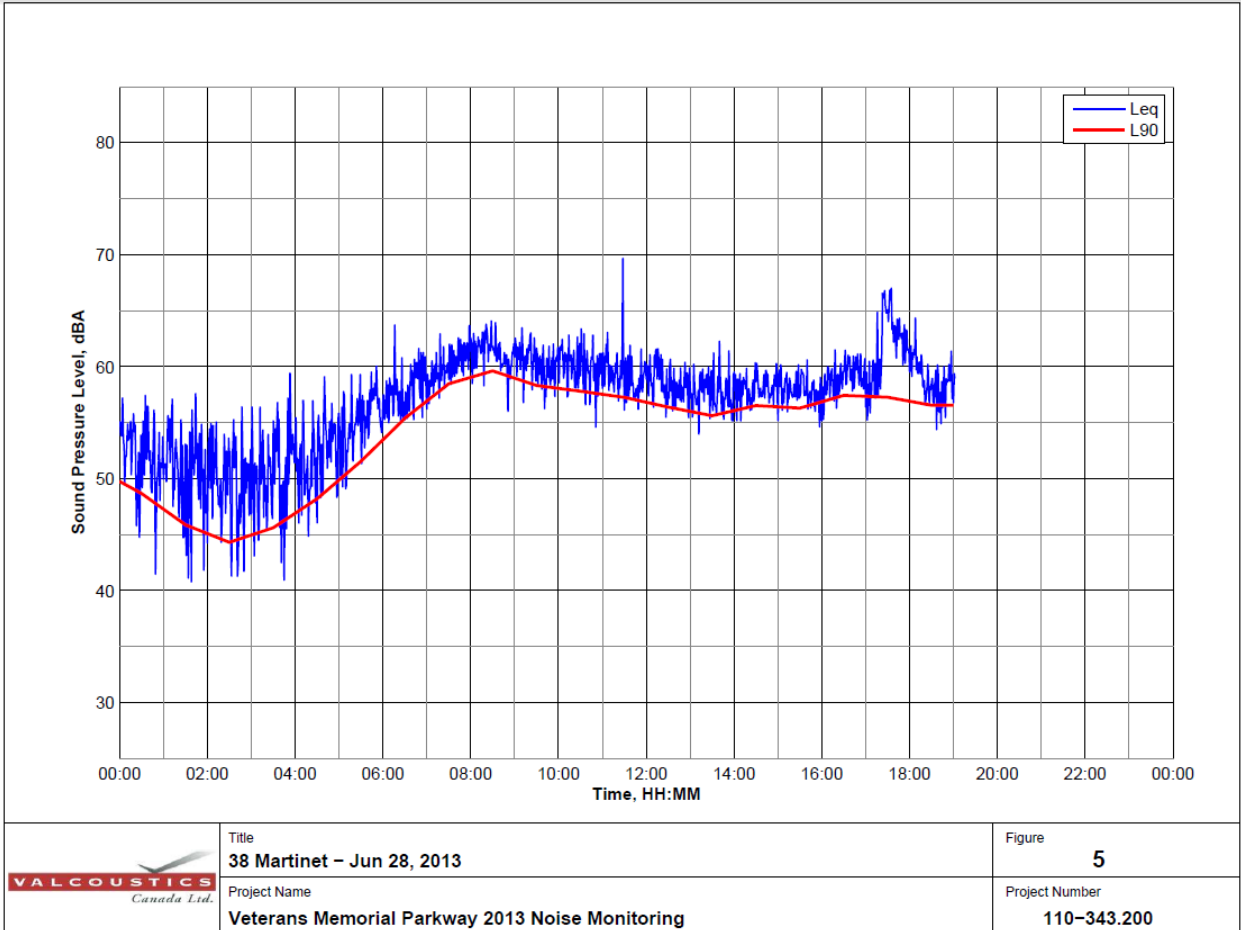
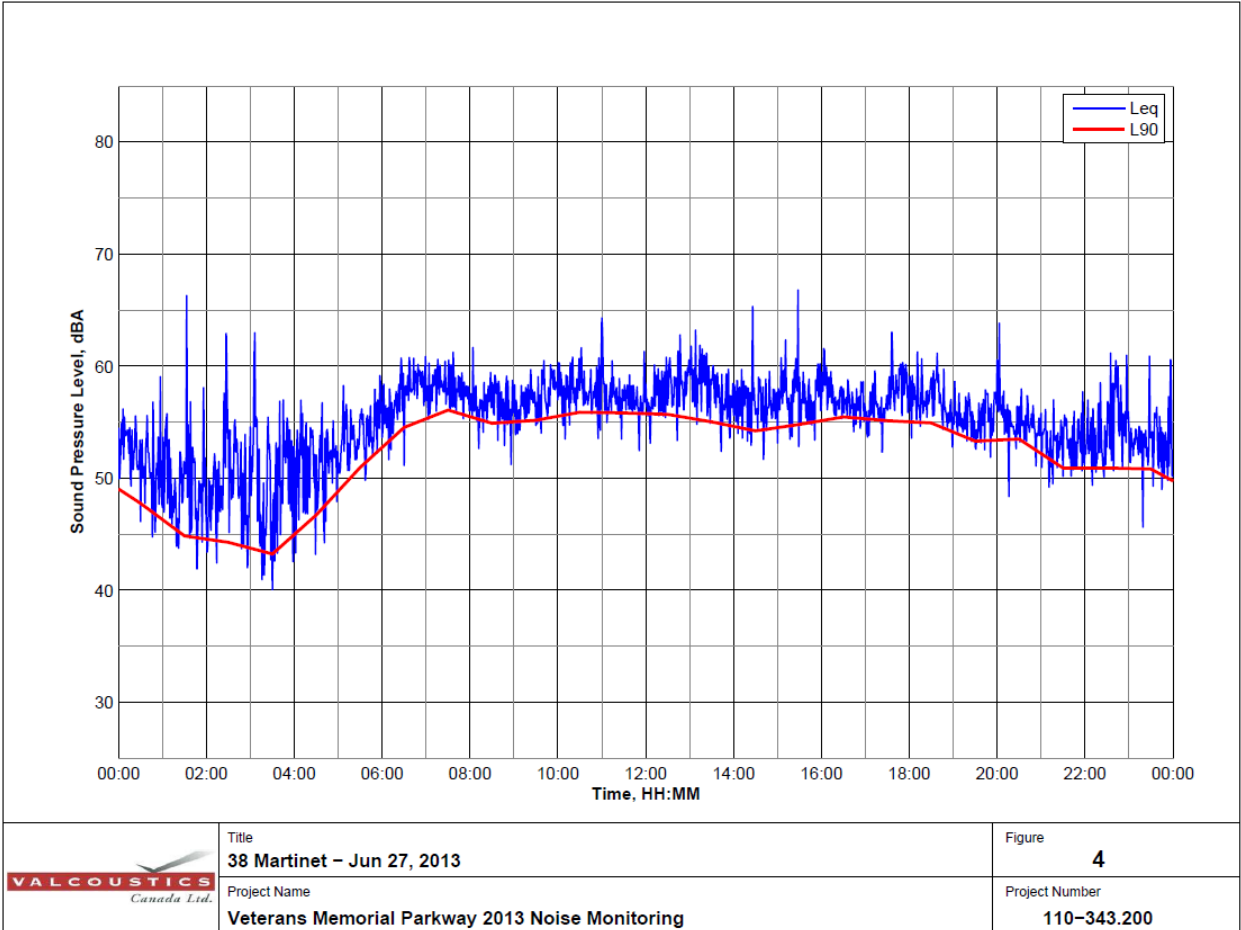
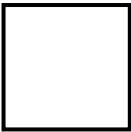
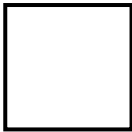
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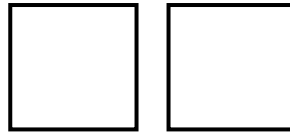




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Weather Data



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We'd like to hear from you! Please click [Contact Us](#) to share your comments and suggestions.

Hourly Data Report for June 24, 2013

All times are specified in Local Standard Time (LST). Add 1 hour to adjust for Daylight Saving Time where and when it is observed.

Metadata including Station Name, Province, Latitude, Longitude, Elevation, Climate ID, WMO ID, TC ID

LONDON A ONTARIO					
Latitude:	43°01'59.000" N	Longitude:	81°09'04.000" W	Elevation:	278.00 m
Climate ID:	6144473	WMO ID:	71623	TC ID:	YXU

Related Data

- [Almanac Averages & Extremes \(June 24\)](#)
- [Daily Data \(June 2013\)](#)

Additional Search Options

- [Nearby Stations with Data](#)
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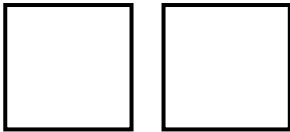
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Hourly Data Report for June 24, 2013



Hourly Data

	Temp °C	Dew Point Temp °C	Rel Hum %	Wind Dir 10's deg	Wind Spd km/h	Visibility km	Stn Press kPa	Hmdx	Wind Chill	Weather
TIME										
00:00 ±	23.3	19.5	79	22	13	24.1	98.45	30		NA
01:00 ±	22.4	19.2	82	22	7	24.1	98.41	29		Mostly Cloudy
02:00 ±	22.4	19.6	84	22	6	24.1	98.43	30		NA
03:00 ±	21.1	19.6	91	13	4	24.1	98.46	28		NA
04:00 ±	22.7	19.3	81	24	18	24.1	98.47	30		Mostly Cloudy
05:00 ±	21.8	19.0	84	25	11	12.9	98.48	29		NA
06:00 ±	22.0	19.0	83	26	12	12.9	98.49	29		NA
07:00 ±	23.0	19.4	80	23	12	16.1	98.52	30		Mainly Clear
08:00 ±	24.5	20.3	77	23	9	19.3	98.50	32		NA
09:00 ±	25.8	21.5	77	25	18	19.3	98.54	35		NA
10:00 ±	26.7	21.3	72	23	13	24.1	98.54	35		Mainly Clear
11:00 ±	27.5	20.5	65	23	26	24.1	98.54	35		NA
12:00 ±	28.8	21.5	64	25	21	16.1	98.54	38		NA
13:00 ±	27.7	20.2	63	25	24	16.1	98.46	35		Mainly Clear
14:00 ±	29.3	20.6	59	24	24	16.1	98.36	37		NA
15:00 ±	29.7	21.3	60	23	24	16.1	98.29	38		NA
16:00 ±	28.6	20.8	62	22	28	16.1	98.21	37		Mostly Cloudy
17:00 ±	29.1	20.7	60	26	18	12.9	98.17	37		NA
18:00 ±	27.8	21.0	66	23	23	12.9	98.13	36		NA
19:00 ±	27.0	20.5	67	22	23	16.1	98.16	35		Mostly Cloudy
20:00 ±	25.9	19.4	67	21	19	24.1	98.17	33		NA
21:00 ±	24.4	19.6	74	20	11	24.1	98.18	32		NA
22:00 ±	23.6	19.8	79	18	9	24.1	98.18	31		Mostly Cloudy
23:00 ±	23.2	19.8	81	20	10	24.1	98.17	31		NA

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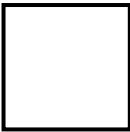
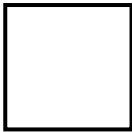
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Hourly Data Report for June 25, 2013

All times are specified in Local Standard Time (LST). Add 1 hour to adjust for Daylight Saving Time where and when it is observed.

Metadata including Station Name, Province, Latitude, Longitude, Elevation, Climate ID, WMO ID, TC ID

LONDON A ONTARIO					
Latitude:	43°01'59.000" N	Longitude:	81°09'04.000" W	Elevation:	278.00 m
Climate ID:	6144473	WMO ID:	71623	TC ID:	YXU

Related Data

- [Almanac Averages & Extremes \(June 25\)](#)
- [Daily Data \(June 2013\)](#)

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Hourly Data Report for June 25, 2013

	Temp °C	Dew Point Temp °C	Rel Hum %	Wind Dir 10's deg	Wind Spd km/h	Visibility km	Stn Press kPa	Hmdx	Wind Chill	Weather
TIME										
00:00 ±	23.5	20.1	81	22	13	24.1	98.15	31		NA
01:00 ±	23.0	20.4	85	26	9	24.1	98.09	31		Cloudy
02:00 ±	22.1	20.1	88	18	6	19.3	98.03	30		NA
03:00 ±	21.5	20.5	94	15	6	12.9	97.99	29		NA
04:00 ±	21.4	20.2	93	19	8	12.9	97.96	29		Cloudy
05:00 ±	21.6	20.3	92	26	7	16.1	97.96	29		NA
06:00 ±	21.6	18.6	83	25	23	16.1	98.02	28		NA
07:00 ±	21.5	18.9	85	26	19	16.1	98.12	28		Mostly Cloudy
08:00 ±	21.7	19.1	85	27	20	19.3	98.16	29		NA
09:00 ±	23.4	19.8	80	27	14	19.3	98.14	31		NA
10:00 ±	23.6	19.2	76	28	15	19.3	98.03	31		Cloudy
11:00 ±	24.4	20.2	77	30	5	19.3	97.99	32		NA
12:00 ±	24.8	19.9	74	27	14	19.3	98.04	32		NA
13:00 ±	26.2	20.4	70	26	23	19.3	98.02	34		Mostly Cloudy
14:00 ±	25.6	19.6	69	25	28	19.3	98.03	33		NA
15:00 ±	23.4	20.2	82	24	17	16.1	97.93	31		Rain Showers
16:00 ±	25.6	19.8	70	25	21	24.1	97.85	33		Mostly Cloudy
17:00 ±	24.5	19.9	75	25	16	24.1	97.80	32		NA
18:00 ±	24.4	20.2	77	25	15	24.1	97.80	32		NA
19:00 ±	24.1	19.5	75	28	11	24.1	97.83	31		Cloudy
20:00 ±	23.2	19.0	77	28	9	24.1	97.83	30		NA
21:00 ±	22.1	18.9	82	27	6	24.1	97.82	29		NA
22:00 ±	20.8	18.8	88	23	2	24.1	97.84	27		Mainly Clear
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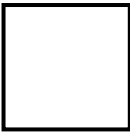
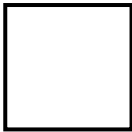
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Hourly Data Report for June 26, 2013

All times are specified in Local Standard Time (LST). Add 1 hour to adjust for Daylight Saving Time where and when it is observed.

Metadata including Station Name, Province, Latitude, Longitude, Elevation, Climate ID, WMO ID, TC ID

LONDON A ONTARIO					
Latitude:	43°01'59.000" N	Longitude:	81°09'04.000" W	Elevation:	278.00 m
Climate ID:	6144473	WMO ID:	71623	TC ID:	YXU

Related Data

- [Almanac Averages & Extremes \(June 26\)](#)
- [Daily Data \(June 2013\)](#)

Additional Search Options

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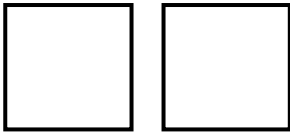
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Hourly Data Report for June 26, 2013



Hourly Data

	Temp °C	Dew Point Temp °C	Rel Hum %	Wind Dir 10's deg	Wind Spd km/h	Visibility km	Stn Press kPa	Hmdx	Wind Chill	Weather
TIME										
00:00 ±	20.1	19.5	96	21	13	12.9	97.90	27		NA
01:00 ±	19.8	19.3	97	23	6	16.1	97.88			Cloudy
02:00 ±	20.2	19.4	95	26	10	16.1	97.78	27		NA
03:00 ±	20.0	19.5	97	25	10	16.1	97.74	27		NA
04:00 ±	20.2	19.9	98	24	9	9.7	97.78	28		Fog
05:00 ±	19.7	19.4	98	25	4	12.9	97.80			NA
06:00 ±	20.0	19.5	97	23	8	9.7	97.81	27		Fog
07:00 ±	20.7	19.6	93	23	11	9.7	97.85	28		Fog
08:00 ±	22.5	20.5	88	22	8	9.7	97.83	30		Fog
09:00 ±	23.2	20.6	85	23	6	12.9	97.84	31		NA
10:00 ±	24.9	20.0	74	26	16	16.1	97.82	32		Mostly Cloudy
11:00 ±	26.0	20.2	70	26	13	16.1	97.83	34		NA
12:00 ±	26.6	20.1	67	24	14	19.3	97.85	34		NA
13:00 ±	26.5	20.5	69	25	15	19.3	97.80	34		Mainly Clear
14:00 ±	27.8	20.3	63	31	13	24.1	97.79	36		NA
15:00 ±	27.9	19.6	60	31	9	24.1	97.73	35		NA
16:00 ±	28.6	19.4	57	28	4	24.1	97.70	36		Mostly Cloudy
17:00 ±	28.0	20.7	64	2	6	24.1	97.64	36		NA
18:00 ±	27.6	20.6	65	14	9	24.1	97.63	36		NA
19:00 ±	24.8	20.6	77	17	13	24.1	97.63	33		Mostly Cloudy
20:00 ±	23.7	19.7	78	19	14	24.1	97.64	31		NA
21:00 ±	22.2	18.5	79	20	9	24.1	97.70	29		NA
22:00 ±	21.0	18.6	86	11	6	24.1	97.71	27		Mostly Cloudy
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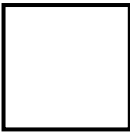
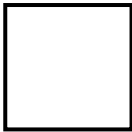
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Hourly Data Report for June 27, 2013

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Metadata including Station Name, Province, Latitude, Longitude, Elevation, Climate ID, WMO ID, TC ID

LONDON A ONTARIO					
Latitude:	43°01'59.000" N	Longitude:	81°09'04.000" W	Elevation:	278.00 m
Climate ID:	6144473	WMO ID:	71623	TC ID:	YXU

Related Data

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- [Daily Data \(June 2013\)](#)

Additional Search Options

- [Nearby Stations with Data](#)
- [Advanced Search](#)

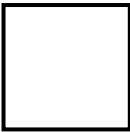
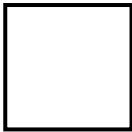
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Hourly Data Report for June 27, 2013



Hourly Data

	Temp °C	Dew Point Temp °C	Rel Hum %	Wind Dir 10's deg	Wind Spd km/h	Visibility km	Stn Press kPa	Hmdx	Wind Chill	Weather
TIME										
00:00 ±	19.4	18.6	95	7	6	24.1	97.63			NA
01:00 ±	19.4	18.4	94	16	3	24.1	97.63			Mostly Cloudy
02:00 ±	19.5	18.7	95	9	7	24.1	97.57			NA
03:00 ±	19.2	18.4	95	7	5	16.1	97.55			NA
04:00 ±	19.4	18.6	95	7	3	16.1	97.56			Rain Showers
05:00 ±	19.3	18.7	96	36	2	12.9	97.54			Rain Showers
06:00 ±	19.4	19.1	98	10	6	12.9	97.54			Rain Showers
07:00 ±	19.7	18.6	93	18	7	9.7	97.55			Rain Showers,Fog
08:00 ±	19.6	19.0	96	30	7	6.4	97.59			Rain Showers,Fog
09:00 ±	20.0	19.5	97	10	7	9.7	97.53	27		Rain Showers,Fog
10:00 ±	20.5	19.4	93	2	5	12.9	97.56	28		Cloudy
11:00 ±	21.2	19.4	89	9	6	16.1	97.50	28		NA
12:00 ±	22.7	20.5	87	9	15	16.1	97.50	31		NA
13:00 ±	24.0	20.6	81	11	12	16.1	97.43	32		Cloudy
14:00 ±	25.6	20.7	74	8	10	24.1	97.38	34		NA
15:00 ±	26.5	20.0	67	15	17	24.1	97.36	34		NA
16:00 ±	26.0	19.0	65	19	7	24.1	97.38	33		Mostly Cloudy
17:00 ±	25.3	19.3	69	11	9	24.1	97.29	32		NA
18:00 ±	24.4	19.6	74	22	10	24.1	97.31	32		NA
19:00 ±	23.6	19.2	76	18	16	24.1	97.19	31		Rain Showers
20:00 ±	22.4	18.6	79	20	10	24.1	97.28	29		NA
21:00 ±	21.8	19.2	85	26	9	24.1	97.25	29		NA
22:00 ±	21.3	19.8	91	32	9	24.1	97.26	29		Cloudy
23:00 ±	21.0	19.3	90	32	8	24.1	97.19	28		NA
Previous Day										
2013 v June v 27 v Go										

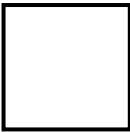
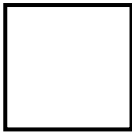
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Hourly Data

NOTICES

Several airport weather reporting stations have switched over to new NAV Canada sensors and reporting tools. Please [click here](#) and expand the message for the list of new NAV Canada stations with the latest data:

The [Notice Inventory](#) contains a record of all past and current Notices.

We'd like to hear from you! Please click [Contact Us](#) to share your comments and suggestions.

Hourly Data Report for June 28, 2013

All times are specified in Local Standard Time (LST). Add 1 hour to adjust for Daylight Saving Time where and when it is observed.

Metadata including Station Name, Province, Latitude, Longitude, Elevation, Climate ID, WMO ID, TC ID

LONDON A ONTARIO					
Latitude:	43°01'59.000" N	Longitude:	81°09'04.000" W	Elevation:	278.00 m
Climate ID:	6144473	WMO ID:	71623	TC ID:	YXU

Related Data

- [Almanac Averages & Extremes \(June 28\)](#)
- [Daily Data \(June 2013\)](#)

Additional Search Options

- [Nearby Stations with Data](#)
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Hourly Data (June 2013)

☒ CSV ☐ XML

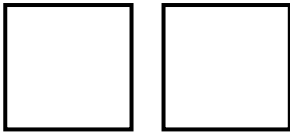
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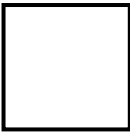
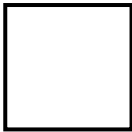
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Hourly Data Report for June 28, 2013



	Temp °C	Dew Point Temp °C	Rel Hum %	Wind Dir 10's deg	Wind Spd km/h	Visibility km	Stn Press kPa	Hmdx	Wind Chill	Weather
TIME										
00:00 ±	20.1	18.1	88	4	8	19.3	97.16	26		Rain Showers
01:00 ±	19.4	18.3	93	4	9	19.3	97.11			Cloudy
02:00 ±	19.2	18.1	93	7	8	19.3	97.07			NA
03:00 ±	18.9	18.1	95	3	1	16.1	97.04			Rain Showers
04:00 ±	18.8	18.3	97	10	5	8.1	97.01			Rain Showers,Fog
05:00 ±	18.3	18.0	98	4	3	2.8	96.97			Rain Showers,Fog
06:00 ±	18.5	18.3	99	6	7	2.4	97.00			Rain Showers,Fog
07:00 ±	18.3	18.1	99	11	13	2.4	96.97			Moderate Rain Showers,Fog
08:00 ±	17.5	17.0	97	14	10	9.7	96.95			Rain Showers,Fog
09:00 ±	17.5	17.2	98	11	13	8.1	96.90			Rain Showers,Fog
10:00 ±	17.9	17.1	95	11	11	16.1	96.83			Rain Showers
11:00 ±	18.2	17.6	96	16	7	6.4	96.86			Rain Showers,Fog
12:00 ±	18.4	17.4	94	21	12	8.1	96.84			Rain Showers,Fog
13:00 ±	18.7	17.9	95	28	13	8.1	96.80			Rain Showers,Fog
14:00 ±	19.0	18.0	94	30	12	24.1	96.75			Rain Showers
15:00 ±	19.4	18.3	93	29	10	24.1	96.73			Rain Showers
16:00 ±	20.6	18.4	87	30	12	24.1	96.74	27		Rain Showers
17:00 ±	18.1	17.8	98	34	9	8.1	96.79			Rain Showers,Fog
18:00 ±	18.6	18.1	97	2	9	9.7	96.78			Rain Showers,Fog
19:00 ±	17.6	17.0	96	8	5	24.1	96.80			Rain Showers



	Temp °C	Dew Point Temp °C	Rel Hum %	Wind Dir 10's deg	Wind Spd km/h	Visibility km	Stn Press kPa	Hmdx	Wind Chill	Weather
	17.6	17.1	97	31	2	24.1	96.82			Rain Showers
21:00 ±	17.3	17.1	99	35	3	24.1	96.88			Rain Showers
22:00 ±	17.5	17.2	98	30	2	24.1	96.86			Rain Showers
23:00 ±	17.3	17.1	99	36	5	16.1	96.82			Rain Showers

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Notes on [Data Quality](#).

Legend

- M = Missing
- E = Estimated
- NA = Not Available
- ± = Partner data that is not subject to review by the National Climate Archives

Date modified: 2013-07-10