

TRAFFIC ANALYSIS REPORT

SCOTT RANCH ROAD SR-260 TO PENROD ROAD

ADOT TRACS NO: SS673 01C
FEDERAL AID NO: HPP-SLW-(200)A

PREPARED FOR:

CITY OF SHOW LOW
550 N. 9TH PLACE
SHOW LOW, AZ 85901

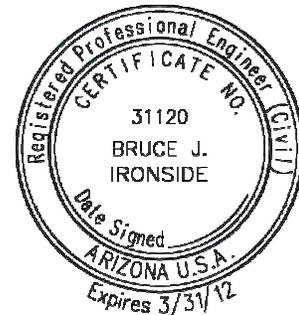
PREPARED BY:
IRONSIDE ENGINEERING & DEVELOPMENT, INC.
401 South White Mountain Road
Show Low, Arizona 85901-6112

JULY 2009



TABLE OF CONTENTS

1.0 Project Description	1
2.0 Existing Conditions	1
2.1 Accident History	1
3.0 Future Traffic Volume	2
3.1 No-Build Scenario	2
3.2 Level of Service Analysis	2
3.3 Adjacent Roadways	3
4.0 Intersection Design	4
4.1 SR 260	4
4.2 Show Low Lake Road.....	4
4.3 Penrod Road	4
5.0 Conclusion	5
6.0 Limitations	6
7.0 References	6
APPENDIX A – FIGURES & EXHIBITS	7
Figure A1- Project Location	8
APPENDIX B – TYPICAL CROSS SECTIONS	9
APPENDIX C – ROAD SECTION EXHIBIT	11
APPENDIX D – LOS CALCULATIONS	13
Figure D1 – Commercial Section 2030 LOS.....	14
Figure D2 – Non-Commercial Section 2030 LOS.....	17
Figure D3 – Penrod Road 2010 LOS.....	20
APPENDIX E – INTERSECTION DESIGN	23
Exhibit E1 – Intersection Traffic Volumes	24
Exhibit E2 – Penrod Road Sight Triangle	25
Figure E1 – Scott Ranch Road/Show Low Lake Road Intersection 2010 LOS.....	26
Figure E2 – Scott Ranch Road/Show Low Lake Road Intersection 2030 LOS.....	28
Figure E3 – Scott Ranch Road/Penrod Road Intersection 2010 LOS	30
Figure E4 – Scott Ranch Road/Penrod Road Intersection 2030 LOS	32



1.0 Project Description

The existing Scott Ranch Road currently terminates 700 ft east of its intersection with State Route 260 (SR 260), approximately one half mile south of Show Low Lake Road, in the heart of the region's largest commercial center and regional hospital. See Figure A1 – Project Location, in Appendix A, for the project location.

The purpose of the proposed Scott Ranch Road project is to provide a much needed east-west connection between SR 260 and Penrod Road. State Route 260 currently serves as the main corridor from Show Low to Pinetop-Lakeside. It is a five (5) lane highway, with a continuous left turn lane, and a posted speed limit of 45 mph in the vicinity of Scott Ranch Road. Penrod Road is currently a two-way two-lane highway with a posted speed limit of 45 mph, and acts as an alternate route to SR 260. This alternate route allows drivers passing through the region to by-pass most of the traffic associated with driving through the City of Show Low.

The Southern Navajo/Apache County Sub Regional Transportation Plan (Sub Regional Transportation Plan), compiled in September 2007 by Wilson & Company, addresses the key projects in order to provide adequate transportation in and throughout the region. A separate Community Transportation Plan that identifies transportation needs that are specific to the City of Show Low was also compiled in September 2007 by Wilson & Company. Both transportation plans emphasize Scott Ranch Road as a viable alternative route in the region.

2.0 Existing Conditions

The land that Scott Ranch Road is proposed to be built upon is primarily privately owned, with the exception of Show Low Creek, which is owned by the United States Forest Service (USFS). The majority of the project is located in undeveloped forest, with some developed areas on the west side of the project.

2.1 Accident History

Accident reports were requested from the City of Show Low Police Department and the Navajo County Sheriff's Department. Accident history was provided by the Navajo County Sheriff's Department for Penrod Road, in the vicinity of the proposed intersection with Scott Ranch Road. The City of Show Low did not have any accidents on record for Penrod Road. Ironside Engineering & Development (IED) is currently in the process of contacting the Arizona Department of Public Safety (DPS) regarding accident reports in the region. Table 2.1 summarizes the accidents reported from March 2005 to July 2007.

Table 2.1 – Penrod Road Accident Summary

Source	Sideswipe	Collision	Rollover	Rear End	Unknown	Animal	Total Injuries	Total Fatalities
Navajo County Sheriff's Dept.	1	1	1	1	4	1	1	0

Based on the accidents reported, there is no direct correlation between the accidents and design features of the roadway network.

3.0 Future Traffic Volume

As the population in the region increases, traffic volumes will increase as well. According to the Sub Regional Transportation Plan, the population of Southern Navajo and Apache Counties is aggressively projected to increase to 177,000 people by 2030, up from 35,653 people in 2000. As a result of this projected population increase, traffic volumes will exceed the capacity of the roadway transportation network throughout the region.

It is anticipated that the land adjacent to the proposed Scott Ranch Road corridor will be developed in the future. At this time, it is difficult to estimate what kind of land uses will result in the development of the area. As an alternative to predicting the future land uses in the area for trip generation purposes, the projected traffic volumes determined by the Sub Regional Transportation Plan were used in the analysis.

3.1 No-Build Scenario

A no-build scenario was investigated in the City of Show Low Community Transportation Plan. The no-build scenario essentially equates to no improvements being made to the existing roadway network, and no additional roadways being constructed in the future. According to the results of the investigation, both SR 260 and Penrod Road are predicted to operate at a LOS 'F' by the year 2030. With SR 260 and Penrod Road operating so poorly, the congestion would more than likely spill over to the rest of the transportation network, including smaller roadways not intended to act as major travel routes.

3.2 Level of Service Analysis

According to the Sub Regional Transportation Plan, the predicted AADT of Scott Ranch Road will reach 8,400 vehicles per day by 2030. There are three proposed cross sections for the project; two separate commercial sections, and a non-commercial section. Both commercial cross sections are a three lane roadway with vertical curb and gutter, one travel lane in each direction, and a continuous left-turn lane. The only differences in the two commercial sections are the sidewalk locations and dimensions, which will not influence the capacity of the roadway. The non-commercial cross section is a two lane roadway, one lane travel lane in each direction, with ribbon curb. A LOS analysis was performed on both types of cross sections due to the differences in shoulder width. The cross section dimensions are illustrated in Appendix B – Typical Cross Sections, and the locations of the cross sections along the corridor are illustrated in Appendix C – Road Sections Exhibit.

The Highway Capacity Manual (HCM 2000) was used to carry out the LOS analyses. Future characteristics of the proposed highway are difficult to predict, therefore, default values for these unknown characteristics were accepted from

the HCM 2000 through the use of engineering judgment. Table 3.1 summarizes the various predicted traffic volumes and LOS analysis input parameters.

Table 3.1 – LOS Analysis Data

Data	Source	Value
Design Year 2030 ADT for Scott Ranch Road East of Show Low Lake Road	Show Low Community Transportation Plan	8,400
Construction Year 2010 ADT for Scott Ranch Road East of Show Low Lake Road	IED	5,000
Design Year 2030 ADT for Penrod Road South of Scott Ranch Road	Show Low Community Transportation Plan	40,000
Existing ADT on Penrod Road South of US 60	City of Show Low Public Works Dept.	6,457
Scott Ranch Road Design Hour Traffic Factor (K)	IED	9%
Scott Ranch Road Directional Distribution Factor (D)	IED	60%
Scott Ranch Road Truck Factor (T)	IED	5%

The LOS for both sections of roadway were determined based upon the percent time-spent-following. The analyses yielded the same results for both sections of the proposed corridor. The results of the analyses are shown in Table 3.2. See Figure B1 – Commercial Section 2030 LOS and Figure B2 – Non-Commercial Section 2030 LOS, in Appendix B, for supporting calculations and values used in the analyses.

Table 3.2 – Projected Scott Ranch Road Level of Service

Section	LOS	Percent Time-Spent-Following	Year
Commercial Cross Section	C	60	2030
Non-Commercial Cross Section	C	60	2030

The goal of Arizona Department of Transportation is to achieve a design year LOS 'C' for new highways. As shown in Table 3.2, it is anticipated that Scott Ranch Road will meet the requirements of operating under a LOS 'C' during the peak hour of traffic flow of the design year.

3.3 Adjacent Roadways

It is anticipated that the LOS of SR 260 will improve as a result of an additional travel route in the region. Traffic volumes on Penrod Road will most likely increase due to drivers choosing to travel on Scott Ranch Road as opposed to traveling through the City of Show Low on SR 260. It is recommended that the widening of Penrod Road be investigated in the near future due to accommodate the projected traffic volume increases.

4.0 Intersection Design

As previously mentioned, the predicted traffic volumes from the Sub Regional Transportation Plan were accepted for this analysis. Traffic volumes for the construction year (2010) and the year 2015 were estimated based upon current traffic volumes on both SR-260 and Penrod Road and the design year (2030) volumes. The traffic movements for the proposed intersections of Scott Ranch Road/Show Low Lake Road and Scott Ranch Road/Penrod Road, along with their associated projected traffic volumes, are illustrated in Exhibit C1 – Intersection Traffic Volumes, in Appendix C.

4.1 SR 260

The intersection of Scott Ranch Road and SR 260 is signalized, and has the capability to accommodate the anticipated traffic that Scott Ranch Road will contribute to the intersection with signal timing plan modifications. Vehicles traveling north and south on SR 260 are provided with both right-turn and left-turn lanes. Scott Ranch Road contains a left-turn lane and a shared right-turn lane.

The traffic signal was built in 2003, when the Home Depot was constructed. The signal plans were obtained from the City of Show Low to verify that all movements of traffic could be accommodated by the signal. The designers assumed that Scott Ranch Road would be extended in the future, and took this assumption into consideration during the design phase. As with any traffic signal, the timing plan at this intersection will need to be monitored by others as traffic volumes increase.

4.2 Show Low Lake Road

Scott Ranch Road forms an intersection with Show Low Lake Road in the proposed design. The intersection is located on a horizontal curve, and as a result, limited sight visibility is available. An all way stop control is proposed for this intersection, and all legs of the intersection are provided with left turn and shared right-turn/thru lanes in order to efficiently accommodate all movements of traffic.

A LOS analysis was performed on the proposed intersection for both the construction year and design year. It is projected that the intersection will operate at a LOS 'A' during the construction year (2010?) and a LOS 'B' during the design year (2030). It is anticipated that the proposed intersection will operate at an acceptable LOS for an all way stop control design, therefore, a traffic signal needs study was not performed. The outputs from both analyses can be viewed in Appendix C.

4.3 Penrod Road

The proposed point of termination for Scott Ranch Road is at Penrod Road, which will form a T-intersection. With the current traffic volumes on Penrod Road, it is proposed that stop control be utilized on Scott Ranch Road. Scott Ranch Road will be provided with both left and right-turn lanes and Penrod Road will be provided with a left-turn lane for northbound traffic and a right-turn lane

for southbound traffic. The intersection design can be viewed in the 30% improvement plans.

Sight distances were analyzed for all movements of the proposed intersection. Sight triangle dimensions were calculated using the methods outlined in the ADOT Roadway Design Guidelines and AASHTO 2004. It was determined that traffic turning onto Penrod Road from Scott Ranch Road, both left and right, are provided with sufficient sight distance to join traffic traveling on Penrod Road. The intersection sight triangles are illustrated in Exhibit C1 – Penrod Road Intersection Sight Triangle, in Appendix C.

A LOS analysis was performed for the construction year and design year of the intersection utilizing the projected traffic volumes. It is anticipated that this intersection will operate under a LOS 'E' during the construction year and a LOS 'F' during the design year.

As a result of the LOS analyses, it is anticipated that the intersection will require a traffic signal by the year 2030. Between the construction year and the design year, the intersection will require frequent monitoring to better determine when a traffic signal will need to be implemented.

5.0 Conclusion

The City of Show Low proposes to construct Scott Ranch Road to provide a much needed alternative route for the region. As part of the evaluation of the new highway, a traffic impact analysis was performed to determine the variety of impacts the project could potentially have on the surrounding roadway network.

According to the Sub Regional Transportation Plan, the roadway network in the vicinity of Scott Ranch Road will be incapable of accommodating the projected traffic volumes by the year 2030. Scott Ranch Road is a viable alternative that can potentially alleviate the deteriorating LOS on the surrounding roadway network. As illustrated throughout the analysis, the construction of Scott Ranch Road would ultimately enhance transportation to and throughout the entire region.

A two-lane roadway will be adequate to accommodate the predicted traffic volumes through the year 2030. Due to the growth forecasts for the region, other alternatives should be investigated in an attempt to lower congestion on the roadway network beyond 2030.

6.0 Limitations

The results provided within this report consist of opinions and conclusions of the consulting engineer. The only warranty or guarantee made by the consultant, in connection with the services performed for this project, is that such services are performed with the care and skill ordinarily exercised by members of the profession practicing under similar conditions, at the same time, and in the same or similar locality. No other warranty, expressed or implied, is made or intended by rendering such consulting services or by furnishing written reports of the findings. However, any deviation from the above recommendations may nullify the conclusions of this report, as may variations in climatic or environmental conditions.

7.0 References

AutoDesk, Civil 3D Land Desktop Companion, 2009

Wilson & Company, Southern Navajo/Apache County Sub Regional Transportation Plan Final Report, September 2007.

Wilson & Company, Community Transportation Plan (City of Show Low), September 2007.

AASHTO. Geometric Design of Highways and Streets, Washington, D.C.: AASHTO 2004.

Transportation Research Board, Highway Capacity Manual, 2000.

University of Florida McTrans Center, Highway Capacity Software Version 4.1e, 2003.

Arizona Department of Transportation Planning Division, Average Annual Daily Traffic (AADT) Reports, 2006-2007.

Arizona Department of Transportation, Traffic Engineering Policies, Guides and Procedures (PGP) Sub Section 430 – Turn Lane Design, January 2000.

City of Show Low, Accident Report Data, 2002-2007.

Navajo County Sheriff's Department, Accident Report Data, 2005-2007.

APPENDIX A – FIGURES & EXHIBITS

APPENDIX B – TYPICAL CROSS SECTIONS

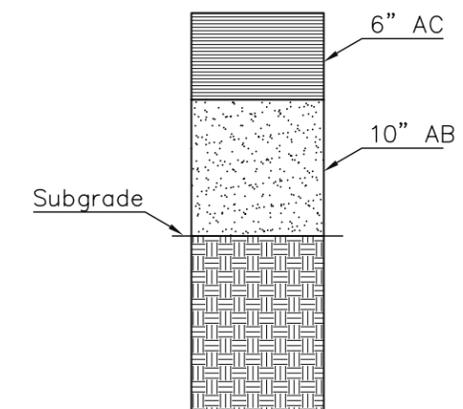
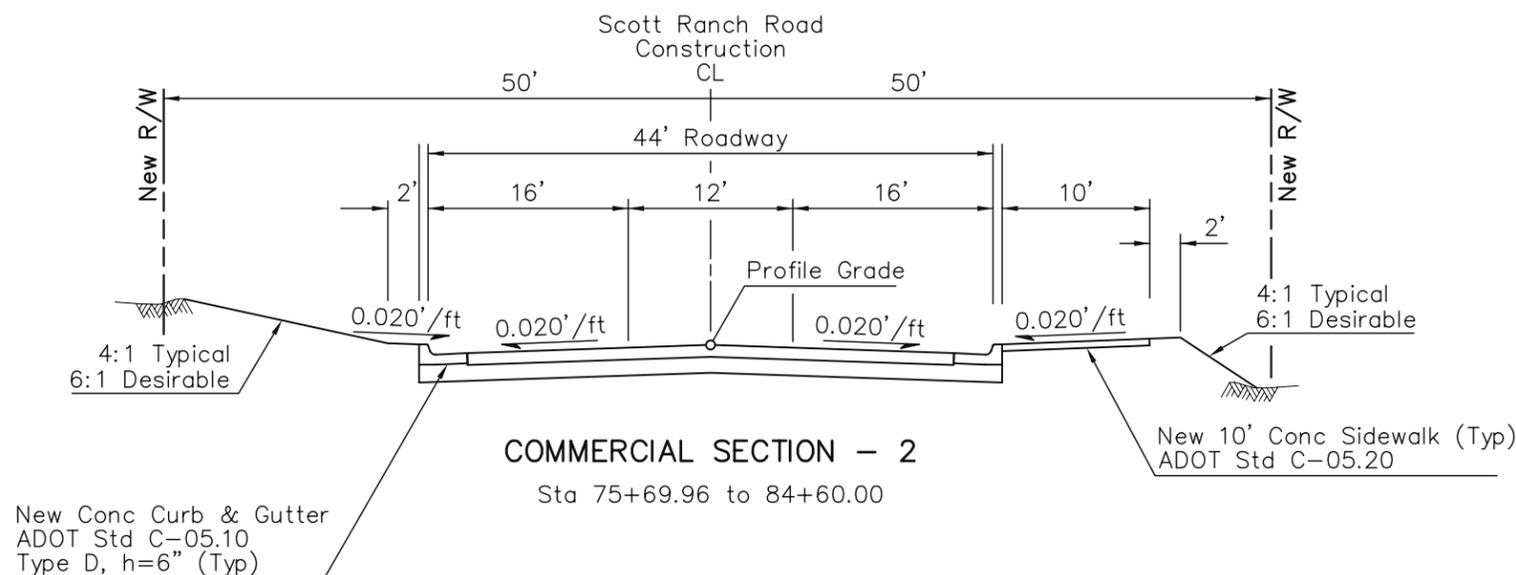
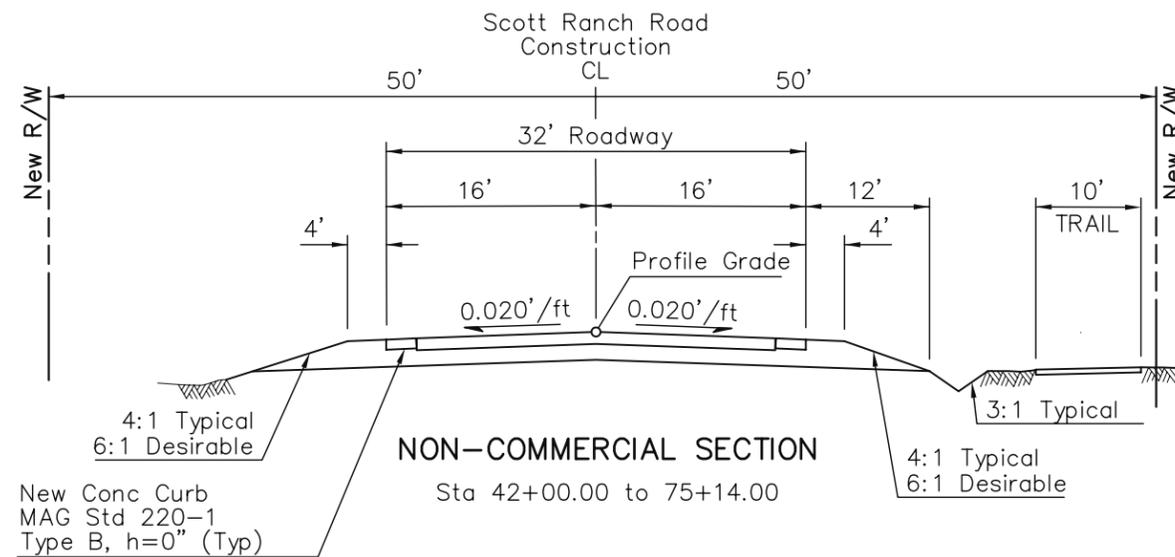
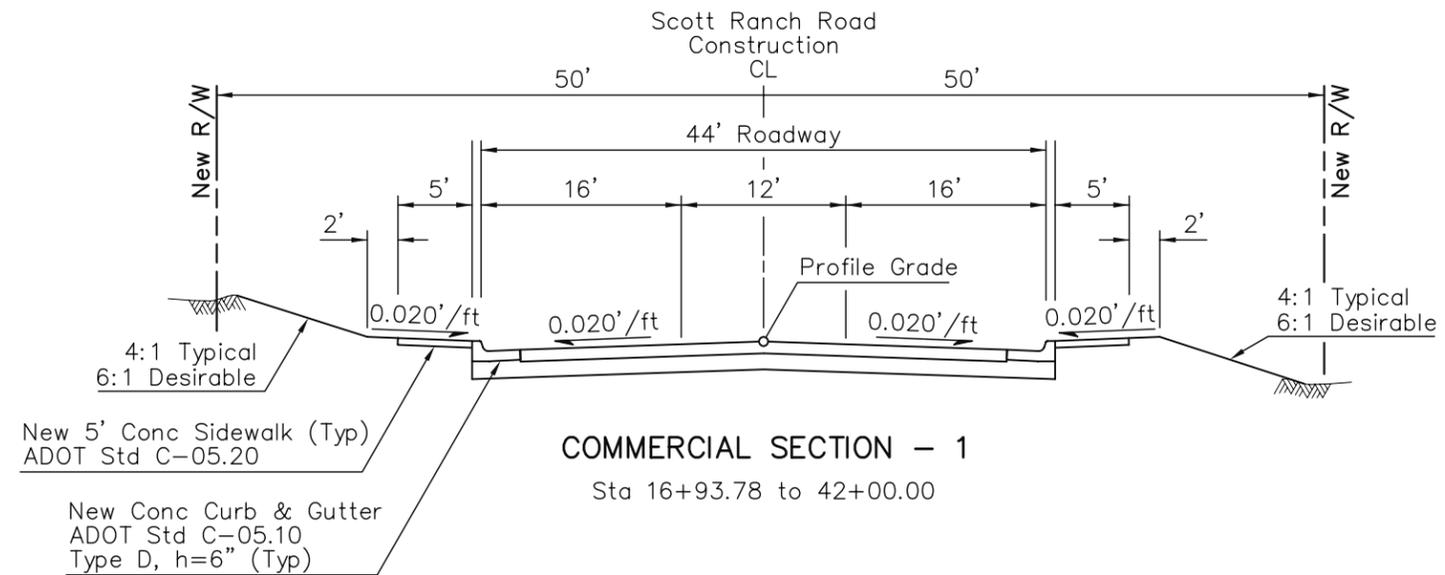
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	10131			

DESIGN DATA

Design Speed = 40 MPH

LENGTH OF PROJECT

Sta 16+93.78 to 84+60.00 = 6766.22' - 1.28 Miles

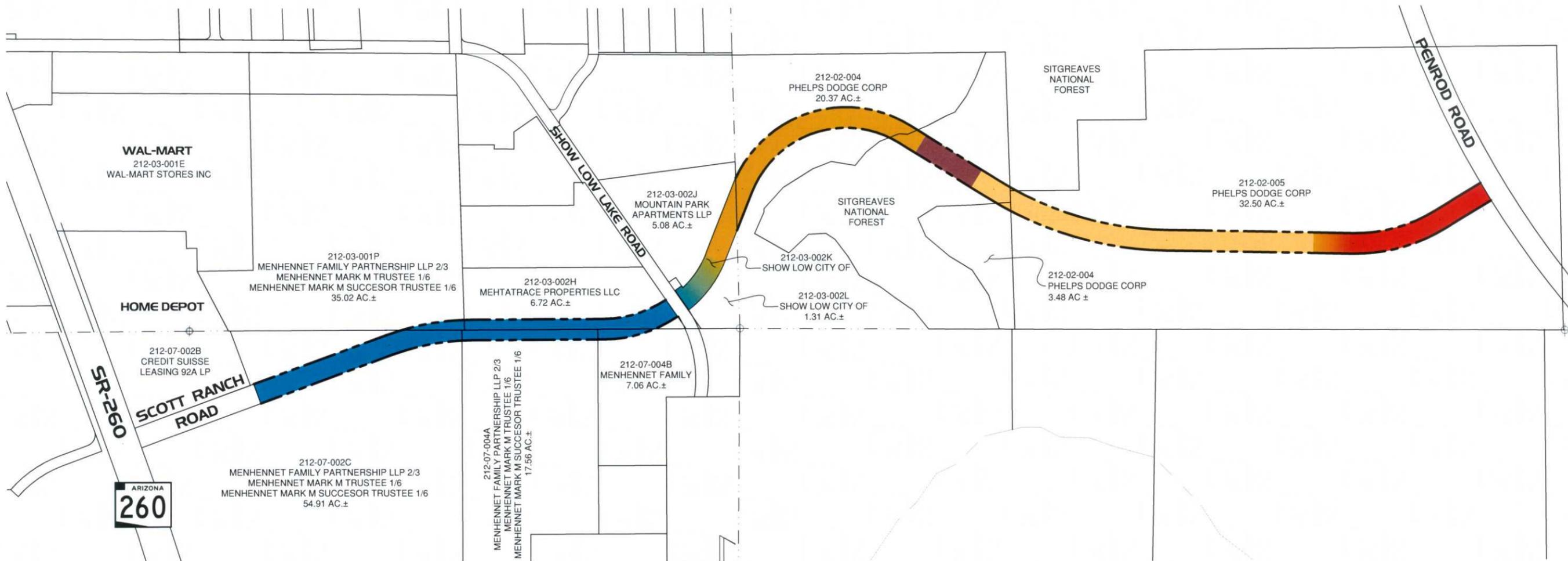
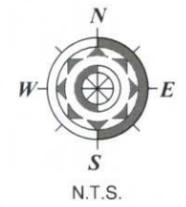


Total Thickness = 16"

**SECTION NO. 1
PAVEMENT STRUCTURAL SECTION**

DESIGN	J. OWENS	01/09	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION ROADWAY DESIGN SERVICES	PRELIMINARY STAGE II Review NOT FOR CONSTRUCTION OR RECORDING
DRAWN	J. OWENS	01/09		
CHECKED				
IRONSIDE Engineering & Development, Inc.			DESIGN SHEET	
ROUTE	LOCATION		SCOTT RANCH ROAD	SHEET 1 OF 2
TRACS NO. SS673 01C	APPENDIX C			OF

APPENDIX C – ROAD SECTION EXHIBIT



NOTE:
PARCEL INFORMATION WAS TAKEN FROM
NAVAJO COUNTY ASSESSORS OFFICE.

- LEGEND**
- NON-COMMERCIAL SECTION
 - COMMERCIAL SECTION - 1
 - COMMERCIAL SECTION - 2
 - BRIDGE SECTION
 - SECTION LINES
 - EXISTING PROPERTY BOUNDARY / RIGHT OF WAY
 - PROPOSED RIGHT OF WAY

ROAD SECTION EXHIBIT
SCOTT RANCH ROAD AND BRIDGE PROJECT
SR-260 TO PENROD ROAD

APPENDIX D – LOS CALCULATIONS

Figure D1 – Commercial Section 2030 LOS

IED
 Ironside Engineering
 401 South White Mountain Road
 Show Low, Arizona 859013

Phone: 928-532-0880
 E-Mail:

Fax: 928-532-8466

-----Two-Way Two-Lane Highway Segment Analysis-----

Analyst SCI
 Agency/Co. IED
 Date Performed 6/9/09
 Analysis Time Period Future
 Highway Scott Ranch Road
 From/To Commercial Section
 Jurisdiction City of Show Low
 Analysis Year 2030
 Description Commercial Cross Section

-----Input Data-----

Highway class	Class 2				
Shoulder width	4.0	ft	Peak-hour factor, PHF	0.90	
Lane width	12.0	ft	% Trucks and buses	10	%
Segment length	0.7	mi	% Recreational vehicles	4	%
Terrain type	Rolling		% No-passing zones	100	%
Grade: Length		mi	Access points/mi	12	/mi
Up/down		%			
Two-way hourly volume, V	454	veh/h			
Directional split	60 / 40	%			

-----Average Travel Speed-----

Grade adjustment factor, fG	0.93	
PCE for trucks, ET	1.9	
PCE for RVs, ER	1.1	
Heavy-vehicle adjustment factor,	0.914	
Two-way flow rate, (note-1) vp	593	pc/h
Highest directional split proportion (note-2)	356	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	45.0	mi/h
Adj. for lane and shoulder width, fLS	1.3	mi/h
Adj. for access points, fA	3.0	mi/h
Free-flow speed, FFS	40.7	mi/h
Adjustment for no-passing zones, fnp	3.9	mi/h
Average travel speed, ATS	32.2	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	0.94	
PCE for trucks, ET	1.5	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	0.952	
Two-way flow rate,(note-1) vp	563	pc/h
Highest directional split proportion (note-2)	338	
Base percent time-spent-following, BPTSF	39.0	%
Adj.for directional distribution and no-passing zones, fd/np	21.0	
Percent time-spent-following, PTSF	60.0	%

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.19	
Peak 15-min vehicle-miles of travel, VMT15	88	veh-mi
Peak-hour vehicle-miles of travel, VMT60	318	veh-mi
Peak 15-min total travel time, TT15	2.7	veh-h

Notes:

1. If $vp \geq 3200$ pc/h, terminate analysis-the LOS is F.
2. If highest directional split $vp \geq 1700$ pc/h, terminate analysis-the LOS is F.

Figure D2 – Non-Commercial Section 2030 LOS

IED
 Ironside Engineering
 401 South White Mountain Road
 Show Low, Arizona 859013

Phone: 928-532-0880

Fax: 928-532-8466

E-Mail:

-----Two-Way Two-Lane Highway Segment Analysis-----

Analyst SCI
 Agency/Co. IED
 Date Performed 6/9/09
 Analysis Time Period Future
 Highway Scott Ranch Road
 From/To SLLR - West of Penrod Road
 Jurisdiction City of Show Low
 Analysis Year 2030
 Description Non-Commercial Cross Section

-----Input Data-----

Highway class	Class 2				
Shoulder width	8.0	ft	Peak-hour factor, PHF	0.90	
Lane width	12.0	ft	% Trucks and buses	10	%
Segment length	0.6	mi	% Recreational vehicles	4	%
Terrain type	Rolling		% No-passing zones	100	%
Grade: Length		mi	Access points/mi	12	/mi
Up/down		%			

Two-way hourly volume, V	454	veh/h
Directional split	60 / 40	%

-----Average Travel Speed-----

Grade adjustment factor, fG	0.93	
PCE for trucks, ET	1.9	
PCE for RVs, ER	1.1	
Heavy-vehicle adjustment factor,	0.914	
Two-way flow rate, (note-1) vp	593	pc/h
Highest directional split proportion (note-2)	356	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	45.0	mi/h
Adj. for lane and shoulder width, fLS	0.0	mi/h
Adj. for access points, fA	3.0	mi/h
Free-flow speed, FFS	42.0	mi/h
Adjustment for no-passing zones, fnp	3.9	mi/h
Average travel speed, ATS	33.5	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	0.94	
PCE for trucks, ET	1.5	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	0.952	
Two-way flow rate,(note-1) vp	563	pc/h
Highest directional split proportion (note-2)	338	
Base percent time-spent-following, BPTSF	39.0	%
Adj.for directional distribution and no-passing zones, fd/np	21.0	
Percent time-spent-following, PTSF	60.0	%

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.19	
Peak 15-min vehicle-miles of travel, VMT15	79	veh-mi
Peak-hour vehicle-miles of travel, VMT60	286	veh-mi
Peak 15-min total travel time, TT15	2.4	veh-h

Notes:

1. If $vp \geq 3200$ pc/h, terminate analysis-the LOS is F.
2. If highest directional split $vp \geq 1700$ pc/h, terminate analysis-the LOS is F.

Figure D3 – Penrod Road 2010 LOS

IED
 Ironside Engineering
 401 South White Mountain Road
 Show Low, Arizona 859013

Phone: 928-532-0880
 E-Mail:

Fax: 928-532-8466

-----Two-Way Two-Lane Highway Segment Analysis-----

Analyst SCI
 Agency/Co. IED
 Date Performed 6/9/09
 Analysis Time Period Current
 Highway Penrod Road
 From/To
 Jurisdiction COSL
 Analysis Year 2009
 Description Current Level of Service

-----Input Data-----

Highway class	Class 2				
Shoulder width	6.0	ft	Peak-hour factor, PHF	0.92	
Lane width	12.0	ft	% Trucks and buses	10	%
Segment length	4.0	mi	% Recreational vehicles	4	%
Terrain type	Rolling		% No-passing zones	40	%
Grade: Length		mi	Access points/mi	10	/mi
Up/down		%			
Two-way hourly volume, V	350	veh/h			
Directional split	60 / 40	%			

-----Average Travel Speed-----

Grade adjustment factor, fG	0.71	
PCE for trucks, ET	1.9*	
PCE for RVs, ER	1.1	
Heavy-vehicle adjustment factor,	0.914	
Two-way flow rate, (note-1) vp	586	pc/h
Highest directional split proportion (note-2)	352	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	52.0	mi/h
Adj. for lane and shoulder width, fLS	0.0	mi/h
Adj. for access points, fA	2.5	mi/h
Free-flow speed, FFS	49.5	mi/h
Adjustment for no-passing zones, fnp	2.4	mi/h
Average travel speed, ATS	42.5	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	0.77	
PCE for trucks, ET	1.5*	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	0.952	
Two-way flow rate,(note-1) vp	519	pc/h
Highest directional split proportion (note-2)	311	
Base percent time-spent-following, BPTSF	36.6	%
Adj.for directional distribution and no-passing zones, fd/np	15.6	
Percent time-spent-following, PTSF	52.2	%

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.18	
Peak 15-min vehicle-miles of travel, VMT15	380	veh-mi
Peak-hour vehicle-miles of travel, VMT60	1400	veh-mi
Peak 15-min total travel time, TT15	8.9	veh-h

Notes:

1. If $vp \geq 3200$ pc/h, terminate analysis-the LOS is F.
2. If highest directional split $vp \geq 1700$ pc/h, terminate analysis-the LOS is F.

* These items have been entered or edited to override calculated value

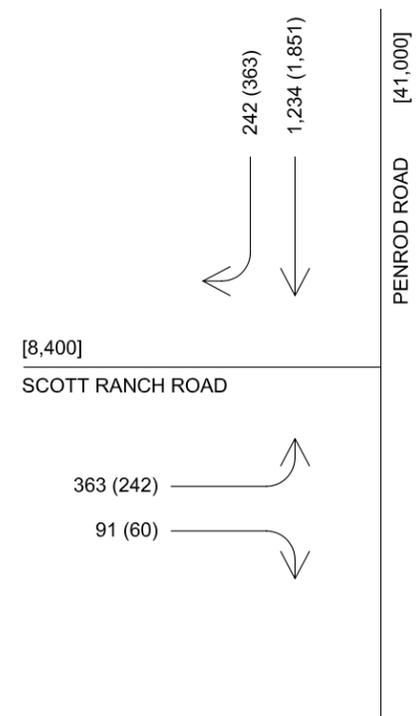
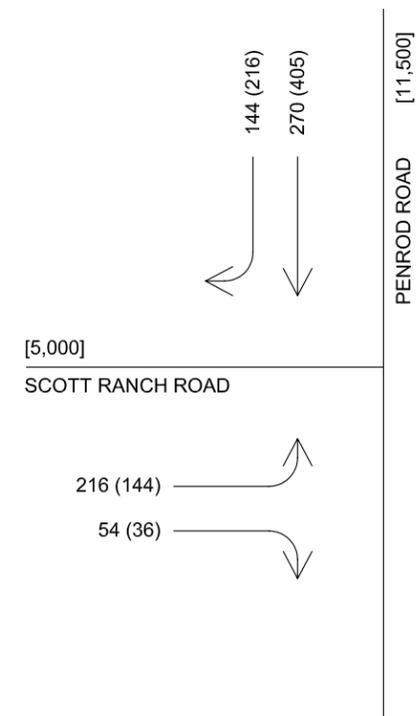
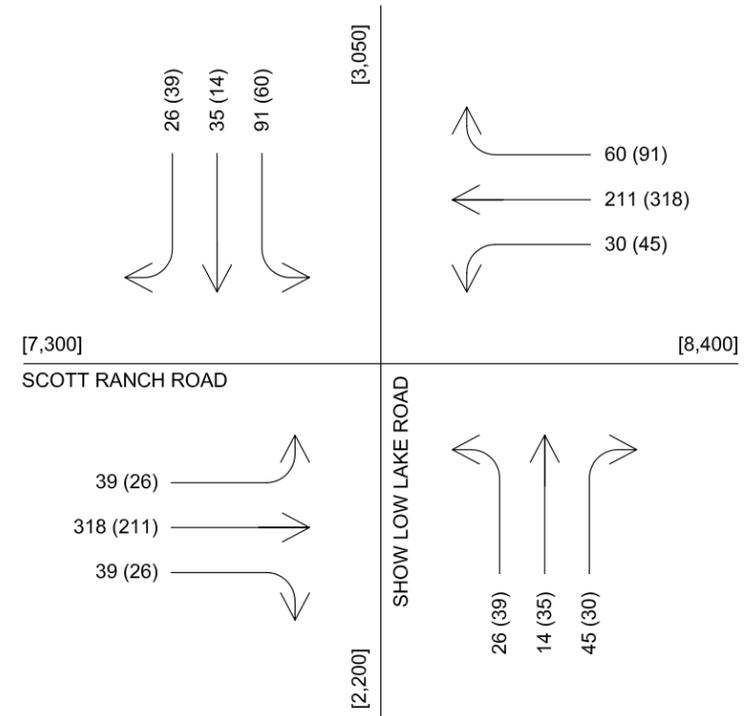
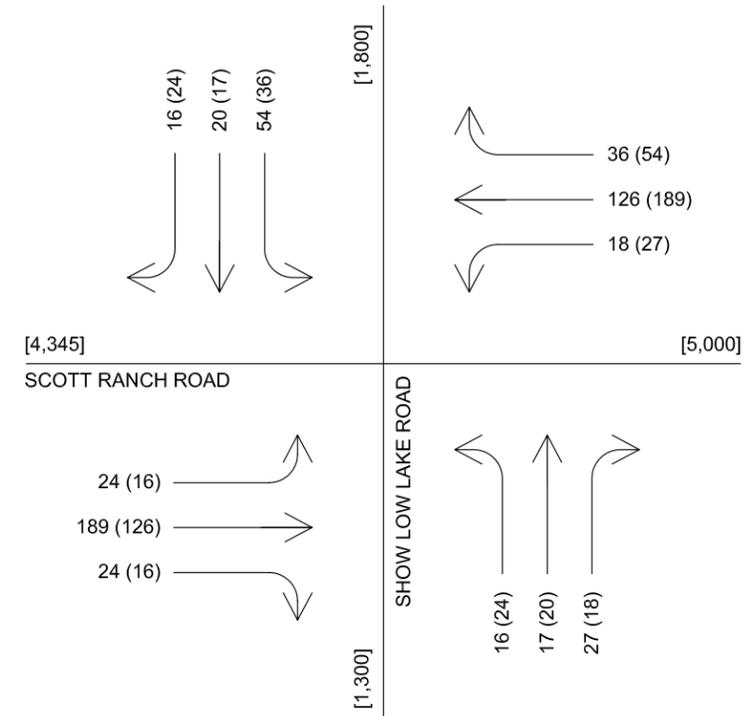
APPENDIX E – INTERSECTION DESIGN

CONSTRUCTION YEAR (2010)

DESIGN YEAR (2030)

LEGEND

- 36 AM PEAK HOUR TRAFFIC VOLUME, VEH/HR
- (54) PM PEAK HOUR TRAFFIC VOLUME, VEH/HR
- [1000] AADT TRAFFIC VOLUME, VEH/HR



N.T.S.

ALL-WAY STOP CONTROL ANALYSIS								
General Information				Site Information				
Analyst	SCI			Intersection	Scott Ranch Road/Show Low Lake			
Agency/Co.	IED			Jurisdiction	City of Show Low			
Date Performed	6/9/09			Analysis Year	2010			
Analysis Time Period	2010							
Project ID 10131								
East/West Street: Scott Ranch Road				North/South Street: Show Low Lake Road				
Volume Adjustments and Site Characteristics								
Approach	Eastbound			Westbound				
Movement	L	T	R	L	T	R		
Volume	24	189	24	18	126	36		
%Thrus Left Lane	50			50				
Approach	Northbound			Southbound				
Movement	L	T	R	L	T	R		
Volume	16	17	27	54	20	16		
%Thrus Left Lane	50			50				
	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	L	TR	L	TR	L	TR	L	TR
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Flow Rate	26	236	20	180	17	48	60	39
% Heavy Vehicles	10	10	10	10	10	10	10	10
No. Lanes	2		2		2		2	
Geometry Group	5		5		5		5	
Duration, T	0.25							
Saturation Headway Adjustment Worksheet								
Prop. Left-Turns	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0
Prop. Right-Turns	0.0	0.1	0.0	0.2	0.0	0.6	0.0	0.4
Prop. Heavy Vehicle								
hLT-adj	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
hRT-adj	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	5.84	5.84	5.84	5.84	5.84	5.84	5.84	5.84
Departure Headway and Service Time								
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.02	0.21	0.02	0.16	0.02	0.04	0.05	0.03
hd, final value	5.84	5.84	5.84	5.84	5.84	5.84	5.84	5.84
x, final value	0.04	0.35	0.03	0.26	0.03	0.07	0.11	0.06
Move-up time, m	2.3		2.3		2.3		2.3	
Service Time	3.5	3.0	3.5	3.0	3.5	3.0	3.5	3.0
Capacity and Level of Service								
	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity	276	486	270	430	267	298	310	289
Delay	8.80	10.72	8.80	9.81	9.37	8.67	9.88	8.67
LOS	A	B	A	A	A	A	A	A
Approach: Delay	10.53		9.71		8.85		9.40	
LOS	B		A		A		A	
Intersection Delay	9.91							
Intersection LOS	A							

Figure E2 – Scott Ranch Road/Show Low Lake Road Intersection 2030 LOS

ALL-WAY STOP CONTROL ANALYSIS								
General Information				Site Information				
Analyst	SCI			Intersection	Scott Ranch Road/Show Low Lake			
Agency/Co.	IED			Jurisdiction	City of Show Low			
Date Performed	6/9/09			Analysis Year	2030			
Analysis Time Period	Design Year							
Project ID 10131								
East/West Street: Scott Ranch Road				North/South Street: Show Low Lake Road				
Volume Adjustments and Site Characteristics								
Approach	Eastbound			Westbound				
Movement	L	T	R	L	T	R		
Volume	39	318	39	30	211	60		
%Thrus Left Lane	50			50				
Approach	Northbound			Southbound				
Movement	L	T	R	L	T	R		
Volume	26	14	45	91	35	26		
%Thrus Left Lane	50			50				
	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	L	TR	L	TR	L	TR	L	TR
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Flow Rate	43	396	33	300	28	65	101	66
% Heavy Vehicles	10	10	10	10	10	10	10	10
No. Lanes	2		2		2		2	
Geometry Group	5		5		5		5	
Duration, T	0.25							
Saturation Headway Adjustment Worksheet								
Prop. Left-Turns	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0
Prop. Right-Turns	0.0	0.1	0.0	0.2	0.0	0.8	0.0	0.4
Prop. Heavy Vehicle								
hLT-adj	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
hRT-adj	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45
Departure Headway and Service Time								
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.04	0.35	0.03	0.27	0.02	0.06	0.09	0.06
hd, final value	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45
x, final value	0.08	0.65	0.06	0.49	0.06	0.12	0.21	0.12
Move-up time, m	2.3		2.3		2.3		2.3	
Service Time	4.1	3.6	4.1	3.6	4.1	3.6	4.1	3.6
Capacity and Level of Service								
	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity	293	603	283	550	278	315	351	316
Delay	9.68	18.63	9.70	14.25	10.70	10.05	11.96	10.16
LOS	A	C	A	B	B	B	B	B
Approach: Delay	17.76		13.80		10.25		11.25	
LOS	C		B		B		B	
Intersection Delay	14.75							
Intersection LOS	B							

Figure E3 – Scott Ranch Road/Penrod Road Intersection 2010 LOS

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst				Intersection	Scott Ranch Road/Penrod Road			
Agency/Co.	IED			Jurisdiction	City of Show Low			
Date Performed	6/9/09			Analysis Year	2010			
Analysis Time Period	Construction Year							
Project Description 10131								
East/West Street: Scott Ranch Road				North/South Street: Penrod Road				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume	36	405	0	0	270	144		
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR	40	450	0	0	300	160		
Percent Heavy Vehicles	10	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0				0	
Lanes	1	1	0	0	1	1		
Configuration	L	T			T	R		
Upstream Signal		0			0			
Minor Street	Westbound			Eastbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume	0	0	0	216	0	54		
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR	0	0	0	240	0	60		
Percent Heavy Vehicles	0	0	0	10	0	10		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0				0	
Lanes	0	0	0	1	0	1		
Configuration				L		R		
Delay, Queue Length, and Level of Service								
Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L					L		R
v (vph)	40					240		60
C (m) (vph)	1060					317		721
v/c	0.04					0.76		0.08
95% queue length	0.12					5.83		0.27
Control Delay	8.5					44.5		10.4
LOS	A					E		B
Approach Delay	--	--				37.7		
Approach LOS	--	--				E		

Figure E4 – Scott Ranch Road/Penrod Road Intersection 2030 LOS

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	SCI			Intersection	Scott Ranch Rd/Penrod Rd			
Agency/Co.	IED			Jurisdiction	City of Show Low			
Date Performed	6/9/09			Analysis Year	2030			
Analysis Time Period	Design Year							
Project Description 10131-Scott Ranch Road								
East/West Street: Scott Ranch Road				North/South Street: Penrod Road				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume	60	1851	0	0	1234	242		
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR	66	2056	0	0	1371	268		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	1	1	0	0	1	1		
Configuration	L	T			T	R		
Upstream Signal		0			0			
Minor Street	Westbound			Eastbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume	0	0	0	363	0	91		
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR	0	0	0	403	0	101		
Percent Heavy Vehicles	0	0	0	10	0	10		
Percent Grade (%)	0			2				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	1	0	1		
Configuration				L		R		
Delay, Queue Length, and Level of Service								
Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L					L		R
v (vph)	66					403		101
C (m) (vph)	401					5		172
v/c	0.16					80.60		0.59
95% queue length	0.58					52.62		3.15
Control Delay	15.7					37260		52.0
LOS	C					F		F
Approach Delay	--	--				29803		
Approach LOS	--	--				F		