HEADING: **AASHTO**

SUBJECT: DESIGN EXCEPTION REQUEST MEMORANDUM WITH RATIONALE FOR EXCEPTIONS - GRADE AND STRUCTURAL CAPACITY/BRIDGE BARRIER EXAMPLE

A design exception request must provide a rationale for the exceptions and describe what measures would be required to bring the features up to AASHTO criteria.

The attached is an example of a Design Exception Request Memorandum where there are design exceptions for grade and structural capacity. Other features requiring design exceptions could also be addressed in a similar manner.

Any remedial actions or mitigation strategies implemented shall be noted in the Memorandum. Refer to the U S Department of Transportation Federal Highway Administration publication “Mitigation Strategies for Design Exceptions - July 2007”. http://safety.fhwa.dot.gov/geometric/pubs/mitigationstrategies/. The Predesign Project Manager and Supervisor should discuss engineering aspects of the features that do not meet AASHTO criteria to determine recommendations of mitigation measures to be included in the project scope of work and the Design Exception Request Memorandum.

The cover letter to FHWA should note any features that are being improved with the project and thereby eliminate the need for any design exceptions.

The Design Exception Request Memorandum is attached to the Design Exception Request Letter which is signed by the Assistant State Engineer with Roadway Engineering Group for approval by FHWA. The approval and distribution of AASHTO Design Exceptions will be as outlined in Project Assessment Bulletin 96-002. An example design exception request for horizontal curve superelevation is provided in Project Assessment Bulletin 09-002.

Arizona Department of Transportation

ROADWAY ENGINEERING GROUP

MEMORANDUM

To: Mary Viparina, 611E Assistant State Engineer Roadway Engineering Group	**Date:** April 26, 2010
From: Paul O'Brien, 605E Manager Roadway Predesign Section	**Subject:** Design Exception Request Project 0xx YV xxx H XXXX XXC XX XX TI – XX XX TI (SB) A – Z Highway I-xx

This project is not programmed nor listed in the 20xx ADOT Five-Year Transportation Facilities Construction Program. It is anticipated that the pavement rehabilitation part of the project will use federal (IM) funds. The intent of this project is to extend the usable life of the roadway pavement and to address safety issues, which can be accomplished within the scope of a Pavement Preservation Project.

Design Exceptions are requested for maximum allowable grade exceeded at one location, for vertical curve stopping sight distance not met at two locations and for minimum structural capacity not met at one location as per the attached AASHTO Controlling Design Criteria Report. A Crash Analysis Report has been prepared for this project and is also attached.

The reasons for requesting the Design Exceptions are as follows:

Grade

I-17 within the project limits is classified as a rural interstate with rolling terrain. The natural terrain dictates the profile of the Interstate. Traveling in the southbound direction the profile grade between the McGuireville TI and the Verde River Bridge is almost continuous downhill. The Verde River Bridge (MP 287.93, Elev. 3,108') is the low point from where the profile grade changes to one long ascending grade that continually increases before reaching the top of Copper Canyon (MP 281.0±, Elev. 4,700'). The terrain classification for I-17 through Copper Canyon would be considered mountainous. This section of I-17 between MP 286.00 and MP 286.65 (3,432') for which the design exception is being requested is in the transitional area between rolling to mountainous terrain. The posted speed limit in this section changes to 65 mph, which is indicative of a mountainous terrain classification. The natural ascending terrain as well as the General Crook Trail TI OP (located 2,600± south of the begin project limit) dictates the profile grade of the Interstate.

To achieve the 4.0% grade would require lowering of the existing roadway profile grade. This would require reconstruction of the southbound roadway (and most likely the northbound roadway), which would have to continue through the Copper Canyon Section, which is outside of project limits. In all probability the entire Copper Canyon Section of I-17 would either have to be reconstructed or relocated to new alignment. Also the General Crook Trail TI OP would have to be reconstructed / relocated.

Reconstructing/relocating 5.65± miles of interstate highway as well as reconstructing the General Crook Trail TI OP would be classified as major reconstruction, require a Design Concept Report with an extensive evaluation of alternate routes, public involvement and would be far beyond the scope, intent and funding limits of a Pavement Preservation Project.

Vertical Curve Stopping Sight Distance

The calculated speeds on the set of vertical curves over Yucca RR OP WB (Begin MP 26.73 end MP 26.98) are only 7 mph and 6 mph below the posted speed limit of 75 mph. The Crash Analysis states there is no indication that the existing roadway geometry contributed to reported crashes on this segment of I-40.

Attaining full standards for this design exception would require reconstruction of Yucca RR OP WB #381 at a program level estimate of $5,000,000. This expense does not seem justifiable as part of a pavement preservation project.

Structural Capacity

The Greenes Wash Bridge EB, Structure No. 1138 (MP 166.90) and Greenes Wash Bridge WB, Structure No. 1139 (MP 166.90) both have a structural rating of HS 16.11 which does not meet the structural requirements of the recommended HS 20. The bridges are carrying normal traffic without showing any signs of distress.

These bridges are not listed in the ADOT 2010 to 2014 Five Year Transportation Facilities Construction Program for rehabilitation and the Bridge Group is not recommending any modifications. It is estimated that approximately $ 3.2 million would be required to replace each bridge. Since the structures are not deemed deficient or functionally obsolete, spending $3.2 million to replace each bridge at this time does not appear to be justified.

Recommended Remedial Action:

(Mitigation measures for the project are noted here)

Summary:

The intent of this project is to extent the usable life of the roadway pavement and address safety issues which can be accomplished within the scope of a pavement preservation project. In conclusion granting these design exceptions is justified because upgrading the existing features to meet current standards would require major reconstruction or replacement of the bridges which is far beyond the original scope, intent and funding for this project.

Concur:_____

Concur:_____Bridge Group Manager Roadway Group Manager

_____ _____

Date Date