KYTC Traffic Noise Abatement Calculation Guide (2015 edition)

In 2015, KYTC released a new Traffic Noise Analysis and Abatement Policy. It is almost exactly the same as the previous (2011) policy in most respects, but the criteria for acoustical feasibility and noise reduction design goal have been modified. This guide is provided to give examples of how the calculations referenced in the Kentucky Transportation Cabinet Noise Analysis and Abatement Policy (July 2015) are to be used.

The scenarios from the 2011 version of the calculation guide are being reused in the hope that it will help those who are accustomed to using the 2011 policy easily understand how to apply the 2015 policy. An additional scenario has been added to demonstrate one benefit of the policy change.

In scenarios 1, 2 and 5 there are minor differences in the way that acoustic feasibility and design goal are checked but the conclusions are the same as would have been reached under the 2011 policy.

Scenarios 3 and 4 demonstrate adjustments to CBR when adjustments are appropriate. Nothing has changed with regard to CBR since 2011 so these examples are not changed.

Scenario 6 previously did not discuss feasibility and design goal, but these have been added as an additional example.

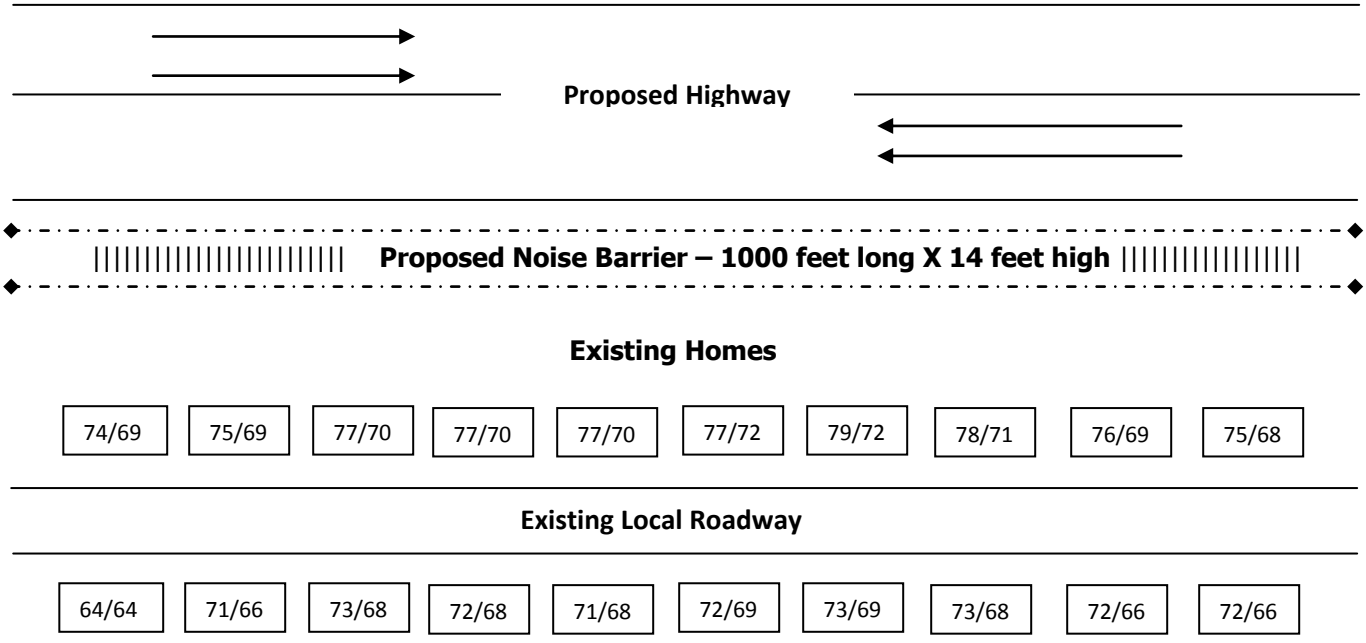
Scenario 7 has been added to demonstrate how in certain cases, a barrier can be found to be not acoustically feasible before any modeling of the barrier takes place.

For illustration purposes, the following example project will be used and expanded upon to take into consideration various activity categories as found in Table 1 of the KYTC Noise Analysis and Abatement Policy: 1) Activity Category B – Residential, 2) Activity Category C - Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings, 3) Activity Category D – Interiors of Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios that have no exterior use, and 4) Activity Category E - Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.

A new project consisting of 4 lanes (2 travel lanes in each direction) is proposed that will bring the alignment close to existing properties in the various Activity Categories. Predicted noise levels approach or exceed the NAC, therefore, mitigation must be

considered. The calculations that follow illustrate appropriate application of the KYTC Noise Policy for the Activity Categories that may be encountered.

Scenario 1: Activity Category B Residential: Single Family Residences



NOTE: xx/xx = predicted noise levels (dbA) without/with mitigation

1. Benefitted receptors: A reduction of at least 5 dB(A) must be realized for a receptor to be considered benefitted. There are fifteen receptors that meet this criterion.
2. Design Goal: A minimum of 50 % of the front row benefitted receptors must realize a minimum 7 dB(A) reduction. Seven of the ten benefitted receptors on the front row reach 7 dB(A) reduction. The design goal is achieved.
3. Acoustic Feasibility: A minimum of 3 of the impacted receptors must achieve a minimum of 5 dB(A) reduction. Fifteen of the nineteen impacted receptors achieve the necessary reduction. The wall is acoustically feasible.
4. Cost per benefitted receptor (CBR): The cost per benefitted receptor shall be calculated to determine if the construction of a barrier for mitigation is reasonable (meets cost considerations). The barrier dimensions are 1000 feet in length, 14 feet in height, with an assumed cost of $30 per square foot in accordance with the policy.

   Barrier square footage = 1000 x 14= 14,000 square feet x $30 per square foot = $420,000 total barrier cost.

   Cost per Benefitted Receptor = $420,000/ 15 benefitted receptors = $28,000

The cost per benefitted receptor is less than $35,000, therefore the barrier is determined to be cost effective.

5. Ballots
   Ballots shall be made available at the public meeting for completion by benefitted owners and/or benefitted residents who may attend. Benefitted receptors that do not provide ballot input at the meeting shall be surveyed to determine their preference. For each such property, both a resident and owner ballot shall be solicited

   One owner ballot and one resident ballot shall be solicited for each benefitted receptor. Points per ballot shall be distributed in the following weighted manner:

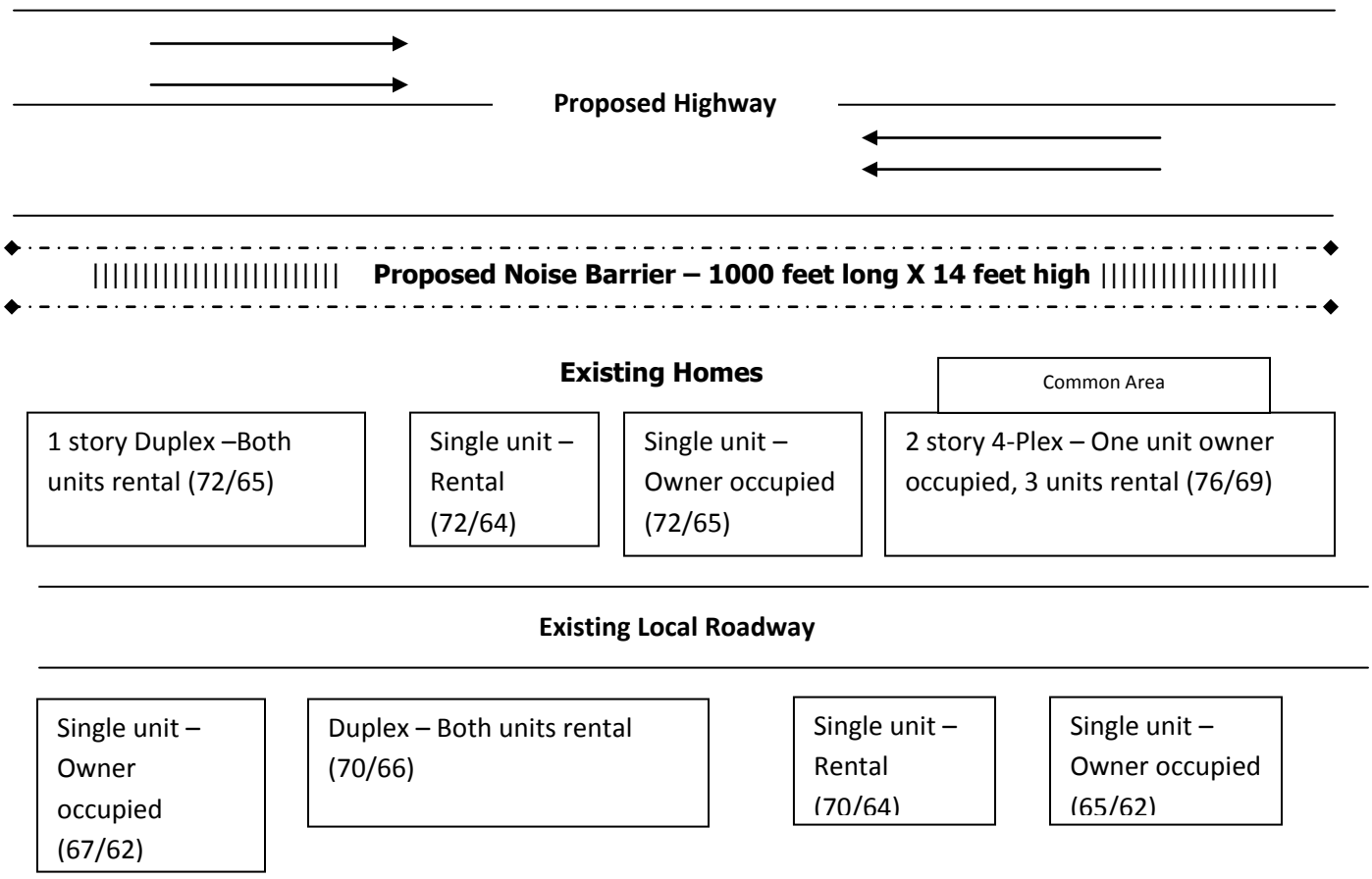
   3 points/ballot for benefitted front row property owners

   1 point /ballot for all other benefitted property owners

   1 point/ballot for all benefitted residents

   Each benefitted receptor on the front row would have 4 points total and the second row benefitted receptors would have 2 points total. In the event that some of the properties are rentals, the vote would split according to the breakdown above. The barrier would be constructed as long as the total points in favor of construction exceed those opposed.

Scenario 2: Activity Category B Residential: Multi Family Residences



NOTE: (xx/xx) = predicted noise levels (dbA) without/with mitigation

1. Benefitted receptors: A reduction of at least 5 dB(A) must be realized for a receptor to be considered benefitted. Per the KYTC Noise policy concerning multi-family dwellings, there are ten receptors that meet this criterion. Because the noise levels in the common use area (typically an outdoor area available for use by all occupants i.e. picnic table, playground, etc.) of the two story 4-plex achieves more than a 5 dB(A) reduction, all units are considered benefitted.
2. Design Goal: A minimum of 50 % of the front row benefitted receptors must realize a minimum 7 dB(A) reduction. All eight of the front row benefitted receptors achieve 7 dB(A) reduction. The design goal is met.
3. Acoustic Feasibility: A minimum of 3 of the impacted receptors must achieve a minimum of 5 dB(A) reduction. Twelve of the thirteen receptors are considered impacted per the definition of impacted receptor in the KYTC Noise Policy. Ten of the twelve impacted receptors achieve the necessary reduction. The wall is acoustically feasible.
4. Cost per benefitted receptor (CBR): The cost per benefitted receptor shall be calculated to determine if the construction of a barrier for mitigation is

reasonable (meets cost considerations). The barrier dimensions are 1000 feet in length, 14 feet in height, with an assumed cost of $30 per square foot in accordance with the policy.
Only two of the second row receptors receive a 5 dB(A). There are a total of 10 benefitted receptors in this example.

Barrier square footage = 1000 x 14= 14,000 square feet x $30 per square foot = $420,000 total barrier cost.

Cost per Benefitted Receptor = $420,000/ 10 benefitted receptors = $42,000
The cost per benefitted receptor is greater than $35,000, therefore the barrier is not determined to be cost effective and reasonable.

No further evaluation of a barrier would be considered at this location.

If the CBR had been less than $35,000.00, input from the affected residents would have been solicited through the ballot process. Table 1 details how the ballots would be compiled for the various structures.

One owner ballot and one resident ballot shall be solicited for each benefitted receptor. Points per ballot shall be distributed in the following weighted manner:

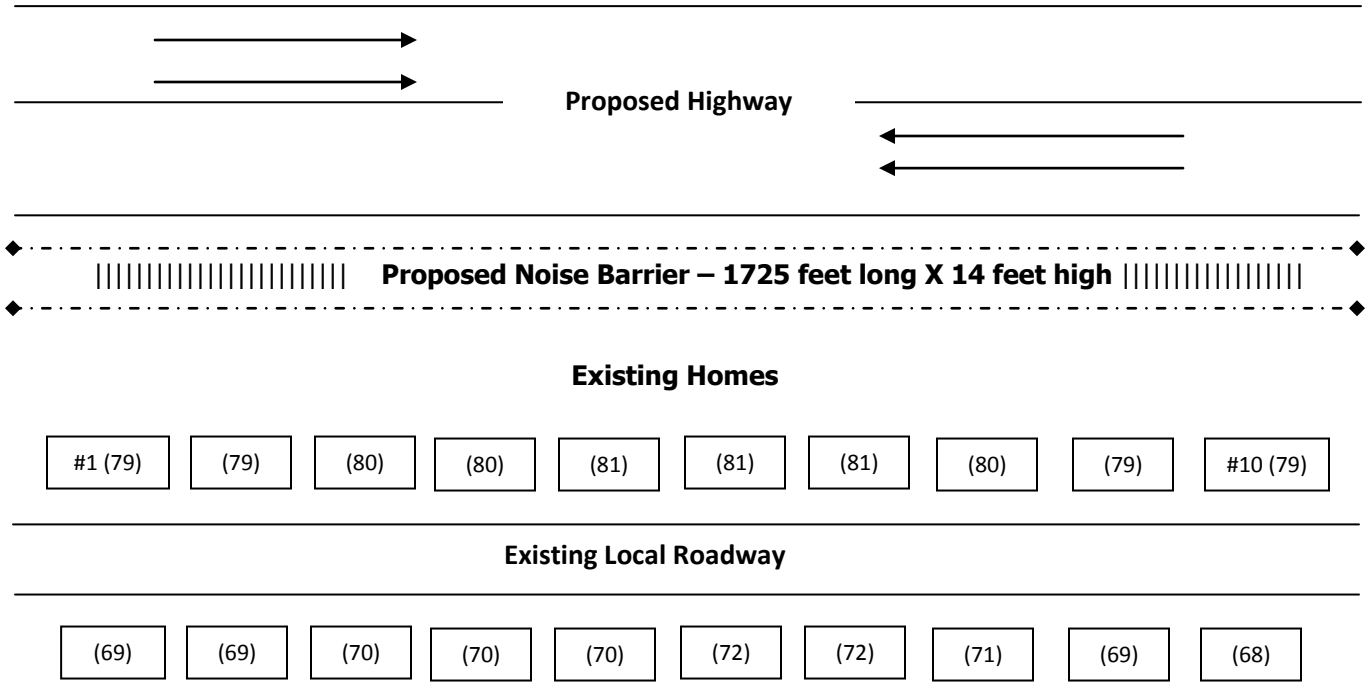
Owner - 3 points/ballot for benefitted front row property owners
Owner - 1 point /ballot for all other benefitted property owners
Occupant - 1 point/ballot for all benefitted residents

Table 1 Ballot Distribution

First Row Receptors	Owner - 3 points/ballot for benefitted front row receptor	Owner - 1 point/ballot for other benefitted property owners	Occupant - 1 point/ballot for all benefitted residents	Total
1 Story Duplex Rental	6	--	2	8
Single Unit Rental	3	--	1	4
Single Unit Owner-occupied	3	--	1	4
2 Story 4-plex	12	--	4	16
Second Row Receptors				
Singe Unit Owner-occupied	--	1	1	2
Duplex Rental	--	0*	0*	0
Single Unit Rental	--	1	1	2
Single Unit Owner-occupied	--	1	1	2

*Does not achieve required 5 dbA reduction to be considered as a Benefitted Receptor

Scenario 3: Activity Category B Residential: Single Family Residences with Extraordinary Absolute Noise Levels



NOTE: (xx) = predicted design year noise levels (dbA)

1. Cost per benefitted receptor (CBR)
   The cost per benefitted receptor shall be calculated to determine if the construction of a barrier for mitigation is reasonable (meets cost considerations). All residences in this example are impacted at 68 to 81 dB(A). The barrier dimensions are 1725 feet in length, 14 feet in height, with an assumed cost of $30 per square foot in accordance with the policy.
   In this example, it is considered that each of the 20 residences shown in the diagram receive at least a 5 dB(A) noise reduction as a result of the proposed barrier and that 8 of the 10 receptors in the first row receive a noise reduction of 7 dB(A).

   Barrier square footage = 1725 x 14= 24,150 square feet x $30 per square foot = $724,500 total barrier cost.

   Cost per Benefitted Receptor = $724,500/ 20 benefitted receptors = $36,225
   The cost per benefitted receptor is greater than $35,000; therefore the barrier is not determined to be cost effective and reasonable. However, since predicted

noise levels exceed 77 dB(A), they are considered extraordinary, so an adjustment is calculated.

2. CBR Adjustment
   The method for adjusting the CBR calculation shall be:

$$CBR = \frac{(Cost\ of\ the\ Noise\ Barrier\ (\$)) - (Total\ Value\ of\ Adjustments)}{Number\ of\ Benefitted\ Receptors}$$

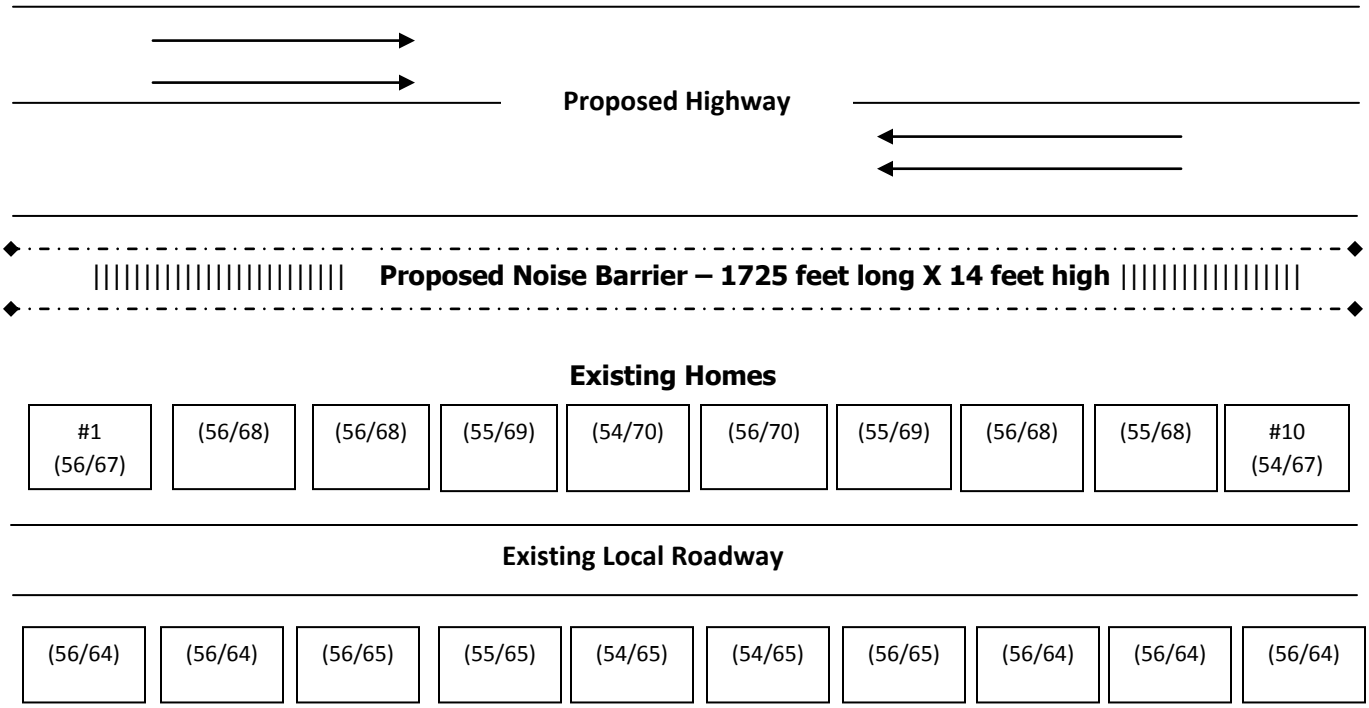
Each benefitted receptor predicted to experience noise levels exceeding 77 dB(A) shall be afforded an additional $1,000 per dB(A) over this limit. The Total Value of Adjustment for absolute noise level shall be calculated based upon the number of benefitted receptors where predicted noise levels are excessive and the degree to which they exceed 77 dB(A). The calculation shall be as follows:

$$\text{Total Value of Adjustment for Absolute Noise Levels (\$)}$$
$$= \sum [\![\{\text{Receptor 1} \left[\text{Predicted Noise Level} \left(\text{dB(A)}\right) - 77\text{dB(A)}\right] \times \$1{,}000\}$$
$$+ \{\text{Receptor 2} \left[\text{Predicted Noise Level} \left(\text{dB(A)}\right) - 77\text{dB(A)}\right] \times \$1{,}000\} \ldots]\!]$$

For Scenario 3 the adjustment is calculated as follows:
Receptor 1 Predicted Noise level 79 dB(A) – 77dB(A) x $1000 = $2000
Receptor 2 Predicted Noise level 79 dB(A) – 77dB(A) x $1000 = $2000
Receptor 3 Predicted Noise level 80 dB(A) – 77dB(A) x $1000 = $3000
Receptor 4 Predicted Noise level 80 dB(A) – 77dB(A) x $1000 = $3000
Receptor 5 Predicted Noise level 81 dB(A) – 77dB(A) x $1000 = $4000
Receptor 6 Predicted Noise level 81 dB(A) – 77dB(A) x $1000 = $4000
Receptor 7 Predicted Noise level 81 dB(A) – 77dB(A) x $1000 = $4000
Receptor 8 Predicted Noise level 80 dB(A) – 77dB(A) x $1000 = $3000
Receptor 9 Predicted Noise level 79 dB(A) – 77dB(A) x $1000 = $2000
Receptor 10 Predicted Noise level 79 dB(A) – 77dB(A) x $1000 = $2000
$29,000

CBR= $724,500-$29,000= $695,500/20=$34,775
The adjustment to the Cost per Benefitted Receptor for Absolute Noise Levels brings the CBR below $35,000 which warrants the barrier for further consideration through the public involvement balloting process previously described.

Scenario 4: Activity Category B Residential: Single Family Residences with Noise Levels Differences > 10 dB(A) Between No-Build and Build Conditions and Exceeding the NAC



NOTE: xx/xx = predicted noise levels (dbA) with/without mitigation

The above diagram illustrates a project scenario where the predicted Design Year un-mitigated noise levels for a Build situation are equal to or greater than 10 dbA over the predicted Design Year No-Build condition.

1. Cost per benefitted receptor (CBR)
   The cost per benefitted receptor shall be calculated to determine if the construction of a barrier for mitigation is reasonable (meets cost considerations). All residences in this example are impacted at 64 to 70 dB(A). The barrier dimensions are 1725 feet in length, 14 feet in height, with an assumed cost of $30 per square foot in accordance with the policy. In this example, each of the 20 residences receive at least a 5 dB(A) noise reduction (greater than 50% of benefitted receptors)as a result of the proposed barrier, thus the barrier is acoustically feasible. Eight of the ten receptors in the first row receive a noise reduction of at least 7 dB(A) (greater than 40% of impacted receptors), therefore the Design Goal requirement is satisfied.

   Barrier square footage = 1725 x 14= 24,150 square feet x $30 per square foot = $724,500 total barrier cost.

Cost per Benefitted Receptor = $724,500/20 benefitted receptors = $36,225
The cost per benefitted receptor is greater than $35,000; therefore the barrier is not determined to be cost effective and reasonable. However, the increase in the predicted noise levels are considered extraordinary, so an adjustment is calculated.

2. An adjustment to the cost calculation shall also be made for each benefitted receptor where the predicted noise level exceeds the NAC AND the difference between the predicted unmitigated noise level and the No Build condition exceeds 10 dB(A). The Total Value of Adjustment for a >10dB(A) noise increase shall be calculated as follows for each receptor meeting these criteria:

$$\text{Total Value of Adjustment for receptors with a Notable Noise Increase (\$)}$$
$$= \sum [\![\{\text{Receptor 1 } [(\text{Predicted } - \text{No Build dB(A)}) - 10 \text{ dB(A)}] \times \$1{,}000\}$$
$$+ \{\text{Receptor 2 } [(\text{Predicted } - \text{No Build dB(A)}) - 10 \text{ dB(A)}] \times \$1{,}000\} \ldots]\!]$$

An example of this calculation is shown below. It should be noted that no second row receptors are included in the adjustment, though the difference between the no build and predicted levels exceed 10 dB(A), the predicted levels do not exceed the NAC.

Receptor 1 Predicted Build Noise level 67 dB(A) – No Build level 56 dB(A) -10 dB(A) x $1000 = $1000

Receptor 2 Predicted Build Noise level 68 dB(A) – No Build level 56 dB(A) -10 dB(A) x $1000 = $2000

Receptor 3 Predicted Build Noise level 68 dB(A) – No Build level 56 dB(A) -10 dB(A) x $1000 = $2000

Receptor 4 Predicted Build Noise level 69 dB(A) – No Build level 55 dB(A) -10 dB(A) x $1000 = $4000

Receptor 5 Predicted Build Noise level 70dB(A) – No Build level 54 dB(A) -10 dB(A) x $1000 = $6000

Receptor 6 Predicted Build Noise level 70dB(A) – No Build level 56 dB(A) -10 dB(A) x $1000 = $4000

Receptor 7 Predicted Build Noise level 69 dB(A) – No Build level 55 dB(A) -10 dB(A) x $1000 = $4000

Receptor 8 Predicted Build Noise level 68 dB(A) – No Build level 56 dB(A) -10 dB(A) x $1000 = $2000

Receptor 9 Predicted Build Noise level 68 dB(A) – No Build level 55 dB(A) -10 dB(A) x $1000 = $3000

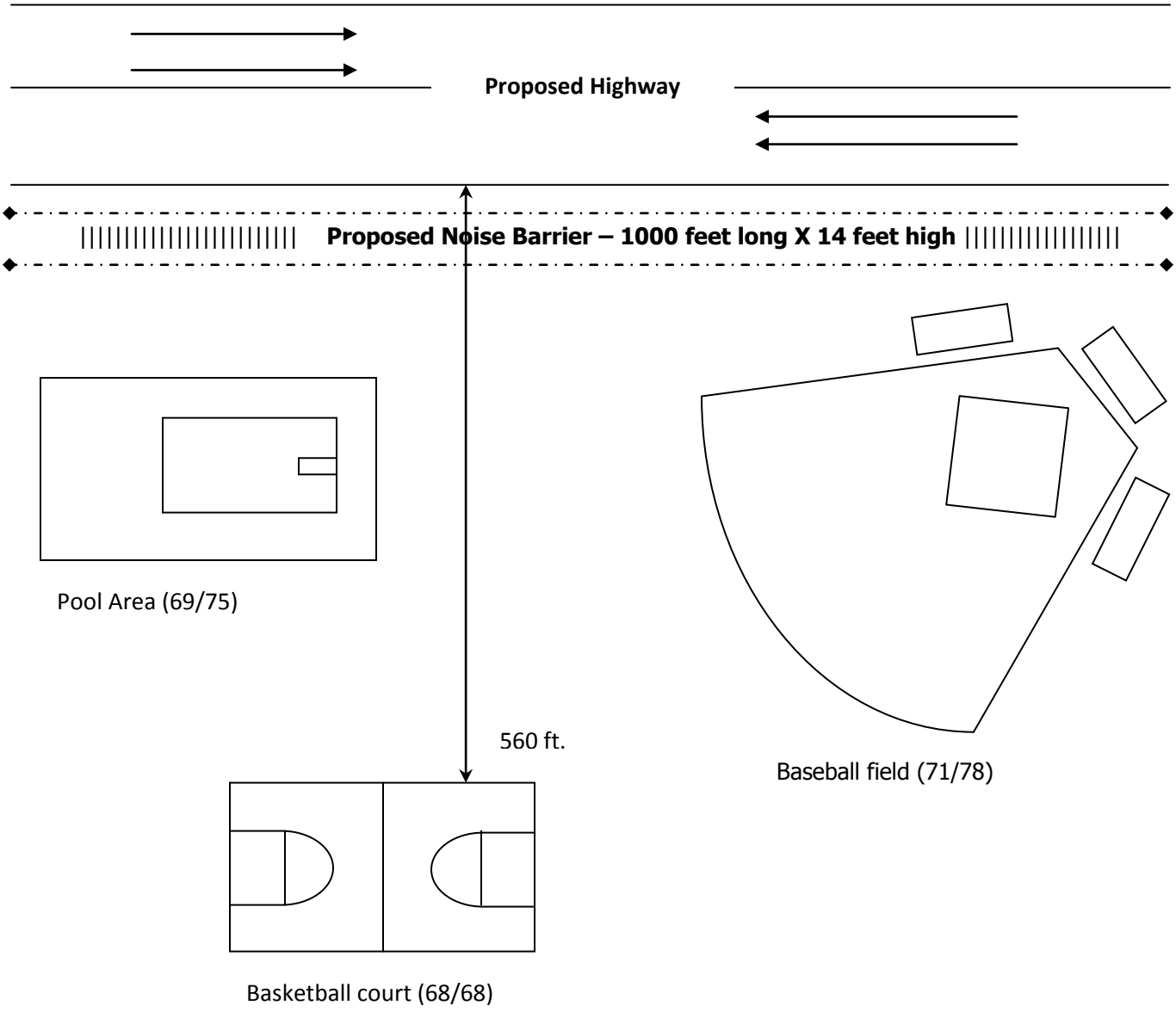
Receptor 10 Predicted Build Noise level 67 dB(A) – No Build level 54 dB(A) -10 dB(A) x $1000 = $3000

$31,000

CBR= $724,500-$31,000= $693,500/20=34,675

The adjustment to the Cost per Benefitted Receptor for Absolute Noise levels brings the CBR below $35,000 which warrants the barrier for consideration through the public involvement balloting process previously described.

Scenario 5: Activity Category C: Park



NOTE: xx/xx = predicted noise levels (dbA) with/without mitigation

1. Equivalent Residences
   For Activity category C,D or E uses, the property shall be considered by calculating an equivalent number of residences for input into the CBR formula using the following equation:

$$Equivalent\ Residences\ = \left(\frac{\#\ Persons}{2.5\ persons\ per\ avg\ household}\right)\left(\frac{Avg\ Daily\ Hours\ Use}{24\ hours\ per\ day}\right)$$

~ OR ~

$$Equivalent\ Residences\ = \left(\frac{\#\ Persons}{2.5\ persons\ per\ avg\ household}\right)\left(\frac{Avg\ Weekly\ Hours\ Use}{168\ hours\ per\ week}\right)$$

Where:

"# Persons" are those people who use the facility within 500 feet of the proposed edge of pavement. Where the facility is a building, such as a church, school or daycare, persons using the structure shall be included if any portion of the structure lies within 500 feet of the proposed edge of pavement. Structures lying totally beyond 500 feet shall not be counted as benefitted receptors. The number of persons shall be established through consultation with the school, church, day care, etc. and shall be based upon the greater of either the number enrolled or capacity of the facility. Where use involves a park, trail, or other exterior activity, the facility official shall be consulted to determine the use that occurs within 500 feet of the proposed edge of pavement and the extent of that use.

"Avg Daily Hours of Use" or "Avg Weekly Hours of Use" is the average number of hours during which the "# Persons" use the facility within the 500 foot area adjacent to the proposed highway. The average should account for all time that the facility is not in use such as nights and weekends.

The pool area Equivalent Residences could be calculated using the Average Daily Hours of Use equation. Through consultation with the park officials, it is determined that approximately 500 people on a daily average use the pool during the 3 months of operation for 10 hours per day. For this scenario a factor of 0.25 is used to reflect three the months of use throughout the year. The Equivalent Residences calculation for the pool area of the park would be 500 x 0.25 / 2.5 average per household times 10 hours per day of use / 24 hours per day = 20 Equivalent Residences.

The baseball area Equivalent Residences could be calculated using the Average Weekly Hours of Use equation. During the week the ball field is used 6 hours a day for 5 days versus 15 hours per day for 2 days on the weekend. Through consultation with the park officials, it is determined the ball field is used 5 months per year and the average team size is 15 x 2 teams, with 2 parents and 1 sibling in attendance per player, 8 coaches and umpires and for a total per game of approximately 83 persons. During the week 2 games are played per day with 7 games per day on the weekend. The number of persons using the facility would be 2 games per day x 5 weekdays x 83 persons = 830 for weekday and 7 games per day x 2 weekend days x 83 persons = 1162 persons. The average weekly total for games = 1,992 persons. For this scenario a factor of 0.41 is used to reflect the five months of use throughout the year. The Equivalent Residences calculation for the

baseball area of the park would be 1,992 x 0.41 / 2.5 average per household times 60 hours of average use per week / 168 hours per week = 116 Equivalent Residences.

The total Equivalent Residences for the park would be 20 + 116 = 136.

2. Acoustic Feasibility
   A minimum of 3 impacted receptors must achieve a minimum of 5 dB(A) reduction. All of the impacted receptors (136 equivalent residences) achieve the necessary reduction. The wall is acoustically feasible.

3. Design Goal
   A minimum of 50 % of the front row benefitted receptors must realize a minimum 7 dB(A) reduction. Both the baseball field and the pool area would be considered front row. 116 of the 136 equivalent residences receive a 7 dB(A) reduction (85%). The design goal is met.

4. Cost per benefitted receptor (CBR)
   The cost per benefitted receptor shall be calculated to determine if the construction of a barrier for mitigation is reasonable (meets cost considerations). The park in this example is impacted at 75 to 78 dB(A). The barrier dimensions are 2000 feet in length, 14 feet in height, with an assumed cost of $30 per square foot.

   In accordance with the Noise Policy, it is considered that the areas shown in the diagram, either completely or partially within 500 ft. of the proposed edge of pavement, receive at least a 5 dB(A) noise reduction as a result of the proposed barrier.

   Barrier square footage = 2000 x 14= 28,000 square feet x $30 per square foot = $840,000 total barrier cost. Cost per Benefitted Receptor = $840,000/136 benefitted receptors = $6,176.

   The cost per benefitted receptor is less than $35,000; therefore the barrier is determined to be cost effective and reasonable.

6. Ballots
   Basically, the jurisdictional authority of the park would have control over all of the votes, unless they solicited the opinion of the general public who use the park.

   In the event that public opinion is sought on the proposed construction of the noise barrier, Ballots would be made available at the public meeting for completion by all users who may attend. In this scenario, the park authority

would receive all first row benefitted receptor votes as owner plus one point per benefitted receptor as occupant and the park users in attendance would receive one point per ballot each as occupant:

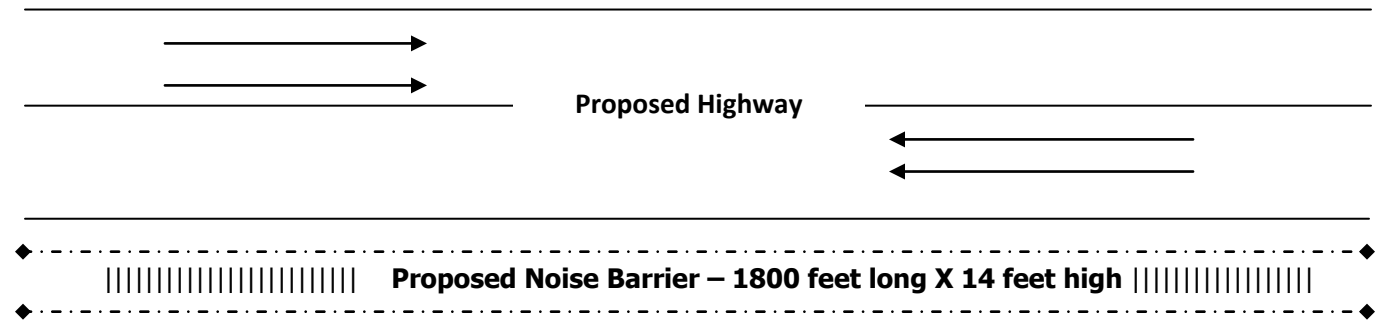
3 points/ballot for benefitted front row property owners (Park Authority)

1 point /ballot for all other benefitted property owners (None)

1 point/ballot for all benefitted residents (Park Authority and Users)

The barrier would be constructed as long as the total points in favor of construction exceed those opposed.

Scenario 6: Activity Category C: Church in Residential Area



NOTE: xx/xx = predicted noise levels (dbA) with/without mitigation

1. Equivalent Residences

For Activity category C,D or E uses, the property shall be considered by calculating an equivalent number of residences for input into the CBR formula using one of the two formulas below:

$$Equivalent\ Residences\ = \left(\frac{\#\ Persons}{2.5\ persons\ per\ avg\ household}\right)\left(\frac{Avg\ Daily\ Hours\ Use}{24\ hours\ per\ day}\right)$$

~ OR ~

$$Equivalent\ Residences\ = \left(\frac{\#\ Persons}{2.5\ persons\ per\ avg\ household}\right)\left(\frac{Avg\ Weekly\ Hours\ Use}{168\ hours\ per\ week}\right)$$

Where:

"# Persons" are those people who use the facility within 500 feet of the proposed edge of pavement. Where the facility is a building, such as a church, school or daycare, persons using the structure shall be included if any portion of the structure lies within 500 feet of the proposed edge of pavement. Structures lying totally beyond 500 feet shall not be counted as benefitted receptors. The number of persons shall be established through consultation with the school, church, day care, etc. and shall be based upon the greater of either the number enrolled or capacity of the facility. Where use involves a park, trail, or other exterior activity, the facility official shall be consulted to determine the use that occurs within 500 feet of the proposed edge of pavement and the extent of that use.

"Avg Daily Hours of Use" or "Avg Weekly Hours of Use" is the average number of hours during which the "# Persons" use the facility within the 500 foot area adjacent to the proposed highway. The average should account for all time that the facility is not in use such as nights and weekends.

When evaluating the church, Equivalent Residences would be calculated using the Average Weekly Hours of Use equation. Through consultation with the church leader, it is determined that an average of 400 people use the church an average of 10 hours per week. Approximate number of people using the church is 450 / 2.5 average per household times 10 hours per week of use / 168 hours per week = 10.62 or 10 equivalent residences. This is added to the number of benefitted residences for a total of 22 benefitted receptors.

For clarity, if the church offered a wide variety of services on various nights of the week, as well as multiple services on weekends to accommodate large congregations you may consider a use analysis similar to that of the park in Scenario #5.

2. Accoustical Feasiblity
   A minimum of 3 of the impacted receptors must achieve a minimum of 5 dB(A) reduction. All 22 receptors are impacted and all 22 receive a 5 dB(A) reduction. The wall is acoustically feasible

3. Design Goal
   A minimum of 50 % of the front row benefitted receptors must realize a minimum 7 dB(A) reduction. Including the 10 of the church, there are 16 front row benefitted receptors. All of them (100%) receive a 7 dB(A) reduction so the design goal is met.

4. Cost per benefitted receptor (CBR)
   The cost per benefitted receptor shall be calculated to determine if the construction of a barrier for mitigation is reasonable (meets cost considerations). The following example shows how the Cost per Benefitted Receptor is calculated. The barrier dimensions are 1800 feet in length, 14 feet in height, with a cost of $30 per square foot. In this example, it is considered that the church receives a noise reduction of 7 dB(A) as well as the front row homes. Second row homes receive a noise reduction of 5dB(A).
   Barrier square footage = 1800 x 14= 25,200 square feet x $30 per square foot = $756,000 total barrier cost.

   Cost per Benefitted Receptor = $756,000/22 benefitted receptors = $34,363
   The cost per benefitted receptor is less than $35,000.00; therefore the barrier is determined to be cost effective and reasonable.

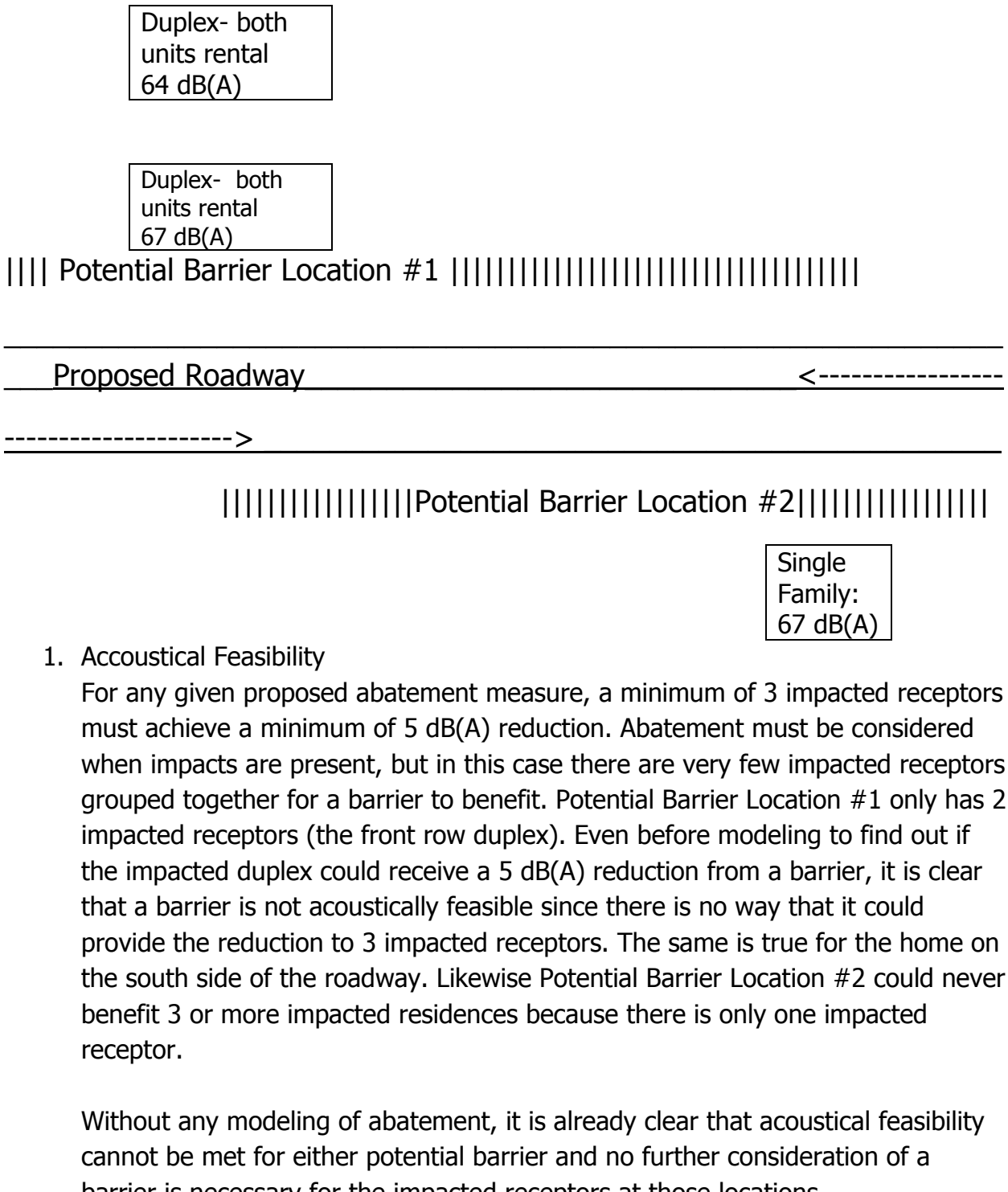
5. Ballots
   Ballots shall be made available at the public meeting for completion by benefitted owners and/or benefitted residents who may attend. Benefitted receptors that do not provide ballot input at the meeting shall be surveyed to determine their preference. For each such property, both a resident and owner ballot shall be solicited

   One owner ballot and one resident ballot shall be solicited for each benefitted receptor. Points per ballot shall be distributed in the following weighted manner:
   - 3 points/ballot for benefitted front row property owners
   - 1 point /ballot for all other benefitted property owners
   - 1 point/ballot for all benefitted residents

Each receptor on the front row would count for 4 points and the second row receptors would count for 2 points. The church's ballots would count for 4 points times the

number of equivalent residences (10) for a total of 40 points. The barrier would be constructed as long as the total points in favor of construction exceed those opposed.

Scenario 7: Activity Category B: Isolated Impacted Receptors



1. Accoustical Feasibility
   For any given proposed abatement measure, a minimum of 3 impacted receptors must achieve a minimum of 5 dB(A) reduction. Abatement must be considered when impacts are present, but in this case there are very few impacted receptors grouped together for a barrier to benefit. Potential Barrier Location #1 only has 2 impacted receptors (the front row duplex). Even before modeling to find out if the impacted duplex could receive a 5 dB(A) reduction from a barrier, it is clear that a barrier is not acoustically feasible since there is no way that it could provide the reduction to 3 impacted receptors. The same is true for the home on the south side of the roadway. Likewise Potential Barrier Location #2 could never benefit 3 or more impacted residences because there is only one impacted receptor.

   Without any modeling of abatement, it is already clear that acoustical feasibility cannot be met for either potential barrier and no further consideration of a barrier is necessary for the impacted receptors at those locations.