June 30, 2022

City of Newark CA
Quiet Zone Study

Prepared by R.L. Banks & Associates, Inc.

Arlington VA

Table Of Contents

QUIET ZONES GENERALLY[1]

Only local governments or public agencies may establish a quiet zone, which must be at least 1⁄2 mile in length and have at least one public highway-rail grade crossing. Every public grade crossing in a quiet zone must be equipped at minimum with the standard or conventional automatic warning devices (i.e. flashing lights and gates). Communities have the option to establish partial quiet zones restricting locomotive horn sounding during overnight hours between10:00 P.M. and 7:00 A.M.[2]

Local government(s) must work in cooperation with the railroad that owns the track and the appropriate state transportation authority to convene a diagnostic team to assess the risk of collision at each grade crossing where they wish to silence the horn. An objective determination is made about where and what type of additional safety engineering improvements are necessary to effectively reduce the risk associated with silencing the horns based on localized conditions such as highway traffic volumes, train traffic volumes, the accident history and physical characteristics of the crossing, including existing safety measures.

Examples of additional safety engineering improvements that may be necessary to reduce the risk of collisions include: medians on one or both sides of the tracks to prevent a motorist from driving around a lowered gate; a four-quadrant gate system to block all lanes of highway traffic; converting a two-way street into a one-way street; permanent closure of the crossing to highway traffic; or approved variations of these treatments.

As an alternative to quiet zones, communities may also choose to silence locomotive horns through the installation of wayside horns at each crossing (train-activated stationary acoustical devices directed at highway traffic), as a one for one substitute for train horns.

Once all necessary safety engineering improvements are made, the local community must certify to the Federal Railroad Administration (FRA) that the required level of risk reduction has been achieved. A quiet zone may only take effect after all necessary safety measures are installed and operational.

Notably, in a quiet zone engineers have no legal duty to sound the horn, but may exercise discretion during emergency situations (i.e. the presence of a vehicle or a person on the track). Under federal regulations, engineers must sound the horn to warn railroad maintenance employees or contractors working on the tracks. If a railroad or individual engineer fails to sound the locomotive horn as required or is unnecessarily sounding the horn in an established quiet zone, they are subject to enforcement action by FRA.

Calculating the Level of Risk[3]

In order to create a quiet zone, one of the following conditions must be met:

1. The Quiet Zone Risk Index (QZRI) is less than or equal to the Nationwide Significant Risk Threshold (NSRT) with or without additional safety measures such as Supplementary Safety Measures (SSMs) or Alternative Safety Measures (ASMs) described below. The QZRI is the

[1] https://railroads.dot.gov/newsroom/fact-sheets/fra-locomotive-horn-sounding-and-quiet-zone-establishment
[2] This is a matter of community option. A nighttime Quiet Zone application is held to the same standards as a 24-hour Quiet Zone
[3] https://railroads.dot.gov/sites/fra.dot.gov/files/2020-05/QuietZoneBrochure.pdf

average risk for all public highway-rail crossings in the quiet zone, including the additional risk for absence of train horns and any reduction in risk due to the risk mitigation measures. The NSRT is the level of risk calculated annually by averaging the risk at all of the Nation's public highway-rail grade crossings equipped with flashing lights and gates where train horns are routinely sounded.

2. The Quiet Zone Risk Index (QZRI) is less than or equal to the Risk Index With Horns (RIWH) with additional safety measures such as SSMs or ASMs. The RIWH is the average risk for all public highway-rail crossings in the proposed quiet zone when locomotive horns are routinely sounded.

3. Install SSMs at every public highway-rail crossing. This is the best method to reduce risks in a proposed quiet zone and to enhance safety**.**

The Quit Zone Risk Index is calculated by using the FRA's Quiet Zone Calculator[4] tool which is preloaded with the values for the crossing as based on the Grade Crossing Inventory System[5] and the Grade Crossing Incident Database[6]. The Calculator allows the user to make correction in the crossing data for purposes of calculation but does not enter these changes in the database. The user enters the proposed Supplementary Safety Measure(s) and the calculator determines the revised Risk Index for the crossing(s). Maps, providing context to the proposed quiet zones are attached as Appendix 1. The Calculator work sheets in connection with the Coast and Niles Subdivisions are attached as Appendix 2.

FRA Estimated Costs

The Quite Zone Calculator includes an Estimated Total Cost of the improvements which have been entered by the user. These cost figures represent an assumed national average cost and are provided solely to provide a planning baseline. They only represent the material and installation of the selected Supplementary Safety Measure(s) and do not represent the cost of connection to the railroad or highway signal system signal system and any required or incidental track, crossing surface, or highway work. RLBA recommends the informal solicitation of informal quotes before committing to budget figures.

[4] https://safetydata.fra.dot.gov/quiet/login.aspx
[5] https://railroads.dot.gov/safety-data/crossing-and-inventory-data/crossing-inventory-dashboards-data-downloads
[6] https://railroads.dot.gov/accident-and-incident-reporting/highwayrail-grade-crossing-incidents/highwayrail-grade-crossing

PROJECT OVERVIEW

R L Banks & Associates, Inc. (RLBA) was retained by the City of Newark, California (the City) to perform a feasibility study of establishing one or more railroad crossing quiet zones within the city limits. Federal regulations[7], known as the 'Train Horn Rule', require that locomotive engineers must begin to sound train horns at least 15 seconds, and no more than 20 seconds, in advance of all public grade crossings. The regulation also allows a local government to apply for a waiver of this requirement where it can show that the likelihood of a train-motor vehicle collision will not be increased due to additional safety measures which have been implemented at the crossing(s) in question. Crossings or groups of crossings where the wavier has been granted are designated as Quiet Zones.

RLBA surveyed the existing crossings within the city limits and compiled an inventory which is enumerated in Table 1 below. The list has been organized by the designated name of the rail line (not the operating railroad) and whether or not, in our opinion, the crossing or group of crossings can qualify for the wavier and designation as Quiet Zones.

FRA Crossing #	Cal PUC Crossing #	RR	Type	Position	Status	Mile post	City	RR SubDivision	Street	Quiet Zone		
										Proposed	Eligible	
749937D	001L-29.10	UP	Public	At Grade	Open	29.10	Newark	Coast Sub	Jarvis Avenue	P	Y	Coast Subdivision Quiet Zone
749938K	001L-29.30	UP	Public	At Grade	Open	29.31	Newark	Coast Sub	Haley Street	P	Y	
922029U		UP	Private	At Grade	Open	29.58	Newark	Coast Sub	Private	NA		
749939S	001L-30.00	UP	Public	At Grade	Open	30.05	Newark	Coast Sub	Mayhews Landing Rd	P	Y	
749940L	001L-30.40	UP	Public	At Grade	Open	30.42	Newark	Coast Sub	Thornton Avenue	P	Y	
749941T	001L-30.60	UP	Public	At Grade	Open	30.62	Newark	Coast Sub	Carter Avenue	P	Y	
749943G	001L-31.10	UP	Public	At Grade	Open	31.12	Newark	Coast Sub	Central Avenue	P	Y	
450368T		UP	Private	At Grade	Open	31.29	Newark	Coast Sub	Private Crossings in	N	N	Excluded
749944N		UP	Private	At Grade	Open	31.70	Newark	Coast Sub	Yard Limits	N	N	
749946C	001L-32.20	UP	Public	At Grade	Open	32.25	Newark	Coast Sub	Mowry Avenue	P	Y	Mowry Quiet Zone
749950S	001DAB-36.40	UP	Private	At Grade	Open	33.40	Fremont	Coast Sub	Stevenson Blvd	NA		
750033G	001DAB-38.60	UP	Public	At Grade	Open	33.70	Newark	Niles Sub	Cedar Road	P	Y	Niles Subdivision Quiet Zone
750032A	001DAB-37.80	UP	Public	At Grade	Open	34.46	Newark	Niles Sub	Cherry Street	P	Y	
750030L	001DAB-37.50	UP	Public	At Grade	Open	34.77	Newark	Niles Sub	Sycamore Street	P	Y	
750021M		UP	Public	At Grade	Open	36.42	Newark	Newark Ind Ld	Willow Road	N	N	Newark Industrial Lead Excluded
750024H	001DAB-36.70	UP	Public	At Grade	Open	36.78	Newark	Newark Ind Ld	Spruce Street	N	N	
750028K	001DAB-37.10	UP	Public	At Grade	Open	37.06	Newark	Newark Ind Ld	Ash Street	N	N	

For purposes of the study, the seventeen[8] identified grade crossings within Newark were grouped into one freestanding crossing and three corridors. Four private crossings within these corridors were determined not to impact the quiet zone analysis.

The freestanding crossing is Mowry Avenue, GX 749946C which is over a mile from the adjacent crossings and was dealt with in a prior report included as Appendix 3. The three corridors designated for Quiet Zone study are: 1) the Coast Subdivision between Jarvis Avenue GX 749937D and Central Avenue GX 749943G inclusive (six grade crossings); 2) the Niles Subdivision between Cedar Road[9] GX 750033G and Sycamore Street GX 750050L inclusive (three grade crossings); and 3) the Newark Industrial Lead between Willow Road GX 750021M

[7] 49 Code of Federal Regulations Part 222

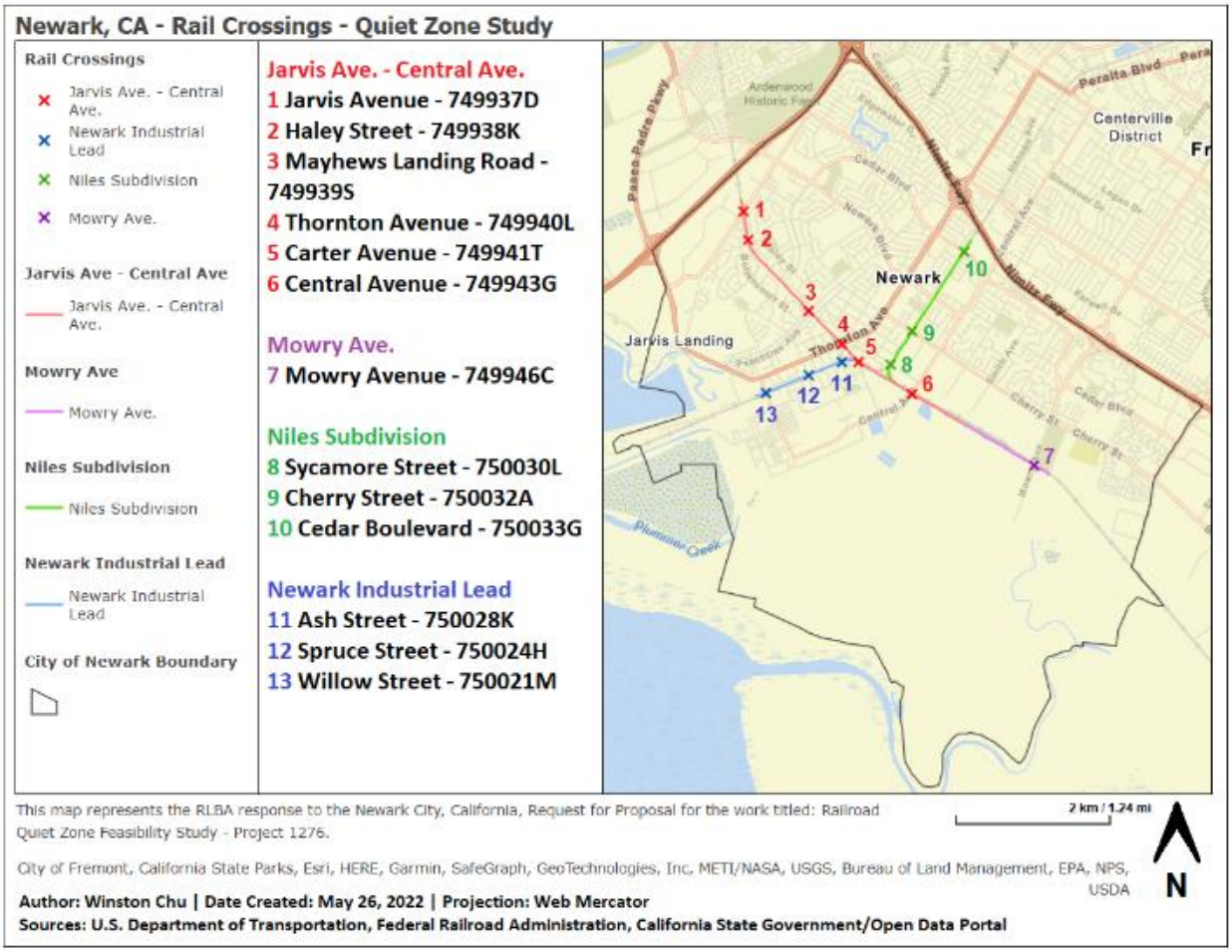
[8] One additional crossing showed as being in Newark on the Federal Railroad Administration Safety Map https://fragis.fra.dot.gov/GISFRASafety/), however this was determined to be the result of a survey error.

[9] Cedar Boulevard is shown as Cedar Road on the FRA documentation and for the sake of clarity we do so here

and Ash Street GX750028K inclusive (three grade crossings). These are shown on Map 1 below.

RLBA reviewed the FRA Grade Crossing Inventory data and, accompanied by the Assistant City Engineer, conducted an onsite inspection of all the public grade crossings within the city limits to determine their overall condition along with any local factors which would have an impact on the feasibility of establishing a quiet zone. While we were not authorized to either open the control housings or perform any testing, all of the crossing signals, except those on the Newark Industrial Lead, appeared to be in good repair and were observed to be functioning properly. The signals on the Newark Industrial Lead appeared to be out-of-service and therefor unmaintained.

Map 1. City of Newark Rail-Highway Grade Crossings



PROPOSED QUIET ZONES

Mowry Avenue Quiet Zone

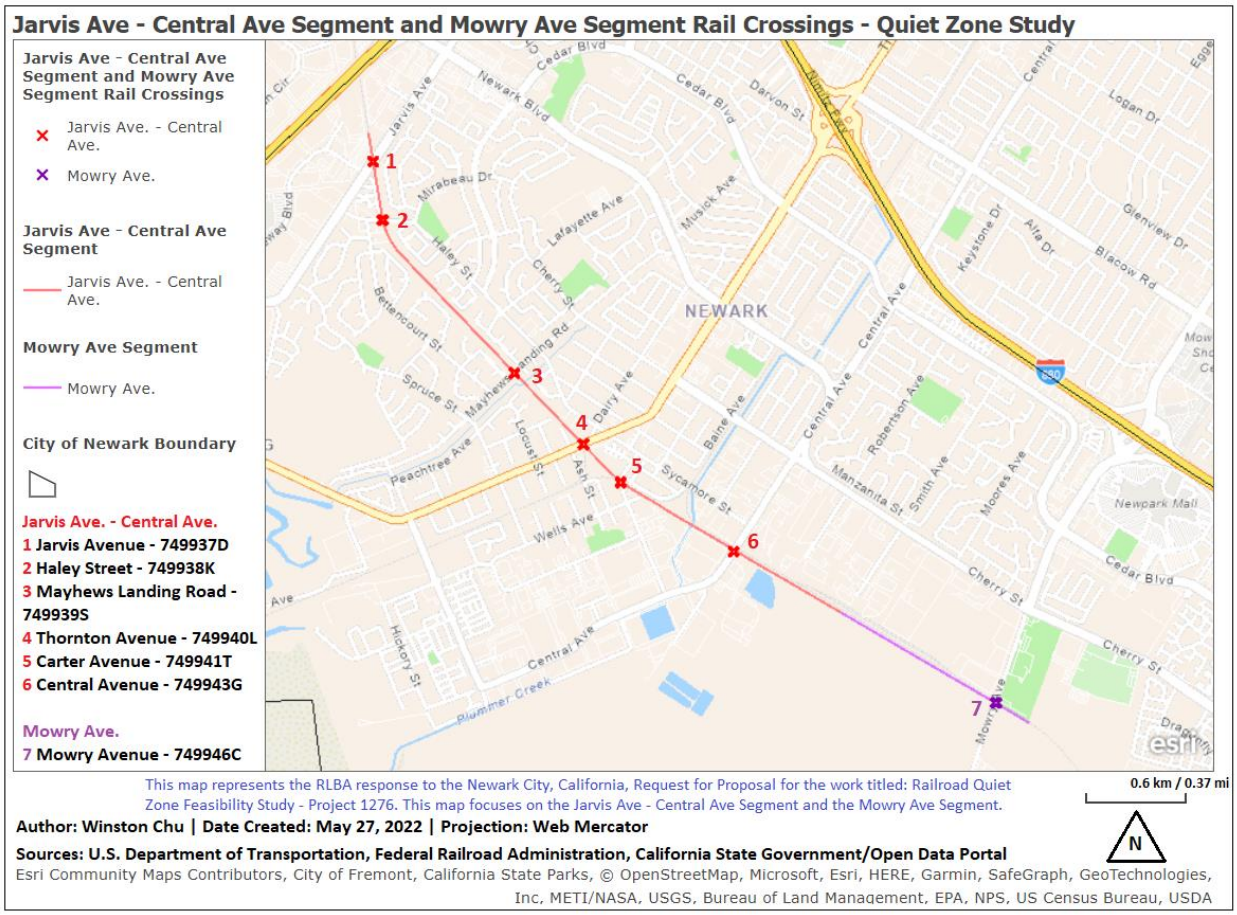
RLBA's report of January 14, 2022 determined that the potential future improvements at Mowry Avenue, GX 749946C would allow it to qualify as a Quiet Zone. RLBA, therefore, recommends that if the crossing is modified in accordance with the plans provided by the City that the City apply for a Waiver of the train Horn Rule at Mowry Avenue. The report is incorporated herein by reference and a copy is attached hereto as Appendix 3.

Coast Subdivision Quiet Zone

The Coast Subdivision Quiet Zone represents a north/south Union Pacific rail corridor approximately 2.2 miles in length between the City Line in the vicinity of Highway 84 and the junction with the Niles Subdivision in the vicinity of Central Avenue. The line is primarily single-track north of Thornton Avenue and double track plus yard tracks south of Thornton. The line's current traffic count is an average of six trains per day.

There are six crossings at grade in the Coast Subdivision Quiet Zone corridor. It is RLBA's opinion that these six crossings as a group can qualify for a waiver of the Train Horn Rule. This will be discussed in more detail below.

Map 2. Coast Subdivision Grade Crossings Recommended for Inclusion in Quiet Zone



The six crossings in the Coast Subdivision Quiet Zone are discussed individually below.

Jarvis Avenue 749937D – Jarvis Avenue is four lanes with a median strip. The crossing angle is approximately 45 degrees. Each direction of travel is already equipped with double gates and cantilevered signals, effectively producing the same effect as a four-quadrant gate. While RLBA has used the addition of four-quadrant gate for purposes of calculating the risk index, we believe that the FRA will accept the current configuration.

Haley Street 749938K – Haley Street is four lanes with no median. It is equipped with two-quadrant gates and cantilevered signals. RLBA recommends the installation of four-quadrant gates along with additional center striping and collapsible bollards.

Mayhews Landing Road 749939S – Mayhews Landing Road is two lanes with no median. It is equipped with two-quadrant gates and pedestal[10] signals. RLBA recommends the installation of four-quadrant gates along with at least one cantilever signal, additional center striping and collapsible bollards.

Thornton Avenue 749940L – Thornton Avenue is four lanes with no median. It is equipped with two-quadrant gates and cantilevered signals. The crossing is complicated by the presence of commercial driveways immediately adjacent to the track on the north side of the street. Provision will have to be made to ensure that the track cannot be accessed from either of these properties while the gates are down. RLBA recommends the installation of four-quadrant gates along with cantilever signals, additional center striping and collapsible bollards.

An additional complication is the presence of Alameda County Fire Department Station 28 in the southwest quadrant of the crossing. The apparatus in this station is frequently delayed in its response to much of the City by the presence of a train on the crossing and can be blocked from leaving the station by traffic backed up at the crossing. RLBA suggests that an additional railroad crossing warning signal with a "Do Not Block Fire Station" sign be placed immediately west of the fire station and that the City and the Fire Department discuss the installation of a remote occupancy indicator in the fire station which will allow the fire apparatus to indicate to their dispatcher a delayed response if the station receives an assignment while a train is occupying or approaching the crossing.

Carter Avenue 749941T – Carter Avenue is four lanes with a center median. It is equipped with two-quadrant gates and cantilevered signals. RLBA recommends that each side be double-gated along with the necessary signage and pavement markings. RLBA further recommends that the median on the northbound side be extended to prevent motor vehicles from going around the gate

Central Avenue 749943G - As this crossing is going to be replaced with an overpass, there is no need to budget additional crossing improvements.

The risk values associated with each crossing, with and without the recommended improvements, are shown in Table 2 below. The cumulative risk index with horns of the Coast Subdivision

[10] A pedestal signal is one which is mounted on a pedestal or a post on the side of the road and is referred to as such in order to differentiate it from a cantilever signal which is mounted on a bridge structure cantilevered over the roadway.

Corridor if no improvements are made is 51,907.00. This is significantly higher than Nationwide Significant Risk Threshold (NSRT) of 15,488.00. The Quiet Zone Risk Index with all of the improvements and the grade separation of Central Avenue is 1,691.05. The recommended Supplementary Safety Measures lower the risk index at each crossing to a level significantly below the NSRT. In addition, the cumulative risk index associated with the corridor is reduced further by the inclusion of the planned Central Avenue overpass project which completely eliminates the crossing with the highest risk index in the corridor.

Table 2. Coast Subdivision QZ Analysis

FRA Crossing #	Position	MP	Street	Current Risk Index	Q Z Risk Index	ASMs Needed	Approximate Cost
749937D	At Grade	29.10	Jarvis Avenue	41,520.01	3,321.60		$115,000
749938K	At Grade	29.31	Haley Street	20,671.18	1,653.69		$115,000
749939S	At Grade	30.05	Mayhews Landing Rd	17,952.90	1,436.23		$115,000
749940L	At Grade	30.42	Thornton Avenue	25,619.86	2,049.59		$115,000
749941T	At Grade	30.62	Carter Avenue	21,064.72	1,685.18		$115,000
749943G	At Grade	31.12	Central Avenue	59,637.99	0,000.00	Overpass	$4,000,000
Quiet Zone Cumulative Risk Index				**51,907.00**	**1,691.05**		
Estimated Cost							**$4,575,000**

For comparison purposes, Table 3 shows the comparative risk index for No Improvement, Quad Gates Only without the planned grade separation of Central Avenue, and Quad Gates with Separation of Central Avenue scenarios

Table 3. Comparative Risk Indices - Coast Subdivision

Scenario	NSRT	QZ Risk Index
No Improvement	15,488.00	31,077.78
Quad Gates only	15,488.00	2,486.22
Quad Gates with Separation of Central Ave	15,488.00	1,691.05
Three Crossings Alternative	15,488.00	3,521.18

In the event that the Thornton Avenue crossing is not approved for a Train Horn Rule Waiver then the Carter Avenue crossing will not either as they are in close proximity to each other. However, the cumulative Quiet Zone Risk Index associated with the three remaining adjacent crossings is 3,521.18, which is still significantly below Nationwide Significant Risk Threshold of 15,488.00

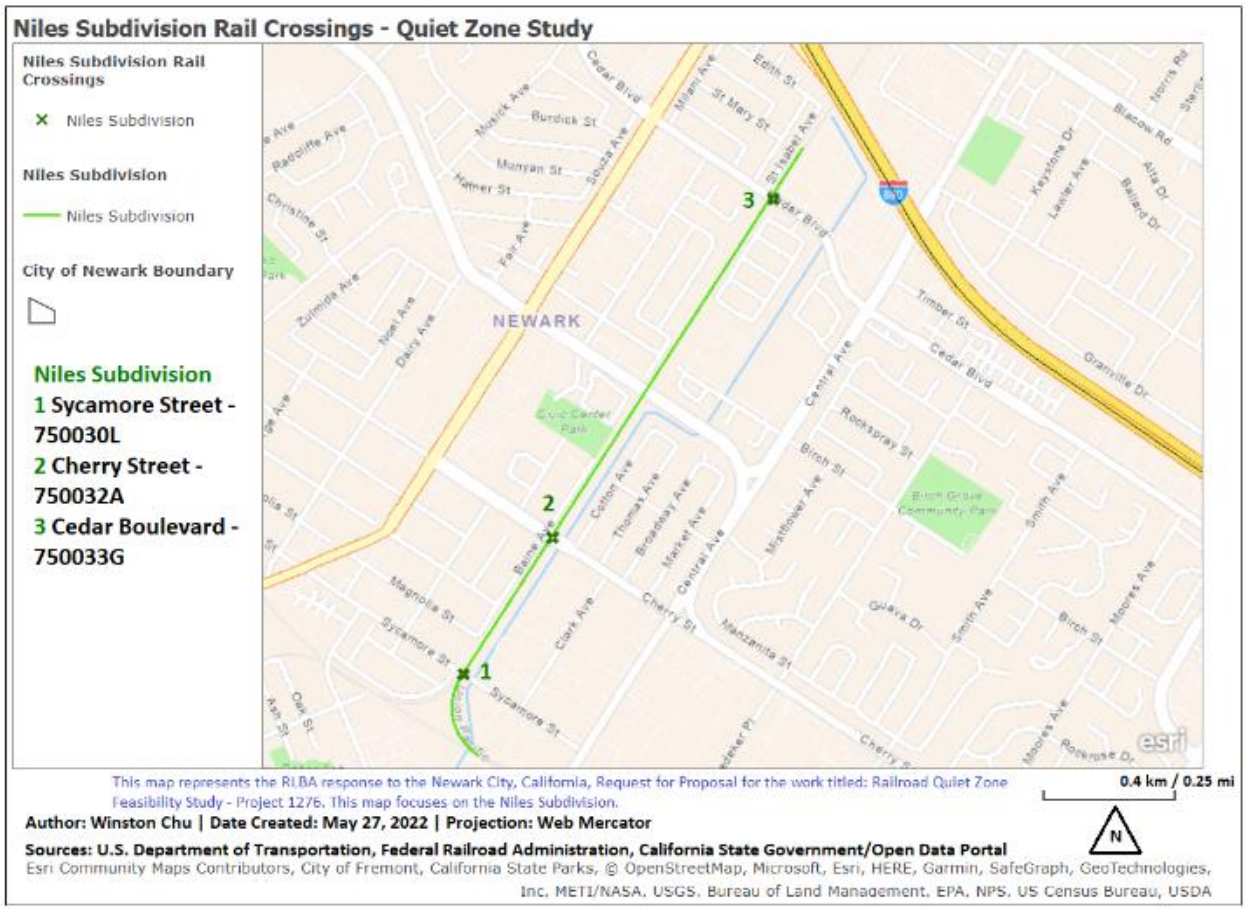
Project Cost The estimated cost in Table 2 is the cost generated by the FRA Quiet Zone Calculator. Removing the FRA's arbitrary $4,000,000 cost of the Central Avenue Grade Separation Project leaves $115,000 per crossing as the marginal cost of installing four-quadrant gates at each of the five remaining crossings or a total of $575,000. As this figure does not include any incidental paving or crossing surface work, or the cost of any necessary changes to the existing railroad or highway signal systems to accommodate the additional equipment, RLBA believes a more accurate figure would be in the vicinity of $150,000 per crossing. As RLBA has only recommended the installation of additional signals at four of the five crossings, this results in a planning figure of $600,000 in signal improvement costs in connection with the Coast Subdivision Quiet Zone

Niles Subdivision Quiet Zone

The Niles Subdivision Quiet Zone corridor represents an east/west Union Pacific rail connector approximately 1.25 miles in length between City Line in the vicinity of Interstate 880 and the junction with the Coast Subdivision in the vicinity of Central Avenue. The line is primarily double-track, with an average of twenty trains per day.

There are three crossings at grade in the Niles Subdivision Quiet Zone corridor. It is RLBA's opinion that the three crossings as a group can qualify for a waiver of the Train Horn Rule. This will be discussed in more detail below.

Map 3. Niles Subdivision Rail-Highway Grade Crossings



The three crossings in the Niles Subdivision Quiet Zone are discussed individually below.

Cedar Road 750033G - Cedar Road is four lanes with no median. It is equipped with two-quadrant gates and cantilevered signals. RLBA recommends the installation of four-quadrant gates along with additional center striping and collapsible bollards. There is an intersection with St. Isabel Avenue on the north side of Cedar Road adjacent to the west side of the railroad right-of-way. RLBA believes that there is sufficient distance between the crossing and the

intersection to meet the 60-foot separation requirement[11].

Cherry Street 750032A – Cherry Street is four lanes with center median. Each direction of travel is already equipped with double-gates and cantilevered signals, effectively producing the same effect as a four-quadrant gate. While RLBA has used the addition of four-quadrant gate for purposes of calculating the risk index, we believe that the FRA will accept the current configuration. However, the intersection with Baine Avenue on the west side of the right-of-way is near enough that the City will need to reconfigure the intersection to meet the 60-foot separation requirement and may need to seek a waiver.

Sycamore Street 750030L – Sycamore Street is three lanes with a center turn lane. It is equipped with two-quadrant gates and cantilevered signals. RLBA recommends the installation of four-quadrant gates along with additional center striping and collapsible bollards

The risk values associated with each crossing, with and without the recommended improvements, are shown in Table 4 below. The cumulative risk index with horns of the Coast Subdivision Corridor if no improvements are made is 47,710.57. This is significantly higher than Nationwide Significant Risk Threshold (NSRT) of 15,488.00. The Quiet Zone Risk Index with all of the improvements and the grade separation of Central Avenue is 6,366.50.

Table 4. Niles Subdivision QZ Analysis

FRA Crossing #	Position	MP	Street	Current Risk Index	Q Z Risk Index	ASMs Needed	Approximate Cost
750033G	At Grade	33.70	Cedar Road	160,539.56	12,843.17		$115,000
750032A	At Grade	34.46	Cherry Street	52,534.32	4,202.75		$115,000
750030L	At Grade	34.77	Sycamore St	25,669.82	2,053.59		$115,000
Quiet Zone Cumulative Risk Index				**47,710.57**	**6,366.50**		
Estimated Cost							**$345,000**

Project Cost The estimated cost in Table 4 is the cost generated by the FRA Quiet Zone Calculator. The total of $345,000 equals $115,000 per crossing as the marginal cost of installing four-quadrant gates at each of the three crossings. As this figure does not include any incidental paving or crossing surface work, or the cost of any necessary changes to the existing railroad or highway signal systems to accommodate the additional equipment, RLBA believes a more accurate figure would be in the vicinity of $150,000 per crossing or a planning figure of $450,000 in signal improvement costs associated with the Coast Subdivision Quiet Zone. This figure does not include the reconfiguration of the two intersections cited above.

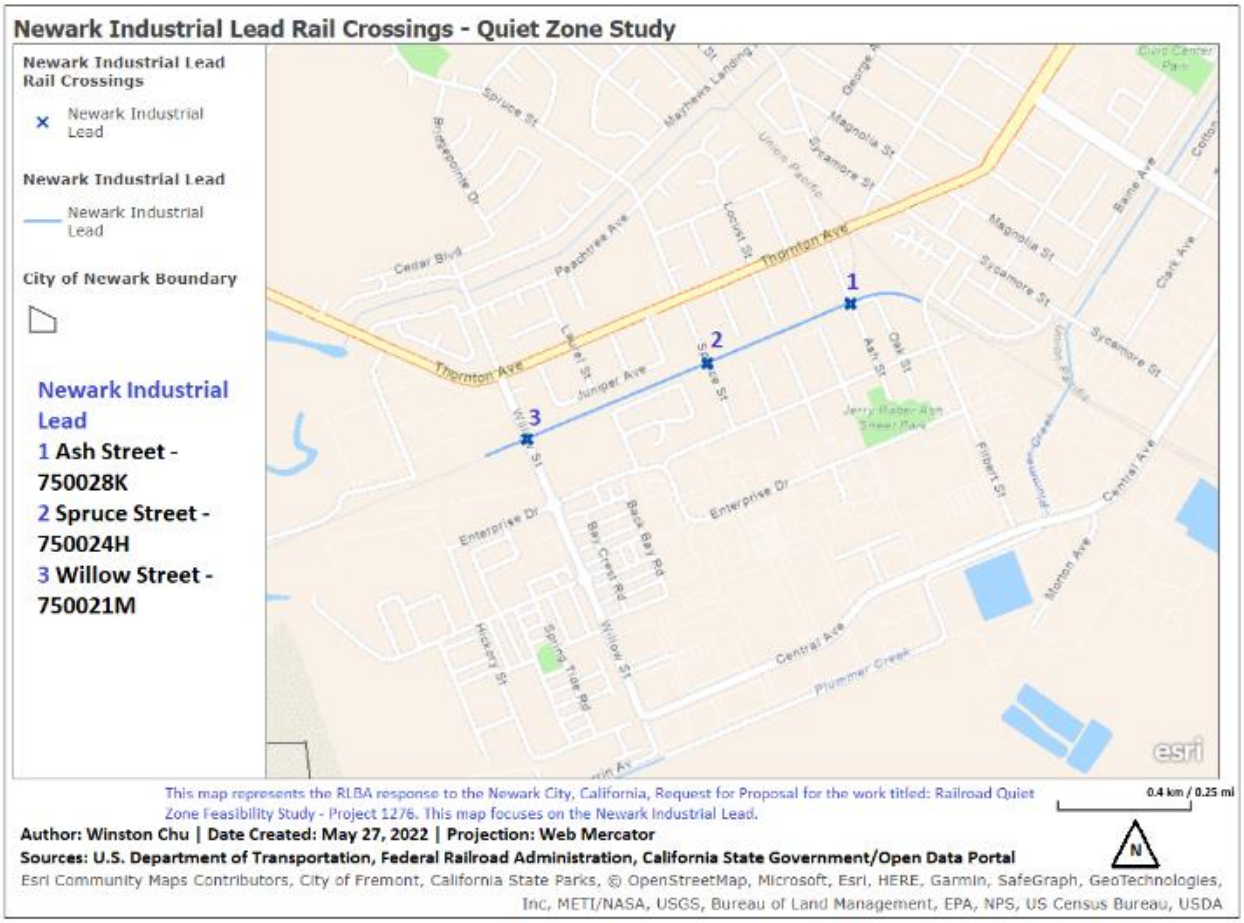
[11] 49CFR222 Appendix A 3 b Medians or channelization devices must extend at least 100 feet from the gate arm, or if there is an intersection within 100 feet of the gate, the median or channelization device must extend at least 60 feet from the gate arm.

Newark Industrial Lead

The Newark Industrial Lead is not recommended for a wavier of the Train Horn Rule. It is further recommended that the existing, active warning devices be removed in their entirety and replaced with crossbucks as specified by the California Public Utilities Commission.

The Newark Industrial Lead appears to be functionally, though apparently not legally, out of service. The most recent inventory of all three crossings FORM FRA F 6180.71, dated 07/20/2021, Part II, Block 1.c. shows a train count (2019) of two daily switching trains, however Google imagery dated 2020-2021 shows significant amounts of rail removed from two of the three tracks and no connected industrial spurs. This was confirmed by a site visit. As a significant portion of the Dumbarton bridge has been removed, there is no current possibility of through traffic.

Map 4. Newark Industrial Lead Coast Grade Crossings Not Recommended for Inclusion in Quiet Zone



All three crossings are currently equipped with flashing light and gates. Area residents and frequent users of the three crossings are accustomed to the absence of trains on the line. In the event that a crossing signal does activate it will probably be ignored. RLBA, therefore, recommends that the existing crossing signals be removed and replaced with RAILROAD CROSSING signs (R15-1) combined with YIELD (R1-2) Signs in accordance with Section 8B.04 of the MUTCD *Crossbuck Assemblies with YIELD or STOP Signs at Passive Grade Crossings.*

Table 4. Newark Industrial Track QZ Analysis

FRA Crossing #	Position	MP	Street	Current Risk Index	Q Z Risk Index	ASMs Needed	Approximate Cost
750021M	At Grade	36.42	Willow Road	NA	NA	None	$0.00
750024H	At Grade	36.78	Spruce Street	NA	NA		$0.00
750028K	At Grade	37.06	Ash Street	NA	NA		$0.00
Quiet Zone Cumulative Risk Index				**NA**	**NA**		
Estimated Cost							**$0.00**

Other Excluded Crossings

Several crossings within Newark City Limits were excluded from the study as they are not on active rail lines, are within yard limits or are not accessible by the general public. Data associated with all of these crossings was confirmed by a site visit.
22029U MP 29.58 Coast Subdivision is a gated private access road used to access the drainage canal. It has no impact on the Quiet Zone Study.
450368T MP 31.29 and 749944N MP 31.7 Coast Subdivision are private crossings within Yard Limits, not on the main line and do not impact the Quiet Zone Study.

749950S MP 33.40 Coast Subdivision Stevenson Boulevard is a private crossing which is located on the city line with Fremont. It does not impact the Quiet Zone Study.

837816X Willow Street (not included in Table 1) was determined to be a survey data recording error. The actual crossing was determined to have been in the City of Alameda.

Appendix 1 Maps

Newark, CA - Rail Crossings - Quiet Zone Study

Rail Crossings

- Jarvis Ave. - Central Ave.
- Newark Industrial Lead
- Niles Subdivision
- Mowry Ave.

Jarvis Ave - Central Ave

- Jarvis Ave. - Central Ave.

Mowry Ave

- Mowry Ave.

Niles Subdivision

- Niles Subdivision

Newark Industrial Lead

- Newark Industrial Lead

City of Newark Boundary

Jarvis Ave. - Central Ave.

1 Jarvis Avenue - 749937D
2 Haley Street - 749938K
3 Mayhews Landing Road - 749939S
4 Thornton Avenue - 749940L
5 Carter Avenue - 749941T
6 Central Avenue - 749943G

Mowry Ave.

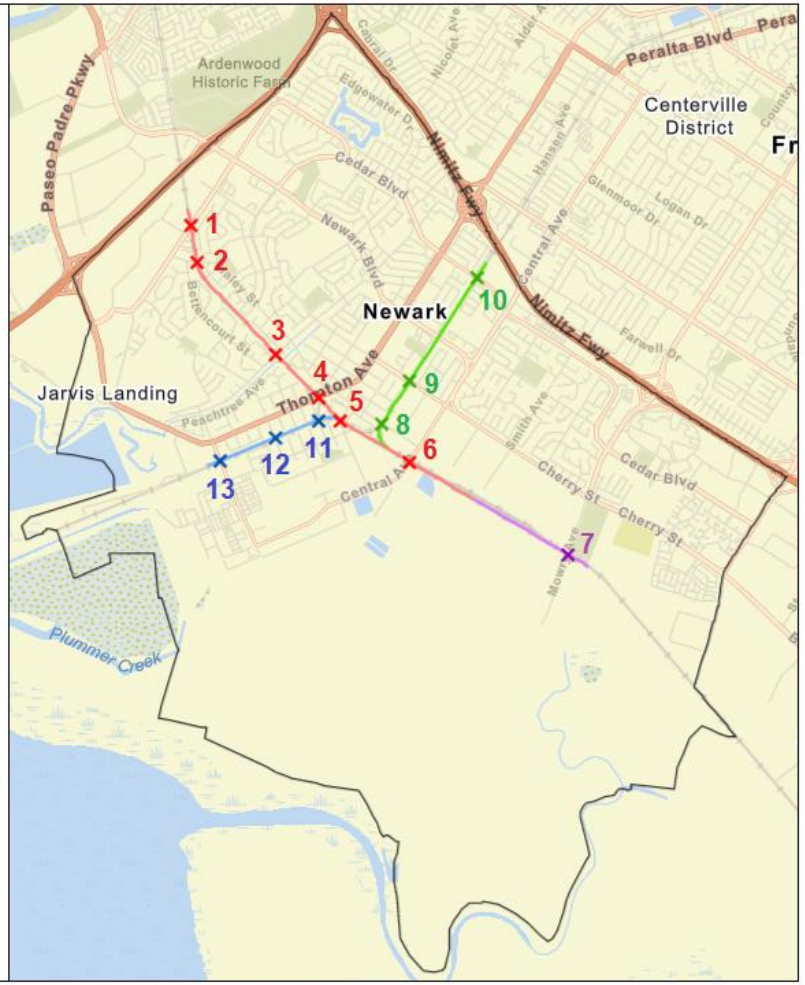
7 Mowry Avenue - 749946C

Niles Subdivision

8 Sycamore Street - 750030L
9 Cherry Street - 750032A
10 Cedar Boulevard - 750033G

Newark Industrial Lead

11 Ash Street - 750028K
12 Spruce Street - 750024H
13 Willow Street - 750021M



This map represents the RLBA response to the Newark City, California, Request for Proposal for the work titled: Railroad Quiet Zone Feasibility Study - Project 1276.

2 km / 1.24 mi

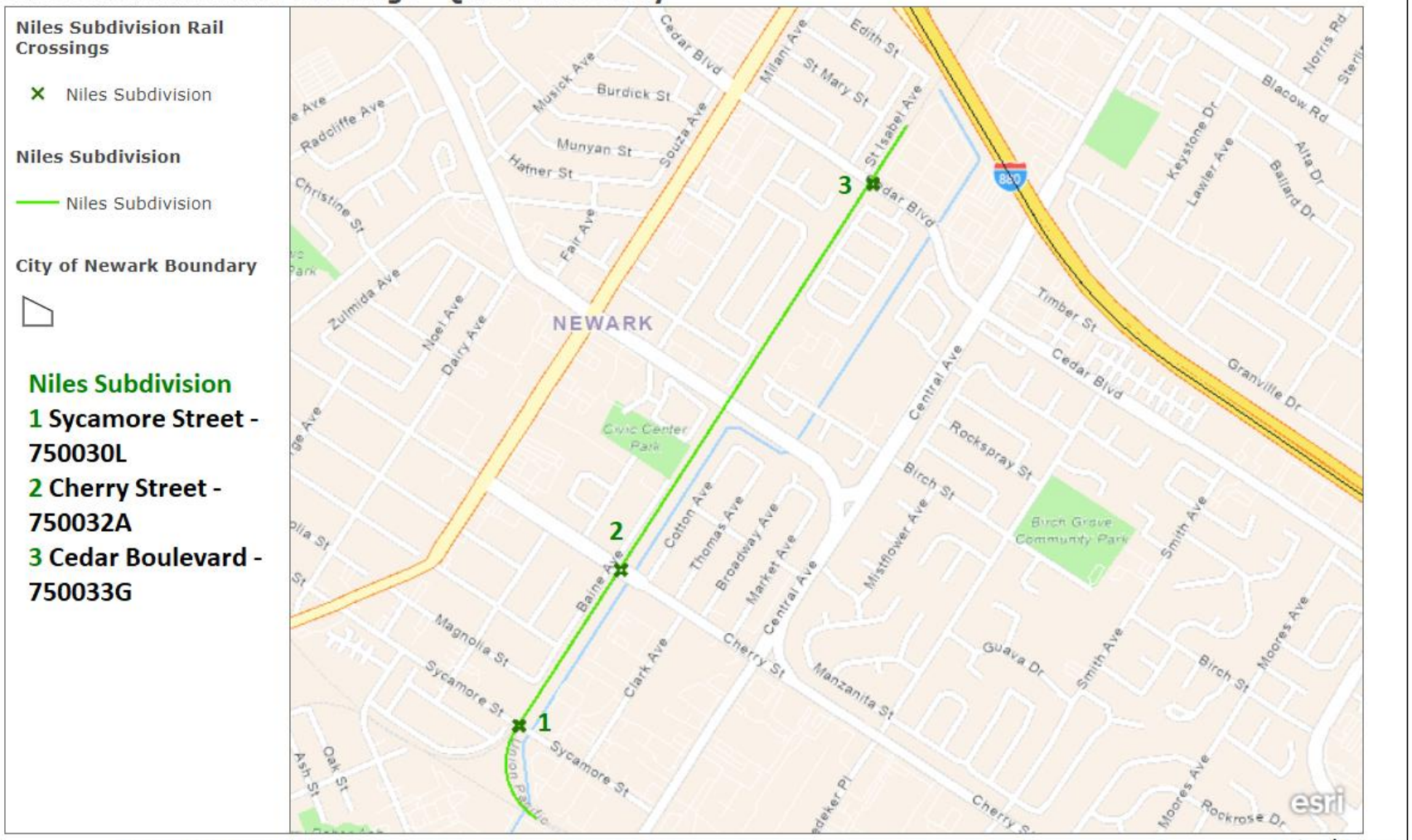
N

City of Fremont, California State Parks, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA

Author: Winston Chu | Date Created: May 26, 2022 | Projection: Web Mercator

Sources: U.S. Department of Transportation, Federal Railroad Administration, California State Government/Open Data Portal

Niles Subdivision Rail Crossings - Quiet Zone Study



This map represents the RLBA response to the Newark City, California, Request for Proposal for the work titled: Railroad Quiet Zone Feasibility Study - Project 1276. This map focuses on the Niles Subdivision.

Author: Winston Chu | Date Created: May 27, 2022 | Projection: Web Mercator

Sources: U.S. Department of Transportation, Federal Railroad Administration, California State Government/Open Data Portal

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0.4 km / 0.25 mi

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Newark Industrial Lead Rail Crossings - Quiet Zone Study

Newark Industrial Lead Rail Crossings

× Newark Industrial Lead

Newark Industrial Lead

Newark Industrial Lead

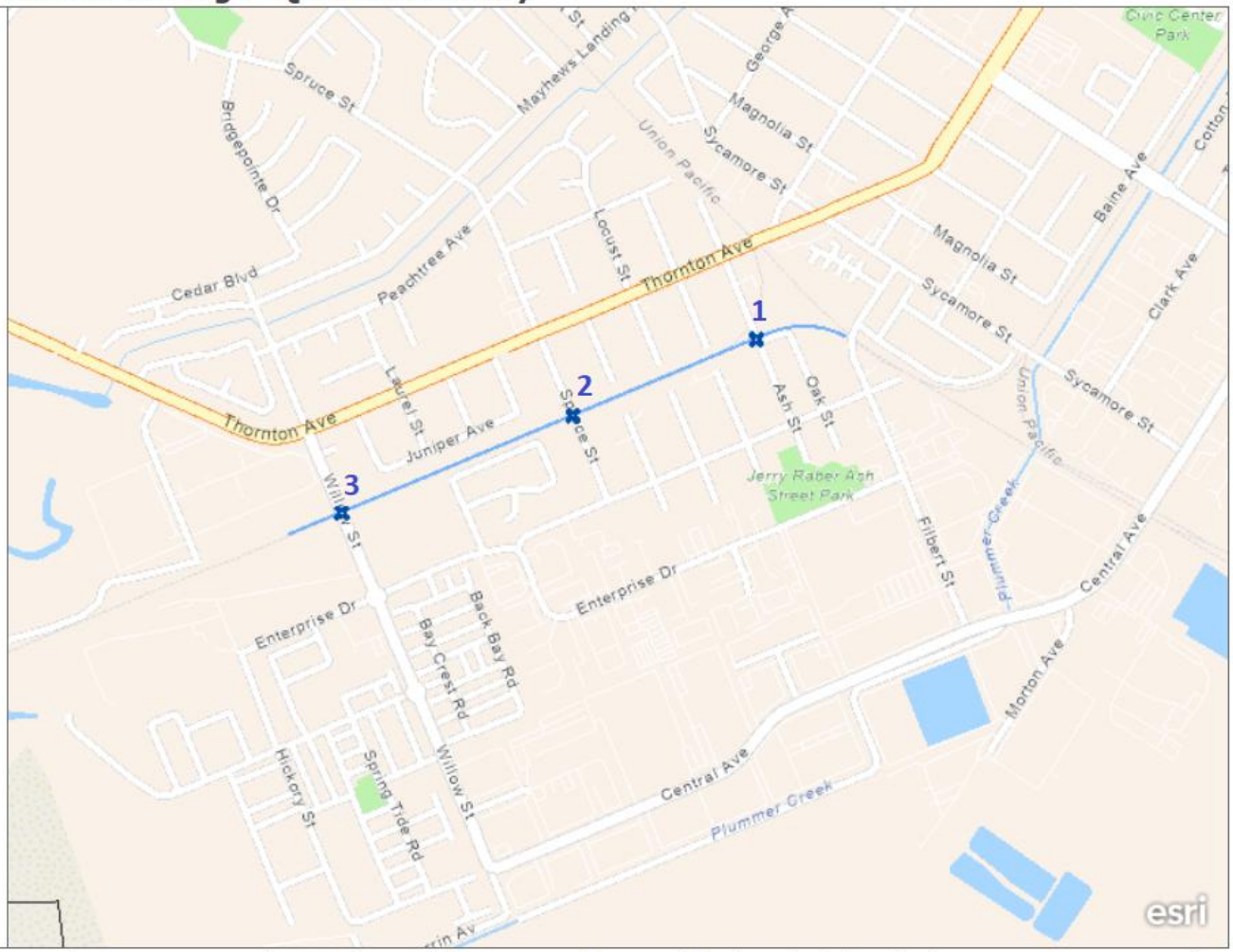
City of Newark Boundary

Newark Industrial Lead

1 Ash Street - 750028K

2 Spruce Street - 750024H

3 Willow Street - 750021M



This map represents the RLBA response to the Newark City, California, Request for Proposal for the work titled: Railroad Quiet Zone Feasibility Study - Project 1276. This map focuses on the Newark Industrial Lead.

0.4 km / 0.25 mi

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Author: Winston Chu | Date Created: May 27, 2022 | Projection: Web Mercator

Sources: U.S. Department of Transportation, Federal Railroad Administration, California State Government/Open Data Portal

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Appendix 2
FRA Grade Crossing Calculator Worksheets

Coast Subdivision Worksheet

6/24/22, 2:03 PM FRA - Quiet Zone Calculator

Print This Page

Home | Help | Contact | logoff mallen@rlbadc.com

Cancel Change Scenario: COAST SUB _66520 Continue

Create New Zone

Manage Existing Zones

Log Off

Crossing	Street	Traffic	Warning Device	Pre-SSM	SSM	Risk	
749937D	JARVIS AVENUE	14688	Gates	13	5	3,321.60	MODIFY
749938K	HALEY STREET	4558	Gates	13	5	1,653.69	MODIFY
749939S	MAYHEWS LANDING ROAD	3299	Gates	0	5	1,436.23	MODIFY
749940L	THORNTON AVENUE	14517	Gates	0	5	2,049.59	MODIFY
749941T	CARTER AVENUE	3849	Gates	13	5	1,685.18	MODIFY
749943G	CENTRAL AVENUE	12054	Gates	0	3	0	Grade Separated

Step by Step Instructions:

Step 1: To specify New Warning Device (For Pre-Rule Quiet Zone Only) and/or SSM, click the MODIFY Button

Step 2: Select proposed warning device or SSM. Then click the UPDATE button.To generate a spreadsheet of the values on this page, click on ASM button—This spreadsheet can then be used for ASM calculations.

Step 3: Repeat Step (2) until the SELECT button is shown at the bottom right side of this page. Note that the SELECT button is shown ONLY when the Quiet Zone Risk Index falls below the NSRT or the Risk Index with Horn.

Step 4: To save the scenario and continue, click the SELECT button

* Only Public At Grade Crossings are listed.

ALERT: Quiet Zone qualifies because SSM has been applied in each crossing.

Click for Supplementary Safety Measures [SSM]

Click for ASM spreadsheet: ASM *

Note:The use of ASMs requires an application to and approval from the FRA.

Summary	
Proposed Quiet Zone:	Coast Sub Newark
Type:	New 24-hour QZ
Scenario:	COAST SUB _66520
Estimated Total Cost:	$4,575,000.00
Nationwide Significant Risk Threshold:	15488 .00
Risk Index with Horns:	51907.51
Quiet Zone Risk Index:	1691.05

Select

Niles Subdivision Worksheet

6/16/22, 10:31 PM FRA - Quiet Zone Calculator

Print This Page

Home | **Help** | **Contact** | **logoff** mallen@rlbadc.com

Cancel Change Scenario: NILES SUB _66487 Continue

Create New Zone

Manage Existing Zones

Log Off

Crossing	Street	Traffic	Warning Device	Pre-SSM	SSM	Risk	
750030L	SYCAMORE STREET	7006	Gates	0	5	2,053.59	MODIFY
750032A	CHERRY STREET	12370	Gates	0	5	4,202.75	MODIFY
750033G	CEDAR ROAD	15084	Gates	0	5	12,843.17	MODIFY

Step by Step Instructions:

Step 1: To specify New Warning Device (For Pre-Rule Quiet Zone Only) and/or SSM, click the MODIFY Button

Step 2: Select proposed warning device or SSM. Then click the UPDATE button.To generate a spreadsheet of the values on this page, click on ASM button—This spreadsheet can then be used for ASM calculations.

Step 3: Repeat Step (2) until the SELECT button is shown at the bottom right side of this page. Note that the SELECT button is shown ONLY when the Quiet Zone Risk Index falls below the NSRT or the Risk Index with Horn.

Step 4: To save the scenario and continue, click the SELECT button

* Only Public At Grade Crossings are listed.

ALERT: Quiet Zone qualifies because SSM has been applied in each crossing.

Click for Supplementary Safety Measures [SSM]

Click for ASM spreadsheet: ASM *
Note:The use of ASMs requires an application to and approval from the FRA.

Summary	
Proposed Quiet Zone:	Niles Sub Newark
Type:	New 24-hour QZ
Scenario:	NILES SUB _66487
Estimated Total Cost:	$345,000.00
Nationwide Significant Risk Threshold:	15488 .00
Risk Index with Horns:	47710.57
Quiet Zone Risk Index:	6366.5

Select

Appendix 3

Mowry Avenue Quiet Zone Study
RLBA, January 14, 2022

14 January 2022

City of Newark CA
Mowry Avenue Quiet Zone Study

Prepared by R.L. Banks & Associates, Inc.

Arlington VA

Introduction

This Report Responds to the City of Newark's request that R.L. Banks & Associates, Inc. (RLBA) Start work early on the Mowry Avenue at-grade railroad crossing.

Location

Newark CA is located in Alameda County on the east side of San Francisco Bay, near the South end of the bay, The Coast Subdivision of the Union Pacific Railroad runs north - south (timetable direction) along the west side of the city, parallel to the bay. The Niles Subdivision and the Newark Industrial Lead run east and west respectively from the Coast Subdivision roughly in the center of the city

The Mowry Avenue crossing (GX No. 749946C) is the southernmost (MP 32.325) of seven crossings located within the city limits of Newark, along the Coast Subdivision.

CURRENT CONDITIONS

Demographics

West of the crossing Mowry Avenue provides access to an auto parts yard and several salt ponds. East of the crossing is a community recreation center and some commercial development. These do not generate traffic over the crossing.

Railroad: Union Pacific Coast Subdivision

The railroad is a double track mainline with a single siding. The mainline track is maintained as FRA Class 4. Maximum timetable speed is 79 miles per hour. The average daily train count is 46 including 18 daily passenger trains

Highway: Mowry Avenue

Mowry Avenue is a two-lane local road which dead ends west of the crossing. The most recent traffic count is less than 1,000 vehicles per day.

There is no sidewalk.

Crossing Conditions GX No. 749946C

The current crossing protection is lights, gates, and bell with the necessary signage and pavement marking. There are no channelization devices nor are there any traffic lights. A copy of the current Grade Crossing Inventory form is attached as Exhibit A.

The most recent train v motor vehicle collision was in 2006. Prior to this there were a total of 6 in

12 years. There are no reports of trespasser collisions related to the crossing.

POTENTIAL CHANGES

Demographics

Potential future development west of the crossing could result in increased recreational, commercial, residential or other uses.
Railroad – None

Highway

Improvements at this crossing could potentially include widening of Mowry Ave through the crossing, the addition of a sidewalk on the south side and other necessary upgrades to the crossing to allow the crossing to be considered for inclusion in a quiet zone. A drawing showing these improvements is attached as Exhibit B.

Quiet Zone Analysis

49 CFR Part 222 et seq provides the overall regulatory guidance for the establishment of a Quiet Zone. The regulatory process and the requirements are summarized in the Federal railroad administration pamphlet in *Guide to The Quiet Zone Establishment Process*[12].Appendixes A and B respectively define Supplementary Safety Measures (SSMs) and Alternative Safety Measures (ASMs).

All public highway-rail crossings in the quiet zone must have, at a minimum, an automatic warning system consisting of flashing lights and gates. The warning systems must be equipped with constant warning time devices (except in rare circumstances) and power out indicators.

There are four separate criteria which may be used to determine whether a crossing may be included in a Quiet Zone.

1. Every public highway-rail crossing in the proposed quiet zone is equipped with one or more SSMs and or ASMs.
2. The Quiet Zone Risk Index (QZRI) of the proposed quiet zone is less than or equal to the Nationwide Significant Risk Threshold (NSRT) without installing SSMs or ASMs.
3. The QZRI of the proposed quiet zone is less than or equal to the Nationwide Significant Risk Threshold (NSRT) after the installation of SSMs or ASMs.
4. The QZRI of the proposed quiet zone is less than or equal to the Risk Index with Horns (RIWH) after the installation of SSMs or ASMs.

Analyzed with each of these sets of criteria the results are as follows:

1. Every public highway-rail crossing in the proposed quiet zone is equipped with one or more SSMs and or ASMs.

The SSMs defined in Appendix A to Part 222. These SSMs are: 1) Medians and/or Channelization devices; 2) One-way streets with gates; 3) Four quadrant gate systems; and 4) Temporary or

[12] https://railroads.dot.gov/sites/fra.dot.gov/files/2020-05/QuietZoneBrochure.pdf

permanent closure (of the crossing).

The drawings provided show, in addition to the basic light gate combination, a 6-inch-high median on both sides of the crossing with flexible tubular delineators on the western/southern side of the of the crossing. This median meets the requirement[13] for an additional SSM and the crossing is eligible for inclusion.

2. The Quiet Zone Risk Index (QZRI) of the proposed quiet zone is less than or equal to the Nationwide Significant Risk Threshold (NSRT) without installing SSMs or ASMs.

The NSRT is 15,488 and the QZRI is 36,301.06. for the unmodified crossing. This does not meet the criteria for inclusion.

3. The QZRI of the proposed quiet zone is less than or equal to the Nationwide Significant Risk Threshold (NSRT) after the installation of SSMs or ASMs.

The NSRT is 15,488 and the QZRI is 9,075.27 for the crossing with the added SSMs. This qualifies the crossing for inclusion.

4. The QZRI of the proposed quiet zone is less than or equal to the Risk Index with Horns (RIWH) after the installation of SSMs or ASMs.

The RIWH 21,763.23 and the QZRI is 9,075.27 for the crossing with the added SSMs This qualifies the crossing for inclusion.

Summary

In Summary Mowry Ave may be qualified as a Quiet Zone With the installation of the Supplemental Safety Measure (SSM) two-quadrant gates, given that raised medians are part of the Union Pacific Railroad Improvements Plan.

[13] Due to the precise nature of the language used in the Grade Crossing Risk Calculator RLBA recommends the addition of reflective delineators on both sides of the crossing

Exhibit A
Grade Crossing Inventory Form

U. S. DOT CROSSING INVENTORY FORM

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION

OMB No. 2130-0017

Instructions for the initial reporting of the following types of new or previously unreported crossings: For public highway-rail grade crossings, complete the entire inventory Form. For private highway-rail grade crossings, complete the Header, Parts I and II, and the Submission Information section. For public pathway grade crossings (including pedestrian station grade crossings), complete the Header, Parts I and II, and the Submission Information section. For Private pathway grade crossings, complete the Header, Parts I and II, and the Submission Information section. For grade-separated highway-rail or pathway crossings (including pedestrian station crossings), complete the Header, Part I, and the Submission Information section. For changes to existing data, complete the Header, Part I Items 1-3, and the Submission Information section, in addition to the updated data fields. Note: For private crossings only, Part I Item 20 and Part III Item 2.K. are required unless otherwise noted. An asterisk * denotes an optional field.

A. Revision Date (MM/DD/YYYY)	B. Reporting Agency	C. Reason for Update (Select only one)	D. DOT Crossing Inventory Number
10 / 14 / 2021	☒ Railroad ☐ Transit ☐ State ☐ Other	☒ Change in Data ☐ New Crossing ☐ Closed ☐ No Train Traffic ☐ Quiet Zone Update ☐ Re-Open ☐ Date Change Only ☐ Change in Primary Operating RR ☐ Admin. Correction	749946C

Part I: Location and Classification Information

1. Primary Operating Railroad	2. State	3. County
Union Pacific Railroad Company [UP]	CALIFORNIA	ALAMEDA

4. City / Municipality	5. Street/Road Name & Block Number	6. Highway Type & No.
☒ In ☐ Near NEWARK	MOWRY AVENUE (Street/Road Name) | * (Block Number)	Is

7. Do Other Railroads Operate a Separate Track at Crossing?	8. Do Other Railroads Operate Over Your Track at Crossing?
☐ Yes ☒ No If Yes, Specify RR	☒ Yes ☐ No If Yes, Specify RR ATK

9. Railroad Division or Region	10. Railroad Subdivision or District	11. Branch or Line Name	12. RR Milepost
☐ None NORTHERN CALIFORNI	☐ None Coast Sub	☒ None	0032.253 (prefix) | (nnnn.nnn) | (suffix)

13. Line Segment *	14. Nearest RR Timetable Station *	15. Parent RR (if applicable)	16. Crossing Owner (if applicable)
		☒ N/A	☐ N/A UP

17. Crossing Type	18. Crossing Purpose	19. Crossing Position	20. Public Access (If Private Crossing)	21. Type of Train	22. Average Passenger Train Count Per Day
☒ Public ☐ Private	☒ Highway ☐ Pathway, Ped. ☐ Station, Ped.	☒ At Grade ☐ RR Under ☐ RR Over	☐ Yes ☐ No	☒ Freight ☒ Intercity Passenger ☐ Commuter ☐ Transit ☐ Shared Use Transit ☐ Tourist/Other	☒ Less Than One Per Day ☐ Number Per Day

23. Type of Land Use
☒ Open Space ☐ Farm ☐ Residential ☐ Commercial ☐ Industrial ☐ Institutional ☐ Recreational ☐ RR Yard

24. Is there an Adjacent Crossing with a Separate Number?	25. Quiet Zone (FRA provided)
☐ Yes ☒ No If Yes, Provide Crossing Number	☒ No ☐ 24 Hr ☐ Partial ☐ Chicago Excused Date Established

26. HSR Corridor ID	27. Latitude in decimal degrees	28. Longitude in decimal degrees	29. Lat/Long Source
☒ N/A	(WGS84 std: nn.nnnnnnn) 37.5155950	(WGS84 std: -nnn.nnnnnnn) -122.0120960	☒ Actual ☐ Estimated

30.A. Railroad Use *	31.A. State Use * CPUC 001L-32.20
30.B. Railroad Use *	31.B. State Use *
30.C. Railroad Use *	31.C. State Use *
30.D. Railroad Use *	31.D. State Use *
32.A. Narrative (Railroad Use) * Amtrak operates Capital Corridor	32.B. Narrative (State Use) *

33. Emergency Notification Telephone No. (posted)	34. Railroad Contact (Telephone No.)	35. State Contact (Telephone No.)
800-848-8715	402-544-3721	415-703-3722

Part II: Railroad Information

1. Estimated Number of Daily Train Movements

1.A. Total Day Thru Trains (6 AM to 6 PM)	1.B. Total Night Thru Trains (6 PM to 6 AM)	1.C. Total Switching Trains	1.D. Total Transit Trains	1.E. Check if Less Than One Movement Per Day ☐ How many trains per week?
12	12	4	18	

2. Year of Train Count Data (YYYY)	3. Speed of Train at Crossing
2019	3.A. Maximum Timetable Speed (mph) 79 3.B. Typical Speed Range Over Crossing (mph) From 35 to 60

4. Type and Count of Tracks
Main 2 Siding 0 Yard 1 Transit 0 Industry 0

5. Train Detection (Main Track only)
☒ Constant Warning Time ☐ Motion Detection ☐ AFO ☐ PTC ☐ DC ☐ Other ☐ None

6. Is Track Signaled?	7.A. Event Recorder	7.B. Remote Health Monitoring
☒ Yes ☐ No	☐ Yes ☒ No	☐ Yes ☒ No

FORM FRA F 6180.71 (Rev. 08/03/2016) OMB approval expires 11/30/2022 Page 1 OF 2

U. S. DOT CROSSING INVENTORY FORM

A. Revision Date *(MM/DD/YYYY)*	PAGE 2	D. Crossing Inventory Number *(7 char.)*
10/14/2021		749946C

Part III: Highway or Pathway Traffic Control Device Information

1. Are there Signs or Signals? ☒ Yes ☐ No

2. Types of Passive Traffic Control Devices associated with the Crossing

2.A. Crossbuck Assemblies *(count)*	2.B. STOP Signs *(R1-1) (count)*	2.C. YIELD Signs *(R1-2) (count)*	2.D. Advance Warning Signs *(Check all that apply; include count)* ☐ None
0	0	0	☒ W10-1 1 ☐ W10-2 ☐ W10-3 ☐ W10-4 ☐ W10-11 ☐ W10-12

2.E. Low Ground Clearance Sign *(W10-5)*	2.F. Pavement Markings	2.G. Channelization Devices/Medians	2.H. EXEMPT Sign *(R15-3)*	2.I. ENS Sign *(I-13)* Displayed
☐ Yes *(count ____)* ☒ No	☒ Stop Lines ☐ Dynamic Envelope ☒ RR Xing Symbols ☐ None	☐ All Approaches ☐ Median ☐ One Approach ☒ None	☐ Yes ☒ No	☒ Yes ☐ No

2.J. Other MUTCD Signs ☒ Yes ☐ No	2.K. Private Crossing Signs *(if private)*	2.L. LED Enhanced Signs *(List types)*
Specify Type ____ Count ____ Specify Type ____ Count ____ Specify Type ____ Count ____	☐ Yes ☐ No	0

3. Types of Train Activated Warning Devices at the Grade Crossing *(specify count of each device for all that apply)*

3.A. Gate Arms *(count)*	3.B. Gate Configuration	3.C. Cantilevered *(or Bridged)* Flashing Light Structures *(count)*	3.D. Mast Mounted Flashing Lights *(count of masts)* 2	3.E. Total Count of Flashing Light Pairs
Roadway 2 Pedestrian 0	☒ 2 Quad ☐ 3 Quad ☐ 4 Quad ☐ Full *(Barrier)* Resistance ☐ Median Gates	Over Traffic Lane 0 ☐ Incandescent Not Over Traffic Lane 0 ☐ LED	☐ Incandescent ☒ LED ☒ Back Lights Included ☐ Side Lights Included	4

3.F. Installation Date of Current Active Warning Devices: *(MM/YYYY)*	3.G. Wayside Horn	3.H. Highway Traffic Signals Controlling Crossing	3.I. Bells *(count)*
____/____ ☒ Not Required	☐ Yes Installed on *(MM/YYYY)* ____/____ ☒ No	☐ Yes ☒ No	2

3.J. Non-Train Active Warning	3.K. Other Flashing Lights or Warning Devices
☐ Flagging/Flagman ☐ Manually Operated Signals ☐ Watchman ☐ Floodlighting ☒ None	Count 0 Specify type ____

4.A. Does nearby Hwy Intersection have Traffic Signals?	4.B. Hwy Traffic Signal Interconnection	4.C. Hwy Traffic Signal Preemption	5. Highway Traffic Pre-Signals	6. Highway Monitoring Devices *(Check all that apply)*
☐ Yes ☒ No	☒ Not Interconnected ☐ For Traffic Signals ☐ For Warning Signs	☐ Simultaneous ☐ Advance	☐ Yes ☒ No Storage Distance * ____ Stop Line Distance * ____	☐ Yes - Photo/Video Recording ☐ Yes – Vehicle Presence Detection ☐ None

Part IV: Physical Characteristics

1. Traffic Lanes Crossing Railroad	2. Is Roadway/Pathway Paved?	3. Does Track Run Down a Street?	4. Is Crossing Illuminated? *(Street lights within approx. 50 feet from nearest rail)*
☐ One-way Traffic ☒ Two-way Traffic ☐ Divided Traffic Number of Lanes 2	☒ Yes ☐ No	☐ Yes ☒ No	☒ Yes ☐ No

5. Crossing Surface *(on Main Track, multiple types allowed)* Installation Date * *(MM/YYYY)* ____/____ Width * ____ Length * ____
☐ 1 Timber ☐ 2 Asphalt ☐ 3 Asphalt and Timber ☒ 4 Concrete ☐ 5 Concrete and Rubber ☐ 6 Rubber ☐ 7 Metal
☐ 8 Unconsolidated ☐ 9 Composite ☐ 10 Other *(specify)* ____

6. Intersecting Roadway within 500 feet?	7. Smallest Crossing Angle	8. Is Commercial Power Available? *
☐ Yes ☒ No If Yes, Approximate Distance *(feet)* ____	☐ 0° – 29° ☐ 30° – 59° ☒ 60° - 90°	☒ Yes ☐ No

Part V: Public Highway Information

1. Highway System	2. Functional Classification of Road at Crossing	3. Is Crossing on State Highway System?	4. Highway Speed Limit
☐ (01) Interstate Highway System ☐ (02) Other Nat Hwy System (NHS) ☐ (03) Federal AID, Not NHS ☒ (08) Non-Federal Aid	☐ (0) Rural ☒ (1) Urban ☐ (1) Interstate ☐ (5) Major Collector ☐ (2) Other Freeways and Expressways ☐ (3) Other Principal Arterial ☐ (6) Minor Collector ☐ (4) Minor Arterial ☒ (7) Local	☐ Yes ☒ No 5. Linear Referencing System *(LRS Route ID)* * 6. LRS Milepost *	35 MPH ☒ Posted ☐ Statutory

7. Annual Average Daily Traffic *(AADT)*	8. Estimated Percent Trucks	9. Regularly Used by School Buses?	10. Emergency Services Route
Year 2016 AADT 905	30 %	☐ Yes ☒ No Average Number per Day ____	☐ Yes ☐ No

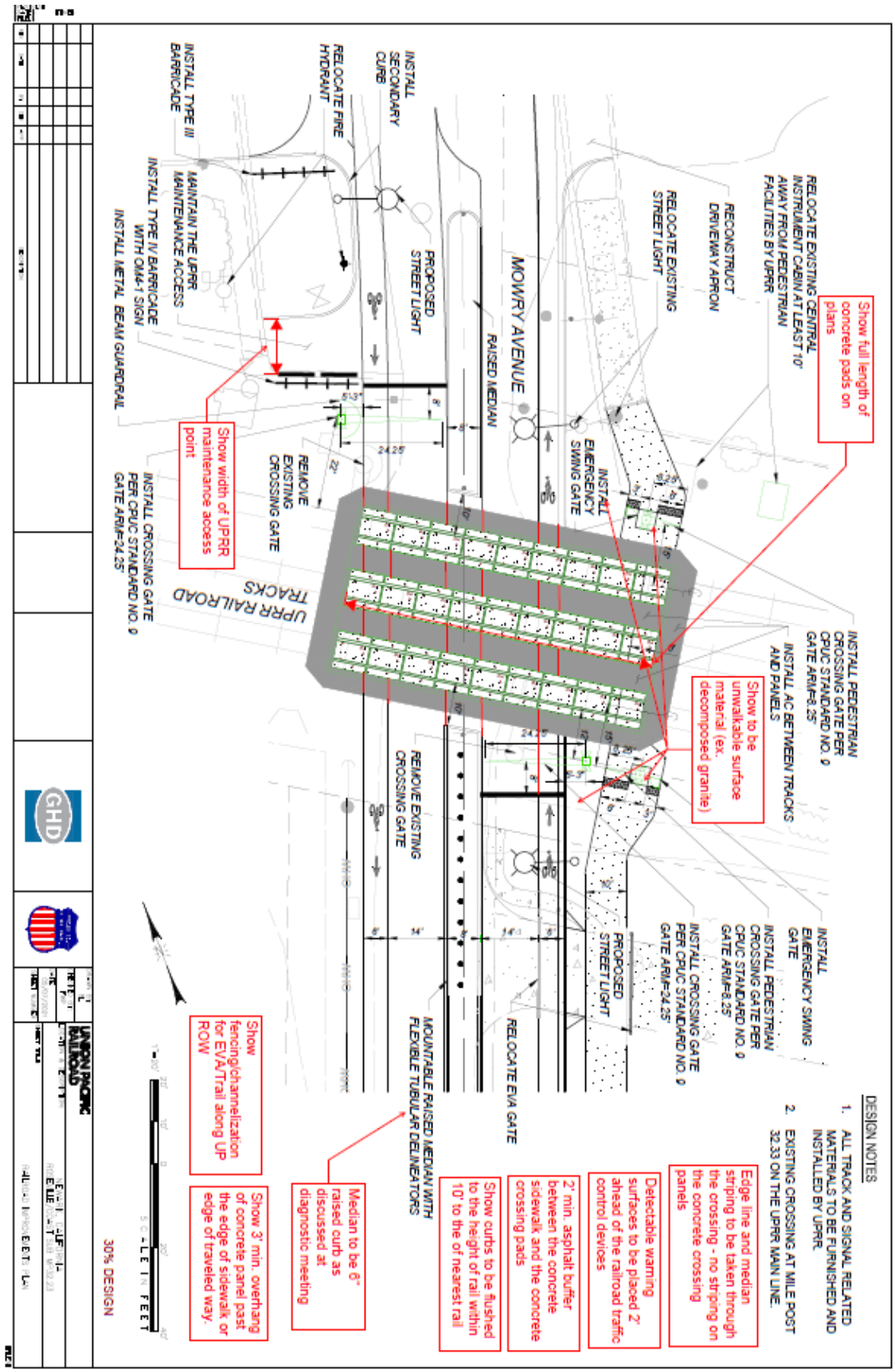
Submission Information - *This information is used for administrative purposes and is not available on the public website.*

Submitted by ____ Organization ____ Phone ____ Date ____

Public reporting burden for this information collection is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information. According to the Paperwork Reduction Act of 1995, a federal agency may not conduct or sponsor, and a person is not required to, nor shall a person be subject to a penalty for failure to comply with, a collection of information unless it displays a currently valid OMB control number. The valid OMB control number for information collection is 2130-0017. Send comments regarding this burden estimate or any other aspect of this collection, including for reducing this burden to: Information Collection Officer, Federal Railroad Administration, 1200 New Jersey Ave. SE, MS-25 Washington, DC 20590.

FORM FRA F 6180.71 (Rev. 08/03/2016) OMB approval expires 11/30/2022 Page 2 OF 2

Exhibit B
Union Pacific Railroad Improvements


Show full length of concrete pads on plans
RELOCATE EXISTING CENTRAL INSTRUMENT CABIN AT LEAST 10' AWAY FROM PEDESTRIAN FACILITIES BY UPRR
RECONSTRUCT DRIVEWAY APRON
RELOCATE EXISTING STREET LIGHT
INSTALL TYPE III BARRICADE
MAINTAIN THE UPRR MAINTENANCE ACCESS
INSTALL TYPE IV BARRICADE WITH OM4-1 SIGN
INSTALL METAL BEAM GUARDRAIL
INSTALL SECONDARY CURB
RELOCATE FIRE HYDRANT
PROPOSED STREET LIGHT
MOWRY AVENUE
RAISED MEDIAN
INSTALL EMERGENCY SWING GATE
REMOVE EXISTING CROSSING GATE
Show width of UPRR maintenance access point
INSTALL CROSSING GATE PER CPUC STANDARD NO. 9 GATE ARM=24.25'
UPRR RAILROAD TRACKS
INSTALL PEDESTRIAN CROSSING GATE PER CPUC STANDARD NO. 9 GATE ARM=8.25'
INSTALL AC BETWEEN TRACKS AND PANELS
Show to be unwalkable surface material (ex. decomposed granite)
REMOVE EXISTING CROSSING GATE
MOUNTABLE RAISED MEDIAN WITH FLEXIBLE TUBULAR DELINEATORS
RELOCATE EVA GATE
INSTALL EMERGENCY SWING GATE
INSTALL PEDESTRIAN CROSSING GATE PER CPUC STANDARD NO. 9 GATE ARM=8.25'
INSTALL CROSSING GATE PER CPUC STANDARD NO. 9 GATE ARM=24.25'
PROPOSED STREET LIGHT
Show fencing/channelization for EVA/Trail along UP ROW
Show 3' min. overhang of concrete panel past the edge of sidewalk or edge of traveled way.
Median to be 6" raised curb as discussed at diagnostic meeting
Detectable warning surfaces to be placed 2' ahead of the railroad traffic control devices
2' min. asphalt buffer between the concrete sidewalk and the concrete crossing pads
Show curbs to be flushed to the height of rail within 10' to the of nearest rail
Edge line and median striping to be taken through the crossing - no striping on the concrete crossing panels
DESIGN NOTES
1. ALL TRACK AND SIGNAL RELATED MATERIALS TO BE FURNISHED AND INSTALLED BY UPRR.
2. EXISTING CROSSING AT MILE POST 32.33 ON THE UPRR MAIN LINE.
SCALE IN FEET
30% DESIGN
UNION PACIFIC RAILROAD
GHD

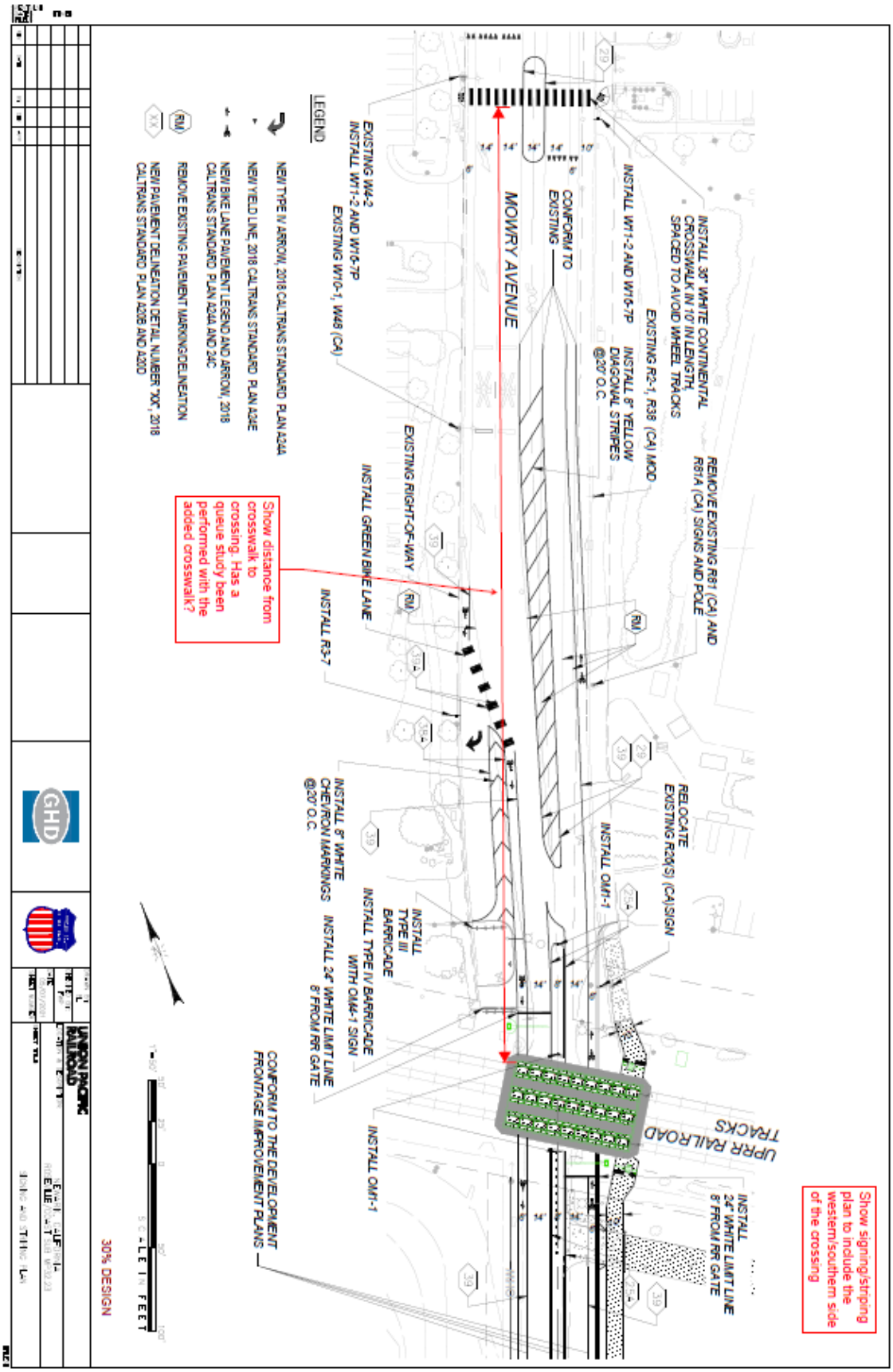

MOWRY AVENUE
UPRR RAILROAD TRACKS
INSTALL 36" WHITE CONTINENTAL CROSSWALK IN 10' IN LENGTH, SPACED TO AVOID WHEEL TRACKS
REMOVE EXISTING R81 (CA) AND R81A (CA) SIGNS AND POLE
EXISTING R2-1, R38 (CA) MOD
INSTALL W11-2 AND W16-7P
INSTALL 8" YELLOW DIAGONAL STRIPES @30' O.C.
CONFORM TO EXISTING
EXISTING W4-2
INSTALL W11-2 AND W16-7P
EXISTING W10-1, W46 (CA)
EXISTING RIGHT-OF-WAY
INSTALL GREEN BIKE LANE
INSTALL R3-7
RELOCATE EXISTING R26(S) (CA)SIGN
INSTALL OM1-1
INSTALL 8" WHITE CHEVRON MARKINGS @20' O.C.
INSTALL TYPE III BARRICADE
INSTALL TYPE IV BARRICADE WITH OM4-1 SIGN
INSTALL 24" WHITE LIMIT LINE 8' FROM RR GATE
INSTALL OM1-1
INSTALL 24" WHITE LIMIT LINE 8' FROM RR GATE
CONFORM TO THE DEVELOPMENT FRONTAGE IMPROVEMENT PLANS
LEGEND
NEW TYPE IV ARROW, 2018 CALTRANS STANDARD PLAN A24A
NEW YIELD LINE, 2018 CALTRANS STANDARD PLAN A24E
NEW BIKE LANE PAVEMENT LEGEND AND ARROW, 2018 CALTRANS STANDARD PLAN A24A AND 24C
REMOVE EXISTING PAVEMENT MARKING/DELINEATION
NEW PAVEMENT DELINEATION DETAIL NUMBER 70X, 2018 CALTRANS STANDARD PLAN A20B AND A20D
Show distance from crosswalk to crossing. Has a queue study been performed with the added crosswalk?
Show signing/striping plan to include the western/southern side of the crossing
30% DESIGN
SCALE IN FEET
UNION PACIFIC RAILROAD

Exhibit C
Quiet Zone Crossing Eligibility Matrix

Quiet Zone Crossing Eligibility Matrix

	Crossing Number	749946C				
	Street Name	Mowery Ave				
		SSMs / ASMs Installed / Proposed	NSRT / RWIH	QRZI Without SSM / ASM	QRZI With SSM / ASM	Qualifying
1	Every public highway-rail crossing in the proposed quiet zone is equipped with one or more SSMs and or ASMs					
	Supplementary Safety Measures (SSM)					
	Medians/ Channelization Devices	Yes				**Yes**
	One-way Streets with gates					
	Four Quadrant gate systems					
	Temporary or permanent closures					
	Alternative Safety Measures (ASM)					
2	The Quiet Zone Risk Index (QZRI) of the proposed quiet zone is less than or equal to the Nationwide Significant Risk Threshold (NSRT) without installing SSMs or ASMs.		15,488.00	36,301.06		**20,813.06** **No**
3	The QZRI of the proposed quiet zone is less than or equal to the Nationwide Significant Risk Threshold (NSRT) after the installation of SSMs or ASMs.		15,488.00		9,075.27	**6,412.73** **Yes**
4	The QZRI of the proposed quiet zone is less than or equal to the Risk Index with Horns (RIWH) after the installation of SSMs or ASMs.		21,763.23		9,075.27	**12,687.96** **Yes**