

PAVEMENT EVALUATION
CALLE OSAY BO-OH
PASCUA YAQUI INDIAN RESERVATION
PIMA COUNTY, ARIZONA

PROJECT # 110048



Prepared by:
ATEK Engineering Consultants, LLC
111 South Weber Drive, Suite 1
Chandler, Arizona 85226



Expires 9/30/2015

July 15, 2013

July 15, 2013
ATEK Project #110048

Kimley-Horn and Associates, Inc.
333 East Wetmore Road, Suite 280
Tucson, AZ 85705

Attention: Mr. Rick Solis, P.E., Project Manager

Re: Pavement Evaluation
Calle Osay Bo-Oh
Pascua Yaqui Indian Reservation
Pima County, Arizona

Dear Mr. Solis:

ATEK Engineering Consultants, LLC is pleased to present the attached Pavement Evaluation Report for Calle Osay Bo-Oh located in the Pascua Yaqui Indian Reservation in Pima County, Arizona. The purpose of our study was to visually evaluate the surface condition of the pavements along the subject roadway, document the extent and types of apparent pavement distress conditions, and provide the results of our evaluation with general recommendations for rehabilitation.

Based on our pavement evaluation the required maintenance would be considered major requiring removal and replacement of the existing pavement section or Full Depth Reclamation of the existing asphaltic concrete and base and application of an overlay.

We appreciate the opportunity of providing our services for this project. If you have questions regarding this report or if we may be of further assistance, please contact the undersigned.

Sincerely,
ATEK Engineering Consultants, LLC



Armando Ortega, P.E.
Principal Geotechnical Engineer

Expires 9/30/2015

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APPENDIX A - Project Plans

APPENDIX B - Pavement Evaluation and Pictures



Expires 9/30/2015

1. INTRODUCTION

This report presents the results of a pavement evaluation performed for the existing Calle Osay Bo-Oh roadway between Calle Torim and Calle Tetakusim in the Pascua Yaqui Indian Reservation. The location of the project and project plans are presented in **Appendix A**.

The purpose of our study was to visually evaluate the surface condition of the pavements along the subject roadway, document the extent and types of apparent pavement distress conditions, and provide the results of our evaluation with general recommendations for rehabilitation. The report includes visual reconnaissance, field mapping of the pavement surface conditions, photos of the pavement conditions, and engineering analyses.

1.1. Scope of Services

1. A field reconnaissance was conducted on February 22, 2013 and June 18, 2013 which consisted of visual observation of the pavement surface conditions, mapping of the general distressed areas and associated distress types along the roadway, and photo documentation. In addition a pothole was excavated to observe the existing pavement section. Project Plans and the documented pavement distress conditions are provided in Appendix A and B. A description and definition of the types of pavement distress are given in Appendix B. A photo log of the observed pavement conditions is provided in Appendix B
2. Results of the field observations were evaluated and engineering analyses were performed to develop appropriate recommendations for the proposed project.
3. This report was prepared to present our findings, conclusions, and recommendations.

2. EXISTING CONDITIONS

2.1. General

Within the project limits, the majority of the roadway exhibited moderate to severe cracking, raveling and potholes. Additionally there were areas where the pavement had deteriorated to the point that the base and subgrade were exposed. The existing pavement section appears to consist of approximately 3-inches of asphaltic concrete and 6-inches of aggregate base. See Pavement Evaluation Form and project pictures in Appendix B.

3. CONCLUSIONS AND RECOMMENDATIONS

3.1. Conclusions

The results of our field observations indicated that the Calle Osay Bo-Oh exhibited significant distress conditions which would require removal and replacement of the pavement section or Full Depth Reclamation of the existing asphaltic concrete and base and application of an overlay.

The types of distress observed during our pavement assessment included moderate to severe cracking including; block/shrinkage cracks, longitudinal cracks, transverse cracks, fatigue (alligator) cracks, edge cracks, depressions, and raveling. The distress is major and wide spread throughout the study area. It is our opinion based on our observations that the roadway will require full depth reconstruction or reclamation. Additionally there is a segment of the roadway south of Vaka Moa which is not paved and could be integrated into the reconstruction.

3.2. Recommendations

As stated in our conclusion it is our opinion that the entire alignment of Calle Osay Bo-Oh evaluated should be reconstructed. Reconstruction involves removal of the existing pavement sections, reworking the subgrade soils, and installing a new pavement section (base course and asphalt). The new pavement sections should then be installed in accordance with current local municipal standards and specifications. New asphaltic concrete and base materials should be tested prior to delivery to the site and during placement to determine conformance with local municipal specifications.

Additionally based on the site conditions and existing pavement section observed, a Full Depth Reclamation (FDR) procedure appears to be a viable alternative. FDR generally consists of pulverizing, moisture conditioning, and uniformly blending the existing AC into the underlying base materials and compacting. If FDR is used it is our recommendation that a three (3) inch AC overlay using Mix No. 2 per City of Tucson and Pima County Standard Specifications section 406, matching the existing AC section, be constructed on the blended base. The placement of the blended materials and AC overlay should be constructed in conformance with applicable local specification.

Positive drainage is essential to the successful performance of any pavement. Both options presented above assume that proper drainage of the pavement areas will be achieved with proposed improvements. Poor drainage can significantly decrease the service life of any pavement improvement. Good surface and subsurface drainage should be established during and after construction to prevent the soils below or adjacent to the pavement areas from becoming wet.

4. CLOSURE

4.1. Limitations

Our professional services have been performed using that degree and skill ordinarily exercised, under similar circumstances, by reputable Geotechnical Engineers practicing in this or similar localities. No warranty is expressed or implied.

The recommendations contained in this report are based on our field observation and our understanding of the proposed construction. If any conditions are encountered at this site that are different from those described in this report, we should be immediately notified so that we may make any necessary revisions to the recommendations contained in this report. In addition, if the scope of the proposed construction changes from that described in this report, our firm should also be notified.

4.2. Recommended Additional Services

The recommendations provided in this report are based on the assumption that an adequate program of tests and observations will be performed during the construction.

APPENDIX A
Project Plans



Project Site

Site Location Map



ATEK Engineering Consultants, LLC
 111 South Weber Drive, Suite 1
 Chandler, AZ 85226

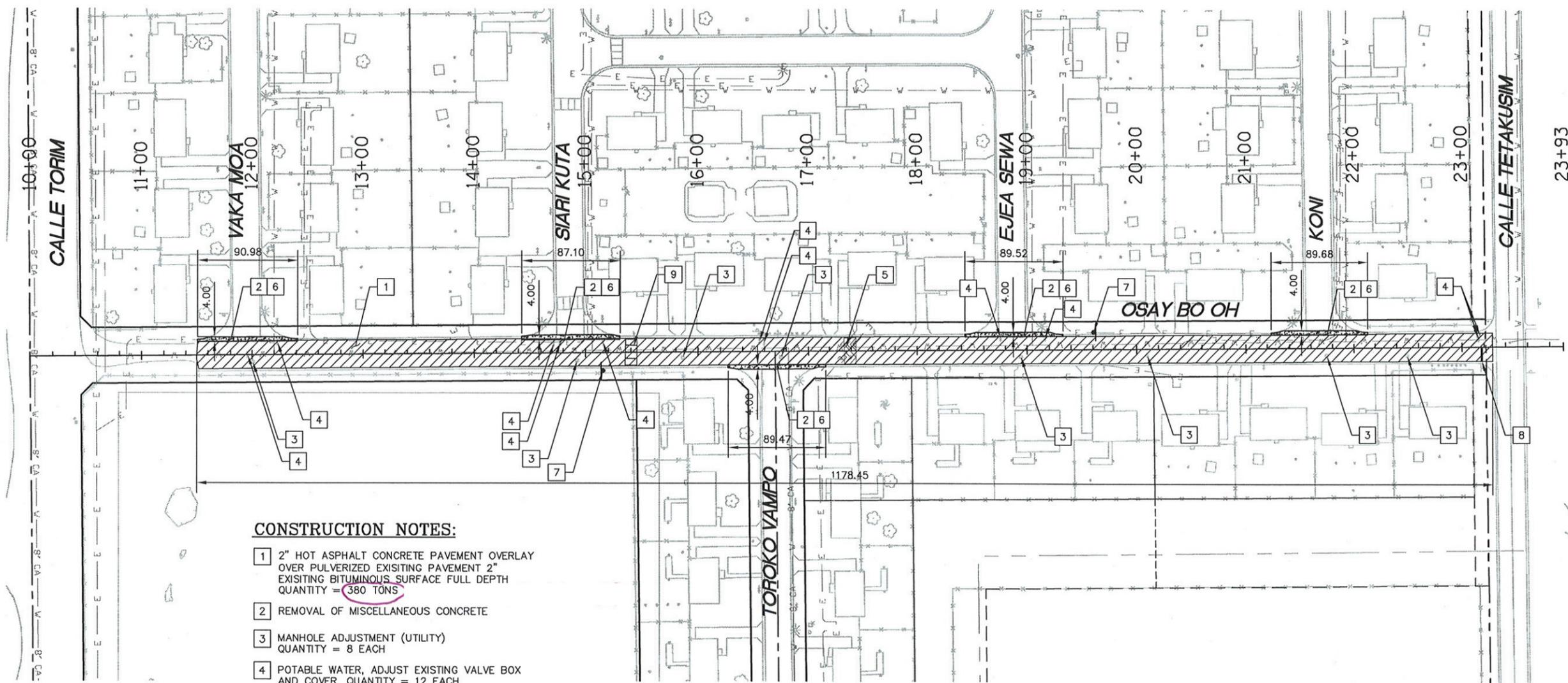
Sheet 1 of 1

Calle Osay Bo-Oh

Project Number:	110048
Date:	June 24, 2013
Drawn By:	J Floyd

NO.	REVISION DESCRIPTION	DIV./SECT.	ENGR.	DATE

PROJECT PLAN MAP



CONSTRUCTION NOTES:

- 1 2" HOT ASPHALT CONCRETE PAVEMENT OVERLAY OVER PULVERIZED EXISTING PAVEMENT 2" EXISTING BITUMINOUS SURFACE FULL DEPTH QUANTITY = 380 TONS
- 2 REMOVAL OF MISCELLANEOUS CONCRETE
- 3 MANHOLE ADJUSTMENT (UTILITY) QUANTITY = 8 EACH
- 4 POTABLE WATER, ADJUST EXISTING VALVE BOX AND COVER, QUANTITY = 12 EACH
- 5 NEW SPEED HUMP PER DETAIL SHOWN IN SHEET 5 THIS PLAN SET
- 6 CONCRETE VALLEY GUTTER PER PCDOT/COT STD. DET. 208 QUANTITY = 1667 SF
- 7 NEW SIGN POST AND SIGN PANEL (W17-1, W13-1 [15 MPH])
- 8 NEW STOP BAR STRIPING (18" SOLID WHITE, HOT SPRAYED THERMOPLASTIC)
- 9 NEW CROSSWALK STRIPING (12" SOLID WHITE INCREMENTS) PER DETAIL SHOWN IN SHEET 6 THIS PLAN SET

K:\TDC_Software\080912011_Calle Torim Study\CADD\PLYR_101(7) Sheet 4 - Plan Mapping Apr 12, 2011 josa.vfela
 THIS DOCUMENT, TOGETHER WITH THE CONCEPTS AND DESIGNS PRESENTED HEREIN, IS INTENDED ONLY FOR THE SPECIFIC PURPOSE AND CLIENT FOR WHICH IT WAS PREPARED. REUSE
 OF ANY PART OF THIS DOCUMENT WITHOUT WRITTEN AUTHORIZATION AND ASSUMPTION BY KIMLEY-HORN AND ASSOCIATES, INC. SHALL BE WITHOUT LIABILITY TO KIMLEY-HORN AND ASSOCIATES, INC.

APPROVALS	
FOR THE CONSULTANT	DATE
DESIGNED R. SOLIS/T. NUNN	4/2011
DRAWN J. VIELLA/R. SOLIS	4/2011
CHECKED R. SOLIS	4/2011
FOR THE PASCUA YAQUI TRIBE	
CHECKED _____	_____
PROJ. ENGR. _____	_____
DIRECTOR _____	_____

PYIR 101(7)
PROJECT PLAN MAP
 IMPROVEMENT PLANS

Kimley-Horn and Associates, Inc.
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 Engineering, Planning, and Environmental Consultants
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 Tucson, Arizona 85719 Fax: (520) 615-9292

PRELIMINARY
 100%
 NOT FOR
 CONSTRUCTION
 EXPIRES 9/30/2011

PASCUA YAQUI TRIBE

SCALE: 1" = 150'

4 OF 10

Call at least two full working days before you begin excavation.
ARIZONA 811
 ARIZONA BLUE STAKE, INC.
 Dial 8-1-1 or 1-800-STAKE-11 (782-5348)
 In Maricopa County: (602) 263-1100

APPENDIX B
Pavement Evaluation Form and Pictures

APPENDIX B ASPHALT CONCRETE PAVEMENT DISTRESS

Distress appears in many forms but usually in cracks and poor surface wear. Within the Osay Bo-Oh roadway we observed the following distress conditions.

1. Fatigue (Alligator) Cracking: Interconnected cracks forming a series of small blocks resembling an alligator's skin or chicken wire. They are usually associated with an inadequate asphalt thickness, a base that has failed, or with resilient subgrade.
2. Block/Shrinkage Cracking: Interconnected cracks forming a series of large blocks, usually with sharp comers or angles. It is often difficult to determine whether shrinkage cracks are caused by volume change in the asphalt mix or in the base or subgrade. Frequently, they are caused by volume change of fine aggregate asphalt mixes that have a high content of low penetration asphalt.
3. Transverse Cracking: Shrinkage cracks that are predominantly perpendicular to the pavement centerline.
4. Longitudinal Cracking: Shrinkage cracks that predominantly parallel the centerline.
Edge Cracking: Crescent-shaped cracks or fairly continuous longitudinal cracks within 2 feet of the pavement edge that branch toward an unpaved shoulder. They are usually caused by lack of shoulder support. They may also be caused by yielding of the base material.
5. Depression: Localized low areas of limited size which may or may not be accompanied by cracking. Depressions are caused by traffic heavier than that for which the pavement was designed and by consolidation or movement within the subgrade.
6. Raveling: The progressive loss of aggregate particles in the pavement from the surface downward or from the edges inward. The fine aggregate usually wears away first by weathering and/or traffic abrasion, leaving little pock marks in the pavement surface. As erosion continues, larger particles eventually break free.
7. Pothole: Bowl-shaped holes of varying sizes in the pavement, resulting from localized disintegration. Potholes are usually caused by weakness in the pavement resulting from too little asphalt, too thin of an asphalt surface, or poor drainage.

LIST OF ATTACHMENTS

The following plates are attached and complete this appendix.

Pavement Evaluation Form
Project Pictures

Pavement Evaluation Form

Type of Pavement:		Type of Curb:		Date of Evaluation:	
Asphaltic Concrete		Roll Curb		2/22/2013	
Type of Street:			Stationing:		
Residential			11+50 to 23+00		
Adjacent Terrain:			Shoulder Type:		
Residential lots/No Sidewalk			NA		
Roadway Name:				Roadway Width:	
Osay Bo-Oh				24 feet	
Criteria	None	Minimal	Moderate	Severe	Summary
Cracking			X	X	
Raveling			X	X	
Bleeding	X				
Rutting/Shoving	X				
Comments:					
Significant Alligator and transverse cracking throughout project, section of pavement were completely deteriorated and subgrade was exposed					
Pictures:		Station Location:		Description	
1		Sta. 22+20		Looking South	
2		Sta. 22+50		Looking South West	
3		Sta. 22+50		Looking South East	
4		Sta. 23+00		Looking South	
5		Sta. 23+00		Looking East	
6		Sta. 20+00		Looking South	

Pictures:	Station Location:	Description
7	Sta. 22+00	Looking South
8	Sta. 17+00	Looking South
9	Sta. 21+00	Looking South
10	Sta. 17+00	Looking West
11	Sta. 15+00	Looking West
12	Sta. 17+00	Looking East
13	Sta. 19+50	Looking South East
14	Sta. 19+20	Looking South West
15	Sta. 13+00	Looking West
16	Sta. 13+00	Looking South East
17	Sta. 17+20	Looking South

Pictures:	Station Location:	Description
18	Sta. 12+00	Looking South East
19	Sta. 13+00	Looking South
20	Sta. 17+50	Looking West
21	Sta. 22+50	Looking West
22	Sta. 22+50	Excavated Pothole - Pavement Section Measurement
23	Sta. 22+50	Excavated Pothole
24	Sta. 22+50	Excavated Pothole - Looking South
25		
26		
27		
28		

Osay Bo-Oh Pavement Evaluation



Picture 1



Picture 2



Picture 3



Picture 4



Picture 5



Picture 6



Picture 7



Picture 8



Picture 9



Picture 10



Picture 11



Picture 12



Picture 13



Picture 14



Picture 15



Picture 16



Picture 17



Picture 18



Picture 19



Picture 20



Picture 21



Picture 22



Picture 23



Picture 24