
**FINAL
CANDIDATE ASSESSMENT REPORT
FOR
AGUA FRIA ALTERNATIVE TRUCK ROUTE**



**MCDOT Contract Number 2006-032
Work Assignment Letter F
Job Number TT104**

Prepared for:

**Maricopa County Department of Transportation
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PB Americas, Inc.

June 2009



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EXPIRES: 12-31-2011





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MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION

JUNE 2009

Project Name:	Agua Fria Alternative Truck Route	Project Termini:	112 th Avenue from Rose Garden Lane to Pinnacle Peak Road
Requested By:	Maricopa County Dept. of Transportation Robert Woodring, Project Manager		
Improvement Requested:	Provide alternative truck route to alleviate truck traffic on Beardsley Road near the Ventana Lakes Community		
Recommended Alternative:	Minor Collector Roadway to extend 112 th Avenue from Rose Garden Lane to Pinnacle Peak Road at 107 th Avenue		
Estimated Cost:	\$8,250,000		
PM 10 Area:	Yes	Length:	1.7 miles

EXECUTIVE SUMMARY

Problem Statement

Quality of life for citizens living near existing truck routes that serve rock product mining areas within the Agua Fria River is adversely affected by truck traffic on roadways adjacent to residential areas. Based on concerns communicated by citizens to their elected officials, the problem is most acute near the Ventana Lakes community where a number of existing homes are very close to Beardsley Road.

Traffic counts conducted in 2007 documented approximately 940 trucks per day on Beardsley Road adjacent to the Ventana Lakes community.

Recommended Alternative

This report recommends construction of an extension of 112th Avenue as a minor collector roadway to connect Rose Garden Lane with 107th Avenue on the Pinnacle Peak Road alignment, with 112th Avenue



designated as a truck route, and the portion of 107th Avenue between Pinnacle Peak Road and Happy Valley Parkway also designated as a truck route. The section of 107th Avenue between the CEMEX access driveway and Happy Valley Parkway is currently designated as a truck route by the City of Peoria, and the section of 107th Avenue between the CEMEX access driveway and the Pinnacle Peak Road alignment would need to be designated by the City of Peoria as a truck route.

The 112th Avenue Extension will generally follow a 230 kV overhead electric transmission line easement owned by SRP along the east bank of the Agua Fria River, and will cross the proposed Deer Valley Road/Williams Drive connector with a grade separation.

Construction of the 112th Avenue Extension is projected to reduce truck traffic on Beardsley Road near the Ventana Lakes community by approximately one-half.

Project Cost Summary

The engineers' estimate of probable project cost for the 112th Avenue Extension is \$7,250,000, not including a grade separation structure over the future Deer Valley Road/Williams Drive connector roadway.

The engineers' estimate of probable project cost for a grade separation structure over the future Deer Valley Road/Williams Drive connector roadway is \$2,000,000. An intergovernmental agreement will be needed between the City of Peoria and Maricopa County Department of Transportation to determine cost sharing between the governmental bodies.

For budgeting purposes, this report recommends that \$1,000,000 be added to the estimated project costs for both the 112th Avenue Extension and Deer Valley Road/Williams Drive connector projects.



1.0 INTRODUCTION

The Maricopa County Department of Transportation (MCDOT), in partnership with the Cities of Peoria and Surprise, and the Arizona Rock Products Association (ARPA) engaged Parsons Brinckerhoff to prepare a report evaluating alternatives for trucks to reach markets from the rock product mining operations along the Agua Fria River. Mining operations have been ongoing in the Agua Fria River bed for approximately 50 years. Growth of the area's population has resulted in construction of homes nearby with residents whose lives are adversely impacted by noise and dust that is generated by transportation of rock products to market. The City of Peoria has designated portions of Beardsley Road as a segment of their truck route in an attempt to limit impacts of truck traffic on the community, and the purpose of this study is to evaluate other alternatives that may provide better results.

1.1 Background

In July 2007, an alternative truck route study was completed for the Maricopa County Department of Transportation that addressed viable alternative truck route alternatives to Beardsley Road between 111th Avenue and 99th Avenue.

Three build alternatives considered by the July 2007 Final Beardsley Road Alternative Truck Route Study, and this document includes pertinent information presented in that study for those alternatives. Differences in modeling between the 2007 study and this study include:

- The 2007 study presented detour lengths based on replacement of portions of the existing City of Peoria Truck Route by the new alternative routes, whereas this study is based on the existing truck route remaining available in addition to the new route
- The 2007 study was based on an intersection between the new truck route and a future east-west roadway contemplated by the Deer Valley Road Design Concept Report prepared concurrent with this study under MCDOT Contract No. 2006-032 Task D, whereas this study is based on no intersection between the truck route and the proposed east-west roadway
- Traffic modeling for this study was based on prohibiting through trucks from traveling on the new east-west roadway

1.2 Purpose and Scope

The purpose of this study is to expand upon the July 2007 alternative truck route study to examine the previous alternatives along with additional alternatives that were put forward after the prior study was completed.

The ultimate goal is to identify a viable alternative truck route that allows rock products mined from the Agua Fria River bed to get to market with minimal disruption of quality of life for area residents and at reasonable cost to the local communities and system users. An excerpt from a letter from Peoria Engineering Director David Moody to the Maricopa County Department of Transportation (MCDOT) regarding a draft Beardsley Road DCR summarized the goals of the City:

'The City's primary concern is that Beardsley Road is used by the trucks from the mines west of 111th Avenue, as the designated truck route, from 112th Avenue to Lake Pleasant Road/99th Avenue. The truck route traverses through a retirement community (Ventana Lakes) and has caused a number of complaints due to noise and dust, which the City and Maricopa County are



trying to resolve. To add 20,000 or 30,000 more vehicles on top of that would be intolerable for the residents and the City.

In order for this to become a viable project, with the City's support, another truck route must be developed and constructed with his project. Unless that can be accomplished, I do not see the City's support forthcoming.'

1.3 Alternatives

The study area for the alternative development is bounded by Happy Valley Parkway on the north, Beardsley Road on the south, 107th Avenue on the east, and El Mirage Road on the west. The study area is shown on Figure 1.

Alternatives examined in the July 2007 study included:

- No build
- 1. 112th Avenue Extension from Rose Garden Lane north to 107th Avenue near the latitude of Pinnacle Peak Road
- 2. Rose Garden Lane Extension from 119th Avenue to El Mirage Road
- 3. 115th Avenue Extension to the latitude of Deer Valley Road, thence in a northeasterly direction to 107th Avenue near the latitude of Pinnacle Peak Road with an at-grade crossing of the Agua Fria River

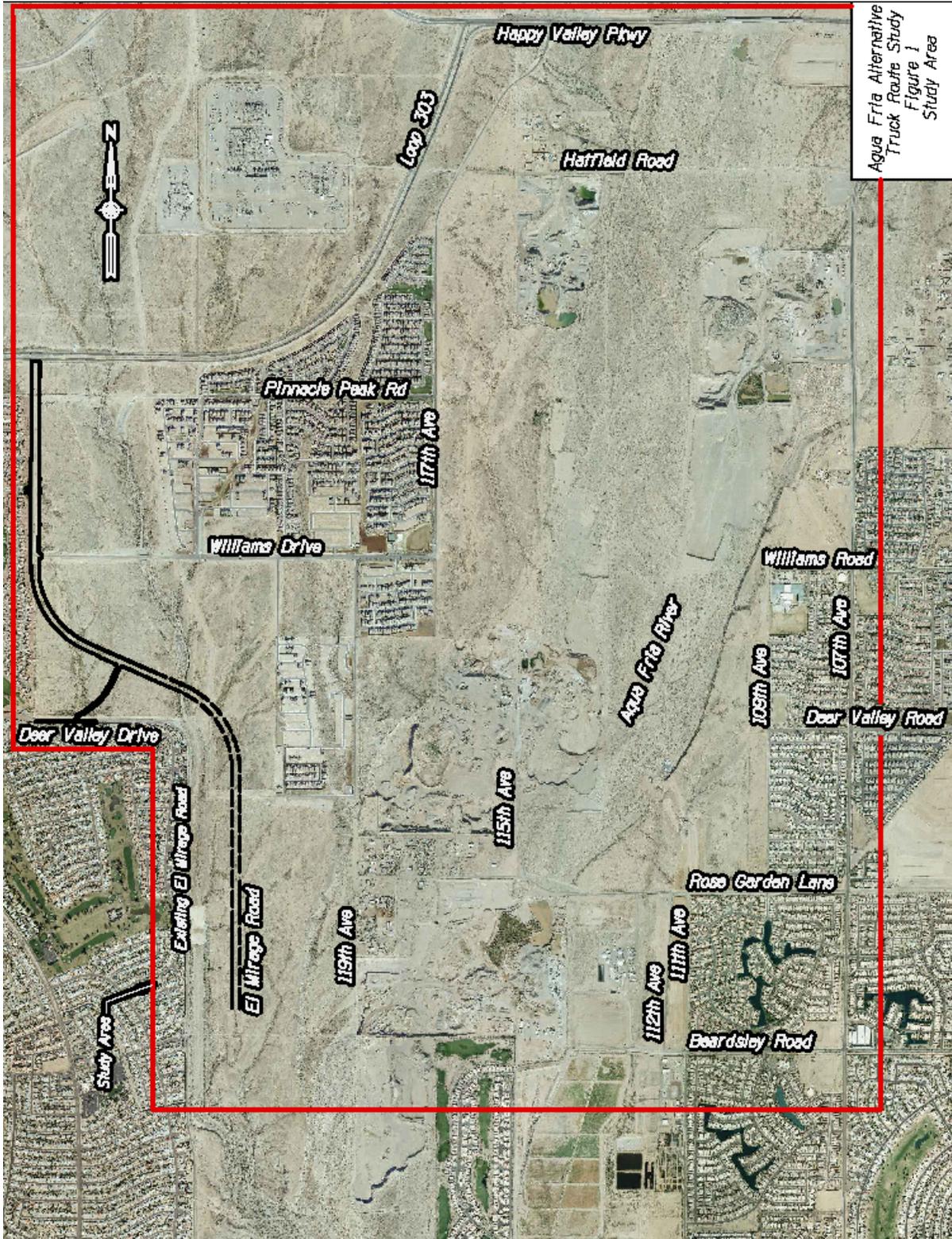
In addition to the alternatives described above, this report examines the following options:

- 4. 115th Avenue Extension from Rose Garden Lane to Happy Valley Parkway
- 5. 117th Avenue Extension from Rose Garden Lane to Williams Drive, with appropriate improvements to existing 117th Avenue from Williams Drive to Happy Valley Parkway
- 6. New Truck-Only Road constructed in the Agua Fria riverbed from Rose Garden Lane to Happy Valley Parkway
- 7. Property acquisition for the homes closest to Beardsley Road to mitigate concerns of the Ventana Lakes Community

Build alternatives are shown on Figure 4.



FIGURE 1 – STUDY AREA





2.0 TRAFFIC ANALYSIS

This report was prepared concurrently with the Deer Valley Road Design Concept Report that evaluated alternatives for a new east-west crossing of the Agua Fria River between existing crossings at Bell Road and Happy Valley Parkway. Traffic analyses were based on truck traffic not being permitted to access the proposed east-west roadway from the proposed truck route. For several east-west roadway alternatives, it was not feasible to construct an intersection because of vertical grade differentials. One of the alternatives examined by this study (Alternative 2 – Rose Garden Lane Extension) is similar to one of the alternatives considered and rejected by the Deer Valley Road Design Concept Report.

2.1 Review of Previous Studies

Truck Traffic Noise Mitigation Study (MCDOT/City of Peoria 1999)

This study was conducted to address the need for truck traffic noise reduction due to excess noise created by the mining of gravel and manufacturing of concrete within the Agua Fria River bed. The truck traffic generates additional noise, which can have a negative impact on the quality of life for nearby homeowners living along the river and the routes the trucks travel. The study area was bounded by Rose Garden Lane on the north, Union Hills Drive on the south, SR 101L on the east, and the Agua Fria River on the west. The following conclusions were presented in the study:

- 35 percent of traffic on Rose Garden Lane is comprised of trucks
- 17 percent of traffic eastbound on Beardsley Road are trucks
- 7 percent of traffic eastbound on Union Hills Drive are trucks
- Truck traffic is heaviest in the morning between the hours of 5:00 AM and 11:00 AM
- One of the quarries operates 24 hours per day
- The 85th percentile speed averages approximately 8 miles per hour above the posted speed

The preferred truck route alternative identified in this study was chosen based on cost, impact on adjacent residents, public and political acceptance, environmental impacts, impacts on quarry haul distances, and intergovernmental coordination. The preferred alternative from this study included:

- The use of segments of Beardsley Road, Lake Pleasant Parkway/99th Avenue, and SR 303L as the primary arterials
- For Salt River Sand and Gravel (S&G) trucks to bypass Rose Garden Lane, a new roadway would be constructed parallel to the SRP power lines between Rose Garden Lane and Beardsley Road, designated as 112th Avenue
- On the north, access from the Sunward Materials mining operation to Lake Pleasant Parkway would be provided by the 107th Avenue connection to SR 303L
- On the south, access from the Sun States and S&G operations would be provided by Beardsley Road and Lake Pleasant Parkway. Trucks would then travel north along Lake Pleasant Parkway or south along 83rd Avenue to Union Hills Drive. Trucks headed toward Bell Road would travel along 83rd Avenue south of Union Hills Drive
- Noise walls would be constructed along Beardsley Road between Lake Pleasant Parkway and 111th Avenue and along 83rd Avenue between Union Hills Drive and Beardsley Road



Traffic Impact Assessment: Bridge Crossings at Rose Garden Lane and Deer Valley Road (MCDOT 2003)

This study was conducted to assess the traffic impact on Bell Road and other major streets if new bridge crossings were constructed over the Agua Fria River at Rose Garden Lane and Deer Valley Road. The MAG travel demand model with updated socioeconomic data was used to forecast traffic volumes. The traffic analysis included volumes from the base year (2003) and horizon years (2010 and 2020). The following alternatives were analyzed for the study:

- Base Condition: Existing street network without any new bridge crossings
- Alternative 1: Bridge crossing of Agua Fria River at Rose Garden Lane
- Alternative 2: Bridge crossing of Agua Fria River at Deer Valley Road
- Alternative 3: Bridge crossing of Agua Fria River at Rose Garden Lane and Deer Valley Road

The analysis indicated that with either bridge crossing alternatives, traffic volumes were reduced and level of service (LOS) improved for Bell Road and Happy Valley Parkway. The north-south arterials would carry more traffic volume in both build alternatives, but would maintain an acceptable level of service. Considering future conditions, the alternatives with a bridge crossing at Deer Valley Road provided more relief to adjacent east-west arterials than the bridge crossing at Rose Garden Lane. The analysis also concluded that a bridge crossing may not be needed at both locations to gain the desired traffic operation improvements.

Alternative Feasibility Study (MCDOT 2004)

This study was conducted to address the need for a parallel route to relieve traffic on Bell Road by considering a new Agua Fria River crossing as a potential source for providing such relief. A number of alternative crossing locations were considered. A Beardsley Road alternative and an alternative that combined the Deer Valley Road and Williams Drive alignments were carried forward and developed to a level suitable for evaluation.

The study presented the project background, land use, right of way, traffic (existing and projected traffic volumes, traffic analysis, and crash analysis), design criteria, geotechnical investigation results, pavement design, environmental overview of Agua Fria River crossings, intelligent transportation system (ITS) assessment, cost estimates, and a discussion of economic justice issues. Roadway alternatives included:

- No Build
- Beardsley Road
- Deer Valley Road

No specific traffic analysis was completed for the alternatives. A summary of the benefits and challenges associated with each build alternative are:

- Beardsley Road: Benefits include a comparatively short bridge length and desirable horizontal geometrics. Challenges include the piping of an existing channel and the quantity of right of way required from existing businesses and residences
- Deer Valley Road: Benefits include construction of much of the roadway by adjacent developers and no new right of way required. Challenges include a longer bridge length and curvilinear alignment



Design Concept Report Deer Valley Road (MCDOT 2006)

This report documented the design and impacts of proposed improvements to Deer Valley Road between El Mirage Road and Lake Pleasant Parkway. The study presented background information, traffic data, design criteria, bridge selection, and utilities.

The preferred alternative was a new arterial roadway and bridge that would connect Williams Drive on the west side of the Agua Fria River to Deer Valley Road on the east side, with a new 800' long bridge over the Agua Fria River.

Design Concept Report Beardsley Road (MCDOT 2006)

This report documented the design and impacts of the proposed improvements to Beardsley Road between El Mirage Road and 111th Avenue. The study presented a project description, traffic data, design concept alternatives, major design features of the selected alternatives, cost estimate, design exceptions, social, economic and environmental considerations, public involvement, and agency coordination. The goal was to provide for a new urban minor arterial street segment from 111th Avenue to the future realigned El Mirage Road with a bridge crossing of the Agua Fria River.

The selected alternative was a five lane section with two through lanes in each direction and a center turn lane constructed as a minor urban arterial roadway with a design speed of 55 miles per hour and posted speed of 45 miles per hour.

Final Beardsley Road Alternative Truck Route Study (MCDOT 2007)

This report examined the no-build and three build alternatives to achieve the goal of mitigating the impacts of truck operations on adjacent residents, and serves as a foundation for this study as described in Section 1.1 of this document.

The three build alternatives examined by this study include:

- 112th Avenue Extension to provide an alternative route for trucks to travel from facilities near Beardsley Road and Rose Garden Lane north to SR 303L and south to SR 101L on a new roadway constructed adjacent to overhead SRP power lines
- Rose Garden Lane Extension to provide an alternative route for vehicles heading west or north to connect to El Mirage Road and SR 303L
- 115th Avenue Extension to provide an alternative route for trucks between Rose Garden Lane and a proposed Deer Valley Road, with consideration given to extension to 107th Avenue

The long term recommendations from this study included continuing study and development of plans for new east-west crossings at Deer Valley Road and Beardsley Road; and to continue study and development of the 112th Avenue Extension considered by this study.

Deer Valley Road Design Concept Report (MCDOT, ongoing)

The Deer Valley Road Design Concept Report is under development concurrent with the work on this study. The draft Deer Valley Road DCR report analyzed six feasible alternatives for creating a new east-west crossing of the Agua Fria River between Bell Road and Happy Valley Parkway. The Deer Valley Road/Williams Drive alternative is being advanced as preferred based on input received at two public information meetings, stakeholder meetings, and project costs. The Deer Valley Road DCR recommends development of the project in phases:



- Deer Valley Road Phase 1 will include construction of a two-lane roadway from 117th Avenue to 109th Avenue with a low-water crossing of the Agua Fria River
- Phase 2 will widen Deer Valley Road/Williams Drive from El Mirage Road to Lake Pleasant Parkway to provide the MCDOT standard typical section for a five-lane minor urban arterial roadway while retaining the low-water crossing of the Agua Fria River. Phase 2 will be programmed when traffic volumes on Deer Valley Road/Williams Drive exceed the capacity of a two-lane facility
- Phase 3 will replace the low-water crossing of the Agua Fria River with a bridge. Phase 3 becomes necessary when the Flood Control District of Maricopa County moves forward with plans for channel improvements in the Agua Fria River at Deer Valley Road. The time frame for channel improvements is 20-100 years from the present day

2.2 Existing Conditions

Bell Road and Happy Valley Parkway are the nearest major east-west arterials, and SR 303L and 99th Avenue/ Lake Pleasant Parkway are the nearest major north-south arterials. SR 101L is located to the south and east of the study area.

A portion of El Mirage Road from SR 303L to Deer Valley Drive was recently reconstructed, and the segment between Deer Valley Drive and Bell Road is currently under design. The ultimate project, when completed, will result in an arterial roadway connecting Bell Road to SR 303L on the west side of the Agua Fria River.

Existing Roadway Network

The numbers of lanes on existing roadways within and near the study area are shown in Table 2.1.

Existing Traffic Data

The existing average daily traffic (ADT) for the arterials in the study area is presented in Table 2.2. The traffic data is from City of Peoria Annual Daily Traffic flow map for 2007.

No additional traffic counts were conducted for the current study. Based on the current traffic counts, the roadway network is operating at acceptable level of service with the exception of Bell Road.

Existing Truck Route

The existing truck route established by the City of Peoria is presented in Figure 2.

Trucks originating and returning to the Agua Fria riverbed south of the Pinnacle Peak Road alignment are to utilize Rose Garden Lane between 115th Avenue and 112th Avenue, 112th Avenue between Rose Garden Lane and Beardsley Road, Beardsley Road between 112th Avenue and 99th Avenue, Lake Pleasant Road north of Beardsley Road and Lake Pleasant Road. Once on Lake Pleasant Parkway, the trucks can either access SR 303L via Happy Valley Parkway or SR 101L via Union Hills Drive. Some producers have access to 107th Avenue and they are permitted to travel north on 107th Avenue to Happy Valley Parkway, which can then be used to gain access to SR 303L or Lake Pleasant Parkway.



TABLE 2.1 – EXISTING NUMBER OF LANES

Roadway	Number of Lanes
Bell Road	6
Happy Valley Parkway	4
El Mirage Road	2 / 6
Beardsley Road	4
Union Hills Drive (west / east of 99 th Avenue)	2 / 4
Deer Valley Road (east of Lake Pleasant Parkway)	4
Pinnacle Peak Road	2
83 rd Avenue	6
99 th Avenue/ Lake Pleasant Parkway	4
107 th Avenue	4
91 st Avenue	4

TABLE 2.2 – EXISTING AVERAGE DAILY TRAFFIC

Arterial Street	Location	Average Daily Traffic (2007)
Bell Road	99 th Avenue – 91 st Avenue	46,289
	91 st Avenue – 87 th Avenue	53,675
	87 th Avenue – 83 rd Avenue	67,333
Union Hills Drive	111 th Avenue – 107 th Avenue	10,549
	95 th Avenue -91 st Avenue	20,050
	91 st Avenue – 87 th Avenue	31,717
	87 th Avenue – 83 rd Avenue	32,762
Beardsley Road	111 th Avenue – 107 th Avenue	4,993
	107 th Avenue – Lake Pleasant Road	14,031
	Lake Pleasant Road – 99 th Avenue	16,461
	94 th Avenue – 91 st Avenue	20,050
	91 st Avenue – 87 th Avenue	31,717
Lake Pleasant Parkway	East of 91 st Avenue	8,440
	West of 91 st Avenue	10,305
	Beardsley Road - Deer Valley Road	20,005
	Deer Valley Road – Williams Road	16,372
	Williams Road – Pinnacle Peak Road	18,810
	Pinnacle Peak Road – Happy Valley Parkway	15,179
Deer Valley Road	111 th Avenue – 107 th Avenue	257
	107 th Avenue – Lake Pleasant Parkway	1,283
	95 th Avenue -91 st Avenue	2,910
	87 th Avenue – 83 rd Avenue	15,691



2.3 Future Conditions

Table 2.3 provides functional classifications for major streets within the study area that are included in the City of Peoria Circulation Map.

TABLE 2.3 – FUNCTIONAL CLASSIFICATION DESIGNATED BY CITY OF PEORIA WITHIN THE CITY PLANNING BOUNDARY		
Roadway	Current Jurisdiction	Classification
Deer Valley Road	City of Peoria	Arterial
Williams Drive (West of 117 th Avenue)	Maricopa County	Arterial
Williams Road (East of 107 th Avenue)	City of Peoria	Collector
El Mirage Road (North of Williams Drive)	Maricopa County	Arterial
116 th -115 ^h Avenue	Maricopa County	Arterial
107 th Avenue	City of Peoria	Arterial
112 th Avenue	City of Peoria	Collector
Beardsley Road	City of Peoria	Arterial
Rose Garden Lane	City of Peoria	Collector
Lake Pleasant Parkway	City of Peoria	Arterial
SR 303L	Arizona Department of Transportation	Freeway
Pinnacle Peak Road (Between 107 th Avenue and Lake Pleasant Parkway)	City of Peoria	Collector
Happy Valley Parkway/Road	Maricopa County	Arterial

The Maricopa Association of Governments (MAG) travel demand model was utilized to obtain the traffic volumes for future traffic conditions for various truck route alternatives. MAG utilized land use elements of adopted comprehensive plans for cities and towns within the metropolitan planning area as the basis for its traffic forecasts. A series of geographic areas was used to located incremental population and employment growth within the Phoenix Metropolitan Area. These areas include Municipal Planning Areas (MPAs), which typically correspond with the incorporated boundaries of cities and towns; Regional Analysis Zones (RAZs), which are geographical subsets of the MPAs; and Traffic Analysis Zones (TAZs), which can be as small as one square mile. Traffic modeling for this project was based on the existing truck route established by the City of Peoria remaining in addition to the new alternative truck route, thus providing truck operators with a choice of routes.

The MAG model can be shown to be a good predictor of overall traffic volumes, but exhibits shortcomings when an attempt is made to focus such a large area model on specific sites such as rock product mining operations. The design team therefore developed alternative strategies to predict truck volume reduction on Beardsley Road near the Ventana Lakes Community for the alignments considered for this study. MAG model results for automobiles and non-rock product trucks were accepted by the design team. Manual adjustments were made to the MAG model results to reflect rock product truck volumes based on two methods for determining distribution, and a comparison was made with actual counts of truck traffic on Beardsley Road in 2007 that were published in a previous study.



Rock product mining operators were canvassed by the design team to ascertain the number of trucks originating from each facility, with the information provided by ARPA members presented in Table 2.4.

TABLE 2.4 – AVERAGE DAILY TRUCK TRAFFIC FROM MINING OPERATIONS	
Originator	ADTT
LaFarge & CEMEX	320
CEMEX 2 nd Unit	120
San Man	140
Gravel Resources & Hansen	120
Maricopa	160
Vulcan	140
Total	1,000

ARPA members informed the design team that, over time, their experience is that delivery locations are evenly distributed in all directions within a 15-20 mile radius from their respective operations. To test the assumption that delivery locations are equally distributed over time, Dodge Reports data showing listing projects for a one year period from 11/7/07 to 11/7/08 in Maricopa County was provided to the project team by ARPA. The data showed that there were a total of 304 projects in the year that were listed as possibly including rock products as a part of the deliverables. Of the total of 304, there were 24 projects whose locations could not be determined by use of a zip code, street address, or neighborhood designation. The number of rock product deliveries to each project site could not be determined, so each site was given equal weight in the analysis. The location of the rock product producer that provided material to each site could not be determined, but the analysis considered that any site within a 20-mile radius could have been served by a producer within the study area, and that any site beyond a 20-mile radius was likely served by a producer in another part of the metropolitan area. Of the 280 sites where a location could be discerned, 68 sites were found to be within a 20 mile radius of the intersection of Rose Garden Lane and 115th Avenue.

Figure 3 shows distribution of projects included on the historical list. Projects within a 20-mile radius of 115th Avenue and Rose Garden Lane were plotted using locations provided in the data, and the area was subdivided the into eight segments. The total number of projects within each segment is in large black font. Some of the red dots reflect multiple projects, so counting the dots does not always yield the number in each segment.

It appears from the historical data that access to 50 of the sites would have been gained by first getting on SR 101L, and that access to 10 of the sites would have been gained by first getting on SR 303L, with the remaining eight sites accessed from the local roadway network.

Traffic engineers then made manual adjustments to data from the MAG model to superimpose truck traffic from rock product mining operations on the overall truck volume predicted from other sources, based on both equal distribution and historical year 2007 distribution. While truck traffic from other sources is expected to increase geometrically in relation to population growth, the truck traffic from mining operations is expected to remain relatively level. Variations in rock product truck traffic from year to year are associated with economic growth rates rather than the growth itself, and is expected to rise and fall within a



narrow range based on the economy. Predicted truck volumes for each alternative truck route alignment and for Beardsley Road near the Ventana Lakes Community are presented in Table 2.5 (Equal Distribution) and Table 2.6 (2007 Distribution).

TABLE 2.5 – FUTURE 2030 TRUCK TRAFFIC VOLUME PER DAY BASED ON EQUAL DISTRIBUTION		
Alternative	Beardsley Road @ Ventana Lakes Community	Alternative Truck Route
No Build	560 Rock Products/1,060 Total	N/A
1 112 th Ave. to 107 th Ave.	280 Rock Products/520 Total	280 Rock Products/530 Total
2 Rose Garden Extension	335 Rock Products/845 Total	225 Rock Products/335 Total
3 115 th Ave. to 107 th Ave.	280 Rock Products/990 Total	280 Rock Products/450 Total
4 115 th Ave. to Happy Valley Parkway	280 Rock Products/790 Total	280 Rock Products/520 Total
5 117 th Ave. to Happy Valley Parkway	280 Rock Products/790 Total	280 Rock Products/520 Total
6 Truck-Only Road in River	280 Rock Products/780 Total	280 Rock Products/350 Total
7 Acquisition of Homes	560 Rock Products/1,060 Total	N/A

TABLE 2.6 – FUTURE 2030 TRUCK TRAFFIC VOLUME PER DAY BASED ON 2007 DISTRIBUTION		
Alternative	Beardsley @ Ventana Lakes	Alternative Truck Route
No Build	560 Rock Products/1,060 Total	N/A
1 112 th Ave. to 107 th Ave.	420 Rock Products/660 Total	140 Rock Products/390
2 Rose Garden Extension	290 Rock Products/800 Total	270 Rock Products/380
3 115 th Ave. to 107 th Ave.	420 Rock Products/1,130 Total	140 Rock Products/280
4 115 th Ave. to Happy Valley Parkway	420 Rock Products/930 Total	140 Rock Products/380
5 117 th Ave. to Happy Valley Parkway	420 Rock Products/930 Total	140 Rock Products/380
6 Truck-Only Road in River	420 Rock Products/920 Total	140 Rock Products/210
7 Acquisition of Homes	560 Rock Products/1,060 Total	N/A

The traffic models that were based on the foregoing assumptions for both equal distribution and 2007 distribution forecast a total of 1,060 trucks per day on Beardsley Road near the Ventana Lakes Community for the existing (No-Build) condition, with 560 of that total arising from trucks associated with the rock product industry. This volume of truck traffic compares favorably with actual counts from 2007 that showed an average of 940 trucks per day on Beardsley Road between 107th Avenue and 104th Avenue over a two-day period.

Differences in total trucks vary between the alternatives because of variations in numbers of trucks from sources other than the mining operations. Each of the build alternatives offer a reduction to numbers of trucks from the rock product operations on Beardsley Road because each of the build alternatives offer a reduction in travel distance to vehicles heading west.

Based on the assumption of equal distribution of deliveries in all directions, Alternative 1 (112th Avenue Extension – Recommend Alternative) provides the greatest reduction in both rock product and total truck

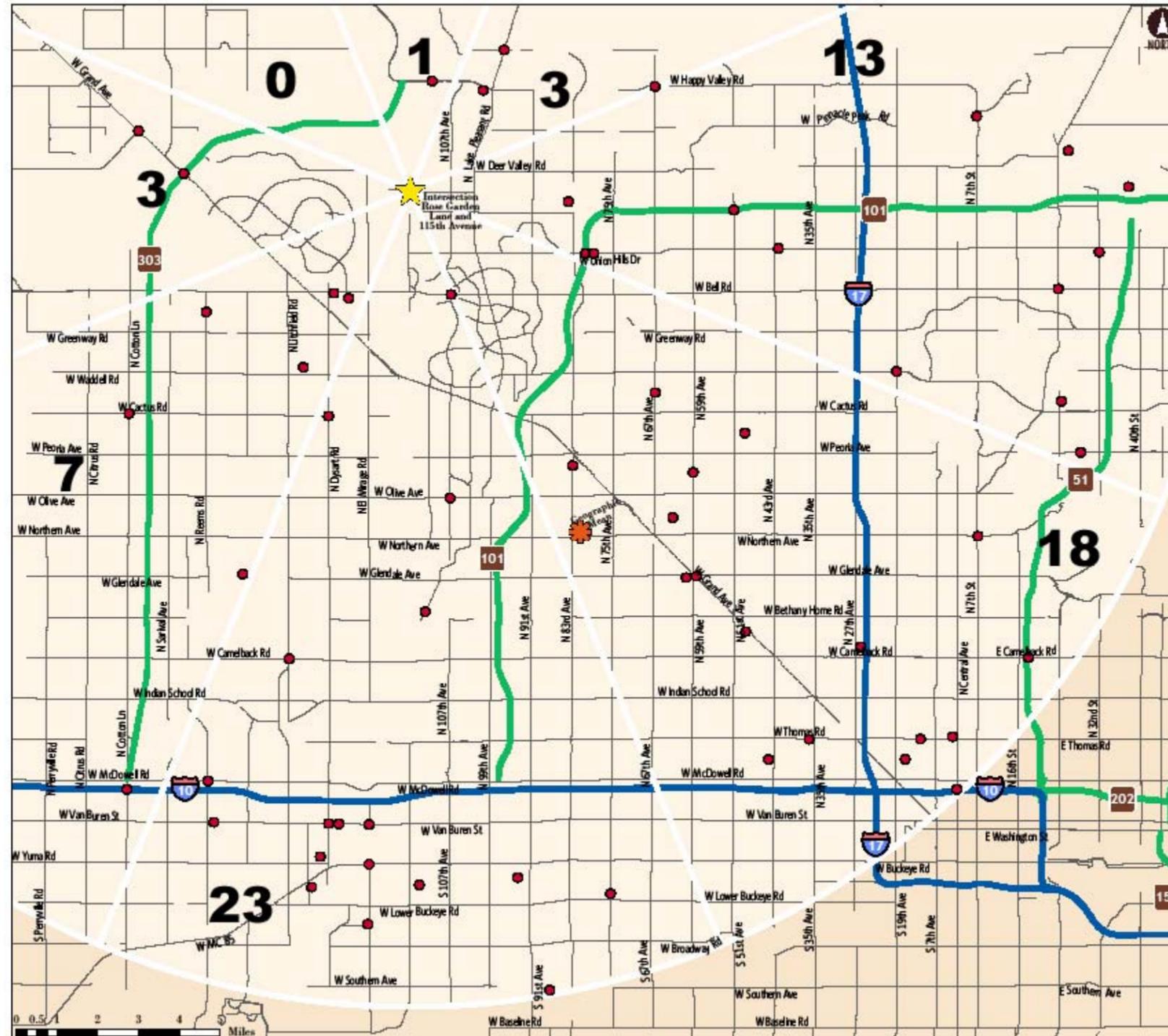


traffic on Beardsley Road. Based on the actual distribution of project sites in the subject year, Alternative 2 (Rose Garden Lane Extension) provides the greatest reduction in rock products truck traffic on Beardsley Road, while Recommended Alternative 1 (112th Avenue Extension) provides the greatest reduction in total truck traffic on Beardsley Road.

Data from November 2007 to November 2008 reflect a period of time when economic activity was diminishing in advance of a recessionary period. Population growth projections anticipate a substantial increase in projects requiring rock products to the north and west of the study area. The design team anticipates that the equal distribution analysis method may be more indicative of future delivery patterns than the year of actual data provided by ARPA.



FIGURE 3 – LOCATION OF CONSTRUCTION PROJECTS FOR ONE-YEAR PERIOD



Delivery Locations within 20 Miles of Agua Fria Riverbed

Intersection of Rose Garden Lane and 115th Avenue

November 7, 2007 to November 7, 2008





3.0 ALTERNATIVES

Alternatives developed for this study are based on prohibiting trucks from travelling west on the new east-west roadway contemplated by the Deer Valley Road Design Concept Report, where a grade separation is anticipated. Therefore, the alternatives developed for this study provide connectivity to roads beyond the new east-west roadway. However, in the event that trucks would be permitted to travel west on the new roadway to El Mirage Road and points beyond, it would be possible to terminate some of the truck route alternatives at the intersection with the new east-west roadway.

3.1 Feasible Alternative Analysis

Alternative truck routes are shown in Figure 4. A matrix measuring performance of each alternative against the evaluation criteria established by stakeholders is included in Table 3.1.

No Build

The No Build alternative would maintain current traffic conditions with respect to Beardsley Road and the current truck route within the City of Peoria. Total truck traffic will increase from current volumes because of increases in truck traffic from sources other than the mining operations. Truck traffic resulting from mining operations is anticipated to remain static until sometime in the next century when it is anticipated that materials that are economically feasible to be mined have been depleted. Rock product trucks from the Beardsley Road and Rose Garden Lane area will continue to travel along Beardsley Road to the Lake Pleasant Road/99th Avenue intersection where they will turn north to Lake Pleasant Parkway. From there, they will either turn north or southeast to access SR 303L to the west, SR 74 to the north, or SR 101L via Union Hills Drive to the southeast. Traffic analyses were based on prohibiting trucks on a new east-west roadway contemplated by the Deer Valley Road Design Concept Report prepared concurrent with this study.

Benefits of the No-Build alternative include:

- No new impacts to residential areas
- The new east-west roadway would provide some congestion relief in the east-west direction for passenger cars

Challenges associated with the No-Build alternative include:

- No reduction in truck traffic on the existing City of Peoria Truck Route

There is no construction cost associated with the No-Build alternative.

Alternative 1 – 112th Avenue Extension from Rose Garden Lane north to 107th Avenue near the latitude of Pinnacle Peak Road (Recommended Alternative)

Extension of 112th Avenue would provide an alternative, shorter route for trucks seeking to go north and west from rock product mining operations. It would be necessary for the City of Peoria to modify their truck route further south on 107th Avenue to include the section of 107th Avenue from the intersection with the new road north to where the existing truck route begins north of Pinnacle Peak Road. Recommended Alternative 1 requires construction of approximately 8,500 feet of new two-lane roadway that meets requirements for an urban minor collector road.



The alignment will generally follow the alignment of overhead Salt River Project power lines, and the road will need to be located between overhead towers and the east river bank north of Deer Valley Road. The alignment crosses the SRP easement at two locations.

The 112th Avenue Extension will be parallel to the SRP easement north of Rose Garden Lane. This will result in the proposed northern leg of 112th Avenue skewed approximately 22 degrees from the existing southern leg. Existing pavement for Rose Garden Lane west of 112th Avenue does not align with existing pavement for Rose Garden Lane east of 112th Avenue.

The 112th Avenue Extension will cross an engineered drainage channel constructed by the City of Peoria that leads to a retention basin. Project costs include a reinforced concrete box culvert to convey stormwater beneath the proposed roadway.

The 112th Avenue Extension will cross a new east-west roadway contemplated by the Deer Valley Road Design Concept Report. The preferred alternative for Deer Valley Road is to construct a two-lane at-grade low-water crossing that connects Deer Valley Road at 109th Avenue to Williams Drive at 117th Avenue in Phase 1, with widening to five lanes in Phase 2, and replacement of the low-water crossing with a bridge in Phase 3. The proposed Deer Valley Road low-water crossing profile depresses Deer Valley Road west of 109th Avenue. At the location of the 112th Avenue Extension along the east side of the SRP transmission line easement, Deer Valley Road is proposed to be depressed approximately 20 feet. Construction of an at-grade intersection at this location would require substantial excavation for the 112th Avenue Extension adjacent to the SRP easement, and the cost to perform this excavation and to protect the SRP easement would be significant. Positioning an at-grade intersection further east on the proposed Deer Valley Road where the proposed Deer Valley Road grade is closer to existing would place the intersection too close to 109th Avenue, and would bring the rock product truck traffic closer to the residences on 109th Avenue. This report recommends that the 112th Avenue Extension and proposed Deer Valley Road low-water crossing be grade separated. Elevating the profile grade of the 112th Avenue Extension by about four feet will allow the future Deer Valley Road low-water crossing to be constructed beneath the 112th Avenue Extension. Determination of which project bears the cost of the grade separation may depend on which project is constructed first, or by negotiation between the affected public agencies. **Additional project cost to add a grade separation is approximately \$2.0 Million.**

The proposed 112th Avenue Extension alignment comes within approximately 50 feet of the Agua Fria River bank north of Deer Valley Road. Geotechnical analysis should be performed to confirm the stability of the existing river bank.

The 112th Avenue Extension will intersect an unpaved utility access road approximately 600 feet south of the Williams Road alignment. Commercial driveway access will be provided from the proposed 112th Avenue Extension.

The 112th Avenue Extension alignment turns eastward north of the Zuni Hills Elementary School and intersects with 107th Avenue as close as practical to the Pinnacle Peak Road alignment. This study anticipates that the intersection will be located south of the actual section line to avoid impacts to the SRP transmission tower located on the west side of 107th Avenue very close to the Pinnacle Peak Road section line. **The Flood Control District of Maricopa County is proceeding with development of plans to construct Pinnacle Peak Road from 107th Avenue to Lake Pleasant Parkway, and if the 112th Avenue**



Extension alternative is selected, the alignment for the Pinnacle Peak Road project should be adjusted to accommodate the future intersection with the 112th Avenue Extension in order to avoid an impact to the transmission tower.

Benefits of Recommended Alternative 1 to extend 112th Avenue from Rose Garden Lane to 107th Avenue include:

- For trucks traveling west, this alternative route will reduce travel distance on the round trip by as much as five miles
- For trucks traveling north and northeast, this alternative will reduce travel distance on the round trip by as much as two miles
- Total average daily truck traffic in year 2030 on Beardsley Road near Ventana Lakes will be reduced by 580 trucks per day, approximately one half of the total anticipated by the no-build alternative
- The alignment traverses open desert that is not currently planned for development

Challenges of Recommended Alternative 1 include:

- The alignment will need to cross beneath the SRP power line at two locations and maintain minimum clearances from towers
- Noise walls may be required adjacent to the Zuni Hills Elementary School and where the roadway is elevated to accommodate a future Deer Valley Road grade separation
- Future residential development north of the 112th Avenue Extension/107th Avenue intersection where the City of Peoria Truck Route is extended south would be impacted by truck traffic

Estimated project cost for the 112th Avenue Extension constructed as a two-lane urban minor collector is \$7.25 million, excluding a grade separation with the proposed Deer Valley Road/Williams Drive connector. If the cost sharing arrangement results in one-half of the grade separation structure being included with the 112th Avenue Extension, the estimated project cost for the 112th Avenue Extension will increase to \$8.25 million.

Alternative 2A – Rose Garden Lane Extension from 119th Avenue to the Future El Mirage Road

The purpose of the Rose Garden Lane Extension is to provide an alternative route for vehicles heading west or southwest. Alternative 2A requires construction of approximately 1,800 feet of new two-lane roadway and reconstruction of approximately 2,700 feet of existing roadway to meet requirements for an urban minor collector road. The existing roadway section from 115th Avenue to 119th Avenue will carry truck traffic that is not on that section of roadway today, and that section of road will likely need to be reconstructed. The existing low-water crossing of the Agua Fria River east of 115th Avenue will be retained by this alternative. Costs in this study are based on improvements to Rose Garden Lane from the intersection with 115th Avenue to the proposed realigned El Mirage Roadway that will be constructed east of the McMicken Dam Outlet Channel, thus avoiding the need to construct a drainage structure for Rose Garden Lane. Rose Garden Lane was considered and rejected as an alternative for a new east-west arterial roadway by the Deer Valley Road Design Concept Report. Improvements contemplated for that study were based on reconstruction of Rose Garden Lane to meet requirements for a four-lane urban minor arterial road between El Mirage Road and Lake Pleasant Road, with a bridge over the Agua Fria River, at substantially higher cost than contemplated by this study.



This alternative was originally considered and rejected for this Alternative Truck Route Study prior to the August 2008 Public Information Meeting, and was described at that meeting as having a fatal flaw because of the potential for increased truck traffic on El Mirage Road adjacent to the Sun City West and Corte Bella communities. Following that meeting, however, it was concluded that this alternative could move forward for consideration so long as through truck traffic could be prohibited from traveling north from the Rose Garden Lane/El Mirage Road intersection. The proposed relocation of El Mirage Road south of Williams Drive results in separation from existing residences to a point just north of Bell Road where the proposed alignment shifts west to match the existing road. The design team understands that current Maricopa County policy does not prohibit the use of Maricopa County roadways by any legal vehicle, including trucks. Prohibition of through trucks on El Mirage Road north of Rose Garden Lane will require a change in Maricopa County policy, and the decision to change the policy will rest with the elected and appointed leadership of county government.

Benefits of Alternative 2 to extend Rose Garden Lane to El Mirage Road include:

- For trucks traveling west or southwest, this alternative route will reduce travel distance on the round trip by as much as 18 miles
- East-west connectivity along Rose Garden Lane from El Mirage Road to 107th Avenue and points beyond will improve local road connectivity across the Agua Fria River

Challenges of Alternative 2 include:

- Several residences along Rose Garden Lane west of 115th Avenue will be impacted by truck traffic
- The change in elevation of the new extension of Rose Garden Lane between 119th Avenue and the future El Mirage Road is approximately 60 feet. Trucks climbing an extended grade will generate significant noise

Estimated project cost for the Rose Garden Lane Extension constructed as a two-lane urban minor collector roadway is \$7.8 million.

Alternative 2B – Rose Garden Lane Relocation and Extension from 115th Avenue to the Future El Mirage Road at Beardsley Road

This alternative provides the same benefits as alternative 2A for reductions of rock product truck traffic on Beardsley Road, but follows a more circuitous route to reduce the impacts to some of the residents along existing Rose Garden Lane. Impacts to other residential properties are increased, including the need to acquire several residences. The proposed Alternative 2B alignment diverges from the existing Rose Garden Lane alignment at the location of the low-water crossing near 115th Avenue, shifts north to Harmony Lane, and then curves toward the south to climb the face of the escarpment by benching into the slope. The alignment continues south before turning west on the alignment of the Beardsley Road section line.

Estimated project cost for the Rose Garden Lane Extension constructed on a circuitous alignment with a connection to El Mirage Road at the Beardsley Road alignment is \$11.3 million.



Alternative 2C – Rose Garden Lane Extension from 119th Avenue to the Future El Mirage Road at Beardsley Road

This alternative provides the same benefit as alternative 2A and 2B for reductions of rock product truck traffic on Beardsley Road. The alignment follows existing Rose Garden Lane, but turns south west of 119th Avenue where the roadway is climbing the escarpment, then continues south before turning west on the alignment of the Beardsley Road section line.

Estimated costs for the Rose Garden Lane Extension with a connection to El Mirage Road at the Beardsley Road alignment is \$9.4 million.

Alternative 3 – 115th Avenue Extension to the latitude of Williams Road, thence in a northeasterly direction to 107th Avenue near the latitude of Pinnacle Peak Road with an at-grade crossing of the Agua Fria River

Extension of 115th Avenue would provide an alternative, shorter route for trucks seeking to go north and west from rock product mining operations. It would be necessary for the City of Peoria to modify their truck route further south to include the section of 107th Avenue from the intersection with the new road north to where the existing truck route begins north of Pinnacle Peak Road. Alternative 3 requires construction of approximately 11,200 feet of new four-lane roadway that meets requirements for an urban minor arterial road and includes a low-flow crossing of the Agua Fria River. Alternative 3 will intersect with a new east-west roadway contemplated by the Deer Valley Road Design Concept Report that connects Deer Valley Road to Williams Drive with an at-grade crossing of the Agua Fria River. The 115th Avenue Extension would turn eastward north of the Zuni Hills Elementary School and intersect with 107th Avenue as close as practical to the Pinnacle Peak Road alignment. This study anticipates that the intersection will be located south of the actual section line to avoid impacts to the SRP transmission tower located on the west side of 107th Avenue very close to the Pinnacle Peak Road section line. The Flood Control District of Maricopa County is proceeding with development of plans to construct Pinnacle Peak Road from 107th Avenue to Lake Pleasant Parkway, and if this alternative is selected, the alignment for that project should be adjusted to accommodate the future intersection with the 115th Avenue Extension in order to avoid an impact to the transmission tower.

Total average daily traffic predicted by the MAG model for year 2030 warrants construction of four lanes for this alternative.

Benefits of Alternative 3 to extend 115th Avenue to 107th Avenue include:

- For trucks traveling west, this alternative will reduce travel distance on the round trip by as much as nine miles
- For trucks traveling north and northeast, this alternative will reduce travel distance on the round trip by as much as five miles
- Total average daily truck traffic in year 2030 on Beardsley Road near Ventana Lakes will be reduced by 110 trucks per day, approximately one tenth of the total anticipated by the no-build alternative
- The alignment traverses open desert that is not currently planned for development



Challenges of this alternative include:

- The Agua Fria low-flow crossing would be subject to flooding and will become impassable following storms that are sufficient to cause the river to flow
- A significant portion of the right of way required by this project is within rock product mining areas that involve significant acquisition costs
- The intersection with the proposed Deer Valley Road/Williams Drive low-water crossing of the Agua Fria River will allow trucks to travel west on Williams Drive to El Mirage Road unless Maricopa County amends county policy to prohibit truck traffic on Williams Drive

Estimated project cost for extension of 115th Avenue to 107th Avenue as a four-lane urban minor arterial roadway is \$25.9 million.

Alternative 4 – 115th Avenue Extension from Rose Garden Lane to Happy Valley Parkway

Extension of 115th Avenue to Happy Valley Parkway will provide an alternative, shorter route for trucks seeking to go north and west from rock product mining operations. This alternative is compatible with the City of Peoria General Plan that shows a future north-south roadway following the 116th Avenue alignment. Total traffic volumes predicted by the MAG model warrant a four-lane roadway. Alternative 4 requires construction of approximately 14,500 feet of new four-lane roadway that meets requirements for an urban minor arterial road. The new roadway would intersect with existing 117th Avenue just south of Happy Valley Parkway.

Benefits of Alternative 4 to extend 115th Avenue to Happy Valley Parkway include:

- For trucks traveling west, this alternative will reduce travel distance on the round trip by as much as 12 miles
- For trucks traveling north and northeast, this alternative will reduce travel distance on the round trip by as much as four miles
- Total average daily truck traffic in year 2030 on Beardsley Road near Ventana Lakes will be reduced by 310 trucks per day, approximately one quarter of the total anticipated by the no-build alternative
- This alternative completes an arterial roadway identified on the City of Peoria General Plan and provides improved connectivity for passenger vehicles

Challenges of this alternative include:

- This alternative will bring trucks in proximity to a small number of existing homes east of 115th Avenue and north of Hatfield Road
- A significant portion of the right of way required by this project is within rock product mining areas that involve significant acquisition costs
- The intersection with the proposed Deer Valley Road/Williams Drive low-water crossing of the Agua Fria River will allow trucks to travel west on Williams Drive to El Mirage Road unless Maricopa County amends county policy to prohibit truck traffic on Williams Drive

Estimated project cost for extension of 115th Avenue as a four-lane urban minor arterial roadway is \$24.6 million.



Alternative 5 – 117th Avenue Extension from Rose Garden Lane to Williams Drive, with appropriate improvements to existing 117th Avenue from Williams Drive to Happy Valley Parkway

From a traffic operation standpoint, this alternative is comparable to Alternative 4 and it provides similar relief for truck traffic on Beardsley Road. Extension of 117th Avenue to Happy Valley Parkway will provide an alternative, shorter route for trucks seeking to go north and west from rock product mining operations. This alternative is compatible with the City of Peoria General Plan that shows a future north-south roadway following the 116th Avenue alignment. Total traffic volumes predicted by the MAG model warrant a four-lane roadway. Alternative 5 requires construction of approximately 15,600 feet of new and widened four-lane roadway that meets requirements for an urban minor arterial road. Approximately one mile of existing 117th Avenue can be retained as a part of the improved roadway. The new roadway would intersect with existing 115th Avenue just south of Happy Valley Parkway. The southern section of this alignment traverses an existing gravel mining operation, and will require substantial embankment construction to fill in a portion of the pit. Significant construction and right of way costs combine to make this alternative the most expensive of those considered by this study.

Advantages of Alternative 5 to extend 117th Avenue to Happy Valley Parkway include:

- For trucks traveling west, this alternative will reduce travel distance on the round trip by as much as 13 miles
- For trucks traveling north and northeast, this alternative will reduce travel distance on the round trip by as much as four miles
- Total average daily truck traffic in year 2030 on Beardsley Road near Ventana Lakes will be reduced by 310 trucks per day, approximately one quarter of the total anticipated by the no-build alternative
- This alternative completes an arterial roadway identified on the City of Peoria General Plan and provides improved connectivity for passenger vehicles

Challenges of this alternative include:

- This alternative will bring trucks in proximity to a significant number of existing homes west of 117th Avenue and a small number of homes east of 115th Avenue and north of Hatfield Road
- Right of way acquisition will include portions of active mining operations, resulting in substantial cost
- Construction will require filling in an existing mining operation, resulting in substantial cost

Estimated project cost for extension and reconstruction of 117th Avenue as a four-lane urban minor arterial roadway is \$23.7 million.

Alternative 6 – New Truck-Only Road constructed in the Agua Fria riverbed from Rose Garden Lane to Happy Valley Parkway

The purpose of this alternative is to construct a 'truck-only' route within the riverbed from Rose Garden Lane to Happy Valley Parkway. It is unlikely that a private owner could be found to take ownership of the roadway because of liability concerns, and the costs associated with this alternative are therefore based on construction that meets MCDOT standards for a two-lane urban minor collector roadway. The roadway would need to be armored to resist stream flow during storm events. Public ownership of the road would result in the roadway being available for all traffic, including passenger vehicles. It is possible that the



roadway could be aligned to be compatible with future plans by the Flood Control District of Maricopa County to channelize the Agua Fria River, serving as an access road for the ultimate channel project. Alternative 6 will not intersect with a new east-west roadway contemplated by the Deer Valley Road Design Concept Report at either Deer Valley Road or Williams Drive unless the new east-west roadway is also constructed with an at-grade river crossing.

Advantages of Alternative 6 to construct a new roadway within the Agua Fria River bed include:

- For trucks traveling west, this alternative will reduce travel distance on the round trip by as much as seven miles
- For trucks traveling north and northeast, this alternative will reduce travel distance on the round trip by as much as one mile
- Total average daily truck traffic in year 2030 on Beardsley Road near Ventana Lakes will be reduced by 320 trucks per day, approximately one quarter of the total anticipated by the no-build alternative

Challenges of Alternative 6 include:

- The entire road would be subject to flooding and will become impassable following storms that are sufficient to cause the river to flow
- Construction within the riverbed results in more significant environmental impacts

Estimate project cost for construction of a truck road within the Agua Fria River bed is \$18.4 million, including substantial costs to armor the road to resist stream flows.

Alternative 7 – Acquisition of Homes Closest to Beardsley Road

This alternative arose from a suggestion of a homeowner at the November 2008 public information meeting held at the Ventana Lakes Yacht Club. The purpose of this alternative is to consider acquisition of homes that are closest to Beardsley Road and thereby increase the distance between truck traffic on Beardsley Road and current residents and homeowners. No noise modeling was used to identify the homes for acquisition. The design team identified 25 residential homes within the Ventana Lakes Community that were adjacent to Beardsley Road with minimal setback. Homes within the Sun City Community have greater setback from Beardsley Road and were therefore not included in the budget development. Options for disposition of the acquired homes include:

- Demolition and replacement by open space
- Rental or lease of the properties to tenants to whom disclosure of Beardsley Road truck traffic issues had been made
- Sale of the properties to buyers to whom disclosure of Beardsley Road truck traffic issues had been made

Benefits of Alternative 7 to acquire homes that are most affected by Beardsley Road truck traffic include:

- Full mitigation of the impacts of Beardsley Road truck traffic for the homeowners whose property was acquired
- Potential to recoup a portion of the project cost with subsequent resale of the properties



Challenges of Alternative 7 include:

- Acquisition and demolition will reduce the number of properties sharing in the common expenses of the Ventana Lakes Homeowners Association, thus increasing the burden for remaining homeowners
- Acquisition and rental/lease of homes will reduce the percentage of owner-occupied homes in the Ventana Lakes Community with resulting potential to adversely impact adjacent home values
- Acquisition and resale of homes may impact adjacent home values if the resale price includes adjustment for disclosure of the Beardsley Road truck traffic

Estimated project cost for acquisition of the 25 homes closest to Beardsley Road is \$9.0 M, including the selling price, relocation expenses, and closing costs. A substantial part of this cost could be recouped by subsequent sale or lease of the properties. The project budget does not include costs for demolition or replacement by a landscaped open space.

3.2 Coordination with Stakeholders

Stakeholder meetings were held with representatives of MCDOT, Cities of Peoria and Surprise, Ventana Lakes Home Owners Association, Sun City Home Owners Association, and the Arizona Rock Products Association to establish criteria for evaluation of alternatives, and to identify origin and destinations for trucks operating from the various rock product locations.

Criteria selected for evaluation of the alternatives include the following, ranked in order of importance as determined by the stakeholder group:

- Proximity to homes
- Cost including roadway, right of way, drainage, utility relocations
- Community acceptance
- Impacts to operations of arterial network
- Compatibility with Peoria & Surprise plans and entitlements
- State land impacts
- Impacts to mining operations
- Ownership/maintenance responsibility
- All weather route
- Permitting challenge,
- Impacts to 4f properties (parks/schools/cemeteries)
- Impacts to biological resources
- Impacts to cultural resources

Each of the rock products producers in attendance at the meetings indicated that their delivery locations varied greatly, but on average were evenly distributed within a 15-20 mile radius from their locations. They also indicated that operations would continue as long as material could be economically mined from the area, and anticipated that this would be in excess of 100 years. Reconstruction and rebuilding will continue even after the area they serve has been built out.

The City of Peoria met with the Arizona State Land Department (ASLD) in June 2009 to discuss their plans to move forward with Recommended Alternative 1. ASLD staff shared their concerns regarding adverse impacts that the proposed truck route might have on the value of the parcels held by ASLD east of the SRP



overhead electric transmission easement, west of 109th Avenue, north of Rose Garden Lane, and south of the Zuni Hills Elementary School. ASLD staff anticipate that the land they hold will be purchased for development of residential properties. ASLD staff indicated their willingness to work with the City of Peoria on this and other issues, and indicated a preference for positioning the proposed 112th Avenue Extension west of the SRP easement so that the easement acts as a buffer between the roadway and a future residential development.

3.3 Public Involvement

Feasible alternative alignments and preliminary results of alternative analyses were presented to the public at a meeting held August 12, 2008 at the Unitarian Universalist Church located at 17540 North Avenue of the Arts in Sun City. No clear consensus could be discerned from attendees regarding a preferred alternative truck route. A significant number of concerns were raised by residents living west of the Agua Fria River in the Sun City West and Corte Bella developments regarding the potential for increased truck traffic near their homes on El Mirage Road.

A meeting was held at the Ventana Lakes Yacht Club on November 19, 2008. No new information beyond what was presented at the August 2008 meeting was presented at the November meeting.

A meeting was held at the Ventana Lakes Yacht Club on May 14, 2009 to share the recommendation for Alternative 1 as the preferred alternative.



TABLE 3.1 – EVALUATION MATRIX

CRITERION	ALTERNATIVE									
	No Build	1 112 th Avenue Extension to 107 th Avenue near Pinnacle Peak Road alignment	2A Rose Garden Lane Extension to El Mirage Road Northbound Trucks Prohibited	2B Rose Garden Lane Relocated to Harmony Lane & Extended to El Mirage Road near Beardsley Road Northbound Trucks Prohibited	2C Rose Garden Lane Extended to El Mirage Road near Beardsley Road Northbound Trucks Prohibited	3 115 th Avenue Extension to 107 th Avenue near Pinnacle Peak Road alignment, with Low Flow Crossing of Agua Fria River	4 115 th Avenue Extension to 117 th Avenue Just South of Happy Valley Parkway	5 117 th Avenue Extension from Rose Garden Lane to Williams Road with Improvements to Existing 117 th Avenue	6 Truck-only road following riverbed from Rose Garden Lane to Happy Valley Parkway (Privately Funded)	7 Acquire Approximately 25 Homes Closest to Beardsley Road Within the Ventana Lakes Community
PROXIMITY TO HOMES	High Impact. Current City of Peoria truck route passes by numerous homes, including Ventana Lakes Community	Low Impact. This alignment is not adjacent to existing homes	High Impact. Single family residences on Rose Garden Lane between 117 th Avenue & 119 th Avenue.	High Impact. Single family residences on Rose Garden Lane and Harmony Lane between 115 th Avenue and 119 th Avenue.	High Impact. Single family residences on Rose Garden Lane between 117 th Avenue & 119 th Avenue.	Low Impact. This alignment is adjacent to one home on 115 th Avenue near West Harmony Lane	Low Impact. This alignment is adjacent to one home on 115 th Avenue near West Harmony Lane	Medium Impact. There are numerous single family residences just west of 117 th Avenue from ¼ mile south of Williams Road to ¾ mile south of Happy Valley Parkway	No/Low Impact. This alignment is not adjacent to existing homes	Not Applicable
COST INCLUDING CURRENT YEAR (2009) ROADWAY, RIGHT OF WAY, DRAINAGE, UTILITY RELOCATIONS, STRUCTURES, ENGINEERING AND ADMINISTRATION	No cost	\$7.3 M (2-lane roadway)	\$7.8 M (2-lane roadway)	\$11.3 M (2-lane roadway)	\$9.4 M (2-lane roadway)	\$25.9 M (4-lane roadway)	\$25.0 M (4-lane roadway)	\$23.7 M (4-lane roadway)	\$18.4 M (2-lane roadway)	\$9.0 M (Acquisition and relocation costs)
COMMUNITY ACCEPTANCE	A significant number of residents at the August 2008 public meeting and the November 2008 Ventana Lakes Community Association meeting indicated concern with high volume of truck traffic on Beardsley Road near Ventana Lakes	Comments received at the August 2008 public meeting were nearly evenly divided between positive and negative. Comments received at the November 2008 Ventana Lakes Community Assoc. meeting were in favor of a new route north of Rose Garden Lane.	Overwhelmingly negative comments at the August 2008 public meeting. A significant number of residents indicated opposition to truck traffic on El Mirage Road adjacent to homes	This alternative was not presented at the August 2008 public meeting or at the November 2008 Ventana Lakes Community Association meeting.	This alternative was not presented at the August 2008 public meeting or at the November 2008 Ventana Lakes Community Association meeting.	Comments received at the August 2008 public meeting were nearly evenly divided between positive and negative. Comments received at the November 2008 Ventana Lakes Community Assoc. meeting were in favor of a new route north of Rose Garden Lane.	Comments received at the August 2008 public meeting were nearly evenly divided between positive and negative. Comments received at the November 2008 Ventana Lakes Community Assoc. meeting were in favor of a new route north of Rose Garden Lane.	Overwhelmingly negative comments at the August 2008 public meeting. Comments received at the November 2008 Ventana Lakes Community Assoc. meeting were in favor of a new route north of Rose Garden Lane.	Overwhelmingly positive comments at the August 2008 public meeting. Comments received at the November 2008 Ventana Lakes Community Assoc. meeting were in favor of a new route north of Rose Garden Lane.	This alternative was not presented at the August 2008 public meeting or at the November 2008 Ventana Lakes Community Association meeting.
IMPACT TO TRAFFIC OPERATIONS ¹ Equal delivery distribution volumes are based on rock product delivery sites located evenly around the compass points over time ² Historical delivery distribution volumes are based on records for rock product delivery sites from November 2007 to November 2008.	No impact to current operations	The average daily traffic volume forecasts are within the range of a two-lane Urban Collector Road as per MCDOT Roadway Design Manual Table 2.1. Construction of this alternative will result in a reduction of total truck traffic on Beardsley Road near Ventana Lakes by approximately 51% based on equal delivery distribution ¹ , or by 38% based on historical delivery distribution. ²	The average daily traffic volume forecasts are within the range of a two-lane Urban Collector Road as per MCDOT Roadway Design Manual Table 2.1. Construction of this alternative will result in a reduction of total truck traffic on Beardsley Road near Ventana Lakes by approximately 20% based on equal delivery distribution ¹ , or by 25% based on historical delivery distribution. ²	The average daily traffic volume forecasts are within the range of a two-lane Urban Collector Road as per MCDOT Roadway Design Manual Table 2.1. Construction of this alternative will result in a reduction of total truck traffic on Beardsley Road near Ventana Lakes by approximately 20% based on equal delivery distribution ¹ , or by 25% based on historical delivery distribution. ²	The average daily traffic volume forecasts are within the range of a two-lane Urban Collector Road as per MCDOT Roadway Design Manual Table 2.1. Construction of this alternative will result in a reduction of total truck traffic on Beardsley Road near Ventana Lakes by approximately 20% based on equal delivery distribution ¹ , or by 25% based on historical delivery distribution. ²	The average daily traffic volume forecasts are within the range of a four-lane Urban Minor Arterial as per MCDOT Roadway Design Manual Table 2.1 Construction of this alternative will result in a reduction of total truck traffic on Beardsley Road near Ventana Lakes by approximately 7% based on equal delivery distribution ¹ , or will cause a 7% increase in total truck traffic based on historical delivery distribution. ²	The average daily traffic volume forecasts are within the range of a four-lane Urban Minor Arterial as per MCDOT Roadway Design Manual Table 2.1 Construction of this alternative will result in a reduction of total truck traffic on Beardsley Road near Ventana Lakes by approximately 25% based on either equal ¹ or historical delivery distribution. ²	The average daily traffic volume forecasts are within the range of a four-lane Urban Minor Arterial as per MCDOT Roadway Design Manual Table 2.1 Construction of this alternative will result in a reduction of total truck traffic on Beardsley Road near Ventana Lakes by approximately 25% based on either equal ¹ or historical delivery distribution. ²	The average daily traffic volume forecasts are within the range of a two-lane Urban Collector Road as per MCDOT Roadway Design Manual Table 2.1 Construction of this alternative will result in a reduction of total truck traffic on Beardsley Road near Ventana Lakes by approximately 25% based on either equal ¹ or historical delivery distribution. ²	No impacts to current operations
COMPATIBILITY WITH PEORIA GENERAL PLAN	Not compatible. Plans show construction of Deer Valley Road and 116 th Avenue within the study area	Not compatible. Roadway is within the Peoria Planning Area and is not identified on the General Plan	Not compatible. Roadway is within the Peoria Planning Area and is not identified on the General Plan	Not compatible. Roadway is within the Peoria Planning Area and is not identified on the General Plan	Not compatible. Roadway is within the Peoria Planning Area and is not identified on the General Plan	Not compatible. Roadway is within the Peoria Planning Area and is not identified on the General Plan	Compatible with 116 th Avenue shown on the City of Peoria General Plan	Compatible with 116 th Avenue shown on the City of Peoria General Plan	Not Compatible. Roadway is within the Peoria Planning Area and is not identified on the General Plan	Compatible with Peoria General Plan
COMPATIBILITY WITH SURPRISE 2030 PLAN	No Impact. Surprise 2030 Plan does not show new roadways within the study area other than currently planned El Mirage Road	No Impact. Surprise 2030 Plan does not show new roadways within the study area other than currently planned El Mirage Road	No Impact. Surprise 2030 Plan does not show new roadways within the study area other than currently planned El Mirage Road	No Impact. Surprise 2030 Plan does not show new roadways within the study area other than currently planned El Mirage Road	No Impact. Surprise 2030 Plan does not show new roadways within the study area other than currently planned El Mirage Road	No Impact. Surprise 2030 Plan does not show new roadways within the study area other than currently planned El Mirage Road	No Impact. Surprise 2030 Plan does not show new roadways within the study area other than currently planned El Mirage Road	No Impact. Surprise 2030 Plan does not show new roadways within the study area other than currently planned El Mirage Road	No Impact. Surprise 2030 Plan does not show new roadways within the study area other than currently planned El Mirage Road	No Impact



TABLE 3.1 – EVALUATION MATRIX (CONTINUED)

CRITERION	ALTERNATIVE									
	No Build	1 112 th Avenue Extension to 107 th Avenue near Pinnacle Peak Road alignment	2A Rose Garden Lane Extension to El Mirage Road Northbound Trucks Prohibited	2B Rose Garden Lane Relocated to Harmony Lane & Extended to El Mirage Road near Beardsley Road Northbound Trucks Prohibited	2C Rose Garden Lane Extended to El Mirage Road near Beardsley Road Northbound Trucks Prohibited	3 115 th Avenue Extension to 107 th Avenue near Pinnacle Peak Road alignment, with Low Flow Crossing of Agua Fria River	4 115 th Avenue Extension to 117 th Avenue Just South of Happy Valley Parkway	5 117 th Avenue Extension from Rose Garden Lane to Williams Road with Improvements to Existing 117 th Avenue	6 Truck-only road following riverbed from Rose Garden Lane to Happy Valley Parkway (Privately Funded)	7 Acquire Approximately 25 Homes Closest to Beardsley Road Within the Ventana Lakes Community
STATE LAND IMPACTS	No Impact	High Impact	High Impact	High Impact	High Impact	High Impact	High Impact	High Impact	High Impact	No Impact
IMPACT TO MINING OPERATIONS	No Impact	No impact to current mining operations	No impact to current mining operations	No impact to current mining operations	No impact to current mining operations	High Impact. Passes through current and future mining operation areas	Medium Impact. Passes alongside current and future mining operations. Single truck grate and wheel washing station on 115 th Avenue approaching Rose Garden Lane must be replaced by multiple stations for each operator approaching 115 th Avenue	High Impact. Passes through an existing mined area.	High Impact to current and future mining operations. Can be constructed to be compatible with future channelization plans by the Flood Control District of Maricopa County.	No Impact
OWNERSHIP AND MAINTENANCE RESPONSIBILITY	Current truck route is on roadways owned and maintained by public agencies	Roadway would be public and maintained by MCDOT and/or City of Peoria	Roadway would be public and maintained by MCDOT and/or City of Peoria	Roadway would be public and maintained by MCDOT and/or City of Peoria	Roadway would be public and maintained by MCDOT and/or City of Peoria	Roadway would be public and maintained by MCDOT and/or City of Peoria	Roadway would be public and maintained by MCDOT and/or City of Peoria	Roadway would be public and maintained by MCDOT and/or City of Peoria	Unlikely that a private entity will accept ownership and maintenance responsibility due to liability concerns. If public, will need to be constructed to meet public agency requirements for construction within flood prone areas.	Not Applicable
ALL WEATHER ROUTE	Rose Garden Lane at Agua Fria River is a low-flow crossing	Constructed outside of the regulatory 100-year flood plain	Rose Garden Lane at Agua Fria River is a low-flow crossing	Rose Garden Lane at Agua Fria River is a low-flow crossing	Rose Garden Lane at Agua Fria River is a low-flow crossing	The southern ¼ mile +/- approaching the intersection with Rose Garden Lane is within the regulatory 100-year flood plain. The low flow crossing of the Agua Fria River would be inundated by storms greater than a 2-year flood	The southern ¼ mile +/- approaching the intersection with Rose Garden Lane is within the regulatory 100-year flood plain	Constructed outside of the regulatory 100-year flood plain	Within the Agua Fria River floodplain and subject to flooding. Roadway construction materials and methods will need to be resistant to erosion from flood waters.	Not Applicable
PERMITTING CHALLENGES (CLEAN WATER ACT SECTION 404/401)	No Impact	Low Impact, potential Nationwide Permit (NWP) for wash crossings	Low Impact. Potential NWP for wash crossings	Low Impact. Potential NWP for wash crossings	Low Impact. Potential NWP for wash crossings	Medium Impact. Potential Individual Permit for Agua Fria River crossing and minor wash crossing	Low Impact. Potential NWP for multiple minor wash crossings	Low Impact. Potential NWP for multiple minor wash crossings	Low to High Impact. Low if constructed outside future river channelization, high if built within floodplain, individual permit and floodplain encroachment issues.	No Impact
IMPACTS TO 4f PROPERTIES	No/Low Impact	Medium Impact. Proximity to Zuni Hills Elementary School must be evaluated if project is constructed with Federal funding	No/Low Impact	No/Low Impact	No/Low Impact	Medium Impact. Proximity to Zuni Hills Elementary School must be evaluated if project is constructed with Federal funding	No/Low Impact	No/Low Impact	No/Low Impact	No Impact
IMPACTS TO BIOLOGICAL RESOURCES	No Impact	Medium Impact	Low Impact	Low Impact	Low Impact	Medium Impact	Medium Impact	Low Impact	High Impact	No Impact
IMPACTS TO CULTURAL RESOURCES	No Impact	Low Impact	Low Impact	Low Impact	Low Impact	Low Impact	High Impact – crosses Hohokam site AZ:T:7:375(ASM) This will require study and possible recovery, but will not otherwise impede this alternative.	Low Impact	Low Impact	No Impact



4.0 MAJOR DESIGN FEATURES OF THE RECOMMENDED PREFERRED ALTERNATIVE

This section describes the major features associated with the recommended preferred alternative, Alternative 1 – 112th Avenue Extension. Recommended Alternative 1 consists of constructing a new roadway connecting the intersection of 112th Avenue and Rose Garden Lane to 107th Avenue near the alignment of the Pinnacle Peak Road section line. The typical section recommended by this study is classified by MCDOT as an Urban Minor Collector consisting of one through lane in each direction with curb, gutter, and sidewalk. Total roadway width is 40 feet from face to face of curbs. MCDOT standards were used for the Minor Collector with a minimum of 80 feet of recommended right-of-way.

While Alternative 2 provided greater reduction in rock product truck traffic on Beardsley Road based on delivery locations as actually experienced from November 2007 to November 2008, Recommended Alternative 1 is found to provide greater reduction in truck traffic on Beardsley Road if the delivery locations are evenly distributed or are skewed to the north and west. Areas to the north and west are expected to experience significant development growth once economic conditions improve, and the stakeholders therefore anticipate that Recommended Alternative 1 will provide the greatest benefit in the future. Recommended Alternative 1 provides the greatest benefit for total truck traffic on Beardsley Road near the Ventana Lakes Community regardless of the assumption for rock product delivery distribution. The Recommended Alternative 1 alignment is shown in Figure 5.

4.1 Design Controls

The design criteria for this project were established using the MCDOT Roadway Design Manual (November 3, 1993) including updates through April 27, 2004; City of Peoria Infrastructure Development Guidelines; and the AASHTO Policy on Geometric Design of Highways and Streets (2001). Selected design criteria used for this report are summarized in Table 4.1.

Costs developed for this report are based on construction of a minor urban collector street with sidewalks on both sides of the street.

Design speed is 45 miles per hour based on the MCDOT Roadway Design Manual for a minor urban collector in level terrain.

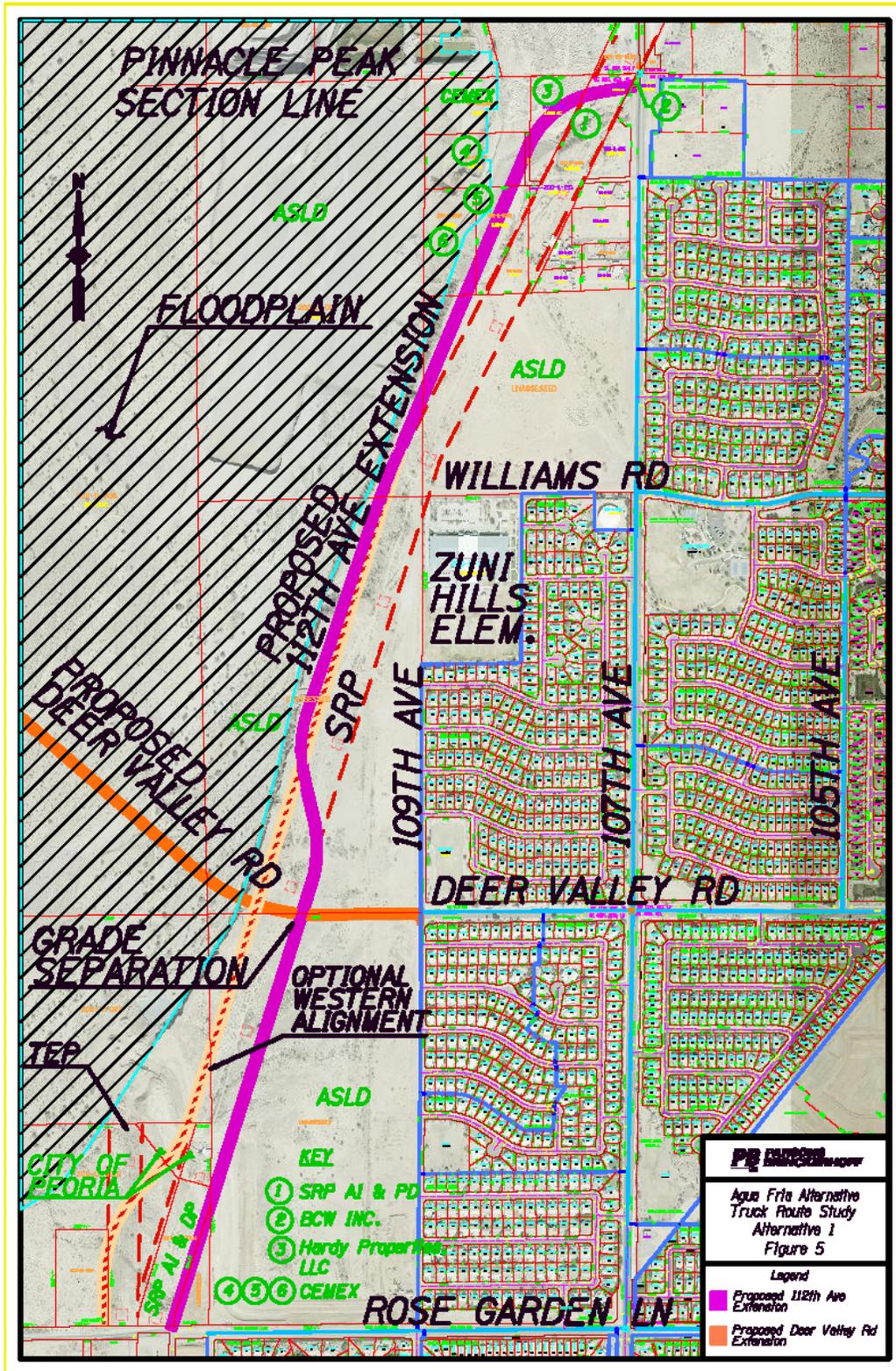
4.2 Horizontal and Vertical Alignments

The horizontal alignment generally follows the SRP overhead transmission line easement. The proposed roadway is east of the SRP easement at Rose Garden Lane in order to better align with the existing 112th Avenue south of Rose Garden Lane. The 112th Avenue Extension will be skewed from the existing road so that it remains outside the SRP easement.

The alignment remains east of the SRP easement from Rose Garden Lane to a point just north of the proposed Deer Valley Road/Williams Drive connector roadway to maximize distance from the roadway to the Agua Fria River bank. The roadway will cross the recently constructed drainage channel just north of Rose Garden Lane with a box culvert. Costs in this budget are based on a similar size culvert as the existing SRP and City of Peoria access road that crosses the channel within the SRP easement.



FIGURE 5 - RECOMMENDED ALTERNATIVE 1



truck route Exhibit 4_new.dgn 6/29/2009 5:35:28 PM



TABLE 4.1 – DESIGN CRITERIA

Design Feature	Criteria
2030 ADT	7,200 vehicles per day (Forecasted by MAG for Recommended Alternative 1)
Design Vehicle	WB-50 (MCDOT)
Design Speed	45 mph Min (MCDOT Urban Minor Collector)
Pavement Design Life	20 Years
Pavement Section	1.5 inches AR-AC, 2.5 inches AC, 12 inches AB (To be reviewed against current MCDOT and City of Peoria standards during final design)
Horizontal Alignment	Curve Length 500 feet Min, e = 4% Max (MCDOT)
Vertical Alignment	Vertical curve is required for algebraic grade difference equal to or greater than 0.3% (0.2% if Federally Funded) (MCDOT). At major street/major street urban intersections, the maximum intersection ride through break-over at signalized intersections shall not exceed 2.5%.
Longitudinal Profile Grades	0.25% Min (MCDOT); 0.15% Absolute Min (MCDOT Special cases) 0.40% Min (Peoria); < 0.40% (Peoria City Engineer Approval)
Roadway Cross Slope	2%
Lane Widths	Travel Lanes: 12 feet Two-Way Left-Turn Lane: 14 feet
Curb Return Radii (Face of Curb)	35 feet min (MCDOT Arterials and Major Collectors) per Table 6.1 MCDOT RDM 30 feet min (MCDOT Minor Collectors and Local) 35 feet (Peoria Arterials); 30 feet (Peoria Collectors); 20 feet (Peoria Local)
Clear Zone	30 feet Desirable
Cut & Fill Slopes	2:1 Max
Curb and Gutter	MAG Standard Detail 220, Type A (Vertical Curb & Gutter) H = 6" except H = 4" with guardrail
Access, Driveway Design	Single Residential – Roadway Design Manual, Figure 7.1 (MCDOT) Commercial - Roadway Design Manual Figures 7.2 -7.4 (MCDOT) Single Residential – MCDOT Standard Detail 2033 (Peoria) Commercial – Peoria Details PE-251-1 or PE-251-2 (Peoria)
Tapers	Narrowing/Shifting: Design Speed:1 Minimum; Widening: 15:1 Minimum
Right-of-way	Desirable 80 feet total width (MCDOT Urban Minor Collector)
Utilities	MCDOT and Peoria guidelines for relocations and the AUCC Public Improvement Project Guide
On-Site Drainage – Roadway	Storm drains associated with the on-site drainage system consist of short laterals due to the proximity of the proposed off-site drainage system. <ul style="list-style-type: none"> •Design on-site inlets, scuppers and storm drains using the 10-year storm. During the 10-year event one 12-foot driving lane must be free from flooding in each direction. This corresponds to an allowable spread width of 17.5 feet. •MAG 531 catch basins (5' – 6" curb opening) are used for on-grade inlets •At sags, flanking inlets are placed so that the ponding depth is 63 percent of the ponding depth at the sag inlet. •Inlets are also placed immediately upstream of curb returns and on the upstream end of superelevation transitions to minimize gutter flow crossing traveled lanes. •Storm drains associated with the on-site drainage system consist of short laterals due to the proximity of the proposed off-site drainage system. The storm drains are sized for the 10-year event. •On-site hydrology computed for the proposed right-of-way limits using the Rational Method procedures outlined in the <i>Drainage Design Manual for Maricopa County, Hydrology</i>.



The alignment crosses to the west side of the SRP easement between Deer Valley Road and Williams Road because there is insufficient distance between the SRP easement and the Zuni Hills Elementary School property south of Williams Road. The alignment within the easement is established to meet the design speed and to maintain at least 50 feet from the proposed roadway right of way to overhead electric tower bases.

The alignment remains west of the SRP easement until just south of the Pinnacle Peak Road section line where it turns eastward to an intersection with 107th Avenue. The intersection with 107th Avenue is just south of the desired location of the Pinnacle Peak section line to maintain at least 50 feet from the proposed roadway right of way to an SRP tower base just west of 107th Avenue. The alignment is skewed 10 degrees so that the 112th Avenue Extension could be aligned with the future Pinnacle Peak Road, if the Pinnacle Peak Road alignment east of 107th Avenue is modified to shift slightly south approaching 107th Avenue.

This report does not address development of a vertical profile. The intent is to construct the roadway as close as practical to existing grade. Vertical profile issues that should be addressed in subsequent project development phases include:

- Where the 112th Avenue Extension crosses the future Deer Valley Road/Williams Drive connector, the vertical profile of the 112th Avenue Extension should be elevated to achieve sufficient clearance to allow for a grade separation structure with the Deer Valley Road/Williams Drive connector. This will require that the proposed 112th Avenue Extension be constructed approximately 3-4 feet above existing grade
- The northern section of the alignment passes through previously mined areas and a tributary stream to the Agua Fria River. The profile design in this area will need to consider existing and future modifications to the ground surface from mining, Agua Fria River flood elevations, and appropriate grades approaching the intersection with 107th Avenue

This report does not include geotechnical analysis that will need to be conducted as the project develops. Agua Fria River bank stability issues may result in a need to excavate a bench between the SRP easement and the river north of Deer Valley Road, and place the roadway profile lower than the existing grade.

4.3 Right of Way

Right of way costs are based on an average of \$55,000 per acre for undeveloped land with a minimum width of 80 feet. A substantial portion of the right of way needed for this project is State Land. Land at the northern project terminus is privately owned.

Arizona State Land Department (ASLD) staff expressed concerns with potential impacts of Recommended Alternative 1 on future development potential for the ASLD parcels east of the SRP overhead electric transmission easement where the proposed truck route is east of the SRP easement. The right of way negotiation process may result in modification of the Recommended Alternative 1 alignment shifting to remain west of the SRP easement from Rose Garden Lane to the crossing of the easement near the Pinnacle Peak Road alignment. Shifting the alignment will require that the proposed road also cross beneath a Tucson Electric Power overhead electric transmission line just north of Rose Garden Lane. Shifting the alignment will result in an offset intersection at Rose Garden Lane and will bring the proposed roadway closer to the Agua Fria River bank south of Deer Valley Road. An advantage of shifting the



alignment is that it will accommodate a grade separation with Deer Valley Road with the proposed 112th Avenue Extension constructed at-grade, because the proposed profile for the Deer Valley Road/Williams Drive connector is several feet lower on the west side of the SRP easement.

4.4 Drainage

Drainage calculations were not performed for this report. Budgets developed for this report include box culverts for the City of Peoria drainage channel north of Rose Garden Lane and for a natural stream just south of the Pinnacle Peak section line. Budgets are based on use of scuppers for on-site drainage with outlets to individual basins for first-flush requirements. Quantities of drainage pipe were also included in the estimate to account for those areas where scuppers are impractical.

4.5 Constructability and Traffic Control

The proposed 112th Avenue Extension is constructed on new alignment and intersects with existing roadways only at Rose Garden Lane and 107th Avenue. Disruption to existing traffic patterns can therefore be minimized. If this project is constructed after the proposed Deer Valley Road/Williams Drive connector, traffic operations on that roadway will be impacted by construction of the grade separation structure, likely under traffic. If the Deer Valley Road/Williams Drive connector is constructed after the 112th Avenue Extension, traffic operations on the 112th Avenue will be impacted by construction of the grade separation structure, likely with a detour.

4.6 Intersections

The proposed 112th Avenue Extension will intersect at the southern terminus with Rose Garden Lane across from the existing 112th Avenue. The proposed northern leg will be skewed from the southern leg because of the SRP overhead electric transmission easement. It is not anticipated that this intersection will meet signal warrants, and 112th Avenue will have stop signs at Rose Garden Lane.

The proposed 112th Avenue Extension will intersect at the northern terminus with 107th Avenue near the Pinnacle Peak section line. The proposed western leg should be aligned with the future Pinnacle Peak Road east of 107th Avenue. It is recommended that the design of Pinnacle Peak Road currently being performed by the Flood Control District of Maricopa be amended to conform to the 112th Avenue Extension geometry presented in this report so that the intersections can align without impacting the SRP tower west of 107th Avenue. It is anticipated that this intersection may meet warrants for a traffic signal once Pinnacle Peak Road is constructed east of 107th Avenue and traffic volumes increase. A signal is not warranted solely based on anticipated rock product truck traffic.

4.7 Utilities

Utility coordination will play a critical role in the timely completion of this project. The proposed 112th Avenue Extension crosses the SRP overhead electric transmission easement at two locations. It is not possible to construct the 112th Avenue Extension without crossing the easement at least once, because the roadway must be west of the easement at the Zuni Hills Elementary School and must be east of the easement at 107th Avenue. The other crossing allows the roadway to align with 112th Avenue south of Rose Garden Lane and minimizes the proximity of the roadway to the steep east bank of the Agua Fria River.



4.8 Coordination with Other Projects

Deer Valley Road/Williams Drive Connector – At the time this report was completed, the Maricopa County Department of Transportation was considering construction of a minor arterial roadway to connect Deer Valley Road at 109th Avenue in Peoria to Williams Drive at 117th Avenue in unincorporated Maricopa County. The Deer Valley Road/Williams Drive project is proposed to be constructed in phases as recommended in the Final Deer Valley Road Design Concept Report dated May 2009.

At the location where the two proposed roadway alignments intersect, the Deer Valley Road/Williams Drive Phase 1 profile is proposed to be depressed approximately 17 feet below existing grade as the roadway approaches the at-grade low-water crossing of the Agua Fria River. Subsequent construction Phases 2 and 3 will not modify the proposed Phase 1 profile at this location. This study recommends that the proposed Deer Valley Road/Williams Drive and the proposed 112th Avenue Extension be grade separated with 112th Avenue passing over Deer Valley Road to discourage sand and gravel mining trucks from entering onto Deer Valley Road. Depressing the 112th Avenue Extension to meet the Deer Valley Road/Williams Drive profile is not feasible because it would require excavation immediately adjacent to the SRP easement. Relocating the 112th Avenue Extension to the east to avoid impacts to the SRP easement would place an at-grade intersection too close to the existing intersection between Deer Valley Road and 107th Avenue.

A grade separation between the proposed roadways was estimated to add approximately \$2,000,000 to project costs. The design team segregated this cost from budgets prepared for this report because the Deer Valley Road/Williams Drive connector has not yet been programmed for construction. An Intergovernmental Agreement between Maricopa County and the City of Peoria will be needed to determine cost sharing for the grade separation. For budgeting purposes, this report assumes that one-half of the estimated project cost for a grade separation will be borne by the 112th Avenue Extension.

Pinnacle Peak Road and Drainage Channel – The Flood Control District of Maricopa County is working with the City of Peoria to develop plans for construction of drainage and roadway improvements for Pinnacle Peak Road from Lake Pleasant Parkway to 107th Avenue. The scope of work for that project should be amended to call for the western portion of Pinnacle Peak Road approaching 107th Avenue to shift slightly to the south in order to align with the 112th Avenue Extension that is controlled by the location of the existing overhead SRP transmission tower just west of 107th Avenue. The centerline of Pinnacle Peak Road should be aligned so that the intersection with 107th Avenue is skewed 10 degrees or less, and aligned so that the extended centerline west of 107th Avenue clears the southern edge of the tower base by at least 90 feet. This will achieve at least 50 feet clearance between the tower leg and roadway right of way as required by SRP for roadway crossings of their easements.

Beardsley Road Crossing of the Agua Fria River – The City of Surprise has a goal of relieving traffic volumes on Bell Road, and has determined that construction of Beardsley Road across the Agua Fria River will provide significant relief to Bell Road traffic. Construction and designation of the 112th Avenue Extension as a truck route will reduce (but not eliminate) trucks on Beardsley Road near the Ventana Lakes community, and this reduction may provide an opportunity to consider additional crossings of the Agua Fria River, including Beardsley Road.



5.0 ENVIRONMENTAL OVERVIEW

5.1 Biological Community

The study area lies in the Agua Fria River Valley, approximately 11 miles south of Lake Pleasant, a reservoir created by the New Waddell Dam. The White Tank Mountains are approximately 10 miles west of the study area and rise to just over 4,000 feet elevation¹ while the Hieroglyphic Mountains, approximately 6 miles north of the study area, rise to a height of over 3,500 feet. Closer to the study area, approximately 2.7 miles north, Calderwood Butte rises to 1,703 feet. Just east of Calderwood Butte, an unnamed geologic formation stands at 1,850 feet. The north-south flowing Agua Fria River, which is an ephemeral drainage within the study area, flowing only during and after rain events, continues south to the Gila River, approximately 20 miles downstream. The study area includes residential developments along the east and west banks of the Agua Fria River and active gravel mining operations within the floodplain.

The study area ranges from an approximate high of 1,280 feet near the northern end of the study area down to just under 1,200 feet at the southern end of the study area. The McMicken Dam Outlet Wash and eight unnamed ephemeral washes flow through the study area. Sections of these washes have been heavily manipulated by residential construction and gravel operations in the study area. The gravel operations within the study area contain several catchment basins created by and related to gravel operations. Soils in the area are well-drained and formed from old mixed alluvium, consisting of volcanic rocks, schist, limestone, and granite (Hendricks 1985).

The study area lies in the Lower Colorado subdivision of the Sonoran desert scrub biotic community and receives an average annual precipitation of approximately 7 inches per year with average annual summer and winter temperatures measuring approximately 90°F and 54°F, respectively (Turner and Brown 1994). This hot arid climate can contain variable plant communities, often depending on the proximity of washes and groundwater. The undeveloped areas can be delineated into two communities: the Agua Fria River bottom and the surrounding uplands. The river bottom is dominated by desertbroom (*Baccharis sarothroides*) but also contains, desert ironwood (*Olneya tesota*), paloverde (*Parkinsonia microphylla*) and mesquite trees (*Prosopis* sp.). The areas outside of the river bottom are dominated by creosote bush (*Larrea tridentata*) but also contain, white bursage (*Ambrosia dumosa*), brittlebush (*Encelia* sp.), globe mallow (*Sphaeralcea* sp.), desert broom, paloverde, mesquite, saguaro (*Carnegiea gigantea*), mammillaria (*Mammillaria grahamii*), barrel cactus (*Ferocactus wislizeni*), hedgehog cactus (*Echinocereus engelmannii*), and cholla (*Cylindropuntia* sp.). Much of the natural vegetation within the study area has been altered or obliterated by residential development, gravel operations, or off highway vehicle use. Developed areas contain some native plants, but these have been introduced as landscaping and are not naturally occurring.

5.2 Wetlands and Special Aquatic Habitats

Neither wetlands nor special aquatic habitats (e.g., cienegas, live streams, or springs) occur within the study area with the exception of the gravel operation catchment basins. These basins may contain perennial water and have limited potential to develop small areas of wetlands, but are subject to alteration due to the continuing operations of the gravel mines.

¹ Elevations in this document are referenced to mean sea level.



5.3 Threatened and Endangered Species

The U.S. Fish and Wildlife Service (USFWS) list of threatened, endangered, proposed, and candidate species for Maricopa County (USFWS 2008) was reviewed by Patrick E.T. Dockens, a qualified biologist with EcoPlan Associates, Inc. Table 5.1 summarizes this list and identifies habitat requirements and potential effects on each species.

TABLE 5.1 – USFWS LISTED SPECIES IN MARICOPA COUNTY AND EVALUATION OF EFFECTS							
Common Name	Scientific Name	Status*	Suitable Habitat Present	Occupied Habitat Present	Critical Habitat Present	Species Affected	Critical/Suitable Habitat Affected
Arizona cliffrose	<i>Purshia subintegra</i>	E	No	No	No	No	No
Bald eagle	<i>Haliaeetus leucocephalus</i>	T	No	No	No	No	No
California brown pelican	<i>Pelecanus occidentalis californicus</i>	E	No	No	No	No	No
Desert pupfish	<i>Cyprinodon macularius</i>	E	No	No	No	No	No
Gila chub	<i>Gila intermedia</i>	E	No	No	No	No	No
Gila topminnow	<i>Poeciliopsis occidentalis occidentalis</i>	E	No	No	No	No	No
Lesser long-nosed bat	<i>Leptonycteris curasoae yerbabuena</i>	E	No [†]	No	No	No	No
Mexican spotted owl	<i>Strix occidentalis lucida</i>	T	No	No	No	No	No
Razorback sucker	<i>Xyrauchen texanus</i>	E	No	No	No	No	No
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	E	No	No	No	No	No
Woundfin	<i>Plagopterus argentissimus</i>	E	No	No	No	No	No
Yuma clapper rail	<i>Rallus longirostris yumanensis</i>	E	No	No	No	No	No
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	C	No	No	No	No	No

*C = Candidate, E = Endangered, PD = Proposed Delisted, T = Threatened (USFWS 2008)
[†]See paragraph below for more information regarding lesser long-nosed bat habitat



No federally protected species were observed during the general site survey. No designated or proposed critical habitat occurs in the corridor study area. Although there are components of suitable foraging habitat present for lesser long-nosed bats in the study area vicinity, food resource plants are sparse (saguaro) or absent (agave). Though potential roost sites (caves, mines, and tunnels) may occur in nearby mountainous areas, such as White Tank Mountains and Hieroglyphic Mountains, there are no known roost sites and no confirmed records for this species have occurred in Maricopa County since two specimens were found in the 1960s. Additionally, the study area is located approximately 80 miles north of the closest known occupied roost site, which is outside of the foraging distance of the lesser long-nosed bat. Therefore, lesser long-nosed bats likely do not occur in the study area vicinity.

5.4 Wildlife of Special Concern in Arizona

The Arizona Game and Fish Department (AGFD) On-Line Environmental Review Tool was accessed to provide a list of special status species that occur near or within the study area for each alternative. The receipts provide lists of special status species, critical habitat, and tribal lands within 3 miles of each alternative and list the presence of four special status species—Sonoran desert tortoises (*Gopherus agassizii*), greater western bonneted bat (*Eumops perotis californicus*), California leaf-nosed bat (*Macrotus californicus*), and cave myotis (*Myotis velifer*)—and a bat colony. See Table 5.2 for specific occurrences per Alternative. No suitable roost sites or suitable colony sites exist in the project limits, though these three bat species could be expected to forage in the project area. Though suitable habitat exists, no Sonoran desert tortoises or their sign were observed during the general site survey. The AGFD provides guidelines for the handling of tortoises encountered on development projects (AGFD 1997).

TABLE 5.2 – ITEMS LISTED ON THE AGFD ON-LINE REVIEW TOOL RECEIPT PER ALTERNATIVE					
Alternative	Species listed on the AGFD On-line Review Tool receipt and potential occurrence in each Alternative				
	Sonoran desert tortoise	Greater western bonneted bat	California leaf-nosed bat	Cave myotis	Bat colony
No-Build	N/A	N/A	N/A	N/A	N/A
1	No	Yes	Yes	Yes	Yes
2	No	Yes	No	No	No
3	No	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	No	No	No
6	Yes	Yes	Yes	Yes	Yes
7	N/A	N/A	N/A	N/A	N/A

In summary, Build Alternatives 2 and 4 may support the least number of sensitive species, while Build Alternatives 1, 3, 5, and 6 may support the most.



5.5 Protected Native Plants

The Arizona Department of Agriculture (AZDA) list of protected native plants (AZDA 2005) was reviewed by Patrick E.T. Dockens, a qualified biologist. Numerous individuals of Arizona protected native plants were observed in the project area during a February 27, 2008, site visit and are listed in Table 5.3.

TABLE 5.3 – PROTECTED NATIVE PLANTS KNOWN TO OCCUR IN THE PROJECT AREA		
Common Name	Scientific Name	Occurrence
Salvage Restricted		
Barrel cactus	<i>Ferocactus wislizeni</i>	Rare
Buckhorn cholla	<i>Cylindropuntia acanthocarpa</i>	Rare
Graham's nipple cactus	<i>Mammillaria grahamii</i>	Rare
Hedgehog cactus	<i>Echinocereus engelmannii</i>	Rare
Harvest Restricted and Salvage Assessed		
Desert ironwood	<i>Olneya tesota</i>	Uncommon
Foothill paloverde	<i>Parkinsonia microphylla</i>	Common
Mesquite	<i>Prosopis</i> sp.	Common
Saguaro	<i>Carnegiea gigantea</i>	Uncommon

5.6 Wildlife Crossing and Movement Corridors

Undeveloped areas, especially the Agua Fria River, and less so the xeroriparian washes within the study area, may allow for wildlife movement and connectivity among habitats used for foraging, cover, and reproduction. Corridors valuable in preserving wildlife movement include those that are less impacted by development and those that form a connection between largely intact and undeveloped natural habitat. Wildlife that may occur in the study area includes, but is not limited to, mammals, such as javelina (*Tayassu tajacu*) or coyote (*Canis latrans*), reptiles, such as ornate tree lizard (*Urosaurus ornatus*) or common side-blotched lizard (*Uta stansburiana*), and birds, such as Costa's hummingbird (*Calypte costae*) or mourning dove (*Zenaida macroura*). In addition to the potentially perennial water present within the gravel operations, surface runoff may flow within the washes and the Agua Fria River following rain events and accumulate in depressions providing temporary aquatic habitat and breeding sites for amphibians.

There are several potential wildlife crossings and corridors within the study area, including, but not limited to, the Agua Fria River, the McMicken Dam Outlet Wash, and the eight unnamed washes. The Agua Fria River represents the most valuable and intact corridor within the study area and would be impacted by a portion of Alternative 3 and the entire length of Alternative 6 which is proposed to be constructed entirely within the Agua Fria River bed. The McMicken Dam Outlet Wash is crossed by Alternative 2 only, and would not be considered a high quality wildlife corridor due to the previous construction of a cement lined channel along the section where Alternative 2 would cross. Most of the unnamed washes within the study area drain residential developments and don't create a corridor connecting largely intact and undeveloped natural habitat and therefore make poor wildlife movement corridors. The exception to this is the wash in very northern portion of the study area which is crossed Alternatives 4 and 5. This wash crossing has a previously constructed culvert which most likely would not be reconstructed as a result of this project.

The AGFD provides guidelines for constructing culverts and fences that allow for the continued movement of wildlife. Culvert design to facilitate wildlife movement should include, but is not limited to, elements such



as suitable habitat at both ends, appropriate size, adequate lighting, and a natural substrate. Specific guidelines on designing culverts to facilitate wildlife crossings can be found at <http://www.azgfd.gov/hgis/guidelines.aspx>.

5.7 Alternatives Analysis

The No Build Alternative and Alternative 7 would not result in impacts to threatened, endangered, proposed, or candidate species or to wildlife of special concern in Arizona. The availability of wildlife crossings and the quality and quantity of habitat would not change with this alternative.

Vegetation removal would be required for all but the No Build Alternative and Alternative 7. Alternatives 1, 3, 4, and 6 would bisect the greatest portion of undeveloped land. Surveys for the presence of native plant species would be required prior to the start of work for whichever alternative is selected. In accordance with the Arizona Native Plant Law, the Arizona Department of Agriculture would be contacted at least 60 days prior to construction to offer commercial salvagers the opportunity to remove and salvage protected plants.

Construction of the alternatives would increase wildlife habitat fragmentation and reduce habitat continuity and use by wildlife. Habitat fragmentation may occur in areas bordered by existing high-traffic roadways, utility corridors (cleared of vegetation and used by recreation and off-road vehicles), and residential developments, all of which are present in the study area. The result of fragmentation is an increased human presence in natural terrain and a reduction in wildlife populations resulting from vehicle strikes, negative human interactions, and discontinuous and isolated nature of wildlife habitat. In general, alternatives which involve less new road construction in natural terrain (e.g., Alternatives 2 and 5) fragment smaller blocks of habitat than those involving long sections of new road alignment (e.g., Alternatives 1, 3, 4, and especially 6).

5.8 Literature Cited

- AGFD. 1997. Guidelines for handling Sonoran desert tortoises encountered on development projects. AGFD, Phoenix, Arizona.
- AZDA. 2005. Protected Arizona native plants. <http://www.azda.gov>. ADA, Phoenix, Arizona.
- Hendricks, D.M. 1985. Arizona soils. The University of Arizona Press, Tucson, Arizona.
- Turner, R.M., and D.E. Brown. 1994. Sonoran desert scrub. *In* Biotic communities: Southwestern United States and northwestern Mexico, edited by D.E. Brown, pp. 180–221. The University of Utah Press, Salt Lake City, Utah.
- USFWS. 2008. Maricopa County species list. <http://www.fws.gov/southwest/es/arizona>. USFWS, Ecological Services Field Office, Phoenix, Arizona.



6.0 PRELIMINARY COST ESTIMATE

Project cost estimates for the six build alternatives plus the acquisition Alternative 7 are shown in Table 6.1. Unit prices used to develop the construction costs are based on construction in 2009. Additional information regarding estimation methods is provided for the following items:

- Pavement costs are based on the pavement section proposed for the Deer Valley Road Design Concept Report prepared concurrent with this study
- Landscaping costs are not included
- Costs for construction water are assumed to be included with earthwork related items
- Right of way costs are based on a unit price of \$55,000 per acre for undeveloped land and \$500,000 per residence
- Utility relocation costs are based on two percent of overall construction cost

Assumptions made in development of the project cost estimate include:

- SRP will allow two crossings of their overhead electric easement that do not cross at the preferred right angles. *Exhibits from this report have been provided to SRP, but actual approval by SRP must be based on more detailed engineering drawings that will be provided with 40% plan development. If the northern crossing of the easement is not approved, it will result in a fatal flaw to the preferred alternative because it is not feasible to position a new roadway between the SRP easement and the Zuni Hills Elementary School. If the southern crossing of the easement is not approved, the alignment would need to remain on the west side of the easement, the intersection at Rose Garden Lane would be offset from existing 112th Avenue, and it may become necessary to reinforce the existing river bank south of Deer Valley Road where the distance between the SRP easement and the river bank narrows. The design team considers the risk that SRP will deny permission to cross the easement to be low*
- The existing river bank is sufficiently stable to support the proposed roadway. *If geotechnical investigations performed as a part of detailed design indicate that the bank has insufficient stability to support the road, the bank will need to be reinforced. Potential reinforcement methods include soil nailing, sheet piling, and bank armoring. The design team considers that the risk that the Recommended Alternative 1 alignment as shown in this report will require reinforcement of the river bank to be low. The design team considers that the risk that an alignment west of the SRP easement south of Deer Valley Road would require reinforcement of the river bank to be significant*
- Profile grade of Recommended Alternative 1 will be set to accommodate a future grade separation with the Deer Valley Road/Williams Drive connector that is depressed west of 109th Avenue to make an at-grade low-water crossing of the Agua Fria River
- Recommended Alternative 1 will be constructed prior to the extension of Deer Valley Road, and the cost of the grade separation bridge is not included with Recommended Alternative 1 project costs. *Estimated project cost to add a grade separation structure to this alternative is approximately \$2.0 million*
- The intersection of Pinnacle Peak Road with 107th Avenue that is currently being designed by the Flood Control District of Maricopa County will be shifted south so that the western leg formed by the 112th Avenue Extension can be constructed without relocating an SRP overhead electric tower just west of 107th Avenue at the Pinnacle Peak Road alignment



- CEMEX Construction Materials Inc. will be granted commercial driveway access from the 112th Avenue Extension so that access to the remainder of their properties can be maintained
- A quantity of 1,000 lineal feet of sound wall is included in the project cost estimate with potential wall locations anticipated to be near Deer Valley Road where the profile grade is elevated and near Zuni Hills Elementary School. *Actual limits of sound walls will be based on detailed noise modeling that will be performed as a part of 40% plan development*
- Drainage structures similar in size to existing adjacent culverts will be provided where the 112th Avenue Extension crosses the City of Peoria drainage channel north of Rose Garden Lane and the unnamed wash near Pinnacle Peak Road. *Actual drainage structure type and sizes will be determined as a part of 40% plan development*



AGUA FRIA ALTERNATIVE TRUCK ROUTE STUDY

	Alternative 1 112th Avenue Extension to 107th Avenue near Pinnacle Peak Road	Alternative 2A Rose Garden Lane Straight Extension	Alternative 2B Rose Garden Lane to Beardsley via Harmony Lane	Alternative 2C Rose Garden Lane to Beardsley	Alternative 3 115th Avenue Extension to 107th Avenue near Pinnacle Peak Road	Alternative 4 115th Avenue Extension to 117th Avenue- Happy Valley Parkway	Alternative 5 117th Avenue & 115th Avenue Extension and Widening	Alternative 6 Truck Road in River Bed	Alternative 7 Acquisition of 25 Homes Closest to Beardsley Road
Construction	\$3,477,022	\$3,984,893	\$4,228,646	\$4,706,393	\$6,717,909	\$5,568,940	\$5,211,869	\$7,561,829	\$0
Design (10% TO 15%)	\$417,243	\$478,187	\$507,438	\$564,767	\$806,149	\$667,073	\$625,424	\$907,419	\$0
Construction Management	\$417,243	\$478,187	\$507,438	\$564,767	\$806,149	\$667,073	\$625,424	\$907,419	\$0
Right-of-Way	\$880,000	\$670,000	\$2,844,564	\$890,000	\$10,275,000	\$10,825,000	\$10,605,000	\$3,848,000	\$6,500,000
Utility Relocation	\$65,296	\$73,117	\$77,590	\$86,356	\$123,264	\$101,999	\$95,631	\$138,749	\$0
Subtotal	\$5,256,804	\$5,884,384	\$8,185,676	\$6,812,283	\$18,726,471	\$17,820,085	\$17,163,348	\$13,363,416	\$6,500,000
Administration (8% TO 13%)	\$420,544	\$454,751	\$653,254	\$544,983	\$1,496,278	\$1,425,607	\$1,373,068	\$1,069,073	\$520,000
Reserve	\$1,572,652	\$1,700,665	\$2,451,070	\$2,042,734	\$5,623,251	\$5,344,309	\$5,153,584	\$4,007,512	\$1,950,000
Engineers Estimate of Probable Project Cost without Grade Separation(2009)	\$7,250,000	\$7,840,000	\$11,270,000	\$9,400,000	\$25,850,000	\$24,590,000	\$23,690,000	\$18,440,000	\$8,970,000
One-half of Project Cost for Grade Separation at Deer Valley Rd/Williams Dr	\$1,000,000								
Engineers Estimate of Probable Project Cost with Grade Separation(2009)	\$8,250,000								



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<i>Alternative 1 - 112th Avenue Extension</i>				
<i>Item Description</i>	<i>Unit</i>	<i>Quantity</i>	<i>Unit Cost</i>	<i>Total</i>
N. P. D. E. S.	Lump Sum	1	\$8,600.00	\$8,600
Decomposed Granite for SWPPP	Mile	1.61	\$30,000.00	\$48,300
Community Relations	Allowance	1	\$12,000.00	\$12,000
Engineer's Field Office	Lump Sum	1	\$36,000.00	\$36,000
Roadway Excavation	CY	19,000	\$5.90	\$112,100
Borrow Excavation (if anticipated)	CY	0	\$9.50	\$0
Subgrade Preparation	SQ YD	34,944	\$2.60	\$90,854
New Asphalt Concrete Pavement (see Pavement sheet)	SQ YD	34,944	\$24.65	\$861,370
Concrete Curb & Gutter	LF	17,000	\$15.00	\$255,000
Concrete Sidewalk Ramp Std Det 231, Type "A"	EA	4	\$1,850.00	\$7,400
Concrete Sidewalk Std Det 230	SQ YD	9,444	\$39.00	\$368,316
Traffic Signing	LF	8,500	\$0.50	\$4,250
Traffic Signal, Full Intersection	EA	0	\$280,000.00	\$0
Interconnect/Traffic Signals	LF	0	\$14.59	\$0
Traffic Signal, Future "Box-in"	EA	1	\$9,300.00	\$9,300
Scupper	EA	34	\$3,300.00	\$112,200
24" CMP	LF	8,500	\$91.00	\$773,500
18" & 24" RGRCP, Class III	LF	680	\$79.00	\$53,720
30" & 36" RGRCP, Class III	LF	0	\$123.00	\$0
On-Site stormwater detention	Lump Sum	1	\$50,000.00	\$50,000
60" CMP	LF	70	\$220.00	\$15,400
Headwall (MAG details)	EA	2	\$3,250.00	\$6,500
Box Culverts (see Structure sheet)	EA	2	\$120,000.00	\$240,000
8' Masonry Soundwall	LF	1,000	\$200.00	\$200,000
<i>Subtotal Roadway & Structures</i>				\$3,264,810
Removal of Existing Improvements @ 2%	Lump Sum	1	\$65,296.00	\$65,296
Mobilization/Demobilization @ 4%	Lump Sum	1	\$130,592.00	\$130,592
Traffic Control @ 0.5%	Lump Sum	1	\$16,324.00	\$16,324
<i>Subtotal Construction</i>				\$3,477,022
Road Right of Way	Acre	16.0	\$55,000.00	\$880,000
Severance Acquisition	Acre	0	\$10,000.00	\$0
Residential Home Acquisition	EA	0	\$500,000.00	\$0
<i>Subtotal Right-of-Way</i>				\$880,000
Utility Relocation @ 2%	Lump Sum	1	\$65,296.00	\$65,296
<i>Subtotal Utility Relocation</i>				\$65,296



<i>Alternative 2A - Rose Garden Lane Straight Extension</i>				
<i>Item Description</i>	<i>Unit</i>	<i>Quantity</i>	<i>Unit Cost</i>	<i>Total</i>
N. P. D. E. S.	Lump Sum	1	\$8,600.00	\$8,600
Decomposed Granite for SWPPP	Mile	0.85	\$30,000.00	\$25,500
Community Relations	Allowance	1	\$12,000.00	\$12,000
Engineer's Field Office	Lump Sum	1	\$36,000.00	\$36,000
Roadway Excavation	CY	365,000	\$5.90	\$2,153,500
Borrow Excavation (if anticipated)	CY	0	\$9.50	\$0
Subgrade Preparation	SQ YD	18,500	\$2.60	\$48,100
New Asphalt Concrete Pavement (see Pavement sheet)	SQ YD	18,500	\$24.65	\$456,025
Concrete Curb & Gutter	LF	9,000	\$15.00	\$135,000
Concrete Sidewalk Ramp Std Det 231, Type "A"	EA	18	\$1,850.00	\$33,300
Concrete Sidewalk Std Det 230	SQ YD	5,000	\$39.00	\$195,000
Traffic Signing	LF	4,500	\$0.50	\$2,250
Traffic Signal, Full Intersection	EA	0	\$280,000.00	\$0
Interconnect/Traffic Signals	LF	0	\$14.59	\$0
Traffic Signal, Future "Box-in"	EA	0	\$9,300.00	\$0
Scupper	EA	18	\$3,300.00	\$59,400
24" CMP	LF	4,500	\$91.00	\$409,500
18" & 24" RGRCP, Class III	LF	360	\$79.00	\$28,440
30" & 36" RGRCP, Class III	LF	0	\$123.00	\$0
On-Site stormwater detention	Lump Sum	1	\$50,000.00	\$50,000
60" CMP	LF	0	\$220.00	\$0
Headwall (MAG details)	EA	1	\$3,250.00	\$3,250
Box Culverts (see Structure sheet)	EA	0	\$120,000.00	\$0
8' Masonry Soundwall	LF	0	\$200.00	\$0
<i>Subtotal Roadway & Structures</i>				<i>\$3,655,865</i>
Removal of Existing Improvements @ 2%	Lump Sum	1	\$73,117.00	\$73,117
Mobilization/Demobilization @ 4%	Lump Sum	1	\$146,235.00	\$146,235
Traffic Control @ 3%	Lump Sum	1	\$109,676.00	\$109,676
<i>Subtotal Construction</i>				<i>\$3,984,893</i>
Road Right of Way	Acre	10.0	\$55,000.00	\$550,000
Road Right of Way (Existing residential frontage)	Acre	1.2	\$100,000.00	\$120,000
Severance Acquisition	Acre	0	\$10,000.00	\$0
Residential Home Acquisition	EA	0	\$500,000.00	\$0
<i>Subtotal Right-of-Way</i>				<i>\$670,000</i>
Utility Relocation @ 2%	Lump Sum	1	\$73,117.00	\$73,117
<i>Subtotal Utility Relocation</i>				<i>\$73,117</i>



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<i>Alternative 2B - Rose Garden Lane Extension via Harmony Lane</i>				
<i>Item Description</i>	<i>Unit</i>	<i>Quantity</i>	<i>Unit Cost</i>	<i>Total</i>
N.P.D.E.S.	Lump Sum	1	\$8,600.00	\$8,600
Decomposed Granite for SWPPP	Mile	1.64	\$30,000.00	\$49,200
Community Relations	Allowance	1	\$12,000.00	\$12,000
Engineer's Field Office	Lump Sum	1	\$36,000.00	\$36,000
Roadway Excavation	CY	159,000	\$5.90	\$938,100
Borrow Excavation (if anticipated)	CY	0	\$9.50	\$0
Subgrade Preparation	SQ YD	35,561	\$2.60	\$92,459
New Asphalt Concrete Pavement (see Pavement sheet)	SQ YD	35,561	\$24.65	\$876,579
Concrete Curb & Gutter	LF	17,300	\$15.00	\$259,500
Concrete Sidewalk Ramp Std Det 231, Type "A"	EA	4	\$1,850.00	\$7,400
Concrete Sidewalk Std Det 230	SQ YD	9,611	\$39.00	\$374,829
Traffic Signing	LF	8,650	\$0.50	\$4,325
Traffic Signal, Full Intersection	EA	0	\$280,000.00	\$0
Interconnect/Traffic Signals	LF	0	\$14.59	\$0
Traffic Signal, Future "Box-in"	EA	1	\$9,300.00	\$9,300
Scupper	EA	35	\$3,300.00	\$115,500
24" CMP	LF	8,650	\$91.00	\$787,150
18" & 24" RGRCP, Class III	LF	700	\$79.00	\$55,300
30" & 36" RGRCP, Class III	LF	0	\$123.00	\$0
On-Site stormwater detention	Lump Sum	1	\$50,000.00	\$50,000
60" CMP	LF		\$220.00	\$0
Headwall (MAG details)	EA	1	\$3,250.00	\$3,250
Box Culverts (see Structure sheet)	EA		\$120,000.00	\$0
8' Masonry Soundwall	LF	1,000	\$200.00	\$200,000
<i>Subtotal Roadway & Structures</i>				\$3,879,491
Removal of Existing Improvements @ 2%	Lump Sum	1	\$77,590.00	\$77,590
Mobilization/Demobilization @ 4%	Lump Sum	1	\$155,180.00	\$155,180
Traffic Control @ 3%	Lump Sum	1	\$116,385.00	\$116,385
<i>Subtotal Construction</i>				\$4,228,646
Road Right of Way	Acre	21.0	\$55,000.00	\$1,155,000
Road Right of Way (Existing residential frontage)	Acre	1.7	\$100,000.00	\$170,000
503-67-003-U	FCV	1.2	\$261,000.00	\$313,200
503-67-003-Y	FCV	1.2	\$205,303.00	\$246,364
503-67-860-A	FCV	1.2	\$243,000.00	\$291,600
503-67-860-B	FCV	1.2	\$107,000.00	\$128,400
503-67-865	FCV	1.2	\$184,500.00	\$221,400
503-67-862	FCV	1.2	\$178,000.00	\$213,600
Residential Home Relocation	EA	3	\$35,000.00	\$105,000
<i>Subtotal Right-of-Way</i>				\$2,844,564
Utility Relocation @ 2%	Lump Sum	1	\$77,590.00	\$77,590
<i>Subtotal Utility Relocation</i>				\$77,590



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<i>Alternative 2C - Rose Garden Lane Extension to Beardsley</i>				
<i>Item Description</i>	<i>Unit</i>	<i>Quantity</i>	<i>Unit Cost</i>	<i>Total</i>
N. P. D. E. S.	Lump Sum	1	\$8,600.00	\$8,600
Decomposed Granite for SWPPP	Mile	1.25	\$30,000.00	\$37,500
Community Relations	Allowance	1	\$12,000.00	\$12,000
Engineer's Field Office	Lump Sum	1	\$36,000.00	\$36,000
Roadway Excavation	CY	370,000	\$5.90	\$2,183,000
Borrow Excavation (if anticipated)	CY	0	\$9.50	\$0
Subgrade Preparation	SQ YD	27,133	\$2.60	\$70,546
New Asphalt Concrete Pavement (see Pavement sheet)	SQ YD	27,133	\$24.65	\$668,828
Concrete Curb & Gutter	LF	13,200	\$15.00	\$198,000
Concrete Sidewalk Ramp Std Det 231, Type "A"	EA	18	\$1,850.00	\$33,300
Concrete Sidewalk Std Det 230	SQ YD	7,333	\$39.00	\$285,987
Traffic Signing	LF	6,600	\$0.50	\$3,300
Traffic Signal, Full Intersection	EA	0	\$280,000.00	\$0
Interconnect/Traffic Signals	LF	0	\$14.59	\$0
Traffic Signal, Future "Box-in"	EA	0	\$9,300.00	\$0
Scupper	EA	26	\$3,300.00	\$85,800
24" CMP	LF	6,600	\$91.00	\$600,600
18" & 24" RGRCP, Class III	LF	520	\$79.00	\$41,080
30" & 36" RGRCP, Class III	LF	0	\$123.00	\$0
On-Site stormwater detention	Lump Sum	1	\$50,000.00	\$50,000
60" CMP	LF	0	\$220.00	\$0
Headwall (MAG details)	EA	1	\$3,250.00	\$3,250
Box Culverts (see Structure sheet)	EA	0	\$120,000.00	\$0
8' Masonry Soundwall	LF	0	\$200.00	\$0
<i>Subtotal Roadway & Structures</i>				\$4,317,791
Removal of Existing Improvements @ 2%	Lump Sum	1	\$86,356.00	\$86,356
Mobilization/Demobilization @ 4%	Lump Sum	1	\$172,712.00	\$172,712
Traffic Control @ 3%	Lump Sum	1	\$129,534.00	\$129,534
<i>Subtotal Construction</i>				\$4,706,393
Road Right of Way	Acre	14.0	\$55,000.00	\$770,000
Road Right of Way (Existing residential frontage)	Acre	1.2	\$100,000.00	\$120,000
Severance Acquisition	Acre	0	\$10,000.00	\$0
Residential Home Acquisition	EA	0	\$260,000.00	\$0
<i>Subtotal Right-of-Way</i>				\$890,000
Utility Relocation @ 2%	Lump Sum	1	\$86,356.00	\$86,356
<i>Subtotal Utility Relocation</i>				\$86,356



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<i>Alternative 3 - 115th Avenue Extension to 107th Avenue</i>				
<i>Item Description</i>	<i>Unit</i>	<i>Quantity</i>	<i>Unit Cost</i>	<i>Total</i>
N. P.D.E.S.	Lump Sum	1	\$8,600.00	\$8,600
Decomposed Granite for SWPPP	Mile	2.12	\$30,000.00	\$63,600
Community Relations	Allowance	1	\$12,000.00	\$12,000
Engineer's Field Office	Lump Sum	1	\$36,000.00	\$36,000
Roadway Excavation	CY	62,000	\$5.90	\$365,800
Borrow Excavation (if anticipated)	CY	88,889	\$9.50	\$844,444
Subgrade Preparation	SQ YD	87,111	\$2.60	\$226,489
New Asphalt Concrete Pavement (see Pavement sheet)	SQ YD	87,111	\$24.65	\$2,147,286
Concrete Curb & Gutter	LF	22,400	\$15.00	\$336,000
Concrete Sidewalk Ramp Std Det 231, Type "A"	EA	8	\$1,850.00	\$14,800
Concrete Sidewalk Std Det 230	SQ YD	12,444	\$39.00	\$485,316
Traffic Signing & Marking	LF	11,200	\$4.07	\$45,584
Traffic Signal, Full Intersection	EA	0	\$280,000.00	\$0
Interconnect/Traffic Signals	LF	0	\$14.59	\$0
Traffic Signal, Future "Box-in"	EA	1	\$9,300.00	\$9,300
Scupper	EA	45	\$3,300.00	\$148,500
24" CMP	LF	0	\$91.00	\$0
18" & 24" RGRCP, Class III	LF	0	\$79.00	\$0
30" & 36" RGRCP, Class III	LF	0	\$123.00	\$0
On-Site stormwater detention	Lump Sum	1	\$50,000.00	\$50,000
60" CMP	LF	70	\$220.00	\$15,400
Headwall (MAG details)	EA	2	\$3,250.00	\$6,500
River Crossing Erosion Protection	Lump Sum	1	\$1,000,000.00	\$1,000,000
Box Culverts (see Structure sheet)	Lump Sum	1	\$347,600.00	\$347,600
8' Masonry Soundwall	LF	0	\$200.00	\$0
<i>Subtotal Roadway & Structures</i>				\$6,163,219
Removal of Existing Improvements @ 2%	Lump Sum	1	\$123,264.00	\$123,264
Mobilization/Demobilization @ 4%	Lump Sum	1	\$246,529.00	\$246,529
Traffic Control @ 3%	Lump Sum	1	\$184,897.00	\$184,897
<i>Subtotal Construction</i>				\$6,717,909
Road Right of Way from Mining Areas	Acre	12	\$760,000.00	\$9,120,000
Road Right of Way from Undeveloped Areas		21	\$55,000.00	\$1,155,000
Severance Acquisition	Acre	0	\$10,000.00	\$0
Residential Home Acquisition	EA	0	\$260,000.00	\$0
<i>Subtotal Right-of-Way</i>				\$10,275,000
Utility Relocation @ 2%	Lump Sum	1	\$123,264.00	\$123,264
<i>Subtotal Utility Relocation</i>				\$123,264



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<i>Alternative 4 - 115th Avenue Extension to 117th Avenue/Happy Valley Parkway</i>				
<i>Item Description</i>	<i>Unit</i>	<i>Quantity</i>	<i>Unit Cost</i>	<i>Total</i>
N.P.D.E.S.	Lump Sum	1	\$8,600.00	\$8,600
Decomposed Granite for SWPPP	Mile	2.75	\$30,000.00	\$82,500
Community Relations	Allowance	1	\$12,000.00	\$12,000
Engineer's Field Office	Lump Sum	1	\$36,000.00	\$36,000
Roadway Excavation	CY	81,000	\$5.90	\$477,900
Borrow Excavation (if anticipated)	CY	0	\$9.50	\$0
Subgrade Preparation	SQ YD	112,778	\$2.60	\$293,223
New Asphalt Concrete Pavement (see Pavement sheet)	SQ YD	112,778	\$24.65	\$2,779,978
Concrete Curb & Gutter	LF	29,000	\$15.00	\$435,000
Concrete Sidewalk Ramp Std Det 231, Type "A"	EA	8	\$1,850.00	\$14,800
Concrete Sidewalk Std Det 230	SQ YD	16,111	\$39.00	\$628,329
Traffic Signing & Marking	LF	14,500	\$4.07	\$59,015
Traffic Signal, Full Intersection	EA	0	\$280,000.00	\$0
Interconnect/Traffic Signals	LF	0	\$14.59	\$0
Traffic Signal, Future "Box-in"	EA	1	\$9,300.00	\$9,300
Scupper	EA	58	\$3,300.00	\$191,400
24" CMP	LF	0	\$91.00	\$0
18" & 24" RGRCP, Class III	LF	0	\$79.00	\$0
30" & 36" RGRCP, Class III	LF	0	\$123.00	\$0
On-Site stormwater detention	Lump Sum	1	\$50,000.00	\$50,000
60" CMP	LF	70	\$220.00	\$15,400
Headwall (MAG details)	EA	2	\$3,250.00	\$6,500
River Crossing Erosion Protection	Lump Sum	0	\$1,000,000.00	\$0
Box Culverts (see Structure sheet)	Lump Sum	0	\$347,600.00	\$0
8' Masonry Soundwall	LF	0	\$200.00	\$0
<i>Subtotal Roadway & Structures</i>				\$5,099,945
Removal of Existing Improvements @ 2%	Lump Sum	1	\$101,999.00	\$101,999
Mobilization/Demobilization @ 4%	Lump Sum	1	\$203,998.00	\$203,998
Traffic Control @ 3%	Lump Sum	1	\$152,998.00	\$152,998
<i>Subtotal Construction</i>				\$5,558,940
Road Right of Way from Mining Areas	Acre	12	\$760,000.00	\$9,120,000
Road Right of Way from Undeveloped Areas		31	\$55,000.00	\$1,705,000
Severance Acquisition	Acre	0	\$10,000.00	\$0
Residential Home Acquisition	EA	0	\$260,000.00	\$0
<i>Subtotal Right-of-Way</i>				\$10,825,000
Utility Relocation @ 2%	Lump Sum	1	\$101,999.00	\$101,999
<i>Subtotal Utility Relocation</i>				\$101,999



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<i>Alternative 5 - 115th Avenue and 117th Avenue Extension and Widening from Rose Garden Lane to Happy Valley Parkway</i>				
<i>Item Description</i>	<i>Unit</i>	<i>Quantity</i>	<i>Unit Cost</i>	<i>Total</i>
N.P.D.E.S.	Lump Sum	1	\$8,600.00	\$8,600
Decomposed Granite for SWPPP	Mile	2.95	\$30,000.00	\$88,500
Community Relations	Allowance	1	\$12,000.00	\$12,000
Engineer's Field Office	Lump Sum	1	\$36,000.00	\$36,000
Roadway Excavation	CY	72,000	\$5.90	\$424,800
Borrow Excavation (if anticipated)	CY	0	\$9.50	\$0
Subgrade Preparation	SQ YD	100,722	\$2.60	\$261,877
New Asphalt Concrete Pavement (see Pavement sheet)	SQ YD	100,722	\$24.65	\$2,482,797
Asphalt Rubber Overlay (see Pavement sheet)	SQ YD	20,611	\$8.50	\$175,194
Concrete Curb & Gutter	LF	25,900	\$15.00	\$388,500
Concrete Sidewalk Ramp Std Det 231, Type "A"	EA	8	\$1,850.00	\$14,800
Concrete Sidewalk Std Det 230	SQ YD	14,389	\$39.00	\$561,171
Traffic Signing & Marking	LF	15,600	\$4.07	\$63,492
Traffic Signal, Full Intersection	EA	0	\$280,000.00	\$0
Interconnect/Traffic Signals	LF	0	\$14.59	\$0
Traffic Signal, Future "Box-in"	EA	1	\$9,300.00	\$9,300
Scupper	EA	52	\$3,300.00	\$171,600
24" CMP	LF	0	\$91.00	\$0
18" & 24" RGRCP, Class III	LF	0	\$79.00	\$0
30" & 36" RGRCP, Class III	LF	0	\$123.00	\$0
On-Site stormwater detention	Lump Sum	1	\$50,000.00	\$50,000
60" CMP	LF	120	\$220.00	\$26,400
Headwall (MAG details)	EA	2	\$3,250.00	\$6,500
River Crossing Erosion Protection	Lump Sum	0	\$1,000,000.00	\$0
Box Culverts (see Structure sheet)	Lump Sum	0	\$347,600.00	\$0
8' Masonry Soundwall	LF	0	\$200.00	\$0
<i>Subtotal Roadway & Structures</i>				\$4,781,531
Removal of Existing Improvements @ 2%	Lump Sum	1	\$95,631.00	\$95,631
Mobilization/Demobilization @ 4%	Lump Sum	1	\$191,261.00	\$191,261
Traffic Control @ 3%	Lump Sum	1	\$143,446.00	\$143,446
<i>Subtotal Construction</i>				\$5,211,869
Road Right of Way from Mining Areas	Acre	12	\$760,000.00	\$9,120,000
Road Right of Way from Undeveloped Areas		27	\$55,000.00	\$1,485,000
Severance Acquisition	Acre	0	\$10,000.00	\$0
Residential Home Acquisition	EA	0	\$260,000.00	\$0
<i>Subtotal Right-of-Way</i>				\$10,605,000
Utility Relocation @ 2%	Lump Sum	1	\$95,631.00	\$95,631
<i>Subtotal Utility Relocation</i>				\$95,631



<i>Alternative 6 - Minor Collector in Riverbed</i>				
<i>Item Description</i>	<i>Unit</i>	<i>Quantity</i>	<i>Unit Cost</i>	<i>Total</i>
N. P.D.E.S.	Lump Sum	1	\$8,600.00	\$8,600
Decomposed Granite for SWPPP	Mile	2.77	\$30,000.00	\$83,100
Community Relations	Allowance	1	\$12,000.00	\$12,000
Engineer's Field Office	Lump Sum	1	\$36,000.00	\$36,000
Roadway Excavation	CY	32,000	\$5.90	\$188,800
Borrow Excavation (if anticipated)	CY	64,000	\$9.50	\$608,000
Subgrade Preparation	SQ YD	60,022	\$2.60	\$156,057
New Asphalt Concrete Pavement (see Pavement sheet)	SQ YD	60,022	\$24.65	\$1,479,542
Concrete Curb & Gutter	LF	29,200	\$15.00	\$438,000
Concrete Sidewalk Ramp Std Det 231, Type "A"	EA	8	\$1,850.00	\$14,800
Concrete Sidewalk Std Det 230	SQ YD	16,222	\$39.00	\$632,658
Traffic Signing & Marking	LF	14,600	\$0.50	\$7,300
Traffic Signal, Full Intersection	EA	0	\$280,000.00	\$0
Interconnect/Traffic Signals	LF	0	\$14.59	\$0
Traffic Signal, Future "Box-in"	EA	1	\$9,300.00	\$9,300
Scupper	EA	58	\$3,300.00	\$191,400
24" CMP	LF	0	\$91.00	\$0
18" & 24" RGRCP, Class III	LF	0	\$79.00	\$0
30" & 36" RGRCP, Class III	LF	0	\$123.00	\$0
On-Site stormwater detention	Lump Sum	1	\$50,000.00	\$50,000
60" CMP	LF	70	\$220.00	\$15,400
Headwall (MAG details)	EA	2	\$3,250.00	\$6,500
River Crossing Erosion Protection	Lump Sum	1	\$3,000,000.00	\$3,000,000
Box Culverts (see Structure sheet)	Lump Sum	0	\$347,600.00	\$0
8' Masonry Soundwall	LF	0	\$200.00	\$0
<i>Subtotal Roadway & Structures</i>				\$6,937,458
Removal of Existing Improvements @ 2%	Lump Sum	1	\$138,749.00	\$138,749
Mobilization/Demobilization @ 4%	Lump Sum	1	\$277,498.00	\$277,498
Traffic Control @ 3%	Lump Sum	1	\$208,124.00	\$208,124
<i>Subtotal Construction</i>				\$7,561,829
Road Right of Way from Mining Areas	Acre	17	\$194,000.00	\$3,298,000
Road Right of Way from Undeveloped Areas		10	\$55,000.00	\$550,000
Severance Acquisition	Acre	0	\$10,000.00	\$0
Residential Home Acquisition	EA	0	\$260,000.00	\$0
<i>Subtotal Right-of-Way</i>				\$3,848,000
Utility Relocation @ 2%	Lump Sum	1	\$138,749.00	\$138,749
<i>Subtotal Utility Relocation</i>				\$138,749



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<i>Alternative 7 - Acquisition of 25 Homes Closest to Beardsley Road</i>				
<i>Item Description</i>	<i>Unit</i>	<i>Quantity</i>	<i>Unit Cost</i>	<i>Total</i>
N. P. D. E. S.	Lump Sum		\$8,600.00	\$0
Decomposed Granite for SWPPP	Mile		\$30,000.00	\$0
Community Relations	Allowance		\$12,000.00	\$0
Engineer's Field Office	Lump Sum		\$36,000.00	\$0
Roadway Excavation	CY		\$5.90	\$0
Borrow Excavation (if anticipated)	CY		\$9.50	\$0
Subgrade Preparation	SQ YD		\$2.60	\$0
New Asphalt Concrete Pavement (see Pavement sheet)	SQ YD		\$24.65	\$0
Concrete Curb & Gutter	LF		\$15.00	\$0
Concrete Sidewalk Ramp Std Det 231, Type "A"	EA		\$1,850.00	\$0
Concrete Sidewalk Std Det 230	SQ YD		\$39.00	\$0
Traffic Signing & Marking	LF		\$0.50	\$0
Traffic Signal, Full Intersection	EA		\$280,000.00	\$0
Interconnect/Traffic Signals	LF		\$14.59	\$0
Traffic Signal, Future "Box-in"	EA		\$9,300.00	\$0
Scupper	EA		\$3,300.00	\$0
24" CMP	LF		\$91.00	\$0
18" & 24" RGRCP, Class III	LF		\$79.00	\$0
30" & 36" RGRCP, Class III	LF		\$123.00	\$0
On-Site stormwater detention	Lump Sum		\$50,000.00	\$0
60" CMP	LF		\$220.00	\$0
Headwall (MAG details)	EA		\$3,250.00	\$0
River Crossing Erosion Protection	Lump Sum		\$3,000,000.00	\$0
Box Culverts (see Structure sheet)	Lump Sum		\$347,600.00	\$0
8' Masonry Soundwall	LF		\$200.00	\$0
<i>Subtotal Roadway & Structures</i>				\$0
Removal of Existing Improvements @ 2%	Lump Sum	1	\$0.00	\$0
Mobilization/Demobilization @ 4%	Lump Sum	1	\$0.00	\$0
Traffic Control @ 3%	Lump Sum	1	\$0.00	\$0
<i>Subtotal Construction</i>				\$0
Road Right of Way from Mining Areas	Acre	0	\$194,000.00	\$0
Road Right of Way from Undeveloped Areas		0	\$55,000.00	\$0
Severance Acquisition	Acre	0	\$10,000.00	\$0
Residential Home Acquisition	EA	25	\$260,000.00	\$6,500,000
<i>Subtotal Right-of-Way</i>				\$6,500,000
Utility Relocation @ 2%	Lump Sum	1	\$0.00	\$0
<i>Subtotal Utility Relocation</i>				\$0



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APPENDIX A
PUBLIC INVOLVEMENT MEETING RESULTS



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MCDOT *RightRoads* Program
Summary of Public Involvement Meeting

Agua Fria Alternative Truck Route Study
Alternatives Analysis Phase

PRELIMINARY DRAFT REPORT

Meeting Date: August 12, 2008

Meeting Site: Unitarian Universalist Church
17540 N. Avenue of the Arts, Surprise, AZ 85374

Public Meeting

Participants: Sami Ayoub, Project Manager
Bob Woodring, MCDOT Planning
Roger Ball, MCDOT Planning
Roberta Crowe, MCDOT Planning
Mike Pavlina, MCDOT Planning
Hugh Davidson, MCDOT Planning
James Mischler, Parsons Brinckerhoff
Doug LaMont, Parsons Brinckerhoff
Gary Sun, Parsons Brinckerhoff
Jamie Winterstein, Parsons Brinckerhoff
Dave Moody, City of Peoria
Dan Nissen, City of Peoria
Karl Zook, City of Peoria
Randy Overmyer, City of Surprise
Dr. Robert Maki, City of Surprise

Public Meeting Purpose:

Public Involvement - The Maricopa County Department of Transportation (MCDOT) *RightRoads* Program, in coordination with the City of Peoria and the City of Surprise, conducted a joint public open house meeting to gather public comments and input regarding the **Deer Valley Road Design Concept Report Update/Environmental Assessment** (El Mirage Road to Lake Pleasant Parkway), including a potential bridged crossing of the **Agua Fria River and the Agua Fria Alternative Truck Route Study** examining alternatives for future north/south Truck Route Designations for trucks traveling to and from Agua Fria River aggregate mining operations in the area between Rose Garden Lane and Happy Valley Road. The Study includes the area bounded by



Happy Valley Road (north), 107th Avenue (east), Rose Garden Lane (south), and El Mirage Road (west).

Public participation and multi-agency involvement works to preserve the rights of adjacent property owners, aids in the resolution of conflicting agency requirements and ensures the development of an agreed upon plan that addresses future traffic conditions and travel demand. MCDOT, the City of Peoria, the City of Surprise, Arizona Rock Products Association, area businesses and residents are all major stakeholders in this study.

(A combined public meeting was held to facilitate a comprehensive public understanding of the two separate but related projects. Public comment regarding the Deer Valley Road Design Concept Report Update is documented in a separate report.)

Project Background and Description:

Though mining operations have been ongoing in the Agua Fria River bed for approximately 50 years, with increased area growth and residential development, the noise and air quality impacts associated with the trucking operations have become a concern to nearby residents. Responding to community requests, the City of Peoria has recently designated certain roadways within Peoria municipal boundaries as truck routes in an attempt to limit the negative impacts of heavy truck traffic on residents of their community. A portion of the current designated truck route, however, passes within heavily populated areas, especially along Beardsley Road adjacent to the Ventana Lakes community and residents have provided documentation to the City of Peoria regarding health and welfare concerns resulting from trucks adjacent to residential communities.

This study expands upon the July 2007 MCDOT alternative truck route study and examines the previous alternatives along with additional alternatives that were put forward for further consideration after the prior study was completed.

STUDY PURPOSE

The purpose of this study is to identify and evaluate alternative truck routes that would further reduce impacts to the residential communities in the area. The ultimate goal is to identify a viable alternative truck route that allows aggregates mined from the Agua Fria River bed to get to market with minimal disruption of quality of life for area residents and at reasonable cost to the local communities and system users.

EVALUATION OF TRUCK ROUTE ALTERNATIVES

Along with a “no build” alternative for comparison analysis, the following Truck Route Designation Alternatives were evaluated in the 2007 MCDOT study:



1. 112th Avenue Extension from Rose Garden Lane north to 107th Avenue near the Pinnacle Peak Road alignment.
2. Rose Garden Lane Extension from 119th Avenue to El Mirage Road, including improvements to existing Rose Garden Lane from 112th Avenue to 119th Avenue, retaining the at-grade crossing of the Agua Fria River.
3. 115th Avenue Extension to the Deer Valley Road alignment, heading a northeasterly direction to 107th Avenue near the Pinnacle Peak Road alignment with an at-grade crossing of the Agua Fria River.

In addition to the alternatives described above, this current study is examining the following additional options:

4. 115th Avenue Extension from Rose Garden Lane to Happy Valley Road.
5. 117th Avenue Extension from Rose Garden Lane to Williams Drive, with necessary improvements to existing 117th Avenue from Williams Drive to Happy Valley Road.
6. New "Truck-Only" road constructed in the Agua Fria riverbed from Rose Garden Lane to Happy Valley Road.

STUDY SCHEDULE

Study Kick-off	May 2008
Stakeholder Advisory Meeting	June 2008
Data Collection	June 2008
Alternatives Analysis	July 2008
Alternatives Analysis Public Meeting	August 12, 2008

NEXT STEPS

Develop Recommendations & Draft Final Report	August 2008
Final Report	November 2008



Public Comment

On August 12, 2008 approximately 175 people attended a joint public open house meeting to discuss and review conceptual alternatives for the Deer Valley Road Design Concept Report Update and Environmental Assessment and the Agua Fria Alternative Truck Route Study.

The meeting was conducted in an “open house” format providing a free, open and accurate exchange of information between area residents with specific issues and questions and the project team.

Graphics, aerials and display exhibits presented project alternatives and study information. Study Fact Sheets and Comment Sheets were distributed to all those in attendance. The following information is representative of written comments received by MCDOT and discussions that the project team had with meeting attendees:

(A combined public meeting was held to facilitate a comprehensive public understanding of the two separate but related projects. Public comment regarding the Deer Valley Road DCR Update is documented in a separate report.)

Alternative-specific comments:

112th Ave Extension from Rose Garden Lane north to 107th Avenue

- This truck route makes the most sense to me.
- Good impact.
- This to me is by far my favorite route. It's the least expensive and has the lowest negative impact. The most reduction of traffic on Beardsley.
- I am against this. The road is too narrow. Children & horses use this area. The speed limit is 25 mph if the trucks are loaded, they will have to be accelerating to make the hill. To come down engine noise will be extreme. The hill is west of 119th Ave extending Rose Garden. It also poses safety health hazards.
- I object to this plan, for many reasons.
- Very opposed. We live near Rose Garden and 109th.
- No- Doesn't cover the north mining region.
- Least favorite-too close to Zuni Hills School- will experience same pollution/noise issues as current.
- This takes most of the traffic off Beardsley. As well as costs less than the others. This is a winner! Not adjacent to homes.
- Sounds like the best alternative, given the cost and low impacts to surrounding areas and mining operations.
- This seems like a possibility, but near major housing area.
- I like this one the best! Keeps trucks off Happy Valley and out of cross river.
- Just pushes same problem further north, Could be close to elementary sch. Not enough improvement for cost.



2.) Rose Garden Lane Extension from 119th Avenue to El Mirage Road

- Poor choice. High impact!
- Of all of the proposed Deer Valley and Agua Fria road proposals. As a resident of Corte Bella I am extremely concerned about the increase in constant noise that will no doubt come with the new El Mirage super highway. It is not only the noise of passenger cars but the horns and lights and trucks that will be using the new highway and any of the proposed Deer Valley routes.
- This area is a rural county community bordered on the North by "Harmony Lane" and to the South by "Sun Valley Lane". To the West it is bordered by 119th Avenue, and to the East it is bordered by 115th Ave.
- I want to express my personal concerns as well as the concerns of others in this community, we are opposed to any truck route that would come thru the above mentioned area. We also have a resident that gives horse back riding lessons to battered and abused children, and on occasion takes them on trail rides thru the desert areas. A truck route would be a very dangerous situation for our neighborhood and the safety of the children. We also have many residents that have livestock and frequently are horseback riding in this community, another very dangerous situation. We have all moved into this area because we want this life style, and imposing a truck route thru this community would destroy (Our life style) and create a dangerous environment for all of us. We do not have any INFRA STRUCTURE on Rose Garden Lane, nor is Rose Garden Lane wide enough to create a INFA STRUCTURE. Not to mention this community would not support Infrastructure anyway. We also have many senior citizens with serious health issues and the dust, traffic, and disturbance in our community could become a very serious if not fatal issue.
- Not acceptable.
- Would have the most noise impact in Corte Bella.
- No- no real improvement.
- No-cuts thru Coyote Lakes and doesn't even connect to N-S river mining locations.
- Won't work!
- Very viable option-direct route to the 303.
- No! This would not be fair to the homeowners. Also, this does not improve the Beardsley issue.
- Unacceptable.
- We don't want Rose Garden extended. This street has several homes and the impact would be significant on quality of life and property values in Ventura Lake.
- Just shifts problem form Beardsley to Rose Garden La. Not worth the investment.
- Unacceptable! Moves traffic from one residential area to another residential area. Corte Bella & Sun City West are retirement communities with many elderly drivers who do not handle heavy traffic well. This poses a safety issue to say nothing of a high noise issue. (retired people are home a lot) Putting in a new road for residents then tearing it up with heavy trucks makes no sense.



3.) 115th Avenue Extension to the Deer Valley Road Alignment

- N/C.
- Not acceptable.
- Good- 4 lane roadway all traffic.
- NO.
- No- Same as 1.
- Yes.
- Yes.
- Good.
- Not feasible.
- Least favorite- too close to Zuni Hills School will experience same pollution/noise issues as current.
- This looks ok but doesn't take much traffic off Beardsley.
- This might be a possibility, especially Pinnacle Peak is included in this study.
- No.
- No.
- Not if it adds trucks to cross river.
- #3 ok.

4.) 115th Avenue Extension from Rose Garden Lane to Happy Valley Road

- Second choice for selection.
- Advantage is compatibility with Peoria general plan & 4 lanes for future traffic. Impact if new homes built near 115th Ave & W. Harmony Ln.
- From the looks of the map, this seems to be a good route.
- Not acceptable.
- My choice.
- Good-Best.
- NO.
- 2nd Choice. Ok as a alternative or 2nd choice.
- Directs the traffic north farthest away from populated areas to the east and west. Doesn't need a bridge.
- 2nd choice. Keeps flow of trucks away from housing and can flow to rte 303.
- Yes- This one is the best! It accesses the whole length of the river mining without impacting housing developments.
- No.
- As far as I can see this route looks like a straight shot to Happy Valley Road.
- No.
- No.
- 2nd choice. Not great but might be ok.
- I find this to be the best route.



- Ideal option-least impact to residents and not close to schools.
- This would still be very close to all the homes on 117th & in Cross River.
- This would be our choice. Doesn't impact residential areas.
- This is a possibility.
- No.
- No.
- I am not ok w/ this but prefer you come up w/ other roads besides Happy Valley and 115th Ave.
- Could end up being alternate traffic from Union Hill Rd. North to 303. Would have mixed traffic.
- #1 Good choice.

5.) 117th Avenue Extension Rose Garden lane to Williams Drive

- Too Expensive.
- Not acceptable.
- Ok.
- NO.
- No-Affects lots of housing and doesn't connect the whole N-S river mining region.
- No.
- Not feasible.
- No! No! The cost is too high! Also, sends trucks right next to homes! Isn't that why we are trying to get traffic off Beardsley?
- Sounds too expensive.
- Seems rather expensive when compared to other options.
- No-too close to residential.
- No.
- I guess this one would be ok but it still makes trucks drive on 115th which is the main drag for all cross river residents.
- Merely changes residential impact from Beardsley to development north.
- #6 Worse choice! Too many homes along 117th Ave.

6.) New "Truck-Only" road

- The Agua Fria Truck route should strongly consider plan number 6 creating a "trucks only" road that goes north only out to Happy Valley. Or if another route is better for the companies involved perhaps they would be willing to build sound walls along the entire route their trucks might take.
- This appears to be the optimal approach with minimal impact to communities & traffic flow. It also allows channel enhancement by the mining interiors there, digging & using the rocks left for channelization of the river. Reasonable cost.
- Alternative 6 to Alternative 3 to 107th Ave.
- Less invasive -does not effect residential communities.
- Yes- only option for homeowners.



- Less invasive- and probably the best alternative and most practical.
- Keeps trucks off neighborhood streets.
- Acceptable.
- This is the best route to eliminate noise for Corte Bella and keep the dust from overwhelming our neighborhood.
- 6 to 3 to 107th.
- I like the truck only route.
- Good, but what about the traffic?
- This makes the most sense but doesn't take into account the "green built" supposed to be planned for the river bed thru to Lake Pleasant.
- 1st choice. I agree that this is the most effective route.
- 1st choice. Keeps flow of trucks away from existing houses.
- Yes-this is about as good as 4. It covers all the mining region and doesn't affect any housing.
- Yes.
- Yes.
- Yes.
- 1st choice. This is the best and most effective route impacting existing communities.
- Another ideal solution-would get the trucks and cars separated until out of the area.
- This could be good but why trucks only? Doesn't show any traffic off Beardsley.
- Perhaps- as long as they are obliged to use it!
- No.
- No.
- Not if it feeds into Happy Valley.
- Preferred alternative. Problem would be to make trucks use this route and not those already existing.
- #2 Good choice.

Additional Comments

- Please consider the homeowners who pay taxes.
- 112th between Beardsley and Rose Garden to noisy move into river bed or put up sound proof walls.
- This truck route needs to be a high priority.
- Why was no stakeholder coordination held for the Corte Bella Community?
- Where is your master plan? Move the mines further up river people with asthma and breathing problems have a very bad time with the foul air.
- Please keep trucks off El Mirage-quiet communities exist along El Mirage!
- We are strongly against option 5. Thank you
- No.



- Please give the millions (set aside to build the roads) to the Agua Fria River aggregate mining operations and truckers to use in moving the mining site for away from the residential communities out into the desert. Valley fever and other respiratory diseases are increasing because of these operations and it is time to solve these major problems. More roads is not the answer.
- ANY new road project or expansion should not be done without including sound walls.
- A truck route thru our residential area is not acceptable.
- This area is Zoned R43, which also supports livestock and rural community. The width of Rose Garden La. And the location of the Utility services specifically the underground water lines. The underground water lines servicing this community were installed in 1973. They cross Rose Garden La. in 3 or more places. These water lines are only about 2" deep and are PVC which has been here since 1973. One is located 117th Ave, another at 118th Ave, another at 11838 W. Rose Garden La. and will not support heavy loaded trucks and heavy traffic. Health Issues: This area is considered as a red zone on the national health study with high pollution particles of 80%. We are the highest in the nation for respiratory illness in this area, for lung cancer, valley fever and other lung diseases. This community is in a low lying area and we retain dust and carbon. It hangs in the air and very notable in the mornings, which is produced from trucks and the mining operations surrounding this area. This alternative route is not acceptable. This is a rural area, most residents have livestock and pets, which is also suffering from Lung Disease and dying from Valley Fever per lab results from our veterinarians. In addition, to the health of our livestock there is also a safety factor involved in this issue. A truck route is not conducive with this life style and could result in killing of the livestock by a big truck, and/or a horseback rider. Traffic Noise: Trucks will create an excessive amount of noise and due to the proximity of the homes along Rose Garden and the width of Rose Garden, the homes sit close to Rose Garden and they can't avoid the noise. Trucks will need Jake brakes also, which is very disturbing to the residents and the animals and could cause a serious accident with a horse and rider. This truck route would devaluate my property and add to our existing health issues. I would support the Agua Fria Alternative #4 study, which is 115th Ave Extension from Rose Garden to Happy Valley Rd.

Comments received by project team members in discussions with meeting attendees:

- If El Mirage is a Road of Regional significance per MAG and Peoria, El Mirage and MC, how can we say no trucks?
- There was a missing alternative based on timing: alt 1 to Deer Valley, then across deer valley to 117th.
- Based on resolving #1, then 2, 4, or 5 can work.
- Alternative 6 – trucks only route was preferred by most folks.



- Concern raised about tax dollars being used for truck only route – why don't mining operators pay for a new road?
- Concern by Ventana Lake residents regarding Beardsley Road – trucks going to south and east.
- The majority of people who identified their place of residence were from the Corte Bella development. Their primary concerns included the proximity of El Mirage Road (under construction) to their development, and the potential for increases in truck and auto traffic that might result from either a truck route alternative or an east-west roadway from the Deer Valley DCR project.
- A representative of the Ventana Lakes HOA expressed a strong preference for Alternative 1.
- Several attendees (more than 3) expressed concern with the proximity of Alternative 1 to Zuni Hills School.
- Two separate residents living on Rose Garden Lane expressed a desire to continue to prohibit trucks from traveling on Rose Garden Lane.
- From among the attendees that shared their preference for an alternative, the front runners were Alternatives 1, 3, and 4. Two people expressed a preference for Alternative 6. One person suggested combining the south end of 4 with the north end of 5. One person suggested combining the south end of 1 to the middle of 6 to the north end of 3. No one indicated a preference for the entirety of Alternative 5.
- A truck owner/operator who works in the area expressed a desire for a connection to the new El Mirage Road, either as Alternative 2, the proposed Deer Valley Road crossing, or any other way that eliminates his need to go all the way north to Happy Valley Road to then come back south on SR 303L.
- A representative of the City of Peoria indicated that it was his understanding that Alternatives 1 and 3 were eliminated a year ago, and questioned their continued presence in the study.
- Two individuals expressed their preference for a designated truck route in the river bottom.
- A truck owner/operator who works in the area expressed a desire for a connection to the new El Mirage Road, either as Alternative 2, the proposed Deer Valley Road crossing, or any other way that eliminates his need to go all the way north to Happy Valley Road then come back south on SR 303L.
- Alternative 4 – Rose Garden Lane alignment was least favorable. Several noted the residential nature of the street east of the river, current efforts to keep trucks off the road and continued organized efforts to maintain Rose Garden Lane traffic as is.
- One individual questioned MCDOT's ability to prohibit trucks from any of the new east-west alternatives.



- I received one alignment proposal for truck that includes an interchange with SR 303L in the vicinity of Hatfield with a transition to Pinnacle Peak to cross the Agua Fria.

Outreach Methods

The following outreach methods were used to inform and notify the general public and impacted residents about the study and opportunities for input:

- Media releases
- Newspaper articles
- Display advertisements in local and regional publications
- MCDOT website
- Direct mail flyers to all property owners within one-half mile radius of the Deer Valley DCR Update project

Future Activities

The results of traffic analyses and analysis of public input will be used to determine a preferred alternative for advancement and continued development. Gaining consensus among the agencies and public is critical to the success of the study and implementation of its recommendations to lessen the impacts of truck traffic from Agua Fria River aggregate mining operations on area residents.

Funding for construction of an alternative truck route has not yet been programmed by the Cities of Peoria and Surprise or by the Maricopa County Department of Transportation. It is anticipated that the results of this inter-agency study may show a preferred alternative that can be used to support future funding commitments by the study partners. The findings and recommendations of the Agua Fria Alternative Truck Route Study will be presented during the Deer Valley DCR Update Findings and Recommendations public meeting currently scheduled to be conducted in February 2009.

For more information about the study, contact Sami Ayoub, MCDOT Project Manager, at 602/506-4662 or Roberta Crowe, MCDOT Public Information Officer, at 602/506-8003.