



DBF2 Ltd.



# Chief Peguis Greenway



Manitoba 

*Submission for:*

## *Sound Attenuation Report*

*Attention: Lester Deane,  
P.Eng.*

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## EXECUTIVE SUMMARY

The extension of Chief Peguis Trail from Henderson Highway to Lagimodiere Boulevard was constructed for the City of Winnipeg by DBF2 Ltd. as part of a Public-Private Partnership. The roadway was opened for traffic in late 2011, with landscaping and other minor works being completed in 2012. The contract requires maintenance to be done for a 30 year period, beginning in 2011 and ending in 2041. The contract also requires compliance with the technical requirements of the project, including traffic noise and traffic noise barrier performance.

TetraTech was retained to monitor traffic noise and assess compliance with the City of Winnipeg motor vehicle noise policies and guidelines and the project technical requirements in conjunction with the design objectives of the noise barrier system that was implemented. This report describes the monitoring program that was undertaken between May 14 and 18, 2012, during year one of the maintenance period. This report details the findings of that assessment.

Traffic noise was monitored at six residential back yards along the new roadway. At each location noise levels were used to compute equivalent 24 hour noise levels (known as  $L_{eq 24}$ ) and equivalent day-night noise levels (known as  $L_{d/n}$ ). The day-night noise level imposes a 10 dB increased noise penalty during the 8 nighttime hours between 10 PM and 6 AM as a means of acknowledging the greater impact of nighttime noise on people. The City of Winnipeg noise guideline is to maintain the day-night noise level below 65 dBA (dBA is a units known as A-weighted decibels, and is a scale that simulates the humans audible sound range).

Each of the locations monitored provided results well below the acceptable limits and no further sound attenuation is required.

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## 1.0 BACKGROUND

Traffic noise mitigation works were designed to comply with the City of Winnipeg motor vehicle noise policies and guidelines and the specific project technical requirements for the Chief Peguis Trail Extension project. The City of Winnipeg traffic noise guideline for regional transportation facilities is a design day-night noise level (L d/n) of 65 dBA, for the 'design year' future traffic volume. The guideline only applies to the outdoor recreation area (i.e. back yard) of residential properties, calculated at a receiver located 1.2m above the ground level nearest the regional transportation facility, and only to lands within 100 m of a regional transportation facility. All testing procedures are performed to comply with the City of Winnipeg by-law and the project technical requirements.

## 2.0 NOISE MONITORING

### 2.1 EQUIPMENT AND SETUP

Two Brüel & Kjær model 2250D Sound level meters and associated equipment for outdoor noise monitoring were rented from XScala Sound and Vibration in Calgary. Each meter setup included an outdoor microphone with windscreen, bird spike, tripod, waterproof case to house the meter and external battery, and extension cable between the case and microphone. A Brüel & Kjær model Model 4231 Calibrator was included and used to calibrate each meter at the beginning of each setup.

The waterproof case housing the meter was chained and padlocked to a tree, fencepost or other fixed object at each monitored location to deter theft. The equipment was also insured against damage and theft.

Each meter was configured to record time averaged sound levels every minute for a 24 hour period, using an A-weighted scale that closely matches the range of sound frequencies audible to humans. The days of the week selected for monitoring were Tuesday, Wednesday and Thursday, since these typically represent the average weekday traffic. It was also desirable to conduct the monitoring before the end of the School Year due to the change in traffic patterns due to summer vacations.

A notebook computer was used to download the sound data. Proprietary software from Brüel & Kjær (BZ-5503 Measurement Partner Suite) was used to download the memory cards, view and graph the data, listen to the recorded sounds (stored as 10 minute .WAV files) and export the data to a .CSV file or Excel spreadsheet for further processing.

A topographic survey of the receiver locations was completed following the noise monitoring to obtain detailed location and elevation data. The survey included ground elevations and locations of the house, noise barrier, significant terrain features and roadway (if possible). The top of wall elevation was also confirmed.

### 2.2 RECEIVER LOCATIONS

Candidate receiver locations were identified based on several criteria:

- Distributed along the route and representative of typical to worst case conditions.

- Not near the adjoining side streets (Rothesay, Gateway, Lagimodiere), to simplify the traffic noise being recorded only from Chief Peguis Trail.

The six selected receiver locations are and summarized in the following table:

**Table 2-1 Receiver Locations – May 2012 Noise Monitoring**

ID	Location	Station	Side of CPT	Barrier Notes
1	Pinecrest	2+240	South	Has Barrier
2	Mellowmead	3+100	North	Has Barrier
3	Edelweiss	3+110	South	Has Barrier
4	Jim Smith	4+170	South	Has Barrier
5	Sunny Hills	4+290	North	No barrier required due to distance from roadway
6	Mahonee	4+670	South	No barrier installed

### 3.0 MONITORED NOISE LEVELS

Noise monitoring was setup to obtain a 24 hour period for each site. Monitored data included average sound levels, the maximum instantaneous level and minimum instantaneous level for each minute of the 24 hour monitoring period.

The day night sound levels (Ld/n) were computed from the one minute average noise levels, adding a 10 dBA increased noise penalty to nighttime noises between 10 PM and 6 AM.

The resultant sound levels were as follows:

**Table 3-1 Noise Monitoring Results**

ID	Address	Number of one minute Records	Monitored L d/n (dBA)	Guideline Limit (Project Goal) (dBA)
1	Pinecrest	1,375	59.1	65
2	Mellowmead	1,406	58.3	65
3	Edelweiss	1,423	55.9	65
4	Jim Smith	1,413	55.6	65
5	Sunny Hills	1,419	58.2	65
6	Mahonee	1,177	61.2	65

The Project Goal was to maintain noise levels at or below 62 dBA at the end of the 30 year maintenance period in year 2041. This will provide a buffer for future traffic growth and for uncertainties in traffic composition (automobiles vs. trucks) while maintaining traffic noise levels below the City's 65 dBA guideline into the future.

Noise mitigation was not warranted for residential yards on the north side of All Season's lake. The noise level in these properties is and will remain well below the guideline level and Project Goal level. Berm barriers were installed as part of the landscaping to provide some additional noise shielding, but were not required to comply with the noise guidelines in all cases. Berm construction was limited to the physical geometry of the right of way.

## 4.0 SUMMARY

Traffic noise measured in the spring of 2012 at six locations along the project route indicates that the noise mitigation measures are being effective at reducing traffic noise to within the guidelines established for this project. The traffic noise model originally used to design the noise barriers was reconfigured to estimate noise levels at the six 2012 monitoring locations and using actual traffic volumes measured by the City of Winnipeg in April and May 2012. The comparison between the monitored noise levels and model prediction was very good, and reassures us that the design basis for estimating traffic noise and developing noise mitigation works is correct.

The noise mitigation works successfully meet the design requirement. Traffic noise has been mitigated to below the 62 dBA project guideline and well below the 65 dBA technical requirement levels at locations where noise barrier walls were constructed. Traffic noise also remains below the project guideline noise level at locations where noise barriers were not recommended due to distance between the roadways and the noise receivers. The Mahonee Drive location may require a noise barrier in the future to maintain traffic noise below the City of Winnipeg guideline level, and future monitoring efforts should be used to determine when this barrier is required due to increasing traffic growth. It is estimated that the need for a barrier would occur sometime near year 20 of the 30 year commitment.