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Director, Safety Division

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Staff Memorandum

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To: THE COMMISSION

DOCKET NO. RR-03639A-07-0494

From: Safety Division

Date: November 20, 2007

RE: IN THE MATTER OF THE APPLICATION OF THE UNION PACIFIC RAILROAD COMPANY TO ALTER THREE CROSSINGS OF THE UNION PACIFIC RAILROAD, AT 83<sup>RD</sup> AVENUE, RIO BRAVO ROAD, AND RALSTON ROAD.

Background

On August 24, 2007, the Union Pacific Railroad Company ("Railroad") filed with the Arizona Corporation Commission ("Commission") an application for approval for the Railroad to alter three crossings of the Railroad by adding a second mainline track. The crossing at 83<sup>rd</sup> Avenue is in the City of Goodyear, in Maricopa County, the other two crossings; Rio Bravo and Ralston Road are in the Town of Maricopa, in Pinal County. Commission Safety Division Staff ("Staff") issued data requests and those data requests and the Railroads responses (without attachments), are included as attachments to this memorandum.

The City of Goodyear is the road authority for 83<sup>rd</sup> Avenue. Rio Bravo and Ralston are under the jurisdiction of Pinal County. All three of these crossing were placed into service in 1974. 83<sup>rd</sup> Avenue was equipped with flashing lights, bells and automatic gates in 1978 in Commission Decision 49249. Flashing lights, bells and gates were installed at Rio Bravo in 1999 in Decision 61380, and at Ralston in 1977 in Decision 48486.

Union Pacific's filing in this application requests approval for the Railroad to add a second main track, twenty feet from the center of the existing main track. This application is part of the Railroad's double tracking effort for their Sunset Route across Arizona.

On February 21, 2007, Staff, the Railroad, Maricopa County and Pinal County, participated in a diagnostic review of the proposed improvements at 83<sup>rd</sup> Avenue, Rio Bravo and Ralston Road. All parties present were in agreement to the proposed improvements at the previously mentioned crossings. It was later determined that the City of Goodyear had annexed the portion of land where 83<sup>rd</sup>

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Avenue and the Railroad intersect. A second diagnostic meeting was later held with the City of Goodyear to discuss the proposed double track project. The following is a break down of each of the three crossings in this application, including information about each crossing that was provided to Staff by the Railroad and its contractors.

**83<sup>rd</sup> Avenue**

The proposed second main track at this crossing will be located south of the existing main track. The Railroad will re-profile a portion of the two lane rural asphalt road to meet the new track. The Railroad will also upgrade the existing warning equipment with new 12' LED flashing lights, gates and bells as well as a new concrete crossing surface. The proposed measures are consistent with safety measures employed at similar at-grade crossings in the state.

Traffic data for 83<sup>rd</sup> Avenue was provided to the Railroad by Vicki Stewart, from Maricopa Department of Transportation (MCDOT). MCDOT estimates the Average Daily Traffic ("ADT") for this crossing to be 200. There was no projected ADT for the year 2016. The current Level of Service ("LOS") for the two lane road is LOS A, for both north and south bound traffic.

**Note:** The American Association of State Highway and Transportation Officials (AASHTO) Geometric Design of Highways and Streets, 2004, states that the Level of Service characterizes the operating conditions on a facility in terms of traffic performance measures related to speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. This is a measure of roadway congestion ranging from LOS A--least congested--to LOS F--most congested. LOS is one of the most common terms used to describe how "good" or how "bad" traffic is projected to be.

The posted speed limit on 83<sup>rd</sup> Avenue is 40 MPH. Commission Rail Safety Section, as well as Federal Railroad Administration ("FRA") accident/incident records indicate two accidents on 83<sup>rd</sup> Avenue, no fatalities have occurred at the crossing.

Alternative routes from this crossing are as follows; to the west 29.6 miles is the Business 8 interchange, and to the east 5.0 miles is Rio Bravo, an at-grade crossing.

The estimated cost of the proposed railroad crossing upgrade is \$239,317. The Railroad is paying for the entire cost of the crossing improvements, broken

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down by signal and crossing surface work, with the signal work costing \$216,317 and the crossing surface \$23,160.

### Rio Bravo

The proposed second main track at this crossing will be south of the existing main track. The Railroad will re-profile a portion of the two lane asphalt road to meet the new track. The Railroad will also upgrade the existing warning equipment with new 12' LED flashing lights, gates and bells as well as a new concrete crossing surface. The proposed measures are consistent with safety measures employed at similar at-grade crossings in the state.

Traffic data provided by John Kraft of Pinal County, estimates the Average Daily Traffic ("ADT") for this crossing to be 400. The projected ADT for the year 2030 is 24,071. The current Level of Service ("LOS") for the two lane road is LOS A, for both north and south bound traffic. The posted speed limit on this road is 40 MPH. Commission Rail Safety Section, as well as Federal Railroad Administration ("FRA") accident/incident records indicate four accidents at this crossing, resulting in two fatalities. The first of the two fatalities occurred on 12/17/1984, and was a pedestrian fatality. The second occurred on 5/22/1997. It should be noted that flashing lights and gates were installed at this location in 1999.

Alternative routes from this crossing are as follows; to the west 5.0 miles to 83<sup>rd</sup> Avenue, and to the east 2.04 miles to Ralston Road, both are at-grade crossings.

The estimated cost of the proposed railroad crossing upgrade is \$257,125. The Railroad is paying for the entire cost of the crossing improvements, broken down by signal and crossing surface improvements, with the signal improvements costing \$ 226,245, and the crossing surface \$30,880.

### Ralston Road

The proposed second main track at this crossing will be located south of the existing main track. The Railroad will re-profile a portion of the two lane asphalt road to meet the new track. The Railroad will also upgrade the existing warning equipment with new 12' LED flashing lights, gates and bells as well as a new concrete crossing surface. The proposed measures are consistent with safety measures employed at similar at-grade crossings in the state.

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Traffic data provided by John Kraft of Pinal County, estimates the Average Daily Traffic ("ADT") for this crossing to be 523. This count was taken in August of 2005. The projected ADT for the year 2025 is 49,324. The current Level of Service ("LOS") for the two lane road is LOS A, for both north and south bound traffic. The posted speed limit is 50 MPH. Commission Rail Safety Section, as well as Federal Railroad Administration ("FRA") accident/incident records indicate two accidents, with one resulting in a fatality. The fatality occurred on 4/18/1976. Flashing lights and gates were installed at this location in 1977.

Alternative routes from this crossing are as follows; to the west 2.04 miles to Rio Bravo, and to the east 5.0 miles to SR 347, both are at-grade crossings.

The estimated cost of the proposed railroad crossing upgrade is \$257,330. The Railroad is paying for the entire cost of the crossing improvements, broken down by signal and crossing surface improvements, with the signal work costing \$ 226,450, and the crossing surface \$30,880.

### Train Data

Data provided by the railroad regarding train movements through these three crossings are as follows, and are the same for all three crossings:

**Train Count:** 48 total average trains per day (46 freight, and 2 passenger trains)

**Train Speed:** 79 mph passenger / 70 mph freight

**Thru Freight/Switching Moves:** All train movements through these four crossings are thru movements with no switching operations, according to Union Pacific, Manager of Train Operations, Rob Henderson.

### Schools and Bus Routes

Information about schools, and school buses, in the area was provided by Sabrina Blanton, from Maricopa County School Districts transportation division, and Julie Tiemann, bus driver for Mobile Elementary School District. There are seven schools in the area, they are; Mobile Elementary at 42798 S. 99<sup>th</sup> Avenue, Maricopa High School at 45012 W. Honeycutt Avenue, Maricopa Wells Middle School at 45725 W. Honeycutt, Santa Cruz Elementary at 45012 W. Honeycutt, Maricopa Elementary at 18150 N. Alterra Parkway, Pima Butte Elementary at 42202 W. Rancho El Dorado, and Santa Rosa Elementary at 21400 N. Santa Rosa Drive. The buses for all the schools cross 83<sup>rd</sup> Avenue four times per day, and Rio Bravo six times per day. Ralston is not used.

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### Hospitals

The nearest hospitals to these crossings are either Chandler Regional Hospital, approximately thirty minutes to the north, or Casa Grande Hospital approximately forty five minutes to the east. None of these three crossings are used regularly by medical personal.

### Zoning

Staff requested the Railroad provide information regarding the type of zoning in adjacent areas from the crossing. The following was their response:

*Union Pacific believes that the second part of CW 1.7 calls for speculation as to whether new housing developments, industrial parks, or other developments will occur in the future. In addition, Union Pacific does not have access to such information, but instead must rely on information provided by others. With those caveats, Union Pacific responds as follows:*

*The zoning in the area of these crossings is shown on the City of Maricopa Draft Zoning Map. 83<sup>rd</sup> Ave has rural land use; Rio Bravo Road has rural and industrial; Ralston Road has rural and industrial with some institutional land use. The zoning maps show future residential and industrial land uses near these three crossings. However, the City of Maricopa public works department and Central Arizona Association of Governments planning department can better answer the question of future developments.*

### Grade Separation

With regard to grade separating any of the three crossings, the Railroad gave the following response:

*Union Pacific understands that whether a grade separation is needed is primarily a question of mobility and convenience for vehicular traffic on the roadway, not safety. That is because an at-grade crossing can be safe without constructing a grade separation and eliminating the grade crossing. Based on this understanding, Union Pacific believes the question of whether a grade separation is needed is irrelevant to Union Pacific's application to add a second mainline track at these grade crossings. With that caveat, Union Pacific responds as follows:*



*The diagnostic team that evaluated the three crossings involved in this application concluded the crossings were safe without constructing grade separations. That conclusion is supported by the fact that the Federal Highway Administration authorizes the use of gates and lights at multiple-track grade crossings as proposed in this application. Union Pacific is not aware of any studies specific to the crossings involved in this application.*

**Exposure Index**

Utilizing the Exposure Index (the product of daily road traffic and the daily number of trains as a simplified method or “quick check” to indicate the potential for a grade separation) described in the report Grade Separations – When Do We Separate? by Nicholson and Reed (this report was provided to Commissioner’s Offices on June 22, 2007), Staff have determined the following for this crossing:

Street Name	Year	Average Daily Traffic	Average Daily Trains	Exposure Index
<b>83<sup>rd</sup> Avenue</b>	2007	200	48	9,600
	N/A			
<b>Rio Bravo Street</b>	2006	400	48	19,200
	2030	24,071	84	2,021,964
<b>Ralston Road</b>	2005	523	48	25,104
	2025	49,324	84	4,143,216

The authors of the above-referenced report state that, “when a predetermined value of the index is reached, further investigation is triggered. Examples of predetermined values range in one state from 15,000 for rural conditions to 30,000 for urban conditions, in another from 50,000 for roads on the state highway system to 100,000 for all other roads, and in a third, by speed (15,000 for rural conditions where roadway vehicle speeds are greater than 50 MPH).” The report further indicates that, “investigation described in this section has shown this method is quick, easy, and sufficiently accurate to represent an adequate initial or general screening tool to be used prior to proceeding with more detailed technical analysis.”

While Staff agrees, the Exposure Index should not be used as the sole decision-making tool for determining the appropriateness of a grade separation,

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we note that future Exposure Index's seem high, and may warrant further investigation of grade separation of these crossing in the future by Pinal County.

Having reviewed all applicable data, Staff supports the Railroads application. Staff believes that the upgrades are in the public interest and are reasonable. Therefore, Staff recommends approval of the Railroads application.

Handwritten signature of Dave Raber.

Dave Raber  
Director  
Safety Division

Handwritten signature of Brian H. Lehman.

Brian H. Lehman  
Railroad Supervisor  
Safety Division

**ARIZONA CORPORATION COMMISSION  
 UNION PACIFIC'S RESPONSES TO FIRST SET OF DATA REQUESTS  
 DOCKET NO. RR-03639A-07-0494  
 83<sup>RD</sup> AVENUE, RIO BRAVO ROAD, and RALSTON ROAD in Pinal County, AZ  
 SEPTEMBER 21, 2007**

CW 1.1 Provide Average Daily Traffic Counts ("ADT") for each of the three locations.

*Response:*

<i>Crossing</i>	<i>Current ADT</i>	<i>Source</i>
<i>83<sup>rd</sup> Avenue</i>	<i>200</i>	<i>Verbally from Vicki Stewart Maricopa County on 2/21/07</i>
<i>Rio Bravo Road</i>	<i>400</i>	<i>Verbally from John Kraft, Pinal County on 2/21/07</i>
<i>Ralston Road</i>	<i>523(2005)</i>	<i>CAAG 2005 Traffic Count data provided by John Kraft</i>

*Source:* *Vicki Stewart @ Maricopa County, 2901 W. Durango Street, Phoenix, AZ 85009, (602) 506-1597.  
 John Kraft @ Pinal County, PO Box 727, Florence, AZ 85232, (520) 866-6480.*

CW 1.2 Please describe the current Level of Service ("LOS") at each intersection.

*Response:* *Union Pacific believes that the level of service analysis is irrelevant because that analysis concerns mobility rather than safety. In addition, Union Pacific must rely on information provided by others to calculate the level of service. With those caveats, Union Pacific responds as follows:*

<i>Crossing</i>	<i>LOS (August 2007)</i>
<i>83<sup>rd</sup> Avenue</i>	<i>Northbound (LOS=A), Southbound (LOS=A)</i>
<i>Rio Bravo Road</i>	<i>Northbound (LOS=A), Southbound (LOS=A)</i>
<i>Ralston Road</i>	<i>Northbound (LOS=A), Southbound (LOS=A)</i>

*Source:* *Traffic level of service calculations were performed using Synchro and SimTraffic programs under the direction of Heidi Schneider with HDR Engineering, Inc at 5210 E Williams Circle, Suite 503, Tucson, AZ 85711, (520) 584-3600. The train delay times utilized in the analysis were provided by Tom Domres, with TKDA at 750 Shoreline Drive, Suite 100, Aurora, IL 60504, (630) 499-4110 via Union Pacific.*

CW 1.3 Provide any traffic studies done by the road authorities for each area.

**Response:** 1) ADOT has a 2007 study for the Maricopa Road / John Wayne Hwy (SR 347) Feasibility Study (ADOT TRACS #347 PN 173 H7007) which included future projections for Rio Bravo and Ralston Roads. ADOT Contact is Tim Wilson.  
2) 2006 City of Maricopa SATS (Small Area Transportation Study) Final Report is available on the internet site <http://www.cityofmaricopa.net/PWDept.htm>

CW 1.4 Provide distances in miles to the next public crossing on either side of the proposed project location. Are any of these grade separations?

**Response:** Union Pacific believes that the last question in CW 1.4 raises an issue that is irrelevant, namely, whether either of the next public crossings is a grade separation. With that caveat, Union Pacific responds as follows:

<b>Crossing</b>	<b>TO THE WEST</b>	<b>TO THE EAST</b>
83 <sup>rd</sup> Avenue	29.6 miles to I-8 (BUS)	5.0 miles to Rio Bravo Rd
Rio Bravo Road	5.0 miles to 83 <sup>rd</sup> Ave	2.04 miles to Ralston Rd
Ralston Road	2.04 miles to Rio Bravo Rd	5.0 miles to SR 347

The only adjacent crossing that is a grade separation is at I-8 (BUS) west of 83<sup>rd</sup> Ave.

**Source:** HDR's use of the Union Pacific Straight-line Diagrams and [www.MapQuest.com](http://www.MapQuest.com).

CW 1.5 How and why was grade separation not decided on at this time? Please provide any studies that were done to support these answers.

**Response:** Union Pacific understands that whether a grade separation is needed is primarily a question of mobility and convenience for vehicular traffic on the roadway, not safety. That is because an at-grade crossing can be safe without constructing a grade separation and eliminating the grade crossing. Based on this understanding, Union Pacific believes the question of whether a grade separation is needed is irrelevant to Union Pacific's application to add a second mainline track at these grade crossings. With that caveat, Union Pacific responds as follows:

The diagnostic team that evaluated the three crossings involved in this application concluded the crossings were safe without constructing grade separations. That conclusion is supported by the fact that the Federal Highway Administration authorizes the use of gates and lights at multiple-track grade crossings as proposed in this

*application. Union Pacific is not aware of any studies specific to the crossings involved in this application.*

CW 1.6 If this crossing was grade separated, provide a cost estimate of the project.

*Response: Again, Union Pacific understands that whether a grade separation is needed is primarily a question of mobility and convenience for vehicular traffic on the roadway, not safety. That is because an at-grade crossing can be safe without constructing a grade separation and eliminating the grade crossing. Based on this understanding, Union Pacific believes the question of whether a grade separation is needed is irrelevant to Union Pacific's application to add a second mainline track at these grade crossings. In addition, any attempt to estimate the cost to construct a grade separation would be speculative in the absence of a detailed study of the particular crossing in question. With those caveats, Union Pacific responds as follows:*

*In connection with its recent application to upgrade the crossing of Union Pacific tracks at the intersection of Power and Pecos Roads, RR-03639A-07-0398, the Town of Gilbert estimated that a grade separation at that location would cost \$22 million. Depending on the particular crossing involved, a reasonable range for the costs of constructing a grade separation would be between \$20 million and \$40 million.*

CW 1.7 Please describe what the surrounding areas are zoned for near this intersection. i.e. Are there going to be new housing developments, industrial parks, etc.?

*Response: Union Pacific believes that the second part of CW 1.7 calls for speculation as to whether new housing developments, industrial parks, or other developments will occur in the future. In addition, Union Pacific does not have access to such information, but instead must rely on information provided by others. With those caveats, Union Pacific responds as follows:*

*The zoning in the area of these crossings is shown on the City of Maricopa Draft Zoning Map. 83<sup>rd</sup> Ave has rural land use; Rio Bravo Road has rural and industrial; Ralston Road has rural and industrial with some institutional land use. The zoning maps show future residential and industrial land uses near these three crossings. However, the City of Maricopa public works department and Central Arizona Association of Governments planning department can better answer the question of future developments.*

*Source: The Central Arizona Association of Governments Planning Department(CAAG) <http://www.caagcentral.org/GIS/gishome.html>*

CW 1.8 Please supply the following: number of daily train movements through the crossing, speed of the trains, and the type of movements being made (i.e. thru freight or switching). Is this a passenger train route?

**Response:** *The movements are the same for these three crossings.*

*Train Count: 48 total average trains per day (46 freight, 2 passenger)*

*Train Speed: 79 mph passenger / 70 mph freight*

*Thru Freight/Switching Moves: All moves through these three crossings are thru freight. (According to MTO Rob Henderson there are no switching moves at these crossings.)*

*These crossings are used by Amtrak twice per day, three times per week.*

**Source:** *Union Pacific's Manager of Train Operations, Rob Henderson.*

CW 1.9 Please provide the names and locations of all schools (elementary, junior high and high school) within the area of the crossing.

**Response:**

*Mobile Elementary @ 42798 South 99<sup>th</sup> Avenue, Mobile, Arizona 85239*

*Maricopa HS @ 45012 W Honeycutt Ave, Maricopa, AZ 85239*

*Maricopa Wells MS @ 45725 W Honeycutt Ave, Maricopa, AZ 85239*

*Santa Cruz Elementary @ 45012 W Honeycutt Ave, Maricopa, AZ 85239*

*Maricopa Elementary @ 18150 N Alterra Pkwy, Maricopa, AZ 85239*

*Pima Butte Elementary @ 42202 W Rancho El Dorado, Maricopa, AZ 85239*

*Santa Rosa Elementary @ 21400 N Santa Rosa Drive, Maricopa, AZ 85239*

**Source:** *Julie Tiemann, bus driver for Mobile Elementary School District No. 86, located at 42798 South 99<sup>th</sup> Avenue, Mobile, Arizona 85239, (520) 384-8855.*

*Sabrina Blanton, in transportation for the Maricopa County School District, located at 45012 W. Honeycutt Avenue, Maricopa, Arizona 85239, (520) 568-5120.*

CW 1.10 Please provide school bus route information concerning the crossing, including the number of times a day a school bus crosses this crossing.

**Response:** *The buses for all the schools cross 83<sup>rd</sup> Ave four (4) times per day and Rio Bravo Road six (6) times per day. Ralston Road is not used.*

**Source:** *Julie Tiemann, bus driver for Mobile Elementary School District No. 86, located at 42798 South 99<sup>th</sup> Avenue, Mobile, Arizona 85239, (520) 384-8855.*

*Sabrina Blanton, in transportation for the Maricopa County School District, located at 45012 W. Honeycutt Avenue, Maricopa, Arizona 85239, (520) 568-5120.*

CW 1.11 Please provide information about any hospitals in the area and whether the crossing is used extensively by emergency service vehicles.

**Response:** *The nearest hospitals to these crossings are either Chandler Regional Hospital (approximately 30 minutes away north) or Casa Grande Hospital (approximately 45 minutes away east). To our knowledge, none of these crossings are used extensively by emergency service vehicles.*

**Source:** *Jennifer Crumbliss, Senior Transportation Engineer with HDR, Engineering, Inc. at 8404 Indian Hills Drive, Omaha, NE 68114, (402) 926-7049 used the internet site [www.GoggleEarth.com](http://www.GoggleEarth.com). Also, Juan Cruz, Roadway Designer with HDR in Tucson, physically verified hospital and school locations on June 14, 2007.*

CW 1.12 Please provide the total cost of improvements to each crossing.

**Response:**

<i>Crossing</i>	<i>Signal</i>	<i>Crossing Surface</i>	<i>Total</i>
<i>83<sup>rd</sup> Avenue</i>	<i>\$ 216,157</i>	<i>\$ 23,160</i>	<i>\$ 239,317</i>
<i>Rio Bravo Road</i>	<i>\$ 226,245</i>	<i>\$ 30,880</i>	<i>\$ 257,125</i>
<i>Ralston Road</i>	<i>\$ 226,450</i>	<i>\$ 30,880</i>	<i>\$ 257,330</i>

**Source:** *Union Pacific's Engineering.*

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of the foregoing filed this 21<sup>st</sup> day of  
September, 2007, with:

Arizona Corporation Commission  
1200 West Washington Street  
Phoenix, Arizona 85007

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COPY of the foregoing hand-delivered  
this 21<sup>st</sup> day of September, 2007, to:

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Mr. Brian Lehman  
Mr. Chris Watson  
Railroad Safety Section  
Arizona Corporation Commission  
2200 North Central Avenue, #300  
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