3.2 Grade Crossing Safety

This section describes the impacts of the Proposed Acquisition on safety at roadway/rail at-grade crossings (grade crossings). A grade crossing is defined as "a location where a public highway, road, street, or private roadway, including associated sidewalks and pathways, crosses one or more railroad tracks at grade," according to 49 C.F.R. § 234.5. If the Board were to authorize the Proposed Acquisition, the Applicants expect that rail traffic would increase on certain rail line segments along the combined CPKC network. This increase in rail traffic would result in an increased risk of crashes involving trains and motor vehicles at grade crossings. Aside from crashes involving individuals trespassing on railroad tracks, the majority of rail-related fatalities and injuries, including fatalities involving motor vehicles and pedestrians, occur at grade crossings (AAR 2022). Based on FRA data from 2017 to 2021, there were 9,030 crashes at public grade crossings in the United States, resulting in 1,262 deaths and 2,865 injured people.

In assessing grade crossing safety impacts, OEA considered federal, state, and local regulatory frameworks for transportation, including the requirements of Federal Highway Administration (FHWA) and FRA, which both have jurisdiction over aspects of grade crossing safety under federal law.

3.2.1 Approach

This subsection discusses the approach for estimating safety impacts at grade crossings under the No-Action Alternative and the Proposed Acquisition. During the scoping period, commenters expressed concern regarding grade crossing safety. OEA considered these concerns and developed the approach below to assess grade crossing safety.

Crashes can occur at crossings when vehicles attempt to cross the tracks at the same time as a passing train. Although such crashes are generally rare, they can result in damages, injuries, or fatalities when they occur. In 2020, FRA published a report that includes statistics on the safety performance of more than 105,000 public grade crossings in the U.S. that are not closed and not grade-separated (FRA 2020). During the five-year period from 2014 to 2018, there were 8,467 crashes at those grade crossings, representing an average of 0.016 crashes per grade crossing per year, or approximately one crash per grade crossing every 62.5 years. OEA analyzed more recent FRA data to estimate the proportion of pedestrian crashes relative to total grade crossing crashes. During the five-year period from 2017 to 2021, there were 9,030 crashes at public grade crossings, including 833 pedestrian-train crashes. Based on the five years of national data at grade crossings, pedestrian crashes represent approximately 9 percent of total grade crossing crashes.

OEA defined the study area for grade crossing safety to include all rail lines where the Proposed Acquisition would result in an increase in rail traffic of eight or more trains per day, on average. OEA identified those rail lines by comparing projected rail traffic for the year 2027 under the Proposed Acquisition to projected rail traffic in 2027 under the No-Action Alternative. OEA then identified all grade crossings in the study area and estimated the probability of a crash occurring at each grade crossing. In response to public comments

on the Draft EIS, OEA expanded the study area to also include rail line segment U-BEAU-01, which passes through the Houston area in Texas. This rail line segment is part of UP's Houston Subdivision and Glidden Subdivision. KCS currently operates trains on this segment under a trackage rights arrangement with UP, the segment's owner. If the Board authorizes the Proposed Acquisition, CPKC would continue to operate on this segment under a trackage rights arrangement. The Applicants project that the Proposed Acquisition would increase rail traffic on segment U-BEAU-01 by 7.57 trains per day, on average, which is less than the grade crossing safety analysis threshold of eight trains per day.

For the purposes of its environmental analysis of the Proposed Acquisition, OEA assumed that all new freight trains would move on rail line segment U-BEAU-01. OEA understands that, because UP and BNSF own most of the rail lines in Houston, CPKC could not control the dispatching of trains on those rail lines. Based on information submitted to the Board by UP, BNSF, and others, OEA understands that trains through Houston are typically dispatched directionally, with westbound traffic using UP's Houston Subdivision and eastbound traffic using UP's Beaumont Subdivision. To the extent that some trains may be dispatched on rail line segments other than U-BEAU-01, then the increase in rail traffic on that segment resulting from the Proposed Acquisition is likely to be less than the 7.57 trains per day that the Applicants have projected. Therefore, the results reported in this section in the Final EIS may overstate the potential grade crossing safety impacts of the Proposed Acquisition in the Houston area.

OEA estimated the probability of a crash occurring and other related statistics based on historical performance data for each grade crossing, as recorded by FRA. Other related statistics included estimated crash frequency per year, intervals between crashes, fatal crash frequency per year, casualty (such as crashes involving injuries) crash frequency per year, and pedestrian crash frequency per year. OEA also relied on other variables to estimate future crash frequency, including the projected number of trains operated per day through each crossing under the Proposed Acquisition and the No-Action Alternative, the estimated train speed, the estimated average train length, the annual average daily traffic (AADT) on the affected roadway, the type of protection at the crossing (for example, flashing lights or crossing gates), the road surface type, the number of roadway lanes, and the number of main line tracks.

OEA specifically considered the potential impacts associated with grade crossings in designated quiet zones. Quiet zones are locations where trains do not need to sound their horns at grade crossings. Because trains do not sound their horns in quiet zones, crossings in these areas may be more susceptible to safety impacts than crossings elsewhere, depending on rail and vehicular traffic levels and crossing safety enhancements. OEA also considered the potential impacts associated with pedestrian-only grade crossings. While the lack of reliable pedestrian crossing volume data precludes the use of quantitative analysis methods, OEA considered the safety performance of pedestrian-only crossings based on the type of protection and historical safety performance at each crossing.

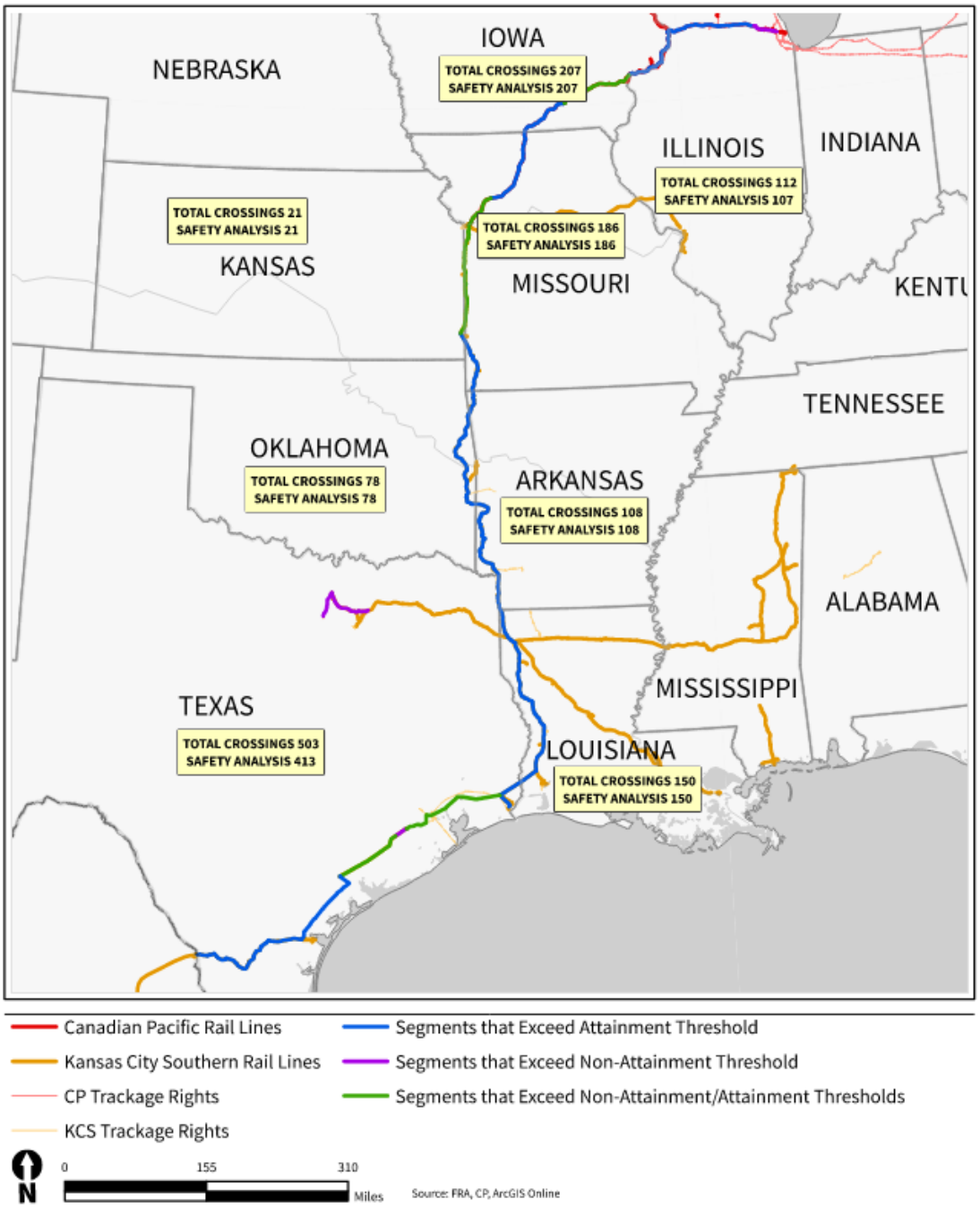
OEA did not estimate safety performance at grade-separated crossings, which are crossings where a roadway passes over or under a rail line via an overpass or underpass, because grade-separated crossings do not create a potential for safety impacts. OEA also did not

estimate safety performance at private ~~and pedestrian only~~ grade crossings because of very low traffic volumes and because insufficient data exist to support a quantitative analysis.

3.2.2 Affected Environment

OEA identified a total of 1,270 public grade crossings and 31 pedestrian-only grade crossings in the study area that met the criteria for safety analysis, which encompasses the CP mainline extending west and then south from Chicago, Illinois, to Kansas City, Missouri, and along the KCS mainline extending south from Kansas City to Laredo, Texas (**Figure 3.2-1**). ~~OEA identified a total of 1,352 public, at-grade vehicle crossings, and filtered to 1,134 grade crossings in the study area that have a projected increase of eight or more trains per day under the Proposed Acquisition (**Figure 3.2-1**). The affected environment for grade crossing safety encompasses 1,134 grade crossings along the CP mainline extending west and then south from Chicago, Illinois, to Kansas City, Missouri, and along the KCS mainline extending south from Kansas City to Laredo, Texas (**Figure 3.2-1**).~~ **Appendix H** provides a list of all grade crossings within the study area. The study area includes eight states: Illinois, Iowa, Kansas, Missouri, Arkansas, Oklahoma, Louisiana, and Texas. The grade crossings in the study area range from rural crossings with low volumes of vehicular traffic, at fewer than 10 vehicles per day, to urban crossings with high traffic volumes, at more than ~~2~~30,000 vehicles per day. The number of mainline tracks at the crossings at issue here ranges from one to ~~two~~ three tracks and the number of roadway lanes at the crossings ranges from one to ~~six~~ seven lanes. The grade crossings include both paved and unpaved roads and the existing warning devices include both passive (such as signage) and active measures (such as flashing lights or flashing lights and gates). Of the ~~1,134~~1,270 evaluated grade crossings in the study area, ~~45~~ 77 are located in a designated quiet zone. There were ~~90~~ 156 crashes reported over the ~~1,134~~1,270 grade crossings during the most recent five-year period (2017-2021). This equates to an average of 0.025~~016~~ crashes per grade crossing per year, or approximately one crash per grade crossing every ~~62.5~~40.7 years, which is ~~identical to~~greater than the national averages reported by FRA based on data from 2014-2018 (FRA 2020). During the same five-year period (2017-2021), there were two crashes at pedestrian-only crossings in study area and both were confirmed suicides.

Figure 3.2-1. Grade Crossings for Safety Analysis on Proposed CPKC Rail System[1]



[1] Refer to **Appendix H** for a detailed list of grade crossings included in the safety analysis by state, county, and city.

3.2.3 Environmental Consequences

To characterize the potential environmental consequences at the ~~1,134~~1,270 grade crossings for safety analysis, OEA estimated vehicular traffic safety performance due to anticipated train movements in 2027 under the Proposed Acquisition and the No-Action Alternative.

3.2.3.1 Proposed Acquisition

OEA expects that the Proposed Acquisition would result in minor impacts on the safety performance of grade crossings in the study area. Because collisions between trains and road users (including vehicles and pedestrians) tend to occur more frequently as rail traffic increases, OEA expects that the projected increase in rail traffic would result in an increase in predicted number of crashes and a reduction in the time between crashes at the grade crossings. Across the ~~1,134~~1,270 grade crossings included in the safety analysis, the predicted number of crashes would increase by an average of 0.005 crashes per crossing per year as a result of the Proposed Acquisition. Assuming that pedestrian crashes represent approximately 9 percent of total train crashes based on national FRA data, the predicted number of train-pedestrian crashes would increase by an average of 0.00045 crashes per crossing per year as a result of the Proposed Acquisition. This corresponds to one additional grade crossing crash approximately every 200 years, which includes one additional train-pedestrian crash every approximately 2,000 years, on average. **Appendix H** provides detailed inputs and results of OEA's analysis, including current safety-related conditions at each grade crossing and pedestrian-only grade crossing in the study area, as well as the predicted number of crashes per year and estimated time between crashes under the Proposed Acquisition and the No-Action Alternative for each grade crossing in the study area.

In general, crossings with less traffic volume and more safety measures (such as gates and flashers) have the lowest predicted crashes and the lowest increase in predicted crashes. On the other hand, crossings with more traffic volume and less safety protection (such as passive protection) have the highest predicted crashes. The crossings with the highest projected increases in train volumes have the largest increase in predicted crashes, but these crossings also have less protection (such as passive protection). The crossings with the lowest predicted increase in crash frequency include Crossing ID 329007L across Roy Hopkins Drive in Vivian, Louisiana, and Crossing ID 329237M across McDonald Drive in Many, Louisiana. For these crossings, the predicted increase in crash frequency is 0.0007 crashes per year, or one additional crash every 1,429 years. The largest increase is 0.0277 crashes per year, or one additional crash every 36 years. This predicted increase would occur at Crossing ID 743351B across Miller Road in Hungerford, Texas. This is also the crossing with the highest total predicted number of crashes per year, with a predicted average of 0.2075 crashes per year, or one crash approximately every five years, under the Proposed Acquisition.

Adding together all potential crashes at the ~~1,134~~1,270 crossings resulted in a total of 31.7~~24.9~~ predicted crashes per year, as compared to the No-Action Alternative of 25.5~~19.1~~ total crashes per year. This results in a predicted total increase of 6.2~~5.8~~ crashes per year under the Proposed Acquisition compared to the No-Action Alternative throughout the entire system of ~~1,134~~1,270 crossings. Assuming that pedestrian crashes represent approximately 9 percent of total train crashes based on national FRA data, there would be a total of 2.9~~2.2~~ predicted train-pedestrian crashes at the ~~1,134~~1,270 crossings per year, as compared to ~~1.7~~2.3 train-pedestrian crashes per year under the No-Action Alternative. This is a predicted total increase of 0.6~~0.5~~ train-pedestrian crashes per year under the Proposed Acquisition compared to the No-Action Alternative throughout the entire system of

~~1,134~~1,270 crossings. Detailed information on potential environmental consequences of the Proposed Acquisition on grade crossing safety is presented in **Appendix H**.

Impacts to Quiet Zones

OEA identified ~~45~~ 77 grade crossings located in designated quiet zones. **Appendix H** presents the predicted total, fatal, and casualty crashes under the No-Action Alternative and under the Proposed Acquisition for these ~~45~~ 77 grade crossings, along with the basic train, vehicle traffic, and roadway characteristics used in the calculation of performance measures.

Under the Proposed Acquisition, there would be an impact on the predicted safety performance of the ~~45~~ 77 grade crossings. Specifically, the expected increase in train traffic would result in an increase in the predicted number of crashes. Across the ~~45~~ 77 grade crossings in quiet zones, there would be a predicted increase of 0.15 crashes per year under the Proposed Acquisition as compared to the No-Action Alternative.

Of the ~~45~~ 77 grade crossings located in designated quiet zones, all ~~45~~ 77 of the grade crossings have lights and gates installed, and ~~40~~ 72 of the grade crossings have supplemental safety measures (SSM) installed (such as median barriers or quad gates). As long as the SSMs remain in place, the conditions needed to establish a quiet zone would remain for all but one of the quiet zones under the Proposed Acquisition.

The five grade crossings without SSMs are spread across quiet zones in three communities: Bartlett, Illinois (Crossing IDs 372210R, 372206B, 372207H), Bensenville, Illinois (Crossing ID 372170V), and Edna, Texas (Crossing ID 746639T). The conditions to maintain the existing quiet zones would remain under the Proposed Acquisition provided that Quiet Zone Risk Index (QZRI) would remain less than the National Significant Risk Threshold (NSRT) or the Risk Index with Horns. OEA does not expect that the projected increase in rail traffic associated with the Proposed Acquisition would cause the QZRI to exceed the higher value of the NSRT or Risk Index with Horns for the existing quiet zones in Bensenville, Illinois, and Edna, Texas. Therefore, OEA expects that these two quiet zones would remain if the Proposed Acquisition were implemented even though there are grade crossings within the two quiet zones that do not currently have SSMs. OEA expects that, in the absence of mitigation, the projected increase in rail traffic associated with the Proposed Acquisition would cause the QZRI to exceed the Risk Index with Horns for the existing quiet zone in Bartlett. However, OEA expects that the Applicants' voluntary mitigation (VM) (specifically, VM-Noise-01) would ensure that the existing quiet zones would remain in compliance with safety regulations for grade crossings in quiet zones. Therefore, OEA does not anticipate that the Proposed Acquisition would adversely affect grade crossing safety in quiet zones.

Pedestrian-Only Grade Crossings

OEA identified 31 pedestrian-only grade crossings in the study area. **Appendix H** presents the current crossing protection and historical fatal and casualty crashes for these 31 pedestrian-only grade crossings.

3.2.3.2 No-Action Alternative

Under the No-Action Alternative, the Board would not authorize the Proposed Acquisition and CP would not acquire KCS. Therefore, impacts related to safety at grade crossings and pedestrian-only grade crossings would not occur as a result of the Proposed Acquisition. However, rail traffic at grade crossings and pedestrian-only grade crossings could increase in the future due to changing market conditions, including general economic growth, under the No-Action Alternative, which would affect grade crossing safety.

3.2.4 Conclusion

If the Board authorizes the Proposed Acquisition, OEA estimates that the number of crashes at grade crossings would increase by 0.005 crashes per grade crossing per year, on average, in the study area. Across all ~~1,134~~1,270 grade crossings in the study area that met the criteria for safety analysis, the total predicted number of crashes would be 31.7~~24.9~~ crashes per year under the Proposed Acquisition, compared to 25.5~~19.1~~ crashes per year under the No-Action Alternative, which is a difference of 6.2~~5.8~~ crashes per year. Across all ~~1,134~~1,270 grade crossings in the study area, the total predicted number of train-pedestrian crashes would be 2.9~~2~~ crashes per year under the Proposed Acquisition, compared to ~~1.7~~2.3 crashes per year under the No-Action Alternative, which is a difference of 0.6~~5~~ crashes per year. While OEA thus expects that the Proposed Acquisition would result in an increase in the number of crashes in the study area, the number of crashes at grade crossings along other rail lines in the U.S. and on roadways could decrease as the result of the diversion of rail traffic from other rail lines to the combined CPKC network and the diversion of truck traffic to rail traffic.

To reduce grade crossing safety impacts, the Applicants have voluntarily proposed mitigation measures. These measures include a commitment to making Operation Lifesaver programs available to affected communities, including schools and other organizations (see *Chapter 4, Mitigation*, VM-EJ-02). Operation Lifesaver is a non-profit education and awareness program that helps increase the public's awareness of the dangers around rail lines. In addition, the Applicants have committed to work with affected communities upon request in support of securing funding for increasing the safety of existing grade crossings (VM-Grade Crossing-01) and to consult with affected communities to improve visibility at grade crossings by clearing vegetation, where practicable (VM-Grade Crossing-03). The Applicants have also committed to notifying appropriate Emergency Services Dispatching Centers if grade crossings become blocked by trains that may be unable to move for a prolonged period of time (VM-Grade Crossing-06). The Applicants have also committed to funding improvements necessary to allow communities with existing quiet zones to maintain their quiet zone designation if an increase in rail traffic resulting from the Proposed Acquisition would otherwise cause the quiet zone to fall out of compliance with FRA's quiet zone regulations (VM-Noise-01). These mitigation measures would also address pedestrian safety at grade crossings and elsewhere.

Following issuance of the Draft EIS, the Applicants notified OEA that the Applicants are committed to implementing additional voluntary mitigation measures to address potential impacts in communities in the Houston area, which could include impacts related to grade

crossing safety. These measures include a commitment to meet regularly with community representatives in the Houston area and to work with communities to address concerns related to impacts resulting from the Proposed Acquisition. The Applicants also commit to providing community leaders with options for reporting issues, such as blocked grade crossings. The Applicants state that these options would include CP's "Community Connect" webpage and CP's Public Safety Communication Centre, which can be reached toll-free at 1-800-716-9132. The Applicants state that the Public Safety Communications Centre is staffed 24 hours a day, 365 days a year with trained communication officers who track reported incidents using Computer Aided Dispatch (CAD) software (see VM-Community-01 and VM-Community-02).

Also following issuance of the Draft EIS, the Applicants notified OEA that the Applicants are committed to implementing additional voluntary mitigation measures to address potential impacts in communities in the Chicago area with which the Applicants have been unable to reach agreements, including DuPage County, the Village of Bartlett, the Village of Bensenville, the City of Elgin, the Village of Itasca, the Village of Hanover Park, the Village of Roselle, the City of Wood Dale, and the Village of Schaumburg. Those commitments include funding and installing a predictive mobility system, interconnected with existing railroad crossing signals, that will deliver advanced notice of blocked grade crossings to citizens, police, fire, and rescue operations, and others; funding and installing Intelligent Transportation Systems (ITS) Interconnect for Advanced Warning Signs at strategic locations to give drivers information about occupied grade crossings, allowing them to make better on-the-spot decisions; and funding and installing Positive Train Control wireless technology tie-ins at grade crossings adjacent to Metra platforms, which will minimize the activation of crossing lights and gates (see VM-Community-03).[1]

To facilitate compliance with VM-Community-01 and VM-Community-02, OEA is recommending that the Board impose an additional mitigation measure MM-Community-03, which would require the Applicants to establish a Community Liaison to consult with Houston area community leaders. To facilitate compliance with VM-Community-03, OEA is also recommending that the Board impose mitigation measure MM-Community-04, which would require the Applicants to establish a Community Liaison to consult with community leaders of the Chicago area communities referenced above (the Village of Itasca, the Village of Bensenville, the City of Wood Dale, the Village of Roselle, the Village of Schaumburg, the Village of Hanover Park, the Village of Bartlett, the City of Elgin, and DuPage County) (MM-Community-04). Finally, OEA is also recommending that the Board impose a mitigation measure requiring the Applicants to consult with appropriate state Departments of

[1] FRA defines ITS as "the application of new communications, computer, and sensor technologies to highways and transit systems and the careful integration of system functions to provide more efficient and effective solutions to multimodal transportation problems. The goal of ITS is to provide a seamless, multimodal, and nationwide transportation system." Tie-ins to Positive Train Control provide information on train locations because each locomotive has a Global Positioning (GPS) device. FRA is working with the American Railway Engineering and Maintenance-of-Way Association to develop standards for ITS grade crossing systems for broader deployment. An example of potential use includes an ITS interconnect system to transmit the status of a crossing to in-vehicle navigation systems. Another example includes Changeable Messaging Signs that use PTC train locations and speed to provide information about trains approaching, second trains, and estimated delay times.

Transportation and other appropriate agencies prior to constructing, relocating, upgrading, or modifying grade crossings, including grade crossing warning devices, and to abide by those agencies' reasonable requirements for the design of grade crossings and associated warning devices (MM-Grade Crossing-01).

OEA believes that the Applicants' voluntary mitigation measures and OEA's additional recommended mitigation measures would minimize the impact of the Proposed Acquisition on grade crossing safety.

~~Because impacts related to grade crossing safety would be minor and would be reduced by the mitigation measures proposed by the Applicants, OEA is not recommending any additional mitigation measures for grade crossing safety.~~