General Instructions

Design Exceptions (DEs) are part of the process that documents the decision making involved in the safety and budgeting impacts of designing the geometric elements of the roadway. (Refer to sections 3.10.03 and 14.11 of the Road Design Manual and section 12.03 of the Bridge Design Manual for information pertaining to DEs.) Review of geometric elements and evaluation of impacts should occur at the project scoping stage. If a Design Exception is needed, the Project Manager (PM) requests the TSC T&S Engineer provide a crash analysis to jointly review with their Lansing Geometrics engineer. The Crash Analysis must be specific to the location and crash types associated with the geometric element in question (refer to T&S website for guidance and example). The PM then initiates the Design Exception request(s) during the Scope Verification process using the latest form on the MDOT website to obtain approval by completion of the Base Plan stage. Crash Analyses provided by consultants require a written memo indicating approval by the TSC T&S Engineer, which is included with the Design Exception request.

It is suggested that the PM submit an unsigned draft design exception by email (cc their Lansing Geometrics engineer) to the FHWA area engineer (if PoDI oversight) for review and comment prior to the DE being submitted to the Engineer of Design or Structures for approval. An appropriate preliminary plan, profile, and/or typical sheet should be included with the DE submittal to assist with review. The unsigned DE is electronically submitted in ProjectWise by the PM. The Design Exception Engineer then reviews the DE for completeness and replies with any revisions. Once all of the revisions are incorporated, the PM then electronically signs the design exception and advances the State in ProjectWise. Approved DE(s) are required to be included with documents submitted for The Plan Review and OEC meetings.

Early submittal is needed to allow a timely review by Lansing Design and the FHWA, including any follow up or re-submittal that may be required. Approval of a submitted design exception request should not be considered automatic. Disapproval of a design exception request can result from a number of deficiencies in the request. Grounds for rejection can range from insufficient justification, to use of an outdated request form. No special consideration is given for requests submitted late in the project scoping stage. The Design Exception Engineer then initiates the Design Exception request(s) during the Scope Verification process using the latest form on the MDOT website to obtain approval by completion of the Base Plan stage. Crash Analyses provided by consultants require a written memo indicating approval by the TSC T&S Engineer, which is included with the Design Exception request.

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II. Legal Speed and Traffic Volumes

Fill in all fields of data for ALL DEs, except as follows. Commercial DDHV is used only to determine appropriate paved shoulder widths on freeways and should only be entered for freeway projects. Commercial DDHV should be obtained from Lansing Project Planning along with the initial traffic data request using the check box on Form 1730. Planning uses the following formula: Commercial DDHV = Directional ADT (which includes a directional factor ~50% - 60% x Lane Distribution Factor (generally varies 70% - 90%) x % DHV (~9%-12%)x % Commercial.

The % Commercial may be different for Commercial DDHV than what is used for the Life Cycle Cost Analysis, consequently, the use of the check box on Form 1730 will ensure obtaining the appropriate Commercial DDHV.

III. Design Exception Elements

A separate Design Exception is needed for each geometric element requested. Choose the appropriate element from the drop down provided.

There may be multiple locations in each Design Exception. Number multiple locations throughout the form. Organize edits to avoid splitting fields onto different pages. When a spreadsheet attachment is used ‘see attached’ in itself is not an acceptable entry. A general description, i.e. # of locations, roadway / ramps (A, B, C…), range of dimensions, etc., is needed to correlate with the spreadsheet information.

Describe the existing roadway/bridge geometric features (pavement section, number of lanes, boulevard, freeway, urban, rural, length of bridge…) and related DE data (radius, super, K-value, HSO) for the identified geometric element at each location. Include numerical values and limits (for example, cross slope is 1% for roadway, shoulder is 3% for bridge) and related DE data (radius, super, K-value, HSO) for the identified geometric element at each location. Include numerical values and limits (for example, cross slope is 1% for roadway, shoulder is 3% for bridge)

For design exception elements for bridges, note whether existing structure is posted for less than legal loads.

Note: For vertical clearance exceptions on Interstate freeway bridges, the Project Manager is responsible for obtaining Military Defense Approval. Refer to Road Design Manual 3.12H or Bridge Design Manual 7.01.08 and related appendix for information and obtain latest fillable Form #0333 from the web site. Include a copy of the request and the military’s response with the design exception submittal.
Cite the specific MDOT and AASHTO requirements, for example, K=120 or e=5.4%, etc. State the pertinent source(s), such as Standard Plan or Special Detail, Road or Bridge Design Manual, or Geometric Guide, with the chapter, page, exhibit number etc. For an AASHTO reference, include “A Policy on Geometric Design of Highway and Streets, 2011” or “A Policy on Design Standards, Interstate System, 2005.” Cite appropriate edition (year). Note: Standard Plan R-107 at 7% Emax and the Straight Line Chart at 6% Emax have been developed to meet AASHTO criteria for superelevation requirements per Methods 5 and 1, respectively, on page 3-26, and for radius per Equation 3-8 on page 3-31 of the 2011 Geometric Book and are the appropriate references for AASHTO Criteria. Use of the AASHTO 6% Emax table for Straight Line Chart or interpolation of the 6% & 8% table to obtain a 7% Emax value are not appropriate due to curvilinear fiction factors used in the tables. Since the FHWA has accepted MDOT criteria for the rate of superelevation, this statement should be entered under “AASHTO Criteria” when the DE element is superelevation rate. Other AASHTO methods are not applicable with MDOT projects.

**Proposed Design Values:**

Describe the proposed design value for design exception element as shown on the project plans. “Match existing” is not a sufficient description, unless all deficiencies have been specifically reported in the description of existing features section. Elaborate on application of data. State what design speed improvements, if any, are attained with the design. If more than one location applies (e.g., three curves with superelevation), list all including stationing.

**Safety Review/Crash Analysis:**

State the site specific crash analysis attached by author and date. Include the author and date of an approval memo, if the crash analysis was conducted by a consultant. Do not include UD-10 or other traffic data. These data are reviewed by T&S personnel and are the basis of the conclusion stated in the crash analysis that is used to support the design exception request. For a vertical clearance exception, the crash analysis must include discussion regarding High Load Hits (HLH) in the Maintenance data base. Don’t use a generic scoping Safety Review in place of the site specific crash analysis. A conclusion in support of the design exception at each location is needed. Refer to the Traffic and Safety web site for instructions and an example of a typical Crash Analysis. Contact the Lansing Geometrics Engineer for additional assistance. If a consultant provides the crash analysis, the report must be submitted with a memo indicating approval by the TSC T&S Engineer. The Project Manager is responsible to coordinate the use of PR/CS miles points and stationing in the crash analysis with those used in the design exception, particularly when multiple locations are in one crash analysis.

**Impacts Other Than Costs:**

Describe other major impacts that would occur if the required design standard was met. Elaborate as to what would have to be altered. Reference any related ordinances, environmental documents, legislative resolutions, etc. and attach a copy of the referenced pages.

**Programmed Cost:**

State programmed project construction cost per latest 2604 from MPINS. Exclude CE costs. Separate JN, bridge / road budgets.

**Increased Cost to Meet Design Criteria:**

Itemize cost of meeting the design standard and related major impacts (e.g., pavement, shoulders, slope work, ROW, structures, drainage, large or box culvert, wetland mitigation, peat excavation / backfill, if significant). Itemize major road/bridge cost items. Attach a separate sheet, if needed.

**Proposed Mitigation:**

Describe and state (include numerical values) partial improvements of all related design features and mitigation measures, if any. Identify future work programmed to complete improvements. Include Job Number and construction year, if available. Review merits of advisory signs, lighting, ‘no passing’ pavement markings and signing with T&S Engineer for horizontal curve radius, stopping sight distance, superelevation rate, lane width and shoulder width design exceptions. Refer to T&S Traffic Sign Design, Placement, and Application Guideline and MUTCD 2C. Consider other safety features such as HMA ribbons, corrugated shoulders, chevrons, etc.

**Additional Comments:**

Provide a summary statement or state any other extenuating circumstances to be considered. Discuss the benefits of partial improvements, if attained. State the job number of a future project, if programmed, which will rectify the excepted feature. State whether or not the crash analysis supports the DE request.

**Miscellaneous:**

Signature box: After the Design Exception Engineer’s review, attach an electronic signature in appropriate box. The dated signature stamp of the Project Manager certifies the completeness, accuracy and necessity of the Design Exception request. When a project has PoDI Oversight but FHWA approval is not required, the Engineer of Design or Structures will note in the FHWA signature box that approval is ‘not needed’. When FHWA approval is required, Design will “change state” to forward the DE to FHWA.

On a project where bridge plans are included with a “large” road project and the Project Manager of record is someone other than the Bridge Design Engineer (and therefore signing the Design Exception form), the Bridge Unit Leader or Bridge Consultant Manager must provide a signed memo stating that they have reviewed the Design Exception for the bridge(s) and concur with its contents. This signed memo to the Engineer of Design Operations – Structures will be attached to the Design Exception and reference made to the author and date in Additional Comments Section.