

# Transportation Design Competition

All competition events will fully take place during the 2024 ASCE Mid-America Student Symposium.

All proposed developments and references to organizations are fictitious and do not represent an actual proposal.

## **Problem Statement**

A new multi-purpose development has been proposed by the owner, further referred to as MST, and your company has been selected to create a design for a bid to be used to adapt the lacking road development infrastructure to accommodate the new traffic loads from the new development. Your company has instructed **your team of up to 4** to design the project and give a presentation to the owner. The scope includes the following aspects of transportation design:

- Determining trip generation for the development.
- Creating new intersection designs.
- Adapting existing road alignments to within the proposed developments.
- Pavement design for the new road alignment.
- Final presentation to the owner of your designs.

Further details on the scope and specifications will be provided on April 20, 2024 at 7:30 pm. Included in the official release of specifications are the development plans, survey data, and the specific location of the development. You will be given **90 minutes** as a group to complete the design and create a presentation for MST about your design choices.

Any RFI or clarification requests should be submitted to Kyle Bryan through email at [kabng6@umsystem.edu](mailto:kabng6@umsystem.edu).

## **Specifications**

### Trip Generation

An overview of the new development will be provided from MST on April 20, 2024 at 7:30 pm. Your company shall use the ITE 11<sup>th</sup> edition trip generation manual to estimate the traffic volume created from the new development.

### Intersection Design

Based on the new traffic volume from the development and the existing traffic loads, your company shall create three new intersection designs using applicable AASTHO and MUTCD standards. For each intersection the result must be modeled in HCS.

### Road Alignment

From the construction of the new development, an existing road alignment must be altered. Your company shall create a new road alignment plan using the survey data provided by the owner. The new design must incorporate at least one superelevation curve based on the existing site conditions and the new development.

### Pavement Design

For the new road alignment, MST has tasked your company to create the new pavement. Based on the economic market and the owner's budget, asphalt will be used for the new pavement. Superpave mix design will be used for the project as the leading standard in asphalt design. Climate conditions of the site will be based on Rolla, Missouri climate. Specifications for the mix design include AASHTO and MoDOT specification based on the project location. Superpave mix design specifications for MoDOT can be found in section 403 of the 2023 Missouri Standard Specifications for Highway Construction as attached to this ruleset.

### Final Presentation

Your company will present their findings to MST on April 20, 2024 as submittal of the design plans. The presentation will include design considerations and final solutions for all aspects of the design conducted by your company. The presentation will be followed by a time for MST to ask questions.

## **Competition Scoring**

Your team will be scored based on the approach to design, use of the specified software and standards, and quality of solutions. All information will be submitted via the final presentation.

### Points Breakdown

#### Trip Generation- 8%

Points will be awarded based on the use of correct ITE trip generation tables and accuracy of generation for the development.

#### Intersection Design- 24%

Points will be awarded both for each intersection individually and the integration of all three intersections into a small corridor. Correct application of traffic loads and turning movements and feasibility of design will be considered for scoring.

#### Road Alignment- 20%

Points will be awarded for the road alignment and superelevation curve design. The quality of the design and reasoning behind engineering judgement will be considered.

#### Pavement Design- 18%

Points will be awarded based on the application of the Superpave mix design according to AASHTO and MoDOT specifications for binder, aggregate, and mix design.

#### Final Presentation- 30%

Points will be awarded based on presentation quality, explanation of engineering design decisions, and response to questions by the judges.

#### Penalties

Points will be deducted from the overall score for a LOS D or F per approach in intersection design.

Points will be deducted from the overall score for using incorrect climate conditions

Points will be deducted from the overall score for exceeding or failing to meet the required presentation time by an initial penalty and an additional penalty for time exceeded.