

Appendix E.8
Noise Study

REPORT NO. WA10-100

**ENVIRONMENTAL NOISE STUDY
IMPROVEMENTS TO HIGHWAY 50 (RR50)
FROM CASTLEMORE ROAD TO MAYFIELD ROAD (RR14)
AND IMPROVEMENTS TO MAYFIELD ROAD
FROM HIGHWAY 50 TO COLERAINE DRIVE
PROJECT # 09-4390
REGIONAL MUNICIPALITY OF PEEL
REGIONAL MUNICIPALITY OF YORK**

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JULY 5, 2011

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1.0 INTRODUCTION

- 1.1** The services of SS Wilson Associates were retained by HDR/ITRANS Consulting Inc. to prepare an Environmental Noise Study for the proposed widening of Highway 50 (RR50) from Castlemore Road to Mayfield Road (RR14) and the proposed widening of Mayfield Road from Highway 50 to Coleraine Drive in the City of Brampton and Town of Caledon, Regional Municipality of Peel and Regional Municipality of York.
- 1.2** This report documents the existing ambient sound levels and the future (horizon year 2031) sound levels with and without the undertaking and analyzes the noise impacts as a result of the proposed widening of the subject Highway 50 and Mayfield Road corridors.
- Figure 1 illustrates the general location of the study area.
- 1.3** The objectives of this study are:
- To determine the potential changes to the road traffic sound levels due to the proposed undertaking.
 - To assess the significance of the predicted changes to road traffic sound levels and to recommend measures to mitigate the road traffic noise impact; where warranted.
- 1.4** The proposed undertaking entails the widening of Highway 50 to six lanes from its current four lane configuration and the widening of Mayfield Road from its current two lane to four lane configuration coupled with other improvements to the noted highway/roadway vertical and horizontal alignments.
- 1.5** The study represents a joint effort with the Consulting Engineering Firm, HDR/ITRANS Consulting Inc. who provided the necessary road traffic data and overall project direction.

2.0 SOUND LEVEL CRITERIA

2.1 MOE/MTO NOISE PROTOCOL

The MOE/MTO Noise Protocol is a joint effort of both Ministry of the Environment (MOE) and Ministry of Transportation (MTO) as outlined in the document titled "A Protocol for Dealing with Noise Concerns During the Preparation, Review and Evaluation of Provincial Highways Environmental Assessments", February 1986. It primarily applies to Provincial Highway undertakings such as Freeways and King's Highways.

The MOE has informally extended the use of the MOE/MTO Noise Protocol criteria to also embrace other roadways, such as Regional and Local Municipal roads subject to the provisions of the Environmental Assessment Act (EAA) administered by the MOE. Since there is no formal direction published by the MOE on the Noise Protocol application, it is recommended that the same direction with regards to mitigation that applies to the MTO projects be applied also for this municipal project. The criteria apply to mitigation within the road right of way (R.O.W). and also consider noise impact assessment primarily in Outdoor Living (amenity) Areas alone. While the Noise Protocol does not specify whether the Leq sound levels should be 24-hr based or some other time frame, the MOE extended the appropriate technical logic to municipal roads by requesting calculations to be done on the basis of daytime Leq (16hrs) in dBA.

The other point worth noting is that despite the presence of a Provincial objective for outdoor levels of Leq 55 dBA*¹, the decision for mitigation depends primarily on the significance of relative noise increases attributable to the future road expansion above the ambient situation when dealing with urban roads.

With regards to the specific sound level criteria, the following statements are quoted from the Noise Protocol:

1. The objective for outdoor sound levels is the higher of the Leq 55 dBA or the existing ambient. The significance of a noise impact will be quantified by using this objective in addition to the change in sound level above the ambient.
2. Mitigation will attempt to achieve levels as close to, or lower than, the objective level as is technically, economically, and administratively feasible.

^{*1}Leq is an energy averaging concept adopted by the MOE to sum the time-varying noise generated by vehicular traffic. The resulting levels are expressed in dBA; i.e. a logarithmic scale that approximates the response of human ears to noise.

3. The following Table summarizes the degree of mitigation effort to be applied for various noise level increases.

SUMMARY OF MITIGATION EFFORT

CHANGE IN NOISE LEVEL ABOVE AMBIENT	MITIGATION EFFORT
0 - 5 dBA	- None
> 5 dBA	<ul style="list-style-type: none"> - Investigate noise control measures on R.O.W. - If project cost is not significantly affected introduce noise control measure within R.O.W. - Noise control measures, where introduced, should achieve a minimum of 5 dBA attenuation, over first row receivers. - Mitigate to ambient, as administratively, economically and technically feasible.

The noise mitigation effort included in the MOE/MTO Noise Protocol can be summarized as follows:

1. If the difference between the Future with the undertaking and the ambient sound levels is equal to or less than 5 dBA, then noise mitigation measures need not be considered.
2. If the difference between the Future with the undertaking and the ambient levels is greater than 5 dBA, then the following is considered:
 - a) If the Future with the undertaking sound levels are at or below the Government Objective for urban areas of Leq 55 dBA, then mitigation measures need not be considered.
 - b) If the Future with the undertaking sound levels is over Leq 55 dBA, then these levels should be mitigated as close as technically, economically and administratively possible to the higher of the ambient levels or Leq 55 dBA.

2.2 PEEL REGION POLICY

For assessment of traffic noise on municipal roads under the authority of the Environment Assessment Act (EAA), the Provincial sound level criteria are outlined in the MOE/MTO Noise Protocol published in February 1986. Whether the Municipality has developed its own policies for traffic noise for Capital Works

projects or not, the overriding criteria are the MOE/MTO Noise Protocol standards for noise unless the municipality follows more stringent standards*².

In the Region of Peel, the only noise policies in place are those related to sound barriers initiated under the Local Improvement process or in connection with new land development applications. Neither one of these policies applies to Capital Works Projects and the only applicable noise standards are bound to be the MOE/MTO Noise Protocol standards.

2.3 YORK REGION POLICY

The York Region noise policy titled “York Region Traffic Noise Mitigation Policy for Regional Roads” was approved by Regional Council on March 23, 2006. This policy applies to capital road projects, development, retrofit and existing privately owned noise barriers.

The following are the relevant excerpts of the York Region noise policy for capital road projects, which are applicable to this project:

CAPITAL WORKS PROJECTS

2. In connection with the implementation of capital road projects, the following shall be used as a guideline in considering mitigation of noise impacts:
 - a) For projected noise level increases from 0 – 5 dBA on adjacent residential properties, no mitigation be considered unless projected noise levels are greater than 60 dBA. (Either at the start of construction or at the mature state of development);
 - b) For projected sound levels at the start of construction greater than 55 dBA, the projected future noise level increases greater than 5 dBA, the feasibility of noise reduction measures shall be investigated where a minimum attenuation of 6 dBA can be achieved;
 - c) If it is deemed that noise mitigation is to be implemented, York Region shall assume the full cost of implementing the noise control measures;
 - d) York Region shall assume the ownership and maintenance of any noise control measures when constructed under the Capital Program;
 - e) Noise mitigation implemented as part of capital road projects will only be permitted along the property line at the extreme outer edge of York Region’s ultimate right-of-way or along the flanking ends of the subdivision where required; and
 - f) When noise mitigation is not warranted on the basis of projected noise levels exceeding 60 dBA, the mitigation may be deferred until noise levels exceed 60 dBA.

*² Examples are the standards and policies developed by the Region of York and the City of Ottawa.

2.4 SUMMARY OF SOUND LEVEL CRITERIA

The sound level criteria used in this study are based on the MOE/MTO Noise Protocol, Region of Peel with consideration given to the Region of York policies for the east side of Highway 50. The noise impact assessment in this project is based on the following comparisons:

- i) For York Region (East side of the project), mitigation is warranted when the future project sound levels exceed L_{eq} day 60 dBA, which is the case for this project.
- ii) For Peel Region, mitigation is warranted when the future project sound levels exceed L_{eq} day 60 dBA and the change in noise levels greater than 5 dBA.

3.0 ANALYSIS AND RESULTS

3.1 NOISE IMPACT METHODOLOGY

Road traffic sound levels in this study have been predicted using the technique developed by the U.S. Federal Highway Administration (FHWA) enhanced by the Ministry of Transportation (MTO) and the Ministry of Environment (MOE).

The U.S. FHWA model was jointly revised by the MTO and the MOE to incorporate procedures for the calculation of additional attenuation due to ground (the additional attenuation is due to the type of ground cover; for example hard, soft, ...etc and also due to the terrain configuration or topographic features). The computerized version of the ORNAMENT model, STAMSON Version 5.04(2000) was used for calculating the sound levels in all sections of the proposed undertaking.

The calculations are primarily based on the average daily traffic volumes (AADT), percentages of medium and heavy trucks, posted speed limits, day/night and directional split of traffic volumes, road to receptor distance, elevation differential between the road and the receptor, roadway gradient, pavement type and the type of ground cover between the road and the receptor in question.

Based on the MOE/MTO and both Regional Municipalities directions, the equivalent daytime sound level in dBA, Leq corresponding to the average hourly volume of the 16 hours traffic was used, i.e. Leq16 in dBA.

For impact assessment purposes, the future sound level with the proposed undertaking is normally compared with the future-do-nothing (F-D-N) alternative (i.e. without the undertaking). In the absence of information on the future-do-nothing traffic data, the existing traffic data may be used instead.

For the purpose of this study, the environmental noise impact assessment is based on the excess of the future sound levels with the undertaking above the existing ambient sound levels.

3.2 ROAD TRAFFIC DATA

All road traffic data have been provided by HDR/ITRANS Consulting Inc. The AADT volumes for the existing conditions are based on the year 2009, while the future- conditions are based on the horizon year 2031.

Appendix A contains the road traffic data used in this study.

3.3 SELECTED RECEPTORS

For the purposes of this study, fifteen (15) receptor locations (denoted R1 to R15) are selected to represent the residential areas along Highway 50 and Mayfield Road within the study area.

The following provides a brief description of the selected receptors:

- R1: House west of Highway 50, approx. 600m north of old Castlefield Road
- R2: House at north-west corner of Coleraine Drive and Highway 50
- R3: House east of Highway 50, approx. 780m north of Major Mackenzie Drive
- R4: House west of Highway 50, approx. 865m north of Coleraine Drive
- R5: House east of Highway 50, approx. 1230m north of Major Mackenzie Drive
- R6: House west Highway 50, approx. 200m north of Countryside Drive
- R7: House east of Highway 50, approx. 880m north of Nashville Road
- R8: House west of Highway 50, approx. 270m south of Mayfield Road
- R9: House east of Highway 50, approx. 330m south of Albion Vaughan Road
- R10: House east of Highway 50, approx. 210m south of Albion Vaughan Road
- R11: House north of Mayfield Road, approx 200m west of Pillsworth Road
- R12: House north of Mayfield Road, approx 290m west of Pillsworth Road
- R13: House north of Mayfield Road, approx 330m west of Pillsworth Road
- R14: House north of Mayfield Road, approx 110m east of Coleraine Drive
- R15: House at north-east of Mayfield Road and Coleraine Drive

Figures 2.1 to 2.13 show the locations of the selected receptors, while Figure 2.14 shows an overall view of all the selected receptor locations

3.4 SOURCES OF AMBIENT NOISE

Ambient noise used in the context of this report is the sound levels at the selected receptor locations without the additional noise generated by the proposed widening of Highway 50 and Mayfield Road.

The dominant sources of ambient noise within the study area are Highway 50 and Mayfield Road .

Table 1, lists the predicted existing ambient sound levels at the Outdoor Living Areas (OLA's) of the selected receptor locations R1 to R15. The predicted existing ambient sound levels are in the range of Leq (16h) 51 to 71 dBA.

Appendix B includes sample ambient sound level calculations

3.5 PREDICTED FUTURE PROJECT SOUND LEVELS

The future project sound levels are based on traffic data which include similar parameters to that of the ambient data plus the forecasted increase/change in the traffic volumes as a result of the proposed undertaking.

Table 1, lists the predicted future project sound levels. The future project sound levels are predicted to be in the ranges of Leq (16h) 60 dBA to 73 dBA.

Appendix B includes sample future project sound level calculations.

3.6 NOISE IMPACT ASSESSMENT

The noise impact is assessed primarily for Outdoor Living Areas (OLA's) and is based on the following comparisons:

The relative change in the predicted future project sound levels above or below the existing ambient sound levels.

The future project sound levels at the receptors of concern (East side of Highway 50) relative to the sound level limit of Leq 60 dBA.

All the predicted sound levels are expressed as Leq (16h) dBA.

Table 1, shows the predicted existing ambient and the future project sound levels, as well as the excesses of the future project sound levels above the existing ambient levels in the study area.

With reference to Table 1, the following conclusions are reached:

Receptors: R1, R2, R4, R6, R8 and R11 to R15

The above noted receptors are located at the west side of Highway 50 and north of Mayfield Road, therefore the impact assessment is based on MTO/MOE Noise Protocol (Peel Region Policy).

All the future project sound levels are predicted to have excesses over the existing ambient sound levels in the range of 2 to 3 dBA. Such excesses are considered to be acoustically insignificant and are mainly attributed to the forecasted increase in the Highway 50 and Mayfield Road future traffic volumes over the existing ambient conditions. According to the MOE/MTO Noise Protocol and the Peel Region guidelines, since the predicted future project sound level excesses do not exceed 5 dBA, noise control measures are not warranted.

Receptors: R3, R5, R7, R9 and R10

The above noted receptors are located at the east side of Highway 50; therefore the impact assessment is based on York Region's Noise Policy.

All the existing ambient and future project sound levels are predicted to be above Leq 60 dBA, therefore according to York Region Policy, the feasibility of noise mitigation measures shall be investigated.

3.7 NOISE MITIGATION

Noise mitigation is warranted, according to the MOE/MTO Noise Protocol and York Region Policy, if the excess above the ambient sound level is predicted to be greater than 5 decibels. The purpose of mitigation is to reduce (as close as technically, economically and administratively possible) the predicted future project sound level to the objective level. The objective level is the higher of the ambient level or Leq (16h) 55 dBA.

With respect to receptors at the west side of Highway 50 and north of Mayfield Road, no noise mitigation measures are warranted.

The receptors at the east side of Highway 50, noise mitigation measures are warranted.

A 3.0m high sound barrier is investigated at the property lines of the residences along east side of Highway 50. The reductions in the OLA sound levels due to this sound barrier are predicted to be less than 6dBA. It should be noted that the investigated sound barrier height is at the maximum limit allowed by York Region Noise Policy and with this height limit, the OLA sound levels will not be reduced by 6 dBA, the Policy's minimum reduction before a sound barrier is considered feasible. Therefore, in accordance with York Region's Noise Policy, this sound barrier is not considered feasible and thus, noise mitigation measures therefore are not recommended.

4.0 SUMMARY AND RECOMMENDATIONS

4.1 SUMMARY

This study has been carried out to investigate the potential noise impact of the proposed improvements of Highway 50 (RR50) from Castlemore Road to Mayfield Road and Mayfield Road from Highway 50 to Coleraine Drive, on the noise sensitive areas adjacent to the noted roadway corridor. Figure 1 shows the limits of the study area.

The study dealt with the existing ambient sound levels as well as with the future project sound levels associated with the highway/road improvements and their noise impacts on the selected receptors within the study area.

The applicable criteria for this study are based on the MOE/MTO Noise Protocol and the Region of Peel guidelines with consideration given to the Region of York policies.

Fifteen receptor locations are selected to represent all the residential areas along the noted Highway 50 and Mayfield Road corridors in study area. Figures 2.1 to 2.13 show the selected receptor locations used in the noise analysis.

The existing ambient sound levels are predicted to be in the range of 57 to 71 dBA; and the future project sound levels are predicted to be in the range of 60 to 73 dBA. Table 1 lists the predicted existing ambient sound levels and the future project sound levels at all receptor locations.

All the future project sound levels are predicted to have excesses over the existing ambient sound levels in the range of 2 to 3 dBA. Such excesses are considered to be acoustically insignificant and are mainly attributed to the forecasted increase in the Highway 50 and Mayfield Road future traffic volumes over the existing conditions, as well as to the proposed shifting of Highway 50 alignment at some locations within the study area. According to the MOE/MTO Noise Protocol and the Region of Peel guidelines, since the predicted future project sound level excesses do not exceed 5 dBA, consideration of noise control measures is not warranted.

The existing and future predicted sound level at the receptors located east of Highway 50 will exceed Leq 60 dBA. According to York Region Policy, these receptors will warrant investigation of the feasibility of noise mitigation measures. A sound barrier is investigated at these receptors and found to be not feasible due to barrier height and sound level reduction limitations imposed by York Region Policy. Therefore no noise mitigation measures are recommended.

Based on the findings of this study and if the widening of Highway 50 and

Mayfield Road are to take place, no noise mitigation measures need to be considered for all the residences within the study area.

4.2 RECOMMENDATIONS

1. Noise Controls During Construction

In addition to the noise emitted by the operation of vehicles on the proposed undertaking, noise during the construction phase is an issue that should also be addressed.

Unlike operational noise, construction noise is temporary in nature depending on the type of work required and its location relative to the noise-sensitive receptors.

The significance of the construction noise impact depends on the number of pieces of equipment, their types, time of operation and their proximity to the receptors in question.

The following is a brief outline of the procedures to be followed in handling construction noise during the Detail Design and Construction phases:

- a. Noise sensitive areas will be identified. These include the residential locations shown in Figures 2.1 to 2.13.
- b. Applicable local municipal noise control by-laws will be identified and obeyed. The by-laws include those enacted under the authority of the Municipal Act, the Environmental Protection Act or any other Provincial Legislation. Where timing constraints or any other provisions of the municipal by-law may cause hardship to the proponent, an explanation of this will be outlined in a submission to the MOE and an exemption from such by-law will be sought directly from the area municipality in question.
- c. "General noise control measures" (not sound level criteria) will be referred to or placed into the contract documents.
- d. Should the municipality receive any complaint from the public, the municipality staff will verify that the "general noise control measures" agreed to, are in effect. The municipality will investigate any noise concerns, warn the contractor of any problems and enforce its contract.
- e. If the "general noise control measures" are complied with, but the public still complain about noise, the municipality will require the contractor to comply with the MOE sound level criteria for construction equipment contained in the MOE's Model Municipal Noise Control By-Law. Subject to the results of field investigation, alternative noise control measures will be required, where these are reasonably available.
- f. In selecting the appropriate construction noise control and mitigation measures, the municipality will give consideration to the technical, administrative, and economic feasibility of the various alternatives.

The above noted procedures are based on the construction noise provisions included in Section 8 of the MOE/MTO Noise Protocol.

2. Future Development and Re-Development Plans

It is recommended that future development and re-development proposals for planning of new residential developments along Highway 50 and Mayfield Road be examined for their noise compatibility. The Provincial and Municipal guidelines should, therefore, be consulted concerning implementation of any required noise control measures at the municipal planning levels.

Noise mitigation for new developments along the Highway 50 and Mayfield Road corridors within the study area should be provided by the developers of these developments as part of their planning agreements to the Town of Caledon, City of Brampton, Peel Region and York Region.

TABLE

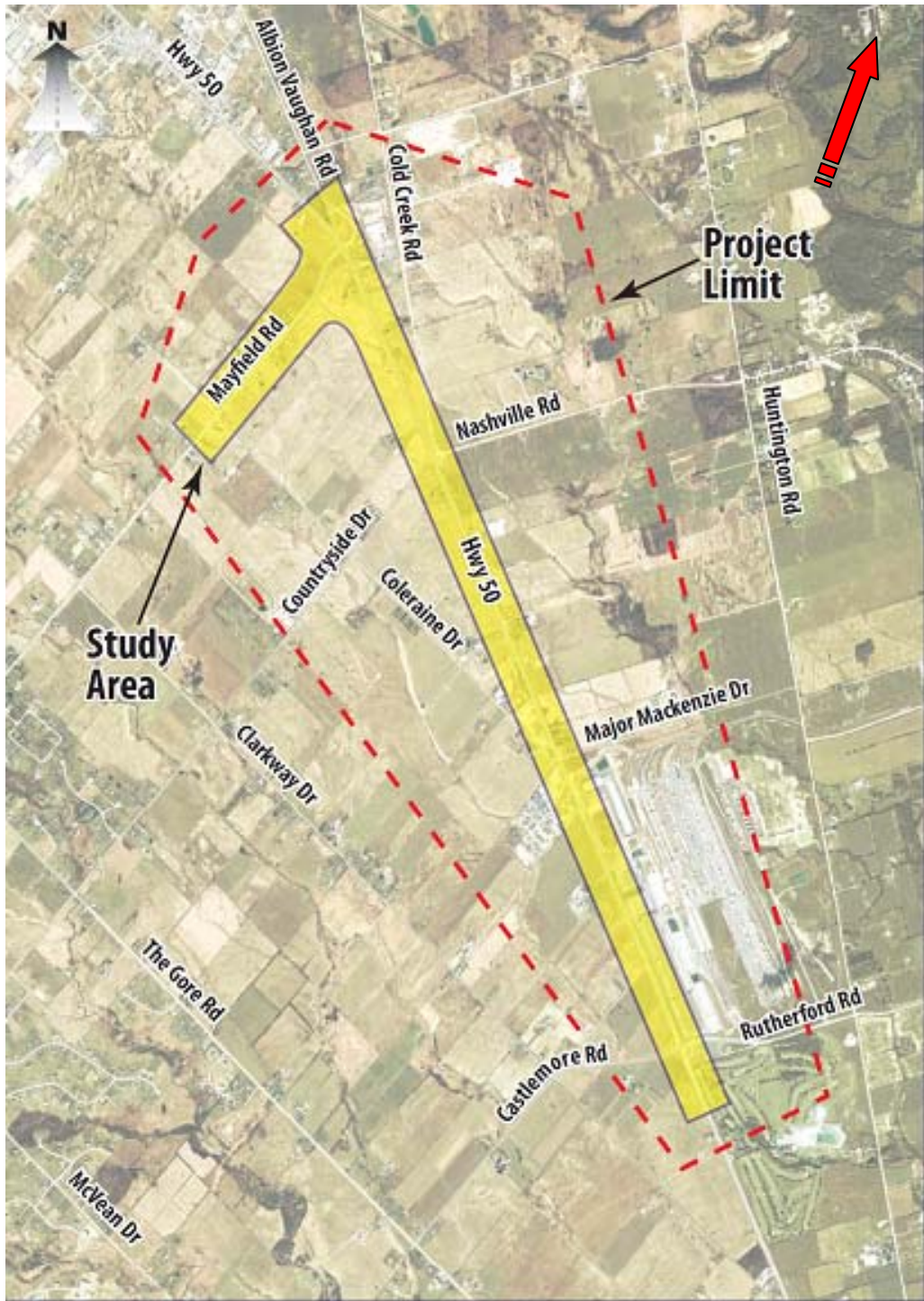
TABLE 1
 ENVIRONMENTAL NOISE IMPACT ASSESSMENT
 HIGHWAY 50 (RR 50) FROM CASTLEMORE ROAD TO MAYFIELD ROAD
 AND MAYFIELD ROAD (RR 14) FROM HIGHWAY 50 TO COLERAINE DRIVE

Receptor Code	Existing Sound Levels (Year 2009) dBA	Future Sound Levels (Year 2031) dBA	Excess Criteria for mitigation dBA	Future Sound Levels (Year 2031) Minus Existing Sound Levels (Year 2009)	Significance of the Change due to the Future Sound Levels (Year 2031) Minus Existing Sound Levels (Year 2009)	Noise Control Measures As per Protocol(Region of Peel) and Region of Yourk
R1	66.1	68.4	5	2	Insignificant	Not required
R2	71.0	72.7	5	2	Insignificant	Not required
R3	64.0	66.3	5	2	Insignificant	Not required
R4	66.8	69.0	5	2	Insignificant	Not required
R5	62.8	65.0	5	2	Insignificant	Not required
R6	58.8	60.8	5	2	Insignificant	Not required
R7	62.6	64.7	5	2	Insignificant	Not required
R8	68.7	71.0	5	2	Insignificant	Not required
R9	64.4	66.6	5	2	Insignificant	Not required
R10	63.9	66.0	5	2	Insignificant	Not required
R11	57.3	59.9	5	3	Insignificant	Not required
R12	59.6	62.2	5	3	Insignificant	Not required
R13	57.1	59.6	5	3	Insignificant	Not required
R14	59.4	62.0	5	3	Insignificant	Not required
R15	57.6	60.2	5	3	Insignificant	Not required

Impact Assessment Rating :

0 to < 3 dB change : Insignificant
 =>3 to < 5 dB change : Noticeable
 => 5 to < 10 dB change: Significant
 => 10 dB change : Very Significant

FIGURES



**FIGURE 1
STUDY AREA**

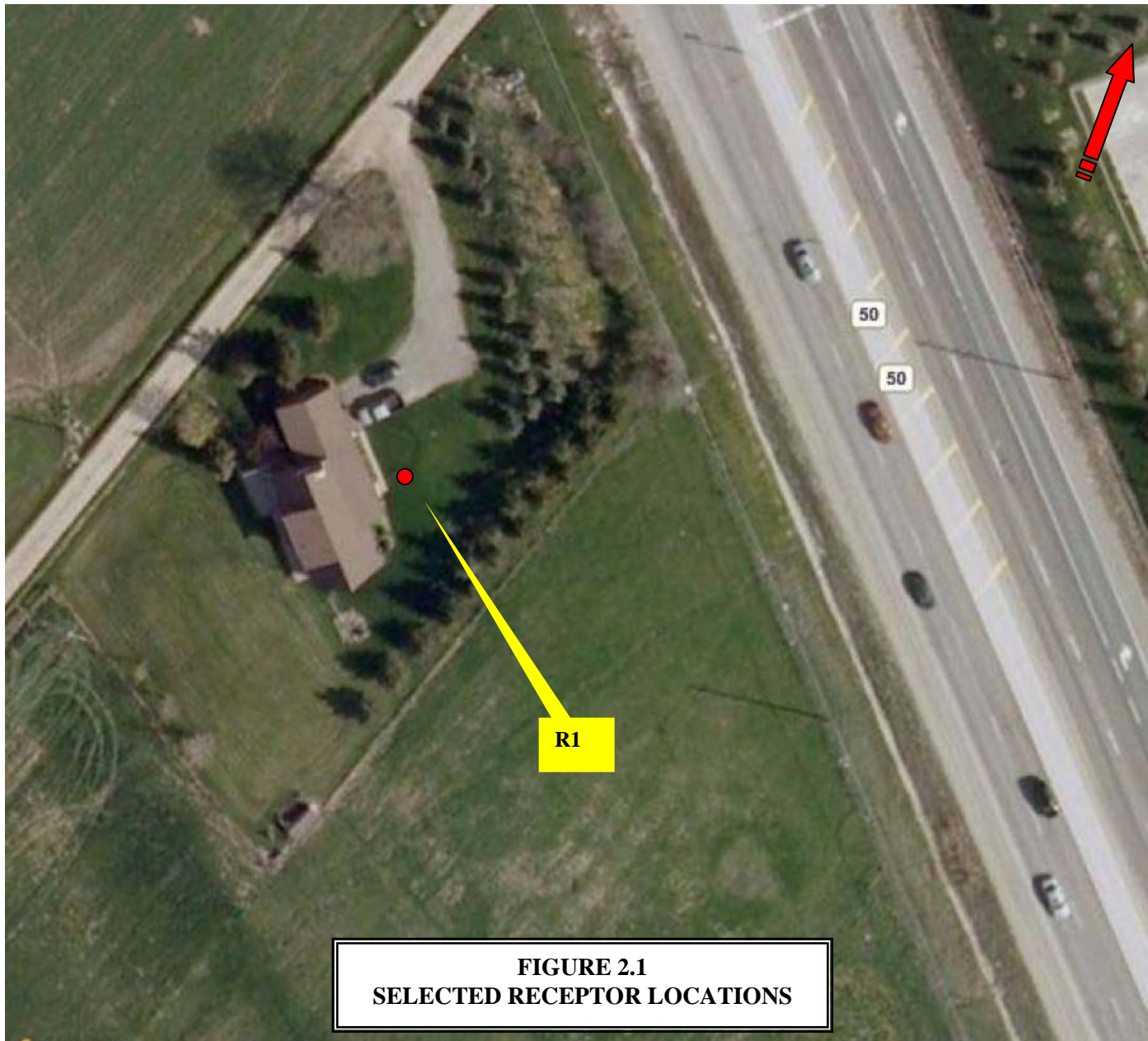


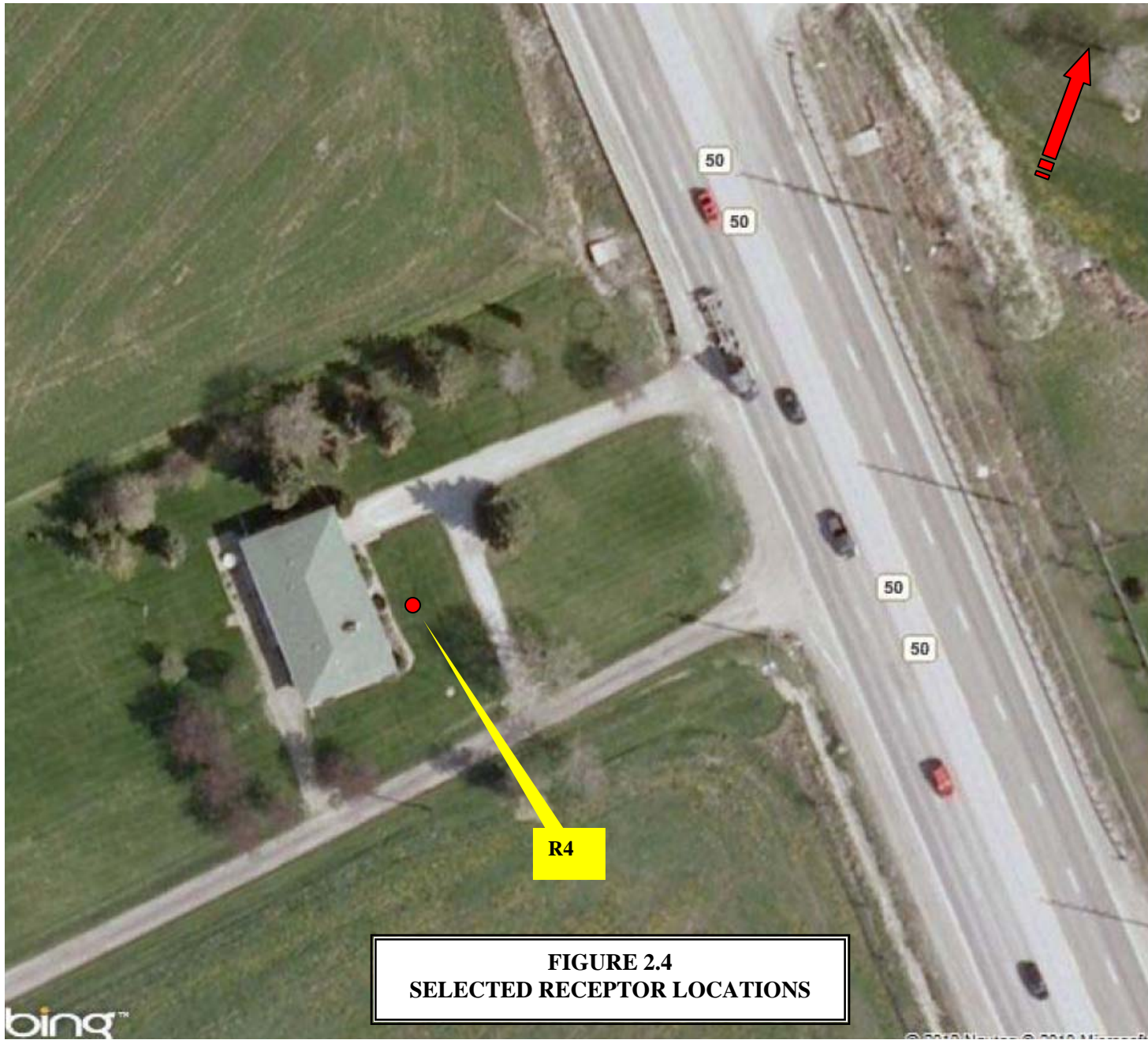
FIGURE 2.1
SELECTED RECEPTOR LOCATIONS



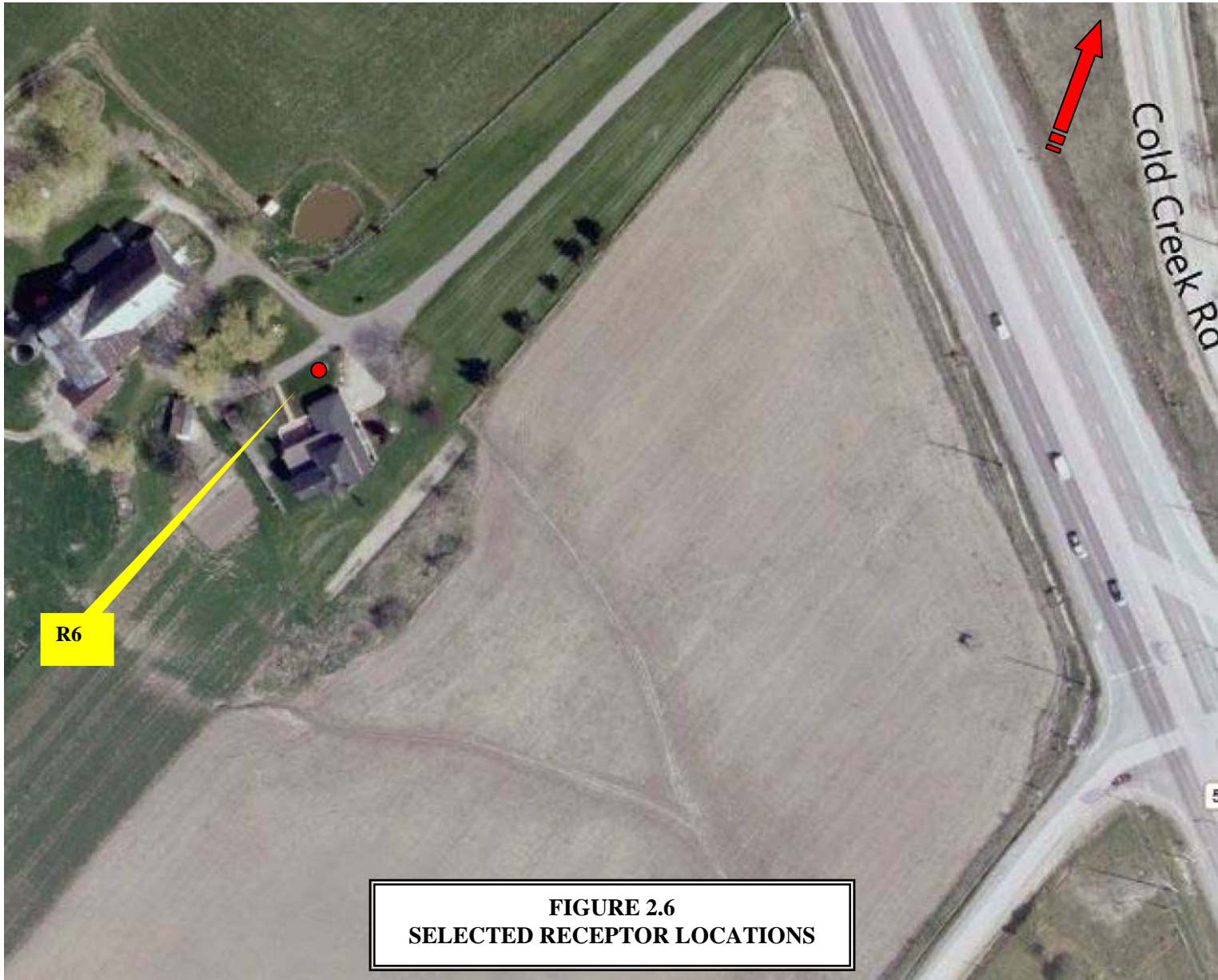
**FIGURE 2.2
SELECTED RECEPTOR LOCATIONS**



**FIGURE 2.3
SELECTED RECEPTOR LOCATIONS**









**FIGURE 2.7
SELECTED RECEPTOR LOCATIONS**



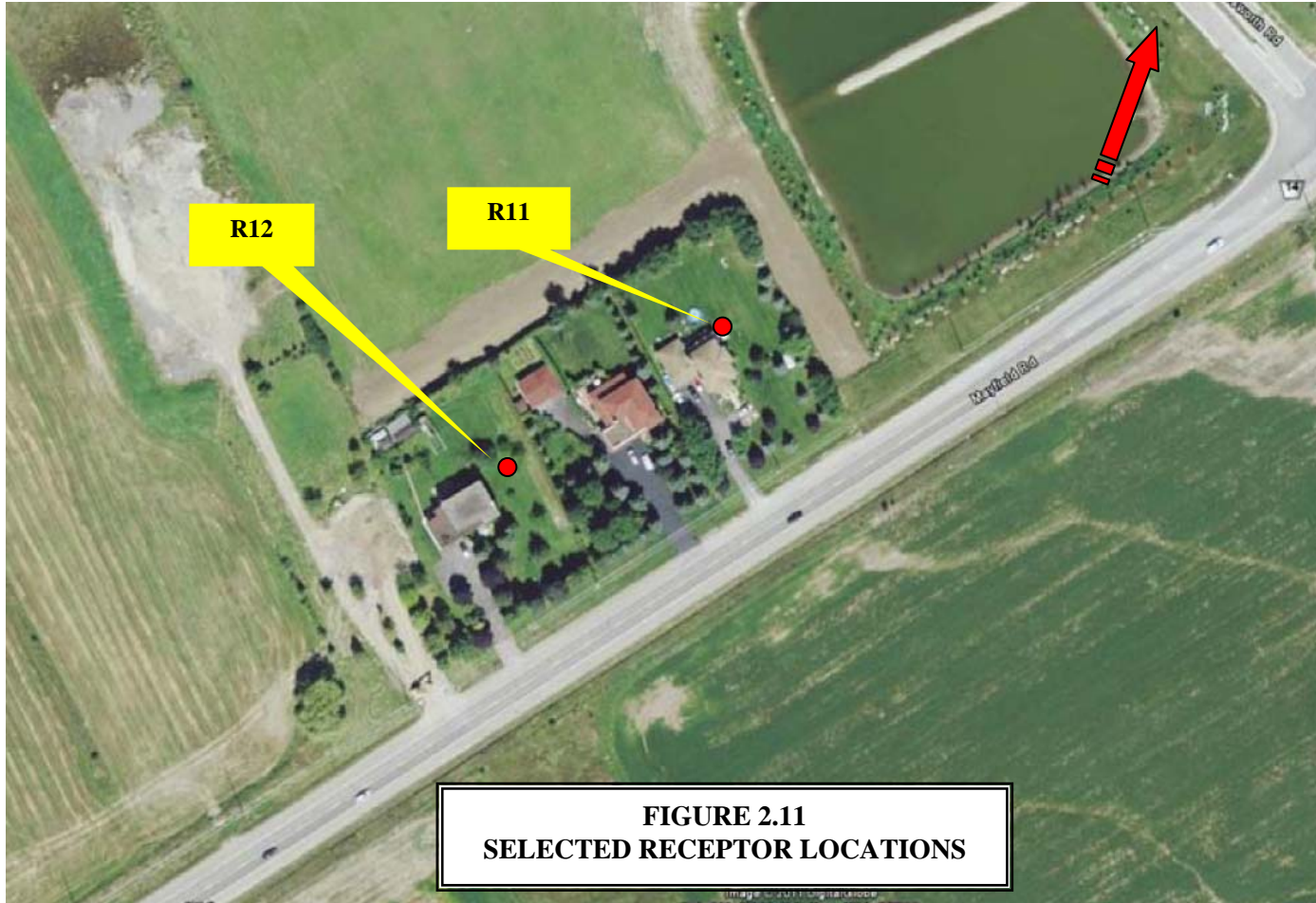
**FIGURE 2.8
SELECTED RECEPTOR LOCATIONS**



**FIGURE 2.9
SELECTED RECEPTOR LOCATIONS**

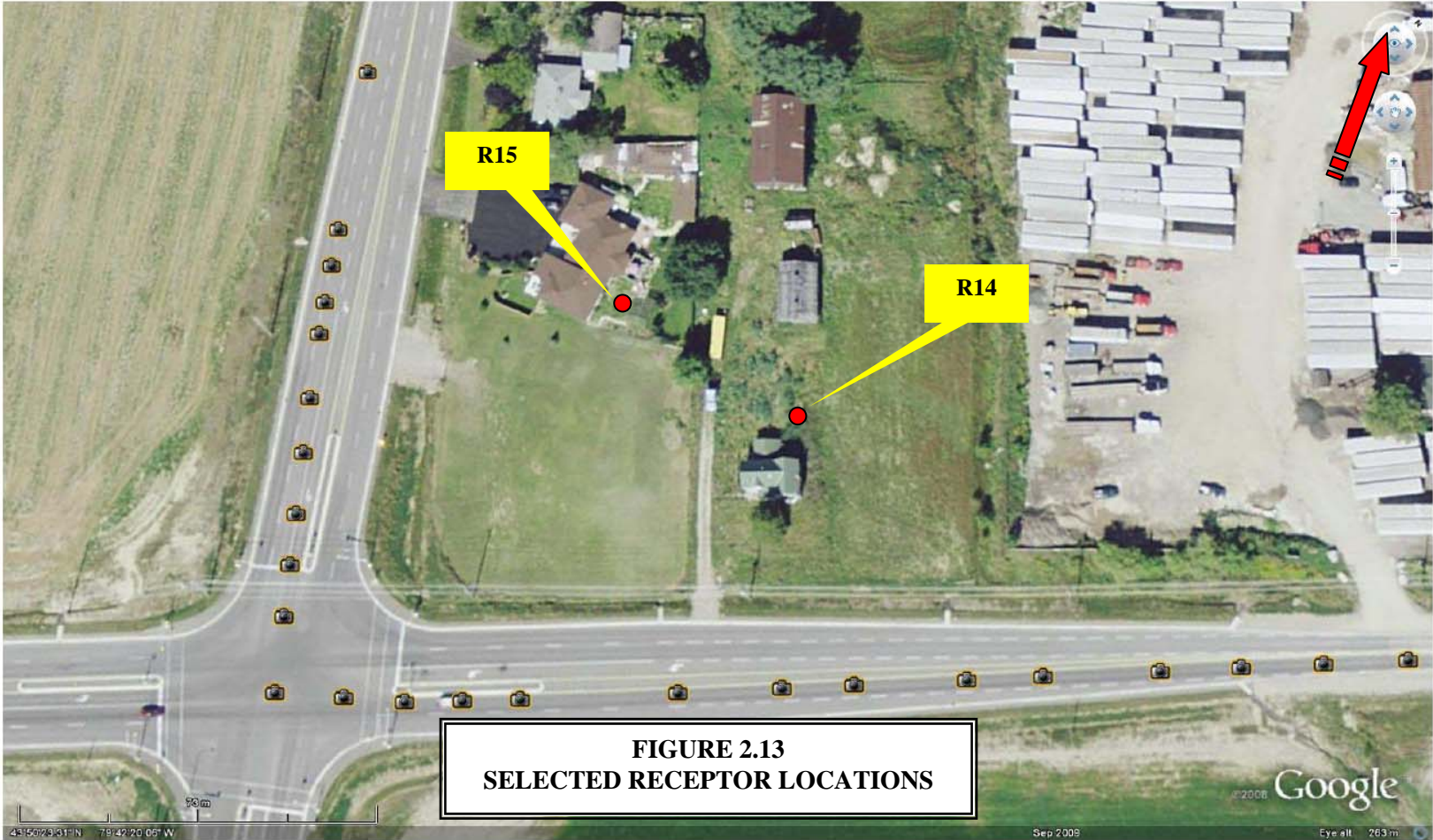


**FIGURE 2.10
SELECTED RECEPTOR LOCATIONS**



**FIGURE 2.11
SELECTED RECEPTOR LOCATIONS**





**FIGURE 2.13
SELECTED RECEPTOR LOCATIONS**

APPENDIX A
ROAD TRAFFIC DATA

LOCATION: Mayfield Road (between Pillsworth Road and Highway 50)

TRAFFIC DATA	EXISTING CONDITIONS 2009	F-D-N CONDITIONS YEAR	FUTURE CONDITIONS 2031 AM PEAK (PM PEAK)
<u>AADT</u>	10071		1529 (1698)
SADT			
No. Of Lanes	2	2	4
% Of Trucks	24.2%		EB 16%, WB 7% (EB 5%, WB 12%)
Ratio Of Medium to Heavy Trucks	3.8% medium trucks, 9% heavy trucks		
Day/Night Traffic Split	88.3% day traffic, 11.7% night traffic		
Directional Split	48.2% westbound, 51.8% eastbound		49.7% wb, 50.3% eb (50.3% wb, 49.7% eb)
Posted Speed Limit	60 km/h		
85 th Percentile Speed	76 km/h		
Gradient Of Road	0.3% – 2.2%		
R.O.W.	31.0 – 48.0		50m (designated)

LOCATION: Highway 50 (between Mayfield Road and Countryside Drive)

TRAFFIC DATA	EXISTING CONDITIONS 2009	F-D-N CONDITIONS YEAR	FUTURE CONDITIONS 2031 AM PEAK (PM PEAK)
<u>AADT</u>	34291		3855 (4282)
SADT			
No. Of Lanes	5	5	7
% Of Trucks	20.4%		NB 9%, SB 8% (NB 8%, SB 10%)
Ratio Of Medium to Heavy Trucks	2.6% medium trucks, 7.9% heavy trucks		
Day/Night Traffic Split	86.6% day traffic, 13.4% night traffic		
Directional Split	48.9% southbound, 51.1% northbound		59.7% sb, 40.3% nb (40.3% sb, 59.7% nb)
Posted Speed Limit	80 km/h		
85 th Percentile Speed	89 km/h		
Gradient Of Road	0.5% – 1.0%		
R.O.W.	35.0 – 58.0		45 m (designated)

LOCATION: Highway 50 (between Coleraine Drive and Cadetta Road)

TRAFFIC DATA	EXISTING CONDITIONS 2009	F-D-N CONDITIONS YEAR	FUTURE CONDITIONS 2031 AM PEAK (PM PEAK)
<u>AADT</u>	30408		3418 (3762)
SADT			
No. Of Lanes	5	5	7
% Of Trucks	24.5%		NB 8%, SB 2% (NB 1%, SB 1%)
Ratio Of Medium to Heavy Trucks	3.8% medium trucks, 10.5% heavy trucks		
Day/Night Traffic Split	86% day traffic, 14% night traffic		
Directional Split	51.5% southbound, 48.5% northbound		59.4% sb, 40.6% nb (40.3% sb, 59.7% nb)
Posted Speed Limit	80 km/h		
85 th Percentile Speed	87 km/h		
Gradient Of Road	0.5%		
R.O.W.	46.0 – 50.0		45 m (designated)

LOCATION: Highway 50 (between Old Castlemore Road and Castlemore Road)

TRAFFIC DATA	EXISTING CONDITIONS 2009	F-D-N CONDITIONS YEAR	FUTURE CONDITIONS 2031 AM PEAK (PM PEAK)
<u>AADT</u>	31834		4240 (4726)
SADT			
No. Of Lanes	5	5	7
% Of Trucks	26%		NB 10%, SB 18% (NB 19%, SB 12%)
Ratio Of Medium to Heavy Trucks	4.8% medium trucks, 11% heavy trucks		
Day/Night Traffic Split	86.1% day traffic, 13.9% night traffic		
Directional Split	51.4% southbound, 48.6% northbound		57.4% sb, 42.6% nb (42.3% sb, 57.7% nb)
Posted Speed Limit	80 km/h		
85 th Percentile Speed	85 km/h		
Gradient Of Road	0.8% – 1.0%		
R.O.W.	49.0 – 51.0		45 m (designated)

LOCATION: Highway 50 (south of Castlemore Road)

TRAFFIC DATA	EXISTING CONDITIONS 2009	F-D-N CONDITIONS YEAR	FUTURE CONDITIONS 2031 AM PEAK (PM PEAK)
<u>AADT</u>	34138		3729 (4142)
SADT			
No. Of Lanes	5	5	7
% Of Trucks	35.4%		NB 8%, SB 11% (NB 9%, SB 11%)
Ratio Of Medium to Heavy Trucks	5.1% medium trucks, 17.6% heavy trucks		
Day/Night Traffic Split	88.3% day traffic, 11.7% night traffic		
Directional Split	50% southbound, 50% northbound		57.4% sb, 42.6% nb (42.6% sb, 57.4% nb)
Posted Speed Limit	80 km/h		
85th Percentile Speed	94 km/h		
Gradient Of Road			
R.O.W.			45 m (designated)

-
- 1) Medium Trucks : 2 axles and 6 wheels, gross weight between 4,500 lb and 12,000 lb (includes city buses);
 2) Heavy Trucks : 3 or more axles, gross weight greater than 12,000 lb (includes inter-city buses).
 3) Day: 07:00 – 23:00 & Night: 23:00 – 07:00

From: Baudais, Nathalie [Nathalie.Baudais@hdrinc.com]

Sent: Tuesday, February 15, 2011 10:53 AM

To: SS Wilson Associates

Cc: Keen, Stephen

Subject: Highway 50 noise assessment

Hi Tarek,

Just to further clarify the truck %'s in the form.

% of trucks = total truck % (small, medium and heavy)

Ratio of medium to heavy trucks = (medium and heavy)

So if the % of trucks = 24% and the % of medium trucks is 4% and the % of heavy trucks is 10%, it means that there's another 10% of trucks which are smaller size (less

2031 AADT Estimation

For all of the 2031 estimations the % of total daily traffic represented by the PM** peak only was used to make the calculations. The value was different for each location. The final result is the combination of the hourly counts for both the northbound and southbound traffic. The growth in AADT reflects what the traffic model has shown for the area with great increases in traffic.

Mayfield Road between Highway 50 and Pillsworth Road RESULTS		
Time Start	East Bound 2031 Count	West Bound 2031 Count
0:00	61	83
1:00	40	49
2:00	39	46
3:00	40	38
4:00	67	55
5:00	198	193
6:00	453	523
7:00	545	777
8:00	549	695
9:00	469	475
10:00	450	413
11:00	428	489
12:00	461	463
13:00	425	452
14:00	512	498
15:00	707	635
16:00	758	752
17:00	843	854
18:00	586	617
19:00	382	427
20:00	285	306
21:00	210	259
22:00	174	201
23:00	104	138
Estimated 2031 AADT	18224	
Existing 2009 AADT	10071	

**The PM Peak was 9.3% of total daily traffic for existing conditions

Highway 50 between Mayfield Rd and Countryside Dr RESULTS		
Time Start	North Bound 2031 Count	South Bound 2031 Count
0:00	262	148
1:00	164	102
2:00	99	135
3:00	83	124
4:00	119	331
5:00	333	1215
6:00	954	2618
7:00	1297	3127
8:00	1244	2691
9:00	1095	1982
10:00	1057	1583
11:00	1172	1471
12:00	1218	1443
13:00	1332	1399
14:00	1532	1401
15:00	2005	1486
16:00	2374	1743
17:00	2556	1726
18:00	1904	1281
19:00	1325	955
20:00	1020	719
21:00	874	569
22:00	614	398
23:00	457	251
Estimated 2031 AADT	53991	
Existing 2009 AADT	34291	

**The PM Peak was 8.1% of total daily traffic for existing conditions

Highway 50 between Coleraine Dr and Cadetta Rd RESULTS		
Time Start	North Bound 2031 Count	South Bound 2031 Count
0:00	314	161
1:00	174	103
2:00	112	112
3:00	96	132
4:00	136	321
5:00	352	1085
6:00	910	2271
7:00	1288	2579
8:00	1241	2449
9:00	1036	1835
10:00	1033	1432
11:00	1045	1385
12:00	1163	1323
13:00	1259	1308
14:00	1401	1340
15:00	1778	1377
16:00	2137	1510
17:00	2246	1516
18:00	1950	1200
19:00	1444	882
20:00	968	648
21:00	872	506
22:00	708	399
23:00	511	248
Estimated 2031 AADT	50295	
Existing 2009 AADT	30408	

**The PM Peak was 7.5% of total daily traffic for existing conditions

Highway 50 between Old Castlemore Rd and Castlemore Rd RESULTS		
Time Start	North Bound 2031 Count	South Bound 2031 Count
0:00	513	266
1:00	315	169
2:00	193	146
3:00	149	210
4:00	181	315
5:00	318	1004
6:00	1240	2261
7:00	1653	2041
8:00	1779	2463
9:00	1550	2218
10:00	1410	1889
11:00	1367	1707
12:00	1519	1700
13:00	1636	1642
14:00	1887	1797
15:00	2177	1821
16:00	2566	1858
17:00	2726	2000
18:00	2664	1513
19:00	2021	1248
20:00	1436	853
21:00	1177	686
22:00	1130	531
23:00	886	602
Estimated 2031 AADT	63433	
Existing 2009 AADT	31834	

**The PM Peak was 7.4% of total daily traffic for existing conditions

Highway 50 South of Castlemore Rd RESULTS		
Time Start	North Bound 2031 Count	South Bound 2031 Count
0:00	331	300
1:00	231	205
2:00	131	154
3:00	101	146
4:00	173	209
5:00	564	908
6:00	1174	2172
7:00	1393	3045
8:00	1261	2950
9:00	1151	2254
10:00	1190	1812
11:00	1312	1653
12:00	1374	1618
13:00	1499	1604
14:00	1747	1655
15:00	2114	1696
16:00	2378	1764
17:00	1999	1843
18:00	1832	1394
19:00	1349	1127
20:00	1008	794
21:00	900	649
22:00	832	523
23:00	531	534
Estimated 2031 AADT	57584	
Existing 2009 AADT	34138	

**The PM Peak was 7.3% of total daily traffic for existing conditions

APPENDIX - B
SOUND LEVEL CALCULATION

Filename: 4ext.te Time Period: Day/Night 16/8 hours

Description: Receptor R4: OLA: Existing Sound Levels

Road data, segment # 1: HWY 50 (day/night)

```
-----
Car traffic volume   : 22411/3648   veh/TimePeriod   *
Medium truck volume :    994/162    veh/TimePeriod   *
Heavy truck volume  :   2746/447    veh/TimePeriod   *
Posted speed limit  :      87 km/h
Road gradient       :      0 %
Road pavement      :      1 (Typical asphalt or concrete)
```

* Refers to calculated road volumes based on the following input:

```
24 hr Traffic Volume (AADT or SADT): 30408
Percentage of Annual Growth       : 0.00
Number of Years of Growth         : 0.00
Medium Truck % of Total Volume    : 3.80
Heavy Truck % of Total Volume     : 10.50
Day (16 hrs) % of Total Volume    : 86.00
```

Data for Segment # 1: HWY 50 (day/night)

```
-----
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 55.00 / 55.00 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg   Angle2 : 90.00 deg
Barrier height : 0.00 m
Barrier receiver distance : 10.00 / 10.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00
```

Result summary (day)

```
-----
! source ! Road ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
-----+-----+-----
1.HWY 50 ! 1.80 ! 66.68 ! 66.68 *
-----+-----+-----
Total 66.68 dBA
```

* Bright Zone !

Result summary (night)

```
-----
! source ! Road ! Total
```


	! height !	! Leq !	! Leq !
	! (m) !	! (dBA) !	! (dBA) !
1.HWY 50	! 1.80 !	! 62.47 !	! 62.47 *
	Total		62.47 dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 66.68
(NIGHT): 62.47

Filename: 4fut.te Time Period: Day/Night 16/8 hours

Description: Receptor R4: OLA Future Sound Levels

Road data, segment # 1: HWY 50 SB (day/night)

Car traffic volume : 18535/3017 veh/TimePeriod *
Medium truck volume : 822/134 veh/TimePeriod *
Heavy truck volume : 2271/370 veh/TimePeriod *
Posted speed limit : 87 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 25148
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 3.80
Heavy Truck % of Total Volume : 10.50
Day (16 hrs) % of Total Volume : 86.00

Data for Segment # 1: HWY 50 SB (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 48.00 / 49.00 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
Barrier height : 0.00 m
Barrier receiver distance : 10.00 / 11.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Road data, segment # 2: HWY 50 NB (day/night)

Car traffic volume : 18535/3017 veh/TimePeriod *
Medium truck volume : 822/134 veh/TimePeriod *
Heavy truck volume : 2271/370 veh/TimePeriod *
Posted speed limit : 87 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 25148
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 3.80
Heavy Truck % of Total Volume : 10.50
Day (16 hrs) % of Total Volume : 86.00

Data for Segment # 2: HWY 50 NB (day/night)

```

-----
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth           :      0           (No woods.)
No of house rows     :      0 / 0
Surface              :      1           (Absorptive ground surface)
Receiver source distance : 62.00 / 62.00 m
Receiver height       :  1.50 / 4.50 m
Topography           :      2           (Flat/gentle slope; with barrier)
Barrier angle1       : -90.00 deg   Angle2 : 90.00 deg
Barrier height        :  0.00 m
Barrier receiver distance : 10.00 / 10.00 m
Source elevation      :  0.00 m
Receiver elevation    :  0.00 m
Barrier elevation     :  0.00 m
Reference angle       :  0.00
  
```

Result summary (day)

```

-----
! source ! Road ! Total
! height ! Leq  ! Leq
! (m)    ! (dBA) ! (dBA)
-----+-----+-----+-----
1.HWY 50 SB      ! 1.80 ! 66.83 ! 66.83 *
2.HWY 50 NB      ! 1.80 ! 65.00 ! 65.00 *
-----+-----+-----+-----
Total                                     69.02 dBA
  
```

* Bright Zone !

Result summary (night)

```

-----
! source ! Road ! Total
! height ! Leq  ! Leq
! (m)    ! (dBA) ! (dBA)
-----+-----+-----+-----
1.HWY 50 SB      ! 1.80 ! 62.43 ! 62.43 *
2.HWY 50 NB      ! 1.80 ! 60.84 ! 60.84 *
-----+-----+-----+-----
Total                                     64.72 dBA
  
```

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 69.02
 (NIGHT): 64.72

Filename: 11ext.te Time Period: Day/Night 16/8 hours

Description: Receptor R11: OLA Existing Sound Levels

Road data, segment # 1: Mayfield RD (day/night)

```
-----
Car traffic volume   : 7754/1027   veh/TimePeriod   *
Medium truck volume : 338/45     veh/TimePeriod   *
Heavy truck volume  : 800/106    veh/TimePeriod   *
Posted speed limit  : 76 km/h
Road gradient       : 2 %
Road pavement      : 1 (Typical asphalt or concrete)
```

* Refers to calculated road volumes based on the following input:

```
24 hr Traffic Volume (AADT or SADT): 10071
Percentage of Annual Growth       : 0.00
Number of Years of Growth         : 0.00
Medium Truck % of Total Volume    : 3.80
Heavy Truck % of Total Volume     : 9.00
Day (16 hrs) % of Total Volume    : 88.30
```

Data for Segment # 1: Mayfield RD (day/night)

```
-----
Angle1  Angle2      : -90.00 deg   0.00 deg
Wood depth          : 0           (No woods.)
No of house rows   : 0 / 0
Surface            : 1           (Absorptive ground surface)
Receiver source distance : 62.00 / 62.00 m
Receiver height    : 1.50 / 4.50 m
Topography         : 2           (Flat/gentle slope; with barrier)
Barrier angle1     : -90.00 deg   Angle2 : 0.00 deg
Barrier height     : 0.00 m
Barrier receiver distance : 10.00 / 10.00 m
Source elevation   : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation  : 0.00 m
Reference angle    : 0.00
```

Result summary (day)

```
-----
! source ! Road ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
-----+-----+-----
1.Mayfield RD ! 1.73 ! 57.29 ! 57.29 *
-----+-----+-----
Total 57.29 dBA
```

* Bright Zone !

Result summary (night)

	! source !	Road	! Total
	! height !	Leq	! Leq
	! (m) !	(dBA)	! (dBA)
1.Mayfield RD	1.73	52.23	52.23 *
	Total		52.23 dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 57.29
(NIGHT): 52.23

Filename: 11fut.te Time Period: Day/Night 16/8 hours

Description: Receptor R11: OLA Future Sound Levels

Road data, segment # 1: Mayfield RD (day/night)

```
-----
Car traffic volume   : 14032/1859   veh/TimePeriod   *
Medium truck volume :    611/81     veh/TimePeriod   *
Heavy truck volume  :   1448/192   veh/TimePeriod   *
Posted speed limit  :     76 km/h
Road gradient       :     2 %
Road pavement      :     1 (Typical asphalt or concrete)
```

* Refers to calculated road volumes based on the following input:

```
24 hr Traffic Volume (AADT or SADT): 18224
Percentage of Annual Growth       : 0.00
Number of Years of Growth         : 0.00
Medium Truck % of Total Volume    : 3.80
Heavy Truck % of Total Volume     : 9.00
Day (16 hrs) % of Total Volume    : 88.30
```

Data for Segment # 1: Mayfield RD (day/night)

```
-----
Angle1  Angle2      : -90.00 deg   0.00 deg
Wood depth          :      0         (No woods.)
No of house rows   :      0 / 0
Surface            :      1         (Absorptive ground surface)
Receiver source distance : 62.00 / 62.00 m
Receiver height    :   1.50 / 4.50 m
Topography         :      2         (Flat/gentle slope; with barrier)
Barrier angle1     : -90.00 deg   Angle2 : 0.00 deg
Barrier height     :   0.00 m
Barrier receiver distance : 10.00 / 10.00 m
Source elevation   :   0.00 m
Receiver elevation :   0.00 m
Barrier elevation  :   0.00 m
Reference angle    :   0.00
```

Result summary (day)

```
-----
! source ! Road ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
-----+-----+-----
1.Mayfield RD ! 1.73 ! 59.87 ! 59.87 *
-----+-----+-----
Total 59.87 dBA
```

* Bright Zone !

Result summary (night)

	! source !	Road	! Total
	! height !	Leq	! Leq
	! (m) !	(dBA)	! (dBA)
1.Mayfield RD	1.73	54.81	54.81 *
	Total		54.81 dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 59.87
(NIGHT): 54.81