

**SR 99 S. Holgate St. to S. King St. Viaduct Replacement Project, Stage 2
XL 3237 and PIN 809936D
Deviation #4 Maximum Superelevation Rate
June 10, 2009**

Description of Design Element, Matrix, Design level, and WSDOT Reference

Superelevation Rate on Principal Arterial (P-1)
Matrix 3-7 (Exhibit 1100-6, June 2009), Full Design Level (Exhibit 1140-6, June 2009)
Max. 8% (Chapter 1250.04 and Exhibit 1250-4b, June 2009)
Max. 6% (Chapter 1250.04 and Exhibit 1250-4c, June 2009)

Existing Conditions

The existing maximum superelevation is 6% and the posted speed is 50 mph.

Proposed Design

The proposed design calls for design based upon 6% maximum superelevation charts in the WSDOT design manual (Exhibit 1250-4c, June 2009) with a design speed of 50 mph.

Deviation description

The proposed roadway does not meet current WSDOT design criteria for a P-1 roadway with a design speed of 50mph. Section 1250.04 states that the 6% max superelevation charts (Exhibit 1250-4c, June 2009) may only be used for Urban Managed Access Highways with justification. The 10% maximum or 8% maximum, with justification, are used for P-1 design criteria. The proposed radii of 1120 feet and 1500 feet don't meet radii requirements under the 8% max chart (Exhibit 1250-4b, June 2009) when a 6% superelevation used.

Justifications

AASHTO guidelines state "In lower speed situations, a maximum superelevation rate of 6 percent may be applicable." The posted speed will be 50mph, which is considered a low-speed freeway. Therefore, the maximum 6% superelevation rate is applicable per AASHTO guidelines.

South and North of the project limits SR 99 is classified as managed access and designed to low speed conditions with a 6% maximum superelevation. In order to provide uniform driving characteristics, a constant superelevation is needed to maintain continuity for the SR 99 route within the urban city limits. Using higher superelevations might confuse driver expectations and create unsafe driving patterns.

The project's UMA-1 design criteria was changed P-1 design standards near the 90% design phase. Redesigning the current SR 99 route and affected project elements would require high engineering costs. It was estimated that the redesigning of the project to the 8% maximum superelevation charts would cost XXXX. This would also cause large delays to the advertisement date which would also have impacts on the rest of the program's projects. This increases the possibility of not making key project and program completion milestone dates.

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Comment [JBK1]: Doesn't the new Corridor Analysis set this to 50 MPH from Spokane to Mercer? You might want to mention the reason why 55 mph was used instead of 50 mph.

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Comment [JBK2]: Correct, AASHTO does say this but the viaduct is coming down and this does not apply here.

Comment [JBK3]: Out of all this is written here, I think this justification is extremely thin. You are showing Engineering Judgment that this is OK by meeting AASHTO. This is fine but I'd like to see more here such as (but not limited to) the following possibilities:

- Route continuity – This Limited Access piece of SR 99 route is sandwiched between UMA to the south (south of Spokane St.) and to the north (north of Mercer St.). It would seem reasonable to have this Limited Access thread in as seamless as possible to this Urban Managed Access.
- Cost to Build to Standards – You already have a project that has been designed over the past couple of years to using the 6% table. You have a bridge and roadway that is already designed to using the 6% table. Changing to the 8% table would cause a redesign of the this roadway and impact the bridge design. This would result in additional costs for new bridge site data, new bridge design, possible impact to the railroad, etc.
- Others?

Deleted: However, it does meet AASHTO guidelines for a low-speed freeway in an urban area. "...this design speed should not be less than 50 mph." "Superelevation rates of 6 to 8 percent are generally the maximum that should be used on viaducts...In lower speed situations, a maximum superelevation rate of 6 percent may be applicable." ¶

The posted speed will be 50mph, which is a low-speed freeway. Therefore, the maximum 6% superelevation rate is applicable. ¶

Comment [JBK4]: Please separate your justification from your Deviation Description.

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AASHTO Reference: title, publication date, page

A Policy on Geometric Design of Highways and Streets, 2004, pages 503 (design speed) and 505 (superelevation)

Recommendation

Use the 6% max. superelevation rate table [for design of this project](#) (WSDOT Design Manual Exhibit 1250-4c, June 2009).



Mark Anderson, PE
Project Engineer

Deviation Approval

Date _____

By _____, P.E.
Susan Everett, P.E. Alaskan Way Viaduct Design Manager