

**Railroad Safety Study Compton
High School Reconstruction Project
Compton, California**

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TABLE OF CONTENTS

Section	Page
Introduction.....	1
Purpose	1
Location.....	1
Methodology.....	4
Railroad Safety Assessment	5
Railroad Derailment Assessment	5
Study Assumptions.....	7
Sources Utilized.....	7
Environmental Setting.....	9
Topography	9
Current Site Use	9
Rail Line Operations and Use	9
a. Historic Use	9
b. Current Use and Operations	9
c. Rail Classifications and Crossings	10
d. Existing Road and Railroad Crossing Conditions	10
e. Railroad Noise Environment	15
Railroad Safety Assessment	15
Railroad Derailment Assessment	15
a. Data Sources and Probability Estimation Methodology	16
b. Probability Calculations.....	16
Potential Hazardous Material Release.....	19
Summary of Results.....	22
Findings	22
Conclusions	23
Recommendations	23
Limitations.....	25
References.....	26

Appendix

A Railway Assessment Calculations

LIST OF FIGURES

Figure		Page
1	Regional Location Map.....	2
2	Proposed High School Site Location.....	3
3	Myrrh Street Crossing.....	12
4	Alondra Boulevard Crossing.....	14
5	Los Angeles Wind Rose.....	20
6	Long Beach Wind Rose.....	21

LIST OF TABLES

Table		Page
1	Summary of Specific Information and Data.....	6
2	Protocol Probability Results for the Proposed Compton High School Site.....	19

INTRODUCTION

The Compton Unified School District (CUSD) is proposing to reconstruct the Compton High School (CHS) campus, which would consist of the demolition of all existing buildings, facilities, and athletic fields, and the construction of new, modern buildings, facilities, and athletic fields with a design that supports a free-flowing campus (“proposed Project”). This Rail Safety Study (RSS) is part of the environmental review being completed by Meridian Consultants LLC for the CUSD.

Purpose

Under Education Code Section 17251, the California Department of Education (CDE)¹ has the authority to approve the acquisition of proposed school sites. CUSD must obtain CDE site approval to receive state funds under the state’s School Facilities Program, which is administered by the State Allocation Board. CDE’s standards and regulations for the process are presented in the California Code of Regulations.

CDE requires that an RSS be completed on all new school sites within 1,500 feet of a railroad easement prior to the CDE’s approving construction of a new school site.² To address this requirement, CUSD has asked that an RSS be prepared to address potential risks resulting from the railroad easement south of the proposed high school site.

Location

The proposed high school site is within the central portion of the City of Compton (“City”), approximately 1 mile north of State Route 91 (SR 91), 2 miles west of Interstate 710 (I-710), 3 miles east of Interstate 110 (I-110), and 2.5 miles south of Interstate 105 (I-105), as shown in **Figure 1, Regional Location Map**. The Project site is generally bound by Myrrh Street to the north, Acacia Avenue to the east, Alondra Boulevard to the south, and Compton Creek to the west. A private street, Oleander Avenue, bisects the Project site, connecting to Myrrh Street on the north and Alondra Boulevard on the south.

The proposed Project would involve the original Compton High School and the acquisition of 10 parcels on the southeastern portion of the Project site. **Figure 2, Proposed High School Site Location**, shows the location of the proposed high school site in relation to the Los Angeles County Metropolitan Authority (Metro) Blue Rail Line (Metro rail line) and existing crossings nearest to the proposed high school site. A second railroad easement, the Alameda Corridor freight rail, is located east of the Metro rail line on Alameda Street; however, it is approximately 1,900 feet from the school site and therefore is beyond the 1,500-foot requirement for an RSS.

1 California Department of Education (CDE). Resources for School Facilities Planning, School Selection, and Approval Guide, <https://www.cde.ca.gov/lr/fa/sf/schoolsiteguide.asp> (last reviewed June 21, 2016).

2 California Code of Regulations Section 14010 (d).

The Project site is currently designated by the City's General Plan for Public/Quasi-Public and Medium Density land uses. The Project site is currently zoned High-Density Residential (RH) and Limited Commercial (CL). The Project site is approximately 40 acres (1,742,400 square feet) in size and is identified by Assessor's Parcel Numbers (APNs) 6160-005-901, 6161-020-900, and 6160-006-001, -002, -003, -004, -005, -006, -007, -008, -009, and -010.

Methodology

The quantitative probability, or annual frequency, of a derailment accident is determined for the Metro rail line for a distance of 1,500 feet from the Project site. The determination is based on the Los Angeles Unified School District's (LAUSD's) "incident analysis" method revised in 2007 as a part of the Office of Environmental Health and Safety' (OEHS) *Draft Rail Safety Study Protocol* (LAUSD Rail Safety Protocol).³ The RSS incident analysis methodology was used for the assessment to calculate accident rates and probabilities; derailment rates and probabilities; and a hazardous materials release probability.

As noted, The CDE regulations, which took effect in 2000, require that if a proposed school site is within 1,500 feet of a railroad track easement, an RSS shall be completed.⁴ This 1,500-foot-radius area surrounding the proposed high school site is referred to in this report as the "Study Area." In addition to the required analysis, possible and reasonable mitigation measures must be identified.

Data from Metro and other readily available sources were used to prepare this RSS. The Federal Railroad Administration (FRA) is responsible for ensuring the safety of all railroad operations in the United States under the Federal Railroad Safety Act of 1970.⁵ The FRA issues and enforces a broad array of regulations related to the 1970 and other federal railroad safety acts. The FRA, along with the National Transportation Safety Board (NTSB), also investigates major train accidents; assists the railway industry in training its workforce on relevant safety laws and regulations; educates the public on the dangers associated with railroading; conducts research; and facilitates cooperative efforts between industry and government to enhance the safety of all railroad operations.

The FRA also maintains crossing protection and accident data for each crossing in the United States. The FRA database has been reviewed for the Study Area.⁶

3 Los Angeles Unified School District (LAUSD), Office of Environmental Health and Safety (OEHS), *Draft Rail Safety Study Protocol* (2007).

4 California Code of Regulations, sec. 14010(d).

5 Code of Federal Regulations, Federal Railroad Safety Act of 1970, 49 USC sec. 20101–20144;21301–21304.

6 Federal Railroad Administration (FRA), Office of Safety Analysis, <http://safetydata.fra.dot.gov/OfficeofSafety/default.aspx>. Accessed November 2017.

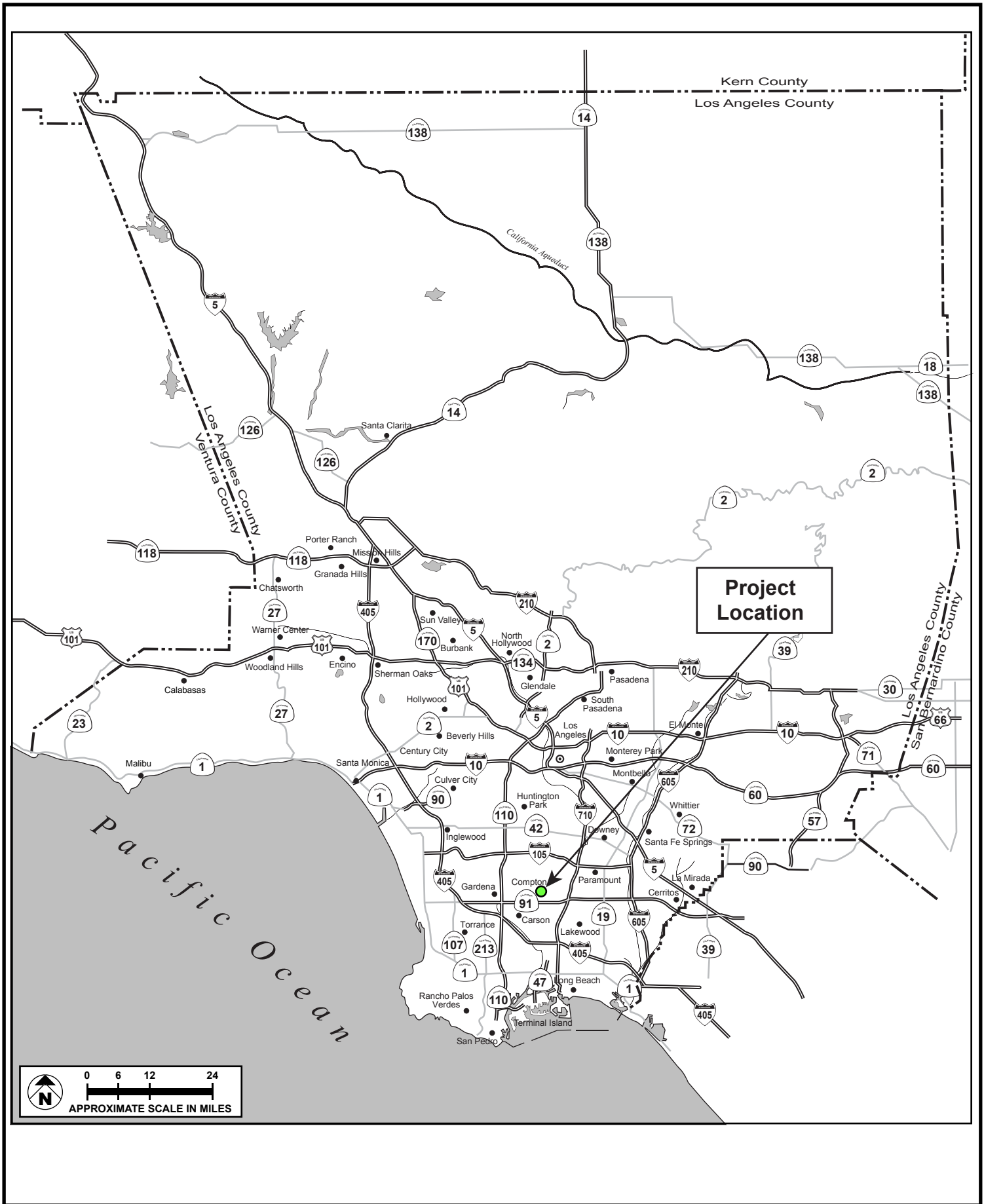



FIGURE 1



SOURCE: Google Earth - 2017

FIGURE 2



Proposed High School Site Location

The RSS consists of two components: (1) a rail safety assessment, and (2) a railroad derailment assessment. The first component, a rail safety assessment, involves the collection of existing information related to the subject railroad line, and includes information relative to the type of rail traffic, type of cargo, frequency of rail traffic, the average speed of trains, and railroad line maintenance schedules, if available. The second component, a railroad derailment assessment, involves an analysis of the probability of a derailment or other rail-related incident within the Study Area.

The RSS assesses a conservative analysis. The distance from the Metro rail line to the northeastern corner of the Project site is 670 feet compared to approximately 690 feet to the southeastern corner of the Project site.

Railroad Safety Assessment

Meridian Consultants staff visited the Study Area to observe, assess, and document the existing railroad line. Photographs were taken to document the railroad environment near the proposed school site. The information, which is summarized in **Table 1, Summary of Specific Information and Data**, is also used as parameters for the risk assessment.

CUSD's Transportation Department provides parents rules and information on routes best associated with their location via a Safe Routes to School Plan.⁷ Consideration in preparing the Safe Route to School Plan emphasizes the potential risks of using the Metro rail line easement as a route to school. It further emphasizes the need for drivers, bicyclists, and motorcyclists to strictly adhere to the traffic safety rules and comply with railroad safety warning devices.

Railroad Derailment Assessment

The quantitative probability (annual frequency) of a derailment accident was determined for the trains using this portion of the Metro rail line within 1,500 feet of the proposed high school site boundaries. This determination is based on the likelihood for geologic hazards, and the likelihood of derailment, based on a comparison of the Study Area railway travel characteristics with the characteristics of railway in the FRA railroad accident statistics.

7 CUSD, "Transportation Department," http://www.compton.k12.ca.us/apps/pages/index.jsp?uREC_ID=707740&type=d&pREC_ID=1137916. Accessed November 2017.

Table 1
Summary of Specific Information and Data

Information	Summary
Existing configuration of roadways and rail line(s) proximate to the proposed Project site	The Metro rail line trends in a north–south direction and is located east of the proposed high school site within CUSD. The Metro rail line runs adjacent and parallel to Willowbrook Avenue and intersects with Myrrh Street and Alondra Boulevard east of the Project site.
Distance to site	The Metro rail line is approximately 670 feet east of the northeastern boundary of the proposed high school site.
Proximity to any switching yards and/or rail spurs	This segment of Metro rail line has two switching trains in the proximity of the proposed high school site, based on inventory reports.
Existing track conditions including but not limited to single or double track, elevation, curvature, line type, track conditions, signage, and existing warning systems	<p>The track in this section of Metro Blue Line is a three-line track that is located on a level elevation. The tracks have no curvature but run in a straight line from the crossing at Alondra Boulevard, north to the crossing at Myrrh Street. These two street crossings lie along this segment within the 1,500 feet boundary. Crossing details include (from north to south):</p> <ol style="list-style-type: none"> <li data-bbox="808 951 1424 1014">1. Myrrh Street Crossing: signage and existing warning systems <li data-bbox="808 1024 1424 1087">2. Alondra Boulevard Crossing: signage and existing warning systems <p>One accident has occurred during the lifespan of the Metro rail line: at the Alondra Boulevard crossing in December 2011.</p>
Relationship of tracks to proposed project site and attendance area	The Metro rail line runs in a north–south direction and is approximately 670 feet east of CHS. Virtually all students and faculty will access the proposed high school site via Myrrh Street, along the northern boundary; Acacia Avenue, along the eastern boundary; and Alondra Boulevard, along the southern boundary of the proposed high school site. These locations are west of the Metro rail line and will be separated from the railway by existing development in between the Project site; thus, they will not provide access points to the Metro rail line.
Information relative to operation of the rail line: Current rail operations	Local passenger trains from Metro rail line transport passengers between Downtown Los Angeles to Long Beach. The Metro currently operates approximately 620 round-trip (310 northbound and 310 southbound) passenger trains per week (Monday through Friday) between the hours of 8:00 AM and 5:00 PM; trains also run in the evening and weekends during non-school hours.
Type of rail traffic (passenger, freight, both)	Metro rail line: passengers.

Information	Summary
Frequency of rail traffic	Passenger: 620 round-trip passenger trains per week Monday through Friday between 8:00 AM and 5:00 PM., with train interval running about 6-12 minutes apart in each direction including outside of school hours.
Speed of trains	The Metro rail line can run up to 55 miles per hour (mph), with an average speed of approximately 22 mph.
Schedule of rail track	Rail line comes by every 6–12 minutes from 8 AM to 5 PM, Monday through Friday.
Type of cargo (hazardous and/or non-hazardous)	None.

Sources Utilized

The data available for the safety assessment include: (1) the number of safety devices (lights, signals, and gates); (2) the accident history at the crossing; (3) train speeds; (4) the number of train movements per day or week; (5) the sidewalk conditions at each crossing; and (6) the potential for the use of the railroad easement by students traveling to and from school. For the derailment assessment, field inspection and descriptions were completed,⁸ and information was obtained from Metro.⁹ The variety of statistical information available for Metro (e.g., crossing accidents, train-miles traveled, number of incidents leading to derailment and/or the release of hazardous materials, and freight tonnage per train) was also used for the analysis.

Information was gathered from three main sources:

- An inspection and statistics for the Study Area obtained from the FRA Web site¹⁰ covering, for example, the crossings, rail accidents, train speeds, and freight train trip miles
- Documents prepared for other projects related to this line, specifically the Long Beach–Los Angeles Rail Transit Project Environmental Impact Report (EIR)¹¹
- Statistical information from agency sources (e.g., Metro) and the LAUSD Rail Safety Protocol¹² used to assess derailment probabilities.

8 Site visit by Gavin Heller, Meridian Consultants LLC, November 14, 2017.

9 Los Angeles County Metropolitan Transportation Authority (Metro), “Blue Line.” https://www.metro.net/riding/paid_parking/blue-line/ Accessed November 2017.

10 FRA, Office of Safety Analysis (website), <http://safetydata.fra.dot.gov/OfficeofSafety/default.aspx>. Accessed November 2017

11 Parsons Brinckerhoff, *The Long Beach–Los Angeles Rail Transit Project* (March 1985).

12 LAUSD, OEHS, *Draft Rail Safety Study Protocol* (2007).

ENVIRONMENTAL SETTING

Topography

The proposed high school site is on relatively level land that has a slight downward slope from north to south. The northern portion of the proposed high school site is approximately 73 feet above mean sea level (amsl), and the southern portion of the proposed high school site is approximately 68 feet amsl. The elevation along the Metro rail line segment near the proposed site is approximately 65 to 75 feet amsl.

Current Site Use

Currently, the site lies within the CUSD and within the City of Compton, and has been used as CHS for the since the mid-1900s. The proposed high school has a capacity of approximately 2,500 seats, with a current enrollment of about 1,850 students.

Rail Line Operations and Use

The Compton segment of the Metro rail line, owned by Metro, is located 670 feet east of the proposed school site's eastern boundary, as shown in **Figure 2**. Currently, Metro uses this stretch of track to transport passengers between the Compton and Artesia stations.

a. Historic Use

The Metro rail line is located 670 feet east of the Project site and runs from Downtown Los Angeles to Long Beach. The route's original streetcar service, operated by Pacific Electric Railway, began service in 1902. In 1958, the remains of the Pacific Electric Railway and Los Angeles Railway systems were taken over by the original Los Angeles Metropolitan Transit Authority, and the line was soon converted to bus operation in 1961. In 1964, the transit authority was taken over by the Southern California Rapid Transit District. The current Metro rail line opened on July 14, 1990. Design and construction was managed by the Rail Construction Corporation, now a subsidiary of the new Metro, which was formed in 1993 by a merger of the Southern California Rapid Transit District and the Los Angeles County Transportation Commission.

b. Current Use and Operations

Passenger train service along this stretch from the Compton to the Artesia branch lines of the Metro rail line is provided by Metro (the rail line east of the proposed high school site). Metro currently operates 620 round-trip passenger operations per day (Monday through Friday) between the hours of 8:00 AM and 5:00 PM. Speeds on this line can reach 55 mph from Washington station to Willow station. This speed will be used as a conservative analysis, although the speed was measured closer to 30–35 mph.

c. Rail Classifications and Crossings

The Metro Rail Line is a passenger train and can run up to 55 mph; therefore, it would be considered a Class 3 train.¹³ The Metro rail line currently has a total of 17 stations along its 22-mile length. All of these stations are at- or near-grade crossings. The condition at each of the crossings varies depending on (1) the degree of current use, and (2) whether the crossings are private or public crossings. The crossings nearest to the Project site from the Metro rail line in general have traffic lights, proper signage, warning systems, sidewalks, and crosswalks.

The section of railway located east of the proposed high school site has two crossings near the site, as shown in **Figure 2**. The northernmost crossing is an at-grade crossing located at the intersection of Myrrh Street and Alondra Boulevard, approximately 670 feet east of the northeastern corner of the proposed high school site. This crossing is protected by sign and existing warning systems. South of the Myrrh Street Crossing is the Alondra Boulevard crossing, approximately 690 feet east of the southeast corner of the proposed high school site. This crossing is protected by a California Public Utilities Commission Standard (CPUC) of proper traffic lights and signage.

The portion of the railway within 1,500 feet of the proposed high school (see **Figure 2**; extending from just south of the US Postal Service building, north, all the way to Willowbrook Avenue and Tichenor Street to the south. Between the intersections and the Compton and Artesia stations, the track alignment has no sharp or significant curves and is relatively straight for the segment nearest to the Project site.

d. Existing Road and Railroad Crossing Conditions

There are two at-grade crossings on the Metro rail line south of the proposed high school site as shown above in **Figure 1**. The crossings are located at Myrrh Street and the Alondra Boulevard. The total length of the Metro rail line under analysis for this report is approximately 3,700 feet in length (measured from the Willowbrook Avenue and Tichenor intersection to just east of the US Postal Service building northeast of the Project site). The exact number and type of safety devices (e.g., signage, lights, signals, bells, and gates) at each street crossing varies slightly due to the use, but each crossing contains all the necessary elements needed for a railway intersection.

In general, the crossing and guard devices at these intersections are comprehensive. An accident/incident report for Myrrh Street indicates an accident at the crossing in March of 1989, while it was still under the Southern Pacific Transportation Company and before the installation of the Metro rail line.¹⁴ The accident/incident report for the Alondra Boulevard intersection indicates three accidents occurring in

¹³ LAUSD, OEHS, *Draft Rail Safety Study Protocol* (2007).

¹⁴ Department of Transportation, *Highway-Rail Grade Crossing Accident/Incident Report* (2011).

September 1975, July 1985, and December 2011, with the latter being the only one under Metro.¹⁵ Therefore, in total, there has only been one accident during the t lifespan of the Metro rail line for these two crossings.

Currently, sidewalks exist at these crossing locations on both sides of Willowbrook. As noted, train speeds can reach up to a maximum of 55 mph for the Metro rail line. Also as noted, Metro currently operates 620 round-trip passenger train trips per week (Monday through Friday) between the hours of 8:00 AM and 5:00 PM.

In theory, the existing CHS campus within the Project site would create the potential for some students traveling to and from school to use the Metro rail line. Upon buildout of the proposed Project, most travel for students would remain unchanged from the type of transportation used to get to school, including walking, biking, driving, or transit.

Myrrh Street Crossing (Crossing No. 747880X)

Myrrh Street intersects with Willowbrook Avenue approximately 670 feet east of the proposed high school site. Myrrh Street is classified as a paved local street. As shown in **Figure 3, Myrrh Street Crossing**, traffic signs, warning signs, and gates signify the railway crossing. According to the FRA, no accidents have occurred at this railway crossing.¹⁶ **Figure 3** shows the approach to Myrrh Street from the south looking north at the intersection. As shown, there are sidewalks on the street on both sides of the rail line along Willowbrook Avenue, and access to the railway is secured. Residences, government buildings, and churches surround the crossing.

For this section of the Metro rail line, there are accessible locations where pedestrians could travel as there are appropriately placed closing gates, signals, and traffic lights. It would then be possible for a pedestrian travel through the railway easement via Myrrh Street crosswalks from the east or the west at this crossing.

Alondra Boulevard Crossing (Crossing Number 747882L)

The Alondra Boulevard Crossing is located approximately 690 feet east of the southeast corner of the proposed high school site. Alondra Boulevard is classified a major highway with a four-lane roadway and a 100 feet right-of-way width that provides main access into Compton. Alondra Boulevard is also a designated scenic corridor and is used as a truck haul route.

15 Department of Transportation, *Highway-Rail Grade Crossing Accident/Incident Report* (1989).

16 FRA, Office of Safety Analysis, "Query and Generate Crossing Accident Reports."
<http://safetydata.fra.dot.gov/OfficeofSafety/publicsite/crossing/crossing.aspx>. Accessed November 2017.



Looking North



Looking South

SOURCE: Google Earth - December 2017

FIGURE 3

At the crossing, as shown in **Figure 4, Alondra Boulevard Crossing**, there are traffic gates into the railway as well as shows the neighboring residences near the Rail line. There are sidewalks along with Willowbrook Avenue. According to FRA records, there have not been any crossing accidents at this crossing location.¹⁷

Figure 4 shows a photo of the Alondra Boulevard Crossing looking south along the Metro rail line. As can be seen, intersection is properly secured with traffic and warning signals, as well as included proper signage. Willowbrook Avenue parallels the railway easement on both sides of the Metro Line, and private properties in further direction. There are barriers located at this crossing that prevent pedestrians from gaining access to the Metro rail line Easement and its railway tracks.

It is anticipated that the majority of students attending the proposed high school will be students generated from the Compton and surrounding area, and they will most likely access the school site via Myrrh Street, Acacia Avenue, and Alondra Boulevard. The locations lie west of the Metro rail line, and they will be separated by existing development within area. This future development will not limit access to the Metro rail line.

e. Railroad Noise Environment

The principle sources of noise from trains are (1) the sound of locomotives and the clatter of wheels on steel trains, and (2) horn noise from locomotives at street crossings. Noise monitoring was conducted on November 14, 2017 along the Metro rail line.¹⁸ The maximum sound level measured while a train passed along the Metro rail line tracks was 91.8 dBA at a distance of 58 feet. Trains traveling along the Metro rail line tracks represent an intermittent and infrequent noise source that occurs outside of peak roadway traffic periods.

Analysis of the railroad noise environment assumed an average of 620 round-trip trains per week east of the proposed high school site. The City of Compton’s Noise Element permits development of schools as long as they are not exposed to noise 60 dBA or higher.¹⁹ The noise measurements collected during the field visit by Meridian Consultants measured an Leq of 64 dbA approximately 58 feet from the Metro rail line (Site 7). In addition, the noise meter nearest to the school site had an existing Leq of 67.5 dbA which was farther away from the Metro rail line (Site 2).²⁰ Due to the distance, existing buildings and the noise observations, noise impacts from the railroad segment are less than significant.

17 FRA, Office of Safety Analysis, “Query and Generate Crossing Accident Reports,” <http://safetydata.fra.dot.gov/OfficeofSafety/publicsite/crossing/crossing.aspx>. Accessed November 2017.

18 Gavin Heller, Meridian Consultants LLC, site visit, November 14, 2017.

19 City of Compton, *Draft Compton General Plan 2030*, “Noise Element,” <http://www.comptoncity.org/civicax/filebank/blobdload.aspx?blobid=24238>. Accessed November 2017

20 Gavin Heller, Meridian Consultants LLC, site visit, November 14, 2017.

RAILROAD SAFETY ASSESSMENT

Railroad Derailment Assessment

The quantitative probability (annual frequency) of a derailment accident is determined for the Metro rail line for a distance of 1,500 feet from the site. The determination is based on the draft protocol being developed by the LAUSD; this “Incident Analysis” method is currently being finalized as a part of the forthcoming Rail Safety Protocol.²¹ The Incident Analysis method is used to calculate accident rates and probabilities, derailment rates and probabilities, and a hazardous materials release probability.

Input data for the assessment was determined from the field inspection and publicly available information (including local, federal, and state railroad statistics). This report provides a brief summary of the data obtained and the likelihood of a future derailment for the subject Metro rail line near the proposed high school site. Since the Metro rail line street crossings are, and will remain, at railroad grade, there is a low chance of increased potential impact on traffic or pedestrians due to the previously summarized routine passenger train activity.

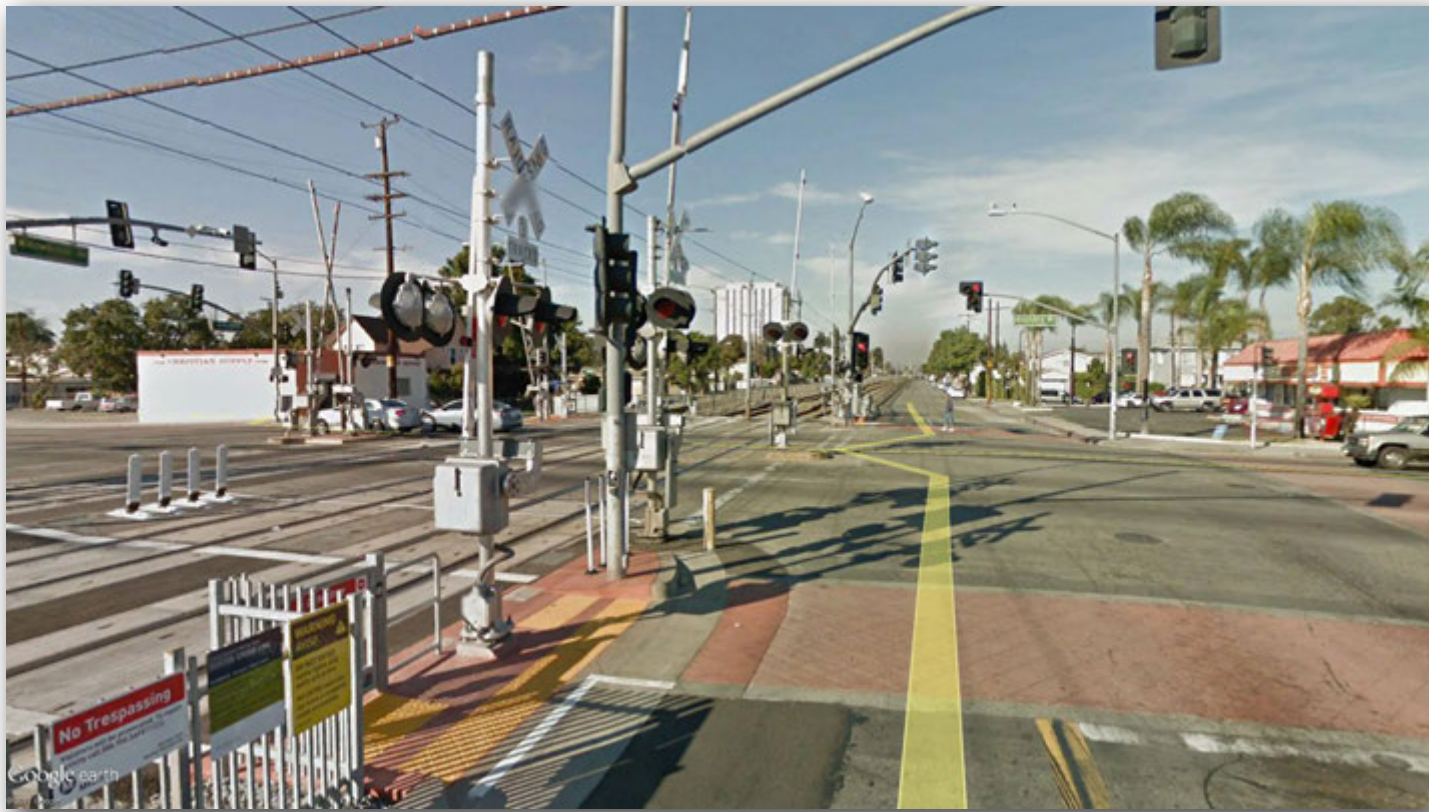
Six years (2000–2005) of FRA accident/incident statistics were evaluated in developing the 2007 LAUSD protocol.²² These statistics relate failure frequency to other characteristics, such as track structural conditions, human factors, mechanical and electrical failure, signal and communication, and miscellaneous factors. The FRA incident statistics contain highway/rail incidents (primarily at crossings).

During the 2000–2005 period used in the 2007 LAUSD protocol the annual probability of an accident/incident for Metro was determined to be 9.83×10^{-7} accidents/train-mile. Due to the nature of the Metro rail line facilities (e.g., Class 3 track), traffic frequency, number of cars per train, and allowable train speeds, these statistics are not considered fully applicable to the current site analysis.

Derailment probability is defined as the annual probability of experiencing a train accident that causes a derailment. Derailment affecting one or more cars occurs in about 75 percent of accidents. It should be noted though that most reported train derailments are not major events, and typically result in wheel detachment and derailment of a single car. The percentage of derailments can vary based on railroad conditions, and this was also determined based on the comparison mentioned and is shown to be closer to 43 percent for passenger trains.

21 LAUSD, OEHS, *Draft Rail Safety Study Protocol*, “Incident Analysis” (2007), 4–10 (attached as Appendix C). The LAUSD methodology is used as it is the most currently methodology available and has been accepted by CDE.

22 LAUSD, OEHS, *Draft Rail Safety Study Protocol*, “Incident Analysis” (2007), 4–10 (attached as Appendix C). The LAUSD methodology is used as it is the most currently methodology available and has been accepted by CDE.



Looking North



Looking South

SOURCE: Google Earth - December 2017

FIGURE 4

a. Data Sources and Probability Estimation Methodology

The 2007 LAUSD Rail Safety Protocol, used in this study, discusses the data sources, methodology, and computations used for the railroad derailment assessment. As of 2016, passenger train accident rates at the national (1.32×10^{-6}) and County (1.62×10^{-6}) levels are similar. National (43.8 percent) and state (42.9 percent) statistics were also similar with regard to the percentage of passenger train accidents that result in derailment.²³ The 2007 LAUSD Rail Safety Protocol indicates that the main line accident rate specific to the rail operator is most appropriate for the analysis. In the case of the Metro rail line, the passenger operator is Metro, and the calculated mainline accident rate per train-mile for the Metro is 9.83×10^{-7} .

In addition to the LAUSD Metro rate, train accident rates of the latest Rail Performance Report were obtained from the Metro archives²⁴ that cover four years were evaluated to determine the annual train accident rates. In combination, this data should be more representative of the conditions affecting the Metro rail line. The latest Rail Performance Report indicates that there are 1.32 CPUC reportable accidents per 100,000 train-miles, which yields a rate of 1.32×10^{-5} and a train derailment rate per train-mile of 5.66×10^{-6} .

Track length adjacent to the proposed high school site was measured using the South Gate USGS 7.5-minute topographic map²⁵ and Google Earth aerial imagery coverage²⁶ for the distance of 1,500 feet from the proposed high school site; the length is approximately 3,700 feet (0.70 mile) of railroad line.

b. Probability Calculations

The probabilities of a train accident and a train derailment, as presented in **Table 2, Protocol Probability Results for the Proposed Compton High School Site**, are computed considering the single main line track for freight traffic. The annual probability of the occurrence of a passenger train derailment within the Study Area during school hours is 9.51×10^{-5} , or roughly one train derailment every 10,000 years; during hours of school occupancy these values are lower at 8.71×10^{-5} . Additionally, the probability of a derailment impacting the high school are low because (a) the Metro rail line is approximately 670 feet from the proposed high school site, and (b) there are existing buildings between the tracks and the school. The likelihood for encroachment of railcar or load debris onto the site directly from a derailment event—not considering possible explosion—on the Metro rail line is considered essentially zero.

While it is recognized that no hazardous materials are currently transported on the Metro line and it is unlikely that this would change in the future, a hazardous materials release annual probability of the

23 FRA, Office of Safety Analysis, "Freight/Passenger Operations Ten Year Overview." Accessed November 2017

24 Metro, *Operations Monthly Performance Report, September 2017*.

25 USGS, *South Gate 7.5-Minute Topographic Quadrangle Map*, scale 1:24,000 (1967).

26 Google Earth (2017).

occurrence was computed to be 4.20×10^{-6} within the Study Area, or roughly 1 release every 238,000 years.

The probability calculation results using the protocol matrix are also provided in **Appendix A, Railway Assessment Calculations**.

Table 2
Protocol Probability Results for the Proposed Compton High School Site

Protocol Categories	Metro Rail Line
Original (Average Project Specific Input) Data^b	
Train accidents/year	25
Main line (ML) train accidents/year	25
Train-miles/year (passenger) ^b	2.37E+08
Derailments/year	1
Track Class (TC) ^d	3 ^a
Representative number of cars	4 ^a
Length of track (miles) within 1,500 feet of site	0.70 ^a
Length of track (miles) within 128 feet of site	0.00 ^a
Distance from track centerline to site (feet)	670 ^a
School frontage parallel to track (feet)	387 ^a
Number of trains/year ^e	3.22E+04 ^a
Number of trains/year from 8 AM to 5 PM, 48 weeks/year	2.95E+04
Percent of time school is occupied	25%
Speed of train (mph)	55 ^a
Shared track or two-way traffic (yes/no)	yes ^a
Freight traffic (yes/no)	no ^a
Maximum car length (feet)	90 ^c
Calculated Annual Incident Values	
Accidents/train-mile	1.05E-07
Derailments/accidents	0.04
Derailments/train-mile	4.22E-09
Percent accidents on ML	100%
ML accidents/train-mile ^f	1.05E-07
ML derailments/train-mile	4.22E-09
TC ML accidents/train-mile	2.10E-05
TC ML derailments/train-mile	8.84E-09
Car-adjusted derailment rate ^f	3.54E-08
Final derailment rate ^g	4.034E-08

Protocol Categories	Metro Rail Line
Calculated Probabilities	
Annual probability of derailment within 1,500 feet	9.51E-05
Annual probability of derailment 1,500 feet during school occupancy	8.71E-05
Probability of derailment debris reaching site during school occupancy	—
Probability of hazardous release	4.20E-06

^a These Original Data cells contain data developed specifically for the Study Area; the remaining cells are taken from the FRA statistics, provided by the Protocol, or computed by the Protocol spreadsheet.

^b Data developed for Metro rail line by Meridian Consultants LLC (2017) and Metro statistics.

^c Taken from Parsons Brinckerhoff, Final EIR Long Beach–Los Angeles Rail Transit Project (March 1985).

^d In the probability computation, a Track Class 3 was used to account for the values.

^e This assumes full capacity of 620 trains per week, 52 weeks per year.

^f This assumes four cars per train.

^g This accounts for a 14 percent increase due to the train’s being a two-way traffic operated train.

Potential Hazardous Materials Release

Albeit unlikely that it would occur from the Metro Rail Line, a generalized analysis of release impact potential was performed. A hazardous materials (hazmat) release could involve liquids, flammable liquids and gases, or toxic gases. In addition to the probability analysis indicating a relatively long predicted recurrence interval (238,000 years).

A number of factors suggest that a hazmat release along the Metro rail line to the proposed reconstructed campus would be very unlikely to impact the site. These include distance and local meteorology as follows:

- Distance (at least 670 feet), the topographic slope toward the railroad tracks, and the presence of intervening buildings would prevent liquids from approaching very near the site.
- Meteorological conditions affect how an airborne cloud of hazmat would disperse should a release occur. The wind rose as shown in **Figure 5, Los Angeles Wind Rose**, from the nearby Los Angeles International Airport meteorological station, approximately 9 miles to the northwest, indicates that wind blows from the Metro rail line toward the high school site, blowing from an eastern to western direction from the tracks to the proposed school site, around 8 percent of the time. The majority of the time the winds blow from the west-southwest to the school site approximately 45 percent of the time. Additionally, **Figure 6, Long Beach Wind Rose**, shows the Long Beach wind rose from the Long Beach Airport meteorological station located approximately 5.6 miles southeast of the proposed school site. The wind rose indicates that wind comes from the south and southwest and travels from east to west approximately 10 percent of the time in a given year. The majority of the time the winds blow from the west-southwest from the school site to the east approximately 45 percent of the time.

Therefore, both of these wind roses indicate that wind throughout the year blows less often from the east (Metro rail line) to the west (Project site) than from other directions.²⁷

Based on these mitigating factors, the probability that a hazardous material release would impact the high school—even if such materials were ever transported along the Metro rail line—is no greater than 2.95×10^{-4} at the Project site boundary based on the above discussion of extenuating factors.

Considering these factors, no mitigation would be required.

SUMMARY OF RESULTS

Because the school buildings are at such a great distance from the tracks and the predominant prevailing wind is toward, or parallel to, the tracks, it is unlikely that a derailment event would have a significant impact on the school site. The following findings and conclusions, based on a review of the available data, are provided below.

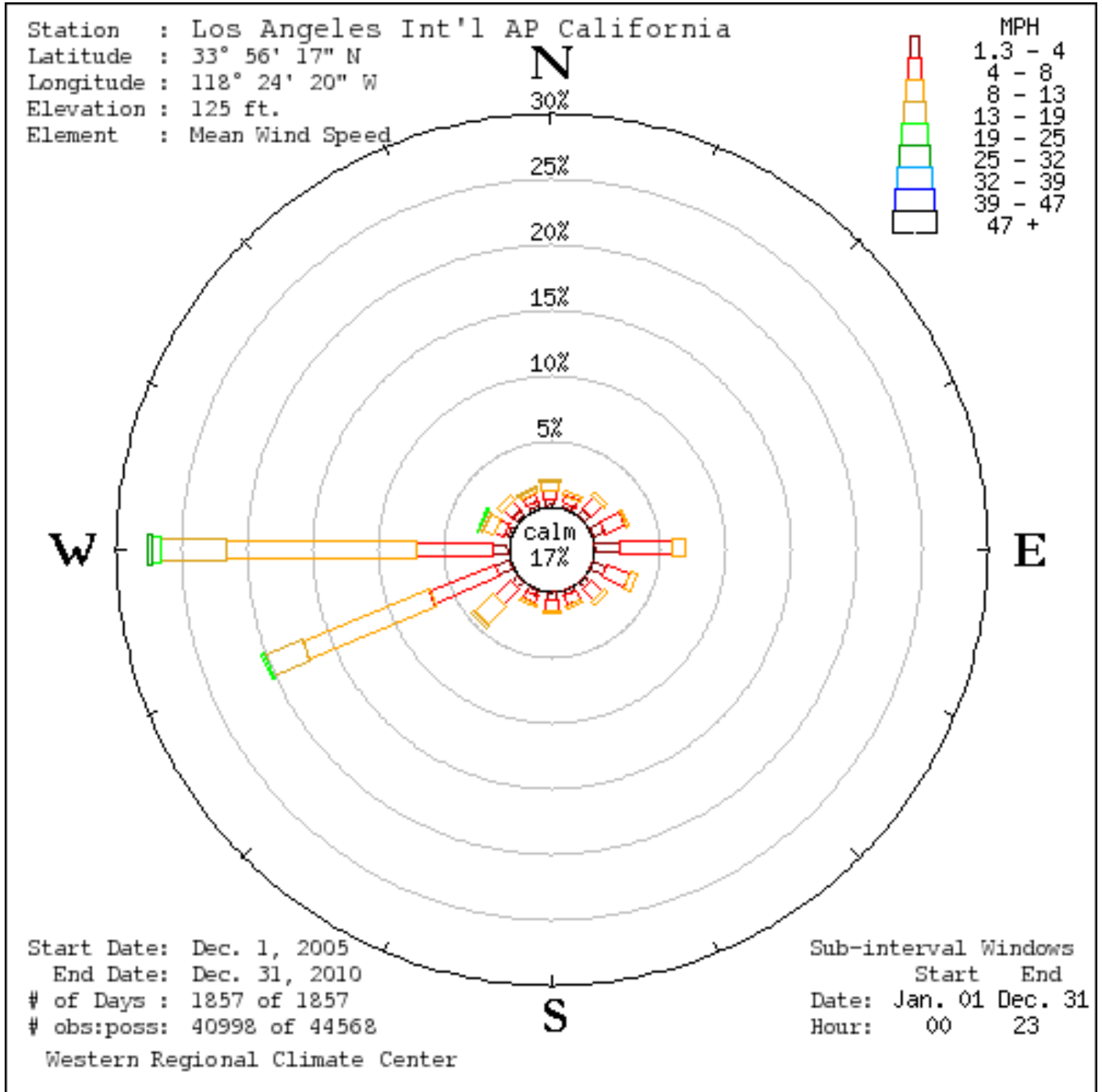
Findings

A summary of the RSS findings are as follows:

- The Study Area contains one railroad segment, the Metro rail line, located approximately 670 feet east of the reconstructed CHS (the closest point to the track centerline).
- The Metro rail line, operated by Metro, utilizes only a passenger train (light rail with electric guidewires) making approximately 620 trips roundtrip (310 northbound and 310 southbound) per week during normal school hours (Monday through Friday, 8:00 AM to 5:00 PM); it also runs in the evening and weekends during nonschool hours, running approximately every 6–12 minutes, and up to approximately 20 minutes during overnight hours.
- There are two switching areas within the Study Area according to the Inventory Report at both intersections. This allows for railway trains to be guided from one track to another. Although this does not factor into the derailment rate, it would have an incremental increase in the probability of an accident. Due to the other factors provided in the analysis, such as the distance and buildings between the rail line and school, this would be less than significant.
- The Metro rail line crosses both Myrrh Street and Alondra Boulevard about 670 feet east and 690 feet east of the site, respectively. These crossings have modern safety appliances (e.g., bells and flashing lights, crosswalks and warning markers on the pavement, and automatic barrier gates for automobiles).

27 Western Regional Climate Center, “Historical Climate Information,” <https://wrcc.dri.edu/CLIMATEDATA.html>. Accessed November 2017

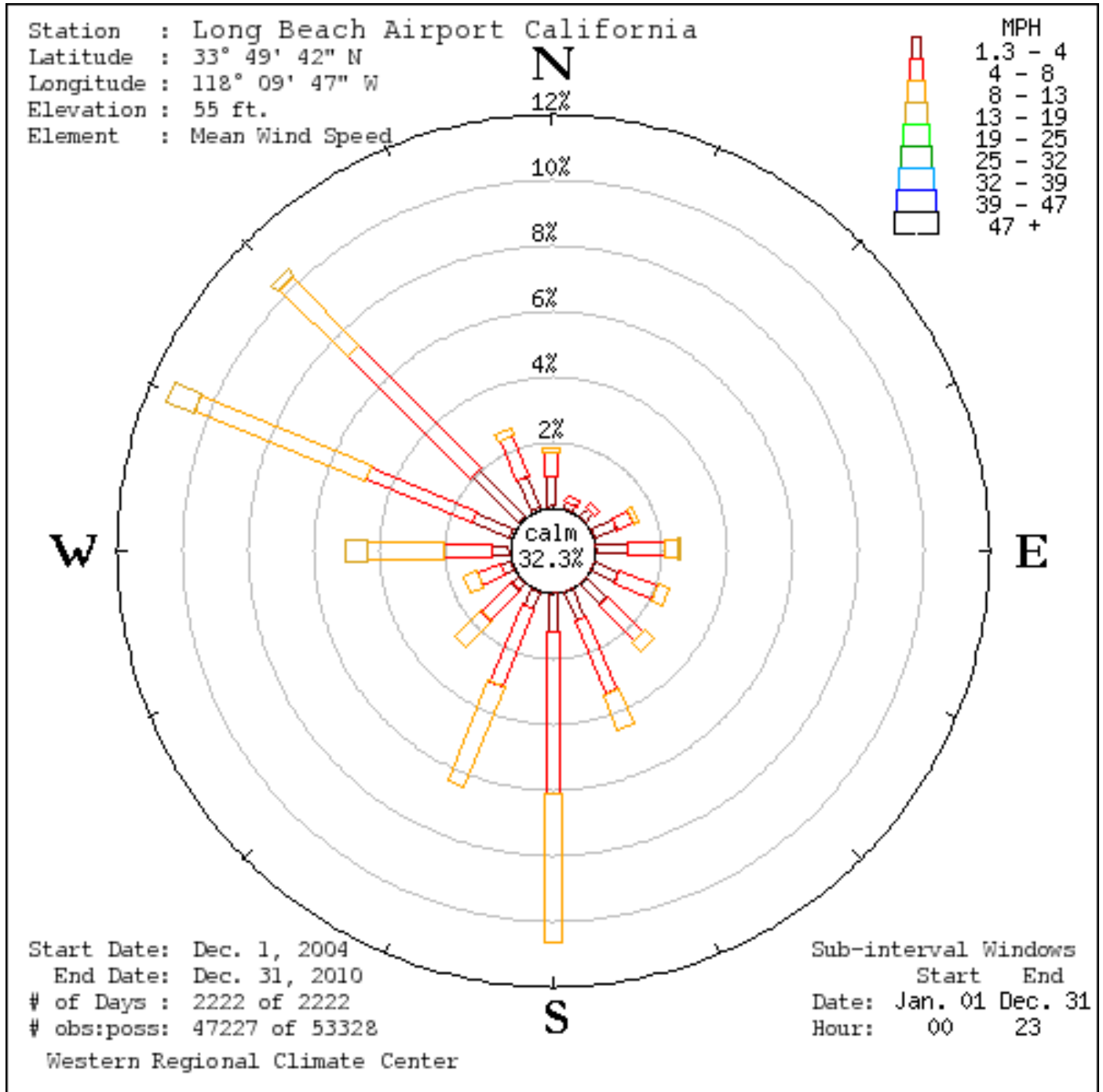
Los Angeles International Airport, California



SOURCE: [Mhttps://wrcc.dri.edu/cgi-bin/wea_windrose2.pl](https://wrcc.dri.edu/cgi-bin/wea_windrose2.pl)

FIGURE 5

Long Beach Airport, California



SOURCE: https://wrcc.dri.edu/cgi-bin/wea_windrose2.pl

FIGURE 6

- The frequency of passenger train traffic (620 trips per week totaling 3.22×10^4 trips per year) and speed (maximum up to 55 mph) are similar compared to other metropolitan lines in the region.
- The Metro rail line is used strictly for transporting passengers; there are no plans for other cargo traffic.
- Calculated annual probability of a Metro rail line derailment in the Study Area is roughly one train derailment every 10,000 years (or 9.51×10^{-5}); during hours of school occupancy, the annual probability of a derailment is 8.71×10^{-5} .
- The annual probability of a Metro rail line hazardous material release, although no such materials are transported on the easement, is no greater than about one release every 238,000 years (4.02×10^{-6}). Based on extenuating factors discussed herein, the annual probability may be one or more orders of magnitude lower.
- Given the distance of the tracks from the proposed school and intervening development, noise from train traffic is not anticipated to negatively impact students or staff.

Conclusions

The following conclusions are made:

- Railroad accident statistics demonstrate that the operation of trains near a school or any other location poses intrinsic risks that can be managed but not fully eliminated.
- The Metro rail line vehicular crossings at Myrrh Street and Alondra Boulevard have safety traffic lights, signage, sidewalks, and crosswalks that appear to meet FRA and CPUC standards.
- The probability exists that students or parents with students would use the Metro rail line as a mode of transportation to and from campus. Therefore, traffic and pedestrian safety are issues to be considered.
- With no transportation of chemicals in freight cars on the Metro rail line, there is presently no concern that railroad-related hazardous materials spills would occur near the site. According to local meteorological stations, the predominant wind blows from the Metro rail line easement to the school site—that is, from east to west—between 8 percent and 10 percent of the year.
- The probability of an accident is approximately 1 in 10,000 years for the Project site. Therefore, the likelihood of a train accident on the Metro rail line, with a subsequent train derailment and movement of railcars and solid debris outside the easement, is very low. Debris from such a derailment should not reach the site, which is greater than 670 feet away and would be buffered by existing buildings.

- The probability for geologic or seismic hazards (ground shaking or liquefaction) to initiate a rail accident is too low to increase derailment probabilities within the Study Area; therefore, it is considered an insignificant factor in the site’s railroad risk assessment.

Recommendations

The following recommendations are made:

- Consideration shall be given to preparing a safe-routes-to-school plan that emphasizes the risks of using the Metro rail line easement as a route to school while stressing the need for drivers, bicyclists, and motorcyclists to strictly adhere to the traffic safety rules and comply with railroad safety warning devices.

LIMITATIONS

As discussed, this RSS has been prepared in compliance with the incident analysis portion of the LAUSD Rail Safety Protocol, using the protocol’s incident analysis methodology.²⁸ Noted modifications to the incident analysis methodology by Meridian Consultants LLC as part of this analysis were made based on a review of the 2007 LAUSD Rail Safety Protocol.

Distance and length measurements cited in this report are estimates made from available maps and aerial photographs (e.g., USGS, Google Earth, and Meridian Consultants LLC measurements). Other consultants may arrive at different results and conclusions with the same information. Although some accident risk may always remain, a lower probability of future problems should result if more conservative criteria for (1) railroad track upgrade and maintenance, (2) railroad operations procedures (e.g., speed, runaway train notification, signals, and protective barriers), and (3) campus emergency procedures and building plans are adopted by the responsible agencies and departments. The scope of this probability analysis did not include modeling of detailed site-specific hazardous release probabilities (air toxics) or of site-specific hazard impacts (risk analysis) associated with an accident, derailment, or hazardous waste release. Final school site location decisions are the responsibility of others. Meridian Consultants makes no warranties expressed or implied.

This RSS does not consider (1) on- or off-site impacts or consequences due to hazardous materials or toxic substances released (including within or outside of railroad cars) on or near the prospective site; (2) off-site impacts; or (3) consequences to any other facilities due to a derailment and release of cargo, or impacts or consequences due to any other man-made or natural hazards other than those described herein as they may affect the railroad described above within the Study Area. “On-site” is considered to mean within the prospective school site.

28 LAUSD, OEHS, *Draft Rail Safety Study Protocol* (2007).

It is outside the scope of this study to assess the possible risks to future occupants at the proposed school site as a result of these accidents, or to specify specific design values (e.g., setback distances, berm heights/widths, wall heights). This necessary level of analysis would be a part of a more detailed study where exposure (e.g., fatalities due to wreckage and load debris, or release of hazardous materials) would be determined as a function of additional factors (such as thresholds for risk of serious injury or death), and specific mitigating design values would be determined that would prevent these effects or minimize them to an acceptable level.

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