Railroad Quiet Zone Implementation In the City of Orange

City of Orange
Public Works Department

April 12, 2005

Introduction

Given the amount of industry within the City of Orange, as well as its history, it is no surprise there are many at-grade railroad crossings of City streets within Orange. Most of them are little used spur lines, bringing rail deliveries to area industry. However 16 of the crossings within the City are mainline crossings, experiencing considerable daily train traffic.

There are two main railroad lines within Orange. The first, known as the "Orange Subdivision" enters Orange from the west, near Collins and Eckhoff, then turns south near Walnut, and proceeds southerly through Old Towne, exiting Orange into Santa Ana.

The second main rail line is known as the "Olive Subdivision". It runs north-south through Orange, entering the City at the north near Riverdale and Orange-Olive Road, and parallels Orange-Olive Road until it joins with the Orange Subdivision line near Walnut. Both railroad lines and the 16 at-grade crossings are shown in Figure 1.

The railroad rights of way, as well as the track, are owned by the Orange County Transportation Authority (OCTA). The "lead railroad" for these lines is the Southern California Regional Rail Authority (SCRRA), also known as Metrolink. The lead railroad, in this case, Metrolink, is responsible for train operations, construction, maintenance and dispatching duties. Other rail operators, such as Amtrak and Burlington Northern may also utilize the rail lines.

According to data supplied by OCTA, the City's northerly rail line, the Olive Subdivision, currently averages a total of about 18 passenger and freight trains per day. This number is predicted to climb to 32 trains per day by the year 2020.

The western segment of the Orange Subdivision currently averages about 49 passenger and freight trains per day and 74 trains per day are expected by 2020.

Where the two rail lines join near Walnut Avenue and proceed south through Old Towne there are currently approximately 61 trains per day. By 2020 this number is expected to climb to 106 trains per day.

AT GRADE RAILROAD CROSSINGS

Crossing name

RAILROAD CROSSING

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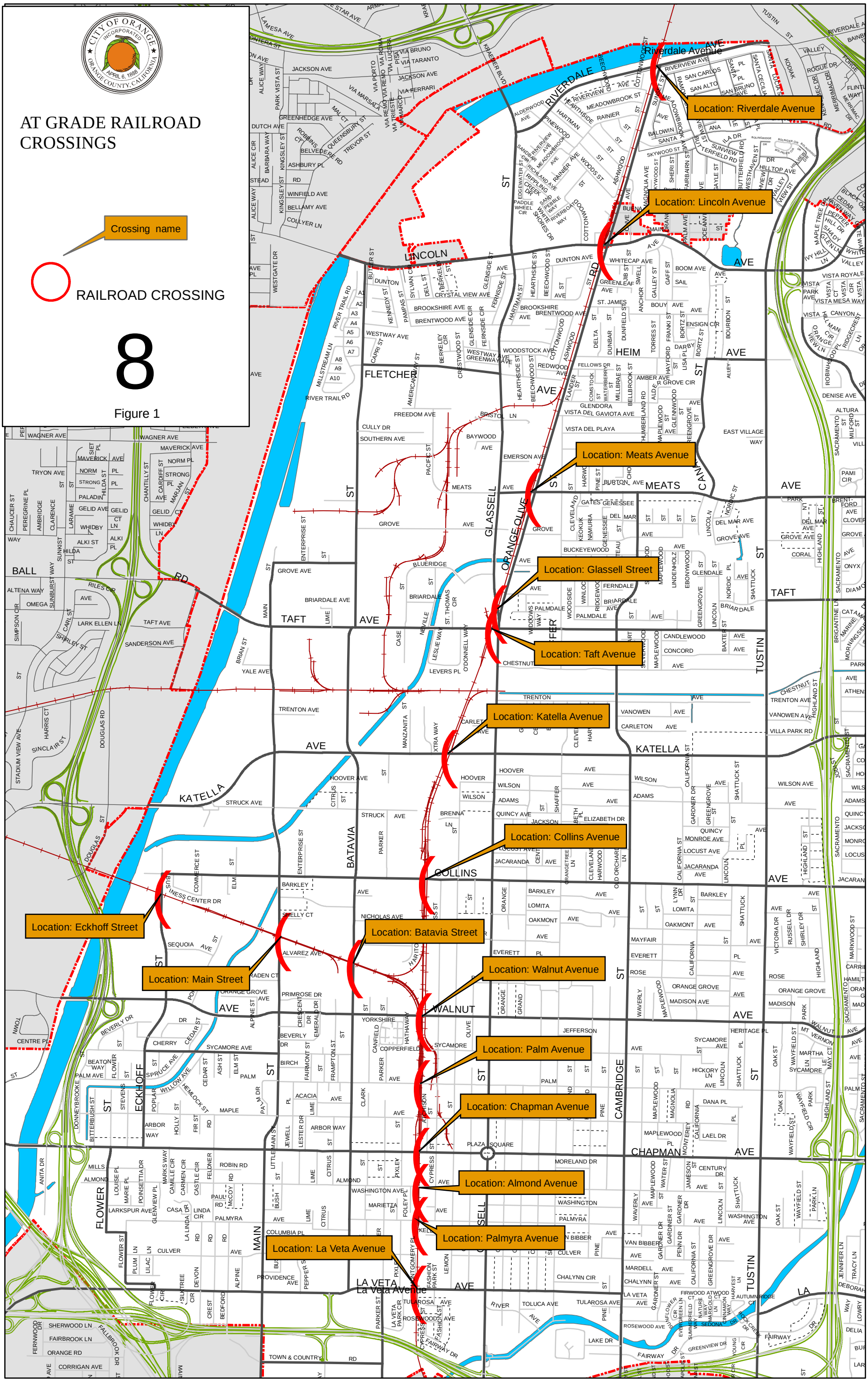
Figure 1



In an effort to improve the quality of life for their residents, many cities have been moving forward with the implementation of "Quiet Zones". These are segments of railroad line where train horns are not routinely sounded at the road crossings.

To accomplish this, a number of safety enhancements are performed on the at-grade rail crossings within the proposed Quiet Zone. These safety enhancements are designed to more than offset an expected decrease in safety that would otherwise result from trains ceasing the sounding of their horns. The net result, even with trains not sounding their horns, is an overall, significant increase in safety for the involved crossings.

How precisely this process is carried out is somewhat complex (and not absolutely defined) with many different options available. This report will examine the process and options in some detail, particularly in regards to how it affects the City of Orange.

Following an understanding of the process, the City's crossings will be reviewed and rough cost estimates presented. Next, a synopsis of available or potentially available funding will be presented. Finally, recommendations will be made for a coherent, reasonable implementation of one or more Quiet Zones within the City of Orange.

The FRA Interim Rule

In November of 1994, Congress passed Public Law 103-440, which, among other things, attempted to address the impact of train horns, safety and the impact to adjacent communities. The legislation required trains sound their horns at public grade crossings, but gave the Federal Railroad Administration (FRA) the authority to make reasonable exceptions. In response, the FRA began a multi-year effort studying the safety impacts of silencing train horns, and what accommodations were necessary to avoid creation of hazardous situations.

On January 13, 2000, the FRA published a Notice of Proposed Rulemaking (NPRM) in the Federal Register, and began solicitation of public comments. By the close of the NPRM comment period on May 26, 2000, approximately 3000 comments had been received. The FRA also conducted twelve public hearings in various parts of the country. Over the next three years, the FRA modified their original NPRM to accommodate the comments received.

On December 18, 2003, the FRA released their "Use of Locomotive Horns at Highway-Rail Grade Crossings; Interim Final Rule". This document became commonly known as the "Interim Final Rule". Public comments were again solicited, due by February 17, 2004. The City of Orange participated in the review, and submitted comments during the period. It was the intention that the Interim Final Rule go into effect December 18, 2004, one year after its release. However due to the large amount of public comment, the Final Rule (as opposed to Interim Final Rule) was scheduled to go into effect on April 1, 2005. In early March, the effective date was again pushed back until June 24, 2005. As far as it is currently known, the Interim Final Rule will become the Final Rule with little or no changes.

The full text of the Final Rule is available online at *http://www.fra.dot.gov/*.

What is a Quiet Zone?

The FRA defines a Quiet Zone as:

> *"A segment of rail line, within which is situated one or a number of consecutive highway-rail crossings at which locomotive horns are not routinely sounded"*

The FRA further states that any new Quiet Zones must be at least one half mile in length.

Interestingly, by installing appropriate, Federally-adopted improvements, a Quiet Zone may be unilaterally established by a local agency without the approval or concurrence of the affected railroad operator. Once the improvements are installed, the local agency notifies the railroad by certified mail, and the railroad must cease the sounding of horns (emergency situations excepted) within 21 days of receipt of the mailing. This is a rather phenomenal transfer of power to local agencies, and was the subject of much opposition from railroads during the Interim Rule comment period. Such a one-sided scenario, while possible, is unlikely due to the need for the local agency to obtain approvals from the railroad for installation of certain improvements within the railroad's right-of-way.

How Eligibility for Quiet Zones is Determined under FRA Rules

In the simplest sense, the cessation of horn sounding by trains will result in a statistical decrease in safety at crossings, which must be more than offset by safety improvements to the grade crossings. But as is the case with many things, the Devil is in the details.

To begin the process, the existing "Risk Index" is calculated for each of the crossings involved in the potential Quiet Zone. The Risk Index is defined as the predicted cost to society of the causalities expected to result from predicted collisions at a crossing. It is an annualized cost, in dollars, for predicted accidents and includes both fatal and injury accidents.

The FRA annually issues an average Risk Index for the entire country, based upon 33,879 rail crossings across the country, averaged over a five-year period. The current Risk Index for the USA is 15,424. Put another way, the cost to society for accidents at the 33,879 crossings surveyed is $15,424 per year, on average, per crossing. The higher the Risk Index, the higher the annual cost and the less safe the crossing.

Since the FRA Interim Final Rule contains the methodology for computation of the Risk Index, it is useful to compute the values for Orange's 16 crossings. To do so requires knowledge of a number of variables, such as number of trains per day, speed of the trains, number of tracks, vehicles per day crossing, number of lanes and previous accident history. That information has been assembled and the rather involved calculations performed, resulting in the following Risk Indices for crossings within the City of Orange, ranked in terms of their value:

Crossing Ranking	Location	Current Risk Index (In Dollars)
1	Chapman	104,623
2	Palmyra	88,767
3	Lincoln	67,902
4	La Veta	47,366
5	Main	45,012
6	Almond	36,651
7	Eckhoff	35,834
8	Palm	34,984
9	Katella	30,579
10	Walnut	29,697
11	Taft	28,758
12	Walnut	29,697
13	Glassell	25,746
14	Collins	25,715
15	Meats	24,589
16	Riverdale	21,219
Average Risk Index for all City crossings $43,152		

A few words about these risk indices are in order. Chapman and Palmyra stand out as having the two highest Risk Indices in the City. This is primarily due to the heavy weighting the calculation methodology gives to accident history. Since Chapman and Palmyra had a record of one accident within the previous 10 years (the study period), it added considerably to the Risk Indices for those crossings. The methodology assumes (rightly or wrongly) that if an accident has occurred at a crossing in the past, one is more likely to occur in the future, and thus skews the prediction in that direction.

As mentioned, the average Risk Index for the entire country is $15,424. This makes the City's average of $43,152 seem rather high. However the nationwide average is comprised of almost 34,000 crossings, the majority of which are low volume, rural crossings. Comparison of rural values to urban/suburban environment that is Orange is perhaps not fair. Overall though, the methodology uses well-established and accepted Federal guidelines to predict the risks involved in the City's crossings.

Once a Risk Index (or average Risk Index) is calculated, the next step is to factor in the effects of silencing train horns. After extensive research, the FRA concluded, that on average, cessation of train horns results in a 66.7% increase in the Risk Index, all other factors remaining the same. So to find the Risk Index without train horns, the existing Risk Index values are simply multiplied by 1.67. This gives the annualized costs with the horns not being sounded.

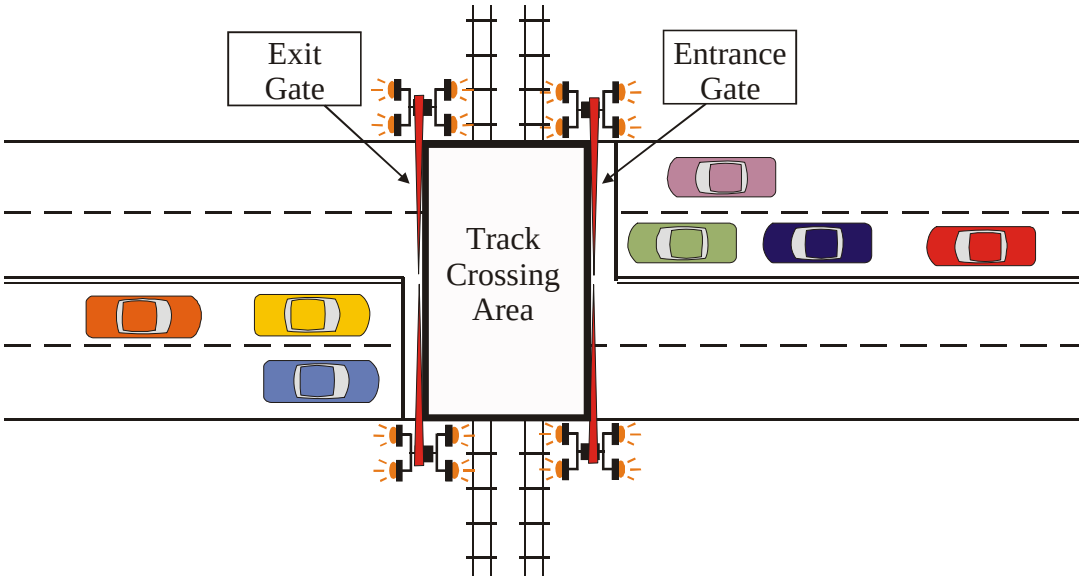
At this point, Quiet Zone improvements come into play. The Interim Rule requires that an agency implement safety improvements at the crossing so that the average Risk Index for the proposed Quiet Zone is either reduced to below the national average Risk Index, or more simply, that the average Risk Index is reduced to a level below what was present before the train horns were silenced. In other words, the crossing must be made considerably safer than before the trains stopped sounding their horns.

To simplify the process for local agencies the FRA has identified four specific types of improvements, already qualified by the FRA for use in Quite Zone implementation. The FRA has computed the reduction in the Risk Indices for each type of improvement. These improvements, called "Supplemental Safety Measures" (SSMs), consist of the following:

1. Temporary closure of a public highway grade crossing during designated quiet periods.
2. Installation of four quadrant gates to fully block highway traffic.
3. Install medians or channelization on each side of the crossing for at least 100 feet.
4. One-way streets with full gates on approach side.

SSM number one, temporary closure of the grade crossing, while interesting and perhaps useful in some situations, is likely not applicable within the City of Orange. Typically it would be done via the use of some type of movable gates that could close a crossing during overnight hours, for example, when a Quiet Zone might be in effect. This SSM does offer a measure of effectiveness of 1.0. This means that the Risk Index for a crossing utilizing this SSM would fall to 0 during the period of its operation.

SSM number two, involves the use of four quadrant gates, and is the means many have come to associate with Quiet Zones. A four quadrant gate (also simply called quad gates), add additional gate arms to crossings to completely "seal" the crossing when the gates are down. With quad gates, it is impossible for vehicles to drive around the gates, because the gates close the entire roadway off from the railroad tracks. An example of quad gates is shown below.



There are variants of quad gates, which include detection of vehicles that could be trapped between the gates when they come down. This style of quad gate is what the City would most likely be required to use. This additional capability and complexity is part of what adds to the cost of quad gates. The FRA has given quad gates, with trapped vehicle presence detection, an effectiveness rating of 0.77. This means the Risk Index will be reduced to 0.23 of its value that existed before the quad gate was installed. The effectiveness rating is increased somewhat if raised medians are installed in conjunction with quad gates, but a 0.77 rating is a conservative value to use.

SSM number three involves the installation of medians or other channelization devices on each side of the rail crossing for at least 100 feet. The concept is to physically prevent vehicles from crossing over to the other side and going around the closed gates. Raised medians receive an effectiveness rating of 0.80, exceeding the rating given to quad gates with presence detection.

So why would an agency spend considerable funds to install a quad gate, when a simple, 100 foot raised median on each side of the crossing approach is more effective? The catch is that there cannot be any streets or driveways within the 100 foot approach area, or if there are, they must be closed off. For Orange, with considerable development adjacent to the railroad tracks, this is a problem. Of the 16 crossings in the City, perhaps only one would be good candidate for raised median treatment.

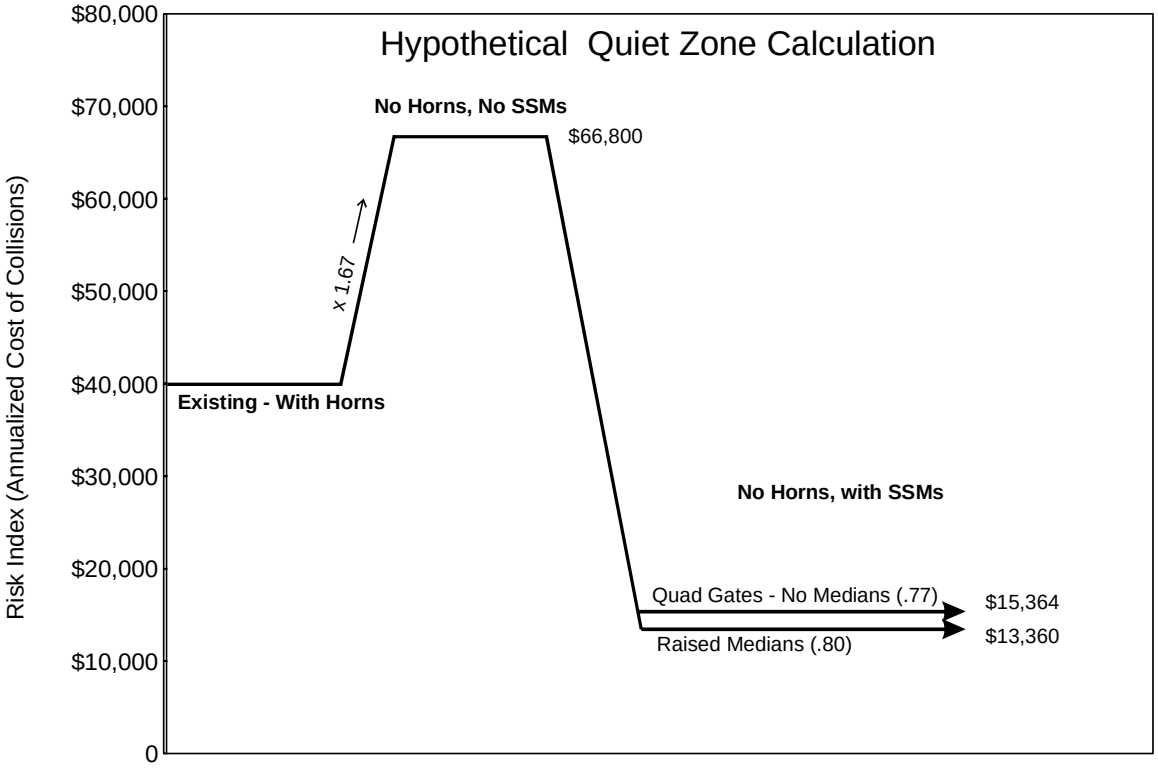
The final SSM, number four, involves one-way street crossings. With gate arms on each side of the road, but on only one side of the rail crossing, the approach is effectively sealed. This SSM garners an effectiveness rating of 0.82. Since all of the existing crossings in Orange are two-way crossings, this SSM does not appear useful for the City. While some of the smaller crossings in the Old Towne area offer the possibility of conversion to one-way traffic, the implications to the surrounding traffic flow could have considerable adverse consequences.

To further illustrate how Quite Zones are derived, a hypothetical situation is illustrated below. It considers treatments to a crossing with an existing Risk Index of $40,000 (which is very close to the City of Orange average of $43,152).

1. The Risk Index without horns and without any SSMs is obtained by multiplying the $40,000 by 1.67. This gives a Risk Index of $66,800.

2. This new Risk Index is then decreased by the effectiveness rating of the desired SSM (0.77 for quad gates or 0.80 for raised medians). In other words, $66,800 may be multiplied by 0.23 to obtain the adjusted Risk Index for quad gates ($15,364) or multiplied by 0.20 to get the adjusted Risk Index for raised medians ($13,360). Note that the Risk Index is now about 1/3 of the original value, before the Quiet Zone was begun. In effect, the Quiet Zone has not only made the area quieter, it has made the crossing considerably safer.

3. If the proposed Quite Zone rail segment involves more than one crossing (typically the case) the Risk Indices for all included crossings are calculated and averaged together. As long as the average Risk Index for the entire segment with the included SSMs and the horns silenced is significantly less than the existing Risk Index, the segment qualifies for Quite Zone Status.



An understanding of the process behind Quiet Zone calculations reveals a critical aspect often overlooked in the sometimes heated debate over Quiet Zones. There is a common perception that Quiet Zones serve merely to improve the quality of life for nearby residents. Because of this, funding is sometimes difficult to obtain, more "worthy" projects taking priority. However the idea that a Quiet Zone is simply a noise reduction program is not correct. Review of the calculation process clearly shows that after installation of Quiet Zone improvements at a crossing, the Risk Index drops to approximately 1/3 of the value had nothing at all been done. This represents a significant increase in the safety of the crossing, and may overshadow the benefits of eliminating the train horns. So, while a Quiet Zone project may deliver quality of life rewards, by its very structure it provides an important boost in crossing safety.

While on the subject of the calculation methodology, it is worth noting a quirk that arises when dealing with averages of multiple crossings. Consider three consecutive crossings where two have fairly high existing Risk Indices, and one has a more modest existing Risk Index. This methodology would allow a local agency to install SSMs at only the two worse crossings of the three, and if the overall average "after" Risk Index was significantly less than the "before" average, the entire segment would qualify for Quiet Zone status. This would be despite the fact that nothing at all was done to one of the crossings, and the

safety decreased at that crossing due to the cessation of horns. In other words, the safety of the two crossings was increased by so much, that it more than offsets the decrease in safety at the crossing where nothing was done.

This is a quite odd result, and has been the subject of some controversy. However due to real world practicalities, it is improbable this scenario will actually occur (and especially for Orange). First, there is the liability issue of a local agency knowingly making a crossing "less safe". While it could be argued that overall the safety was considerably improved on the rail segment, should an accident occur at the untreated crossing the local agency's position in court might prove difficult. Secondly, implementation of many of the SSMs require railroad approval and it is unlikely the railroad would approve anything resulting in a safety decrease at one of their crossings.

In some cases, full implementation of SSMs is not possible due to physical constraints. The FRA leaves the possibility of Quiet Zone open through the use of Alternative Safety Measures (ASMs). There are other, more general means to improve safety at crossings, such as turn prohibitions, raised medians shorter than the SSM-required length, partial quad gates or enforcement programs. Since each ASM may be unique, specific effectiveness ratings are not published. Local agencies wishing to use ASMs must petition the FRA for approval, and the FRA will provide the local agency with the appropriate effectiveness rating for each ASM. Given that the FRA must review ASM requests for the entire country, it is unknown at this point how long such an approval might take. However it remains a viable alternative for Orange, should full SSM implementation prove difficult.

Yet another option exists through the use of what are called "wayside horns". These are horns permanently installed at crossings, which sound when a train passes through. The fixed wayside horns sound instead of the train itself. This provides an advantage of better focusing the horn sound directly at the point most needed, the crossing. Since the train is not sounding its horn a quarter mile in advance of the crossing, the acoustic impact to the surroundings, while not eliminated, is greatly reduced.

In terms of their use in Quiet Zones, wayside horns neither add to nor reduce safety. Their use effectively removes the crossing from Quiet Zone calculations. Because wayside horns are generally considered a noise reduction device and not a significant safety enhancement, it would be unlikely OCTA would fund such

installations. Since most Orange citizens wish to cease trains horns altogether, their use was not really considered for this report.

The actual calculation of Risk Indices in support of Quiet Zones is somewhat involved, and this has been a simplification of the process. It does give an accurate portrayal of the process.

OCTA Grade Crossing Safety Enhancement Program

Over the past several years, the Orange County Transportation Authority (OCTA) has been preparing a report dealing with safety at the county's 64 at-grade highway crossings. The report, titled, "OCTA Grade Crossing Study", inventoried existing conditions at all the county's existing crossings in terms of improvements and protection equipment used. It also offered recommendations for safety enhancements at the crossings. Finally, the report ranked the 64 crossings need for enhancement based upon safety impacts and a consideration of costs. The final report was released December 31, 2003.

The main focus of the report was safety. Quiet Zones and other quality of life issues were not addressed. While in some locations quad gates were recommended (and thus potentially qualify as a Quiet Zone component), most improvements recommended involved street, and sidewalk upgrades, as well as enhancements to signing, striping and rail protection equipment.

The total cost estimated by the OCTA report for all 64 crossings in the county was just under $21 million. The City's total, for our 16 crossings, is $3.8 million.

As mentioned, the OCTA report ranked all 64 crossings in terms of need. It should be noted that the methodology used for the ranking was not the same federal methodology used for Quiet Zone computation. While the federal methodology is actually a predictor of future accident rates, the OCTA ranking methodology uses a point system recommended by OCTA's consultant. As such, rankings made using the two different schemes can be quite different. This has some bearing on the City's crossings.

Figure 2 shows the City's grade crossings and compares the rankings made using the FRA Quiet Zone methodology and the OCTA criteria. It also shows the cost, estimated by the OCTA report, to provide the necessary safety enhancements. Finally, the exhibit identifies the crossings as either "Phase 1" or "Phase 2".

AT GRADE RAILROAD CROSSINGS

Phase 1

Location
Cost
Rank: **XX / YY / ZZ**

Phase 2

Location
Cost
Rank: **XX / YY / ZZ**

XX = OCTA Rank out of 64
YY = OCTA Rank out of 16
ZZ = FRA Rank out of 16

RAILROAD CROSSING

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Figure 2

Location: Riverdale Avenue
Cost: $81,000.00
Rank: **27 / 4 / 16**

Location: Lincoln Avenue
Cost: $170,000.00
Rank: **30 / 6 / 3**

Location: Meats Avenue
Cost: $156,000.00
Rank: **28 / 5 / 15**

Location: Glassell Street
Cost: $129,000.00
Rank: **21 / 2 / 13**

Location: Taft Avenue
Cost: $191,000.00
Rank: **38 / 8 / 12**

Location: Katella Avenue
Cost: $658,000.00
Rank: **48 / 12 / 10**

Location: Collins Avenue
Cost: $131,500.00
Rank: **39 / 9 / 14**

Location: Main Street
Cost: $623,000.00
Rank: **34 / 7 / 5**

Location: Eckhoff Street
Cost: $6,000.00
Rank: **61 / 16 / 8**

Location: Batavia Street
Cost: $371,400.00
Rank: **23 / 3 / 6**

Location: Walnut Avenue
Cost: $915,500.00
Rank: **41 / 10 / 11**

Location: Palm Avenue
Cost: $253,800.00
Rank: **57 / 14 / 9**

Location: Chapman Avenue
Cost: $51,000.00
Rank: **18 / 1 / 1**

Location: Almond Avenue
Cost: $23,500.00
Rank: **58 / 15 / 7**

Location: Palmyra Avenue
Cost: $63,500.00
Rank: **44 / 11 / 2**

Location: La Veta Avenue
Cost: $26,000.00
Rank: **52 / 13 / 4**

The reason for the phasing designation is that funding for the OCTA program has been in a state of flux over the past 6 months. Initially, OCTA identified approximately $10 million of funding that would likely be available for the program. This would only accommodate the top 30 of the 64 crossings. Those top 30 crossings were designated as "Phase 1", and the remainder as "Phase 2", presumably to be accommodated when additional funding became available.

Note that in the exhibit, the methodology used greatly affects rankings. For example using the OCTA methodology, the Riverdale crossing is ranked 4th highest in the City in terms of need (27th overall in the County). This suggests a high priority for the crossing, in OCTA's opinion. Yet using the FRA accident predictive methodology, the Riverdale crossing ranks 16th, making it the City's safest crossing. This is illustrative of how the OCTA program is not necessarily in synchronization with a desire for Quiet Zone implementation. It does not preclude a Quiet Zone, but there are incongruities between the two programs needing resolution.

Staff has expressed interest to OCTA about re-tasking funding provided to Orange for the OCTA-specified improvements toward those improvements more supportive of a Quiet Zone. Recall that a Quiet Zone is only permissible if the overall safety of the involved crossings are significantly improved, so such a desire is not inappropriate. The initial response from OCTA has been that any OCTA funds must go toward the OCTA-recommended improvements. However recent developments with the Placentia Quiet Zone has shown the existence of at least some flexibility on the part of the OCTA Board of Directors toward this concept.

In the past several months, OCTA appears to have identified a source for the additional funds, and intends to move forward with the entire package of 64 crossings, combining Phase 1 and Phase 2. A potential complication to be resolved is that the additional $10 million is federal funding, with more stringent requirements than the first $10 million. How, or if, this will affect the program is unclear.

It appears that OCTA will issue the equivalent of a "Call for Projects" in April of this year. It will not be the typical Call for Projects the City has participated in for other OCTA programs, as these projects are already identified, have cost estimates and are prioritized. It might be better to categorize it as a request for interest.

Information released to date on the new program specifies a minimum City match of 12%. Further, the lead on improvement design will be the railroad (Metrolink, in Orange's case), with OCTA providing project oversight. The participation of cities is expected to be minimal, other than participation in Diagnostic Team meetings and execution of agreements. (A Diagnostic Team is comprised of members of the affected railroads, OCTA the CPUC and local agency, which review a crossing in an attempt to reach consensus on the best improvement option).

This limited participation on our part will make it difficult to emphasize Quiet Zone eligible improvements. Because of the number of crossings and the lengthy approval process, the program is expected to take at least three years until the improvements are completed.

There are some components to the OCTA program worth noting in regards to Quiet Zone implementation. The report does recommend installation of quad gates at the Main Street, Katella and Walnut crossings. Unfortunately the Main and Katella crossings are located in commercial/industrial areas, so Quiet Zone status is less of a priority. The Walnut crossing is in a transitional area approaching the Old Towne residential district, so a quad gate at Walnut is a step in the right direction.

The OCTA report also recommends $15,000 for each of the Riverdale, Lincoln and Meats crossings ($45,000 total) to study the implementation of quad gates at these locations. Due to the proximity of Orange-Olive Road paralleling the railroad tracks, during the comment period for the OCTA report City staff recommended to OCTA that quad gates were good treatments for these crossings. OCTA's response was to include funds for more detailed study. In follow-up questioning of OCTA, it is unclear what the funding status or rankings of the crossings would be should the quad gate detailed studies come back positive. In any event, the door remains slightly open for OCTA implementation of quad gates at these three crossings in the heart of the City's northern residential district.

Cost Estimates for City Grade Crossings

To better understand the costs involved in upgrading the City's crossings to permit Quiet Zone implementation, the firm of J. L. Patterson and Associates (JLP) of Orange was retained by Public Works to prepare "order of magnitude" cost estimates. These are quick, very rough estimates for quad gate installation. This sort of work is highly specialized, and specific knowledge is required. JPL's specialty is railroad design, has an ongoing relationship working with Metrolink, and had done previous work designing quad gate installations.

The cost estimates prepared by JLP are presented below. It should be noted that much of Quiet Zone implementation is worked out through the Diagnostic Team process, and is thus unique to each crossing (and still subject to some CPUC review). Both scheduling and financial constraints prevented such a detailed analysis. Instead, a conservative (meaning high), "rough" cost estimate was prepared, assuming installation of quad gates at each crossing. While useful for planning purposes, these rough estimates should be viewed with some caution. They do not contain any engineering administration or contingency amounts, so an additional 20% should be added to allow for those costs.

Crossing Number	Location	Estimated Cost (in Dollars)
1	La Veta	$385,360
2	Palmyra	$427,844
3	Almond	$425,275
4	Chapman	$406,000
5	Palm	$545,280
6	Walnut	$605,568
7	Collins	$474,700
8	Katella	$572,540
9	Taft	$547,960
10	Glassell	$596,480
11	Meats	$530,080
12	Lincoln	$521,600
13	Riverdale	$505,480
14	Batavia	$522,120
15	Main	$407,260
16	Eckhoff	$414,360
Total for all City crossings:		**$7,887,907**

There are potential recurring costs in addition those capital costs already listed for the actual installation of quad gates (or similar Quiet Zone treatments). Unfortunately, there is considerable uncertainty as to their amounts, but they could possibly be significant.

The first of these possible recurring costs is the maintenance of the quad gates. In the case of other quad gate installations in Southern California, the railroad typically requested the local agency wishing to install quad gates participate in the increased maintenance and utility costs the railroad would incur as owner and operator of the gates. While the local agency's cost participation in this area does not appear to be mandated anywhere, it usually arises as a negotiated item with the railroad to ensure their cooperation with the quad gate program.

The second potential recurring cost is liability insurance for the railroad. The argument made by the railroad is that despite the documented safety provided by quad gates, not sounding their horns will increase their liability and thus increase their liability insurance premiums. The railroad's position has been that the local agency should accommodate the increased premium, as the project is being undertaken at the request of the local agency. Again, nowhere is this mandated, and it usually appears as part of the negotiations.

While these costs may seem quite high, there is some justification for them. All work done within the rail right of way, especially in the case of quad gates, is performed by the railroad. The local agency merely transfers the funding to the railroad. The necessary equipment is determined and installed by the railroad. This installation is further complicated by the need to maintain rail traffic so work periods may be intermittent and inefficient. In summary, such an installation ends up costing much more than an equivalent City-contracted project.

Possible Funding Sources

As previously discussed, the OCTA is expected to make funding available shortly for rail safety projects at grade crossings throughout the county. This amount could total $3.8 million for Orange, subject to a 12% local match.

The City has already secured a grant of $248,000 from GMA 3 for rail safety projects. The money is programmed for award in FY 09/10 but may be eligible for advancement to an earlier fiscal year. If so, it has potential to be used for the local matching portion of the OCTA program.

There is the possibility for funding participation by the City's Redevelopment Agency (subject to crossing inclusion within a defined area of benefit), due to the benefits it will provide to our community from the reduction in train noise. Likewise, large entities such as Chapman University may wish to participate due to the positive impact a Quiet Zone may have on their holdings. In the case of Chapman University, their new film school is located only a few hundred feet from the rail line, and a reduction in train noise might assist their operations.

The Transportation System Improvement Program (TSIP) is generally not a source of funding for these sorts of improvements, as TSIP funds are intended for capacity improvements due to the cumulative impacts of development projects.

No other viable sources of funds (State or Federal) have been identified at this time.

Potential Courses of Action for the City of Orange

The high costs associated with Quiet Zone implementation likely preclude creating a blanket zone for the entire City. JLP estimated to do all 16 crossings within the City would require at least $7.9 million. However OCTA funding appears to be coming available for quad gates at the Main, Katella and Walnut crossings. When those amounts are removed from the JLP figures, an adjusted total for the remaining crossings is $6.3 million. Adding in 20% the specialized engineering administration needed, as well as contingencies, gives a total for the entire City of $7.5 million. Note this does assume the OCTA program moves forward and the City provides appropriate matching funds to participate.

As many of the City's crossings are in commercial or industrial areas where there is little desire for Quiet Zones. It is possible to focus on the City's residential communities, and craft Quiet Zones reflective of just those areas.

Review of the City's rail crossings clearly show two areas of residential use immediately adjacent to the railroad. The first of these, which this report will refer to as the "Northern Residential District", is located in the north part of Orange, and involves the three crossings of Meats, Lincoln and Riverdale. The other residential area will be called the "Old Towne Residential District" and contains the six crossings of La Veta, Palmyra, Almond, Chapman, Palm and Walnut. The following is a detailed look at each area and the crossings involved.

Northern Residential District

These three crossings are all likely candidates for quad gates. Assuming those are the improvements ultimately selected, they have a total cost (JLP estimates plus 20% administration) of $1.87 million.

OCTA has proposed funding of $407,000 for these three crossings. If any retasking of these funds is permitted, the total cost could be offset by this amount, leaving a funding need of $1.46 million.

An unknown at this point is OCTA's willingness to fund study of quad gate installation at these crossings, as previously discussed. Should that course of action prove fruitful and funding is increased to cover quad gates for these crossings, the net costs to the City could be minimal (a 12% match would still probably apply), and a Quiet Zone for this area could prove attainable.

Old Towne Residential District

The JLP estimate for these six crossings (plus 20% administration) totals approximately $3.3 million, which assumes quad gates at all locations. OCTA's proposed funding for these crossings totals $1.3 million, suggesting a shortfall of about $2 million. In fact, this segment is somewhat complex and it bears a closer look at each crossing.

Recent engineering studies for the Santa Ana Double Track Project have shown that the La Veta crossing is not a candidate for quad gates. This was considered by a Diagnostic Team for the Double Track Project and rejected. The problem lies with the proximity of Montgomery Place to the railroad line, on the west side of the tracks. Montgomery Place is a very narrow, public alley providing access to properties fronting the rail line. The Diagnostic Team found there simply wasn't enough room available between Montgomery Place and the operating tracks to install quad gate facilities. This means that as presently configured, the La Veta crossing will likely require ASM-type improvements. This does have the benefit of likely being less expensive than quad gates, however FRA approval is

necessary for ASM measures and in no way certain. In light of quad gates not being feasible at this crossing, a rough improvement cost estimate might be $150,000. OCTA has proposed $26,000, leaving a net need of $124,000.

As part of the Santa Ana Double Track Project, raised, 100-foot long medians will be constructed on each approach to the La Veta crossing. Were it not for the presence of Montgomery Place, the proposed Double Track improvements would qualify as an ASM by themselves, under the raised median criteria. If some means were found to eliminate the access Montgomery Place on to La Veta, the problem of the La Veta crossing (and the costs) would be resolved.

The Palmyra crossing appears to be the only crossing in the City where the raised median SSM could be currently used in place of quad gates. The existing median could be extended to the length needed, and there are no driveways in the prohibited area. If this proves to be the case, the $63,500 estimated by OCTA could completely fund this crossing.

The Almond crossing was also examined for the raised median SSM, but there are commercial driveways too close to the crossing to meet the raised median SSM requirements. It is unlikely these driveways could be closed off without undue impacts to the businesses they serve. In view of this, quad gates appear as the only viable option. The JLP adjusted estimate for quad gates at this location is $510,300. With OCTA proposing to fund only $23,500, an additional $486,800 is required.

For the Chapman crossing, quad gates are estimated to cost about $487,200. OCTA has identified improvements costing $51,000, leaving a net need of $436,200.

The Palm crossing is estimated to require $654,300 for quad gates. This crossing needs some street drainage work, which tends to increase the overall cost. In view of the street improvements needed, OCTA estimates $253,800. Assuming perhaps $100,000 for drainage improvements, and the remaining money going toward crossing safety improvements, there is a net requirement of $500,500.

The last crossing in the Old Towne Residential District is the Walnut crossing. In this case, OCTA is proposing a full quad gate installation, so it appears this crossing may be covered completely in terms of Quiet Zone eligibility.

In summary, assuming the City has the ability to retask some of the OCTA funds, implementation of a Quiet Zone in the Old Towne Residential District is estimated to cost $1,546,700 beyond the funding OCTA is likely to provide.

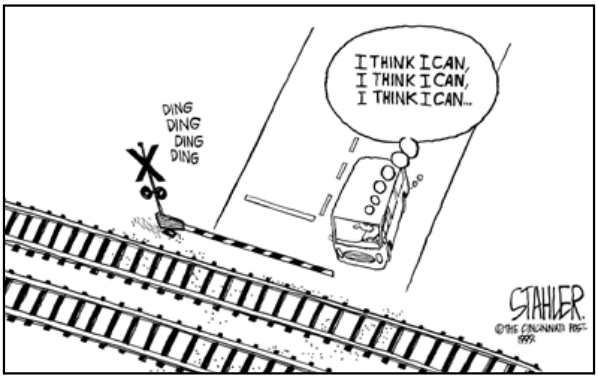
Conclusion

Quiet Zones within the City of Orange are both desirable and attainable. In addition to the benefits of noise reduction, they produce a substantial increase in railroad crossing safety. Unfortunately, they are an expensive proposition. The primary challenge will be identifying a source of funds.

In the most likely case, if OCTA at-grade rail crossing safety funding is permitted to partially go towards Quiet Zone improvements, at least $3 million additional would be needed to implement minimal Quiet Zones in the City's residential areas.

The Quiet Zone process is a lengthy one, and when considering the need to deal with the railroad and the CPUC approval process, three years is a realistic estimate from initial project go-ahead to construction completion.

Staff will continue to work to identify potential sources of funds that may be used for Quiet Zone improvements.



Appendix

Cost Estimates from J.L. Patterson & Associates, November 10, 2005