

Northwest Cochise County
Long- Range Transportation Plan

Railroad Crossing Assessment
Working Paper

Prepared for:



Arizona Department of Transportation
Cochise County
City of Benson

Prepared by:

URS

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1.0 INTRODUCTION

The Arizona Department of Transportation (ADOT) is preparing a Long-Range Transportation Plan (Plan) for Northwest Cochise County to evaluate potential highway and arterial routes to meet anticipated transportation demands. The Plan is being prepared under ADOT's Planning Assistance to Rural Arizona Program (PARA) and will include potential projects, strategies, and actions for the years 2020 and 2040. Local and state trends, citizen and stakeholder visions and goals, and emerging issues are key considerations in the development of this plan.

This Working Paper evaluates the existing conditions of two active railroad lines, Union Pacific Railroad (UPRR) and San Pedro & Southwestern Railroad (SPSR), and the impacts those railroads have throughout the defined study area. This analysis will include the evaluation of the existing railroad/highway crossings, rail traffic, roadway traffic, rail/highway accident data, crossing issues, and potential future crossing improvements. Identification of future railroad crossings and associated cost estimates will be conducted in the final development of the Plan.

1.1 Railroad Location and Overview

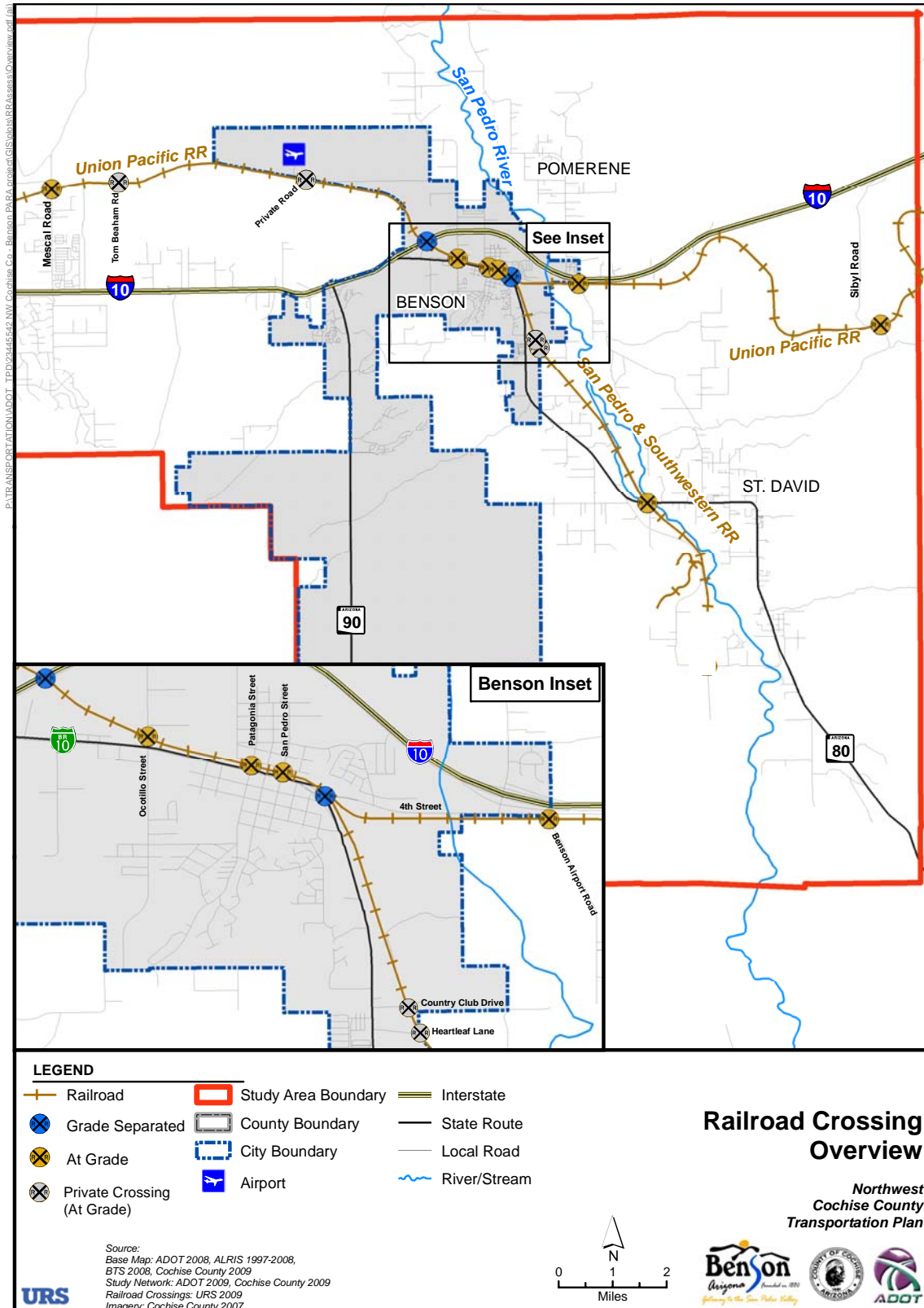
The study area for this Plan encompasses approximately 234 square miles in the northwestern corner of Cochise County which includes the City of Benson and the unincorporated areas of St. David, J-Six/Mescal and Pomerene. The two railroad lines that currently exist within the study area, UPRR and SPSR, run east/west and north/south respectively. UPRR is a double tracked line that crosses Interstate 10 (I-10) at milepost 1031.15 via an underpass just west of the City and crosses over Business 10 (B-10) at milepost 1033.0 in the City of Benson. SPSR is a short line single track railroad that begins at a junction with UPRR near milepost 1033.0 at the intersection of SR 80 and West 4th Street in the City of Benson and continues south approximately 7.5 miles. Figure 1 identifies the locations of these railroads within northwest Cochise County.

The UPRR Sunset Route passes through Northwest Cochise County and the City of Benson as it connects the cities of Los Angeles, CA and El Paso, TX where it then diverges into three lines continuing to San Antonio/New Orleans, Dallas/Fort Worth, and Chicago. According to the State of Arizona 2007 Railroad Inventory and Assessment and UPRR data, traffic on the Sunset Route varies from 44 to 49 freight trains per day, on average carrying container traffic and materials that include lumber, plywood, steel, cement, automobile parts, and grain. Approximately 20% of total UPRR system volume passes through the study area and recent double tracking improvements could potentially increase traffic volume to 80 to 100 trains per day in the future. The Sunset Route is also used for Amtrak service. The Sunset Limited Route provides passenger service between New Orleans and Los Angeles three days a week to the Benson Amtrak station located on 4th Street just west of San Pedro Street.

SPSR provides service to one customer, the Apache Nitrogen Plant, three days a week in the southern portion of the study area. SPSR parallels SR 80 until it crosses at milepost 1037.9.



Figure 1. Railroad Location Overview





2.0 EXISTING RAILROAD CROSSINGS

The two railroads operate freight traffic on a daily basis through the Northwest Cochise County study area. UPRR intersects several arterial streets at-grade. In total, there are ten at-grade crossings along the UPRR rail line, two of which cross private roads. Additionally, there are two grade-separated intersections along this corridor. The UPRR track is grade-separated from I-10 as the track passes underneath the interstate at milepost 1031.15 and over B-10 at milepost 1033.0. SPSR, the north/south short line railroad, parallels SR 80 until they intersect in the southern portion of the study area. There are three at-grade crossings in this corridor, two of which cross private roads. There are no grade-separated intersections along SPSR.

The following information describes each of the 15 highway/railroad grade crossings and lists the associated crossing ID numbers for crossings located within the study area as described by the Federal Railroad Administration (FRA). As one of ten organizations within the U.S. Department of Transportation, the FRA enforces rail safety regulations and supports rail transportation activities across the United States. In the State of Arizona, the Arizona Corporation Commission (ACC) has regulatory oversight over public railroad crossings.

UPRR Crossings

Mescal Road (748 709M) – located at railroad milepost 1023.65, the Mescal Road crossing includes one general travel lane in each direction that crosses two UPRR tracks. The crossing has been upgraded to include a concrete surface as well as safety gates with flashing lights.

Tom Beaham Road (741 380E) – located at milepost 1024.89, Tom Beaham Road is a private dirt road that crosses two UPRR tracks west of the City of Benson. Additional crossing characteristics are not available for this crossing.

PVT (748 756V) – located at milepost 1028.44, this crossing is a private dirt road that crosses two UPRR tracks just south of the Airport. Additional crossing characteristics are not available for this crossing.

I-10 (741 381L) – located at milepost 1031.15, the crossing at I-10 is a grade-separated crossing where I-10 passes over two UPRR tracks. The crossing includes four general purpose lanes along I-10 that include eastbound and westbound travel lanes.

Ocotillo Street (741 382T) – located at milepost 1031.91, the Ocotillo Street crossing includes 2 general purpose lanes, right turn lanes in each direction and a center median that crosses two UPRR tracks. The crossing has been upgraded to include a concrete surface and four sets of safety gates with flashing lights.

Patagonia Street (741 383A) – located at milepost 1032.5, Patagonia Street includes two general purpose lanes and crosses two UPRR tracks. The crossing has been upgraded to include a concrete surface as well as safety gates and flashing lights. This crossing is one of two crossings



identified by the FRA at this railroad milepost and is considered the crossing for the "Main" UPRR track. The maximum train speed for this crossing is 55 mph.

Patagonia Street (741 384G) – the second of two crossings identified at Patagonia Street is located at milepost 1032.51. This crossing is located at and includes the same crossing characteristics as railroad crossing id 741 383A, previously described. This crossing is identified by the FRA as crossing the "Spur House" track along the UPRR line. The maximum train speed for this crossing is 10 mph.

San Pedro Street (741 386V) – located at milepost 1032.68, the San Pedro Street crossing includes two general purpose lanes that cross two UPRR tracks. This crossing has been upgraded to include a concrete surface as well as safety gates and flashing lights. Similar to the Patagonia Street crossing, this crossing is one of two crossings identified by the FRA at this railroad milepost and is considered the crossing for the "Main" UPRR track. The maximum train speed for this crossing is 55 mph.

San Pedro Street (741 385N) – the second of two crossings identified at San Pedro Street is located at milepost 1032.69. Similar to Patagonia Street, this crossing is located at and includes the same crossing characteristics as crossing id 741 386V, previously described. This crossing is also identified by the FRA as crossing the "Spur House" track along the UPRR line. The maximum train speed for this crossing is 10 mph.

4th Avenue/I-10 Business (BUS) (741 387C) – located at milepost 1033.0, the 4th Ave/I-10 BUS crossing is the second grade-separated crossing located in the study area where the highway passes under two UPRR tracks. 4th Avenue includes four general purpose travel lanes separated by a center median.

Benson Airport Road (741 388J) – located at milepost 1034.25, the crossing at Benson Airport Road includes one travel lane in each direction which crosses two UPRR tracks. The crossing has been upgraded to include a concrete surface as well as safety gates and flashing lights.

Sibyl Road (741 389R) – located at milepost 1041.93, the Sibyl Road crossing includes a dirt road with one travel lane in each direction which crosses two UPRR tracks east of Benson. This crossing has been upgraded to include a concrete surface with safety gates and flashing lights.

SPSR Crossings

Country Club Road (741 720N) – located at milepost 1034.23, Country Club Road is a private road with two general purpose lanes that cross the single track SPSR line. This crossing has an asphalt surface and is protected by crossbuck signs and stop signs. This private road provides access to the golf course located southeast of the City of Benson.



Heartleaf Lane (741 721V) – located at milepost 1034.43, Heartleaf Lane is a private dirt road that crosses the single track SPSR line southeast of the City of Benson. Additional crossing information is not available for this crossing

SR 80 (741 722C) – located at milepost 1037.90, SR 80 is a state route with one general purpose travel lane in each direction. SR 80 crosses the single track SPSR line in the southwestern portion of the study area. This crossing has been upgraded to include a concrete surface as well as safety gates and flashing lights.

Highway/railroad grade crossings create complex situations and issues, one of which is safety. Average daily traffic for both trains and automobiles is directly related to the amount of train/automobile accidents that have occurred over time. Accident data provided for the years 2000 to 2009 show one accident has occurred in the study area. Although the number of accidents between trains and automobiles within the study area is not high, it is important to understand that such accidents have previously occurred.

Table 2-1 identifies each grade crossing that lies within the study area along with the average daily train and automobile traffic experienced at each crossing, and the number of accidents reported at each location by the FRA between 2000 and 2009.

Photographs of each identified crossing are provided in Appendix A.

Table 2-1 Highway/Rail Grade Crossings

Railroad	Crossing ID	Roadway	ADT (Trains/Day)	ADT (Vehicles/Day)	Accidents (2000 - 2009)
UPRR	748 709M	Mescal Rd	30	1,400	1
UPRR	741 380E	Tom Beaham (pvt)	Unknown	Unknown	0
UPRR	748 756V	PVT (pvt)	Unknown	Unknown	0
UPRR	741 381L	I-10	<i>grade-separated</i>	<i>grade-separated</i>	0
UPRR	741 382T	Ocotillo St	30	3,456	0
UPRR*	741 383A	Patagonia St	30	700	0
UPRR*	741 384G	Patagonia St (spur)	4	700	0
UPRR*	741 386V	San Pedro St	30	2,350	0
UPRR*	741 385N	San Pedro St (spur)	4	2,350	0
UPRR	741 387C	4th Ave/I-10 BUS	<i>grade-separated</i>	<i>grade-separated</i>	0
UPRR	741 388J	Benson Airport Rd	38	350	0
UPRR	741 389R	Sibyl Rd	30	630	0
SPSR	741 720N	Country Club Rd (pvt)	Unknown	Unknown	0
SPSR	741 721V	Heartleaf Ln (pvt)	Unknown	Unknown	0
SPSR	741 722C	SR 80	2	3,400	0

Source: FRA, 2009; Cochise County, 2009.

Denotes *Grade-separated Crossing*

(pvt) = Private Road

*Crossing locations along identical streets separated per FRA data



3.0 STUDY AREA ASSESSMENT

The Northwest Cochise County study area covers approximately 234 square miles and includes two rail lines that extend through the City of Benson into unincorporated areas of the county. Cochise County is located in the southeast corner of Arizona, sharing its eastern border with the State of New Mexico and its southern border with the Mexican states of Chihuahua and Sonora. The County shares its western border with Santa Cruz and Pima counties and its northern boundary with Graham and Greenlee counties.

The study area is centered at the intersection of three highway corridors, Interstate 10, State Route 80 and State Route 90. These highways provide access to the rest of Cochise County and to the Tucson metropolitan area to the west. Within the study area UPRR crosses I-10, and I-10 Business (4th Avenue) with grade separated crossings and SR 80 with an at-grade crossing. The presence of freight rail facilities throughout the study area adds to the diversity of the existing transportation network. This rail traffic creates crossing issues at highway/rail intersections, possibilities of train/automobile accidents and increased congestion and wait times for vehicle traffic where railroad crossing intersect with roadways.

3.1 Crossing Issues

The UPRR tracks operate directly through the City of Benson creating multiple at-grade crossings throughout the city as described in Section 2.0. The existence and location of the railroad creates a separation between the northern portions of the city and the areas south of the railroad tracks. The developed areas north of the railroad are predominantly residential while the commercial strip of the city is centered along 4th Street, just south of the rail line. The railroad location creates a barrier between the northern residential developments and the commercial district of the city. In addition, the railroad separates the northern residential areas from the city offices and the hospital, which are both located south of the tracks. However, due to the infrequent train activity on the line, vehicle traffic is not impeded by railroad operations where at-grade crossing exist along the SPSR line. Additional crossing issues that result from the location and operation of freight traffic include:

- UPRR railroad line within the study area operates on a double track which increases safety concerns at highway/rail crossings;
- The traffic signal at Patagonia St is connected to train traffic warning devices which result in flashing yellow and red lights. Proximity of traffic intersection to railroad crossing results in confusion for drivers when trains pass, a concern identified by project stakeholders and the City of Benson;
- Increased roadway traffic at peak travel times add to wait times at rail intersections;



- As residential development to the north increases, the amount of daily traffic that crosses the railroad tracks will increase.

3.1.1 Accident History

Since 2000, there has been only one recorded accident between a train and automobile at an at-grade crossing within the Northwest Cochise County study area. According to FRA data, in September 2004, an automobile collided with a train at the Mescal Road highway/rail crossing. The incident occurred at 5 a.m., and it was reported that the driver of the vehicle drove through crossing warning devices including gates, flashing lights, audible warning and crossbucks. This is the only recorded accident occurrence in the study area in the past 10 years.

As determined by the FRA Web Accident Prediction System, the average number of annual accidents that will occur within the study area at highway/rail crossings is only 0.025 accidents per year. This number takes into consideration FRA data including: the average daily vehicular traffic that crosses railroad intersections; the average daily train traffic at each crossing, and the history of accidents at each location.

3.1.2 Congestion

One of the more significant issues relating to the highway/railroad crossings is the level of congestion that results from increased wait times at specific highway/railroad intersections. Increased congestion on the roadway network creates less desirable driving conditions throughout the study area. Increased wait times are the result of trains passing through during peak highway travel times. Grade crossings that are blocked by slow moving trains or are the result of non-preemptive signal priority for trains may create incentives for drivers to seek other routes to cross the tracks.

Within downtown Benson there are three at-grade rail crossings. 4th Street parallels the UPRR track to the south through the city creating traffic intersections with crossing streets. Two of the three intersections; Ocotillo Street and Patagonia Street are controlled with traffic signals, the other; San Pedro Street is controlled by stop signs. According to information obtained through project stakeholder interviews and the City of Benson, there may be congestion issues associated with the increase in train traffic.

Congestion issues relating to freight traffic on the SPSR are not considered significant due to the infrequent railroad traffic on the line.



4.0 TYPICAL IMPROVEMENTS

The UPRR Sunset Route has been undergoing improvements since 2004, which include double tracking portions of the line that pass through Northwest Cochise County. The entire segment of the Sunset Route that lies within the study area has been double tracked and the at-grade crossings have been updated throughout the corridor as described in Section 4.1. Future improvements to the existing transportation network will be developed through the identification of future alternatives. Any future alternatives that include new at-grade railroad crossings will adhere to current design standards which include concrete crossing beds and safety gates. According to ADOT, per railroad policy, any new highway/railroad crossing constructed within Arizona would require the closure of two existing crossings. The purpose of this policy is to ensure no unnecessary railroad crossings are constructed. In addition, considerations should be made regarding the impact new crossings may have on wildlife in the study area. New crossings should consider accommodations for wildlife passage without impacting railroad operations.

FRA policy explains that individual states determine which public crossings require improvements, and identify what those improvements will be. Section 130 of Title 23 CFR establishes a railroad-highway safety improvement program that is administered by FHWA and ADOT. Funding for this program current comes from the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). Safety and hazard elimination projects are proposed based on a State Wide crossing inventory and in consultation with the railroads, road authorities, FHWA and the ACC. Section 130 projects are administered by ADOT and can include signal and/or surface upgrades at railroad-highway crossings.

Typical costs for a new at-grade railroad crossing range from \$250,000 to \$600,000. These costs are dependant on crossing characteristics such as necessary safety measures and number of traffic lanes crossing the tracks.

4.1 Existing Crossings

At-Grade

While the FRA is responsible for regulating the aspects of grade crossing safety in regards to the railroads, the Federal Highway Administration (FHWA) is responsible for issues regarding public grade crossings that affect highway safety. FHWA guidelines provide standards for typical grade crossing design, assessment of safety issues at crossings, and appropriate traffic control devices at and around highway/rail intersections. Traffic control device requirements depend on individual crossing characteristics and can include circular advance warning signs, crossbucks, pavement markings, bells, gates, and flashing lights. Specifications for these traffic control devices are described in detail in the FHWA Manual on Uniform Traffic Control Devices (MUTCD). The FHWA Railroad-Highway Crossing Handbook uses the MUTCD to describe how to design railroad crossings.



As part of the double tracking project, for the UPRR Sunset Route through Northwest Cochise County, all public at-grade crossings along the UPRR line were updated to the most recent industry standards and include concrete crossings, advance warning signs, crossbucks, bells, gates, and flashing lights. Recently, the only public crossing along the SPSR line at SR 80 was updated by replacing the rubber crossing material with a concrete surface.

Grade-separated

Currently, there are two existing grade-separated crossings located within the study area, both of which include UPRR and I-10. One is located along I-10, west of Ocotillo Street where I-10 passes under the railroad. The other is located at the Business I-10 (B-10)/SR 80 interchange where B-10/I-10 passes under the railroad. The B-10/I-10 crossing was identified by project stakeholders as needing improvements for congestion relief.

Any improvements to existing crossings recommended as part of this study or any new at-grade or grade-separated highway/railroad crossing and their associated costs will be analyzed during the final development of this Plan. Due to the recent upgrade of each at-grade crossing along the UPRR Sunset Route, and the SR 80 at-grade crossing along the SPSR, additional improvements do not appear to be necessary at this time.

4.2 Future Crossings

Any recommended future highway/railroad crossings that are not currently part of the existing transportation network will be identified with the final recommended alternatives. This information will be documented and included as part of the Task 6, Future Scenarios Report. All future recommended at-grade or grade-separated highway/railroad crossing should adhere to FRA and FHWA standard and guidelines as documented in the U.S. Department of Transportation Railroad-Highway Grade Crossing Handbook. UPRR prefers overpasses as there is less long term risks for the railroad and the need to keep their existing lines in service during construction. Associated costs will be evaluated as necessary improvements and additions to the existing transportation network are recommended.

5.0 CONCLUSION

The Northwest Cochise County Long-Range Transportation Plan will identify improvements to the existing transportation network necessary to meet anticipated future growth demands in the area. Due to the existence of two railroad lines in the study area, UPRR and SPSR, the relationship between the current roadway system and railroad activity was evaluated. This analysis has found that the impact the highway/railroad grade crossings have on the current safety of the transportation network within the study area is minimal. There has been one recorded accident in the past 10 years between a train and automobile, and in that time all public at-grade crossings in the study area have been updated and improved. There is some congestion around at-grade crossings in the City of Benson during peak travel times, and signal timing issues occur with the coordination of train movements. Furthermore, anticipated future growth will increase both the number of vehicles on the road and the volume of train traffic in



the study area thereby increasing the possibilities of additional highway/railroad crossing issues. Recommendations to improve the existing transportation network will take into account the characteristics of the identified grade crossings. These results and any additional recommended improvements to any highway/railroad grade crossing will be included as part of the final development of this Plan.



Appendix A

Photographic Record – Highway/Railroad Grade Crossings



PHOTOGRAPHIC RECORD – Highway/Railroad Grade Crossings

Arizona Department of Transportation
Cochise County
City of Benson


Photo No. 1	
View Direction of Photo:	
South	
Date: November 2009	
Description:	
Highway/Railroad at-grade crossing at Mescal Rd and UPRR. Crossing ID 748 709M	

Photo No. 2	
View Direction of Photo:	
Date:	
Description:	
Private highway/railroad at-grade crossing at Tom Beaham Rd and UPRR. Crossing ID 741 380E	
	PRIVATE ROAD NOT ACCESSIBLE



PHOTOGRAPHIC RECORD – Highway/Railroad Grade Crossings

Arizona Department of Transportation
Cochise County
City of Benson

Photo No. 3	
View Direction of Photo:	
Date:	
Description: Private highway/railroad at-grade crossing at UPRR track. Crossing ID 748 756V	

PRIVATE ROAD NOT ACCESSIBLE

Photo No. 4	
View Direction of Photo:	
Date:	
Description: Grade separated crossing at I-10 and UPRR. Crossing ID 741 381L	

PICTURE NOT AVAILABLE



PHOTOGRAPHIC RECORD – Highway/Railroad Grade Crossings

Arizona Department of Transportation
Cochise County
City of Benson

Photo No. 5	
View Direction of Photo:	
Date: February 2010	
Description: Highway/railroad at-grade crossing at Ocotillo Street and UPRR. Crossing ID 741 382T	

Photo No. 6	
View Direction of Photo:	
Date: November 2009	
Description: Highway/Railroad at-grade crossing at Patagonia Street and UPRR Crossing ID 741 383A & 741 384G	



PHOTOGRAPHIC RECORD – Highway/Railroad Grade Crossings

Arizona Department of Transportation
Cochise County
City of Benson



Photo No. 7	
View Direction of Photo:	
North	
Date: November 2009	
Description:	
Highway/Railroad at-grade crossing at San Pedro Street and UPRR. Crossing ID 741 386V & 741 385N	


Photo No. 8	
View Direction of Photo:	
Date: February 2010	
Description:	
Grade separated crossing at 4th Avenue/I-10 BUS and UPRR. Crossing ID 741 387C	



PHOTOGRAPHIC RECORD – Highway/Railroad Grade Crossings

Arizona Department of Transportation
Cochise County
City of Benson

Photo No. 9	
View Direction of Photo: East	
Date: November 2009	
Description: Highway/Railroad at-grade crossing at Benson Airport Rd and UPRR. Crossing ID 741 388J	

Photo No. 10	
View Direction of Photo: Northeast	
Date: November 2009	
Description: Close up of improved crossing bed at Benson Airport Rd and UPRR. Crossing ID 741 388J	



PHOTOGRAPHIC RECORD – Highway/Railroad Grade Crossings

Arizona Department of Transportation
Cochise County
City of Benson



Photo No. 11	
View Direction of Photo:	
North	
Date: November 2009	
Description:	
Highway/Railroad at-grade crossing at Sibyl Road and UPRR. Crossing ID 741 389R	

Photo No. 12	
View Direction of Photo:	
Date: February 2010	
Description:	
Private highway/railroad at-grade crossing at Country Club Road and SPSR. Crossing ID 741 720N	



PHOTOGRAPHIC RECORD – Highway/Railroad Grade Crossings

Arizona Department of Transportation
Cochise County
City of Benson



Photo No. 13	
View Direction of Photo:	
Date: February 2010	
Description: Private highway/railroad at-grade crossing at Heartleaf Lane and SPSR. Crossing ID 741 721V	

Photo No. 14	
View Direction of Photo:	
Date: February 2010	
Description: Highway/railroad at-grade crossing at State Route 80 and SPSR. Crossing ID 741 722C	