

## HIGHWAY CAPACITY MANUAL (HCM) METHODOLOGY FOR ALTERNATIVE

FEDERAL HIGHWAY ADMINISTRATION  
Saxton Transportation Operations Laboratory

### Project Objectives

Over the past decade, the Federal Highway Administration (FHWA) has conducted and developed extensive research, workshops, tech briefs, and other outreach materials about alternative intersection/interchanges. These research efforts and publications have increased interest and rapid adoption of alternative geometric designs across the United States. Of the many alternative intersections/interchange designs, stakeholders showed significant interest in these four specific designs:

- Double Crossover Diamond (DCD) interchange (aka, Diverging Diamond Interchange (DDI)).
- Displaced Left Turn (DLT) intersection.
- Median U-Turn (MUT) intersection.
- Restricted Crossing U-Turn (RCUT) intersection.

Most existing analysis tools supporting the adoption of alternative intersections/interchanges involve the use of complex microscopic simulations that are expensive and time consuming. The Highway Capacity Manual (HCM) and the Highway Capacity Software (HCS) are widely used analytical tools that assess the quality of service for conventional intersections and interchanges. However, they do not assess any of the alternative designs considered in this project.

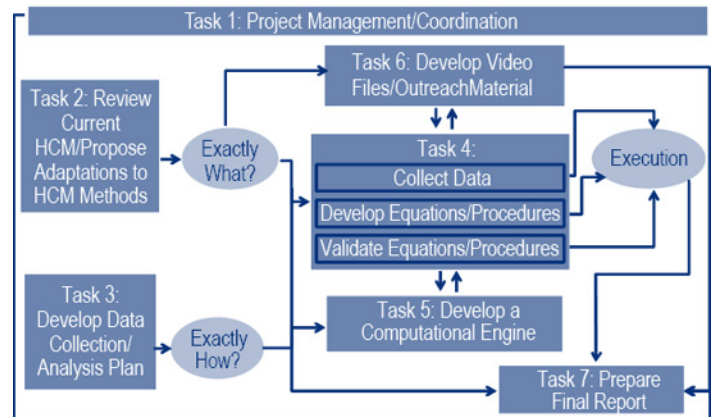
To support the increased exposure and interest in those designs, FHWA is conducting activities to integrate alternative intersection/interchange guidance into the HCM and HCS. This will help expand the portfolio of design alternatives contained in the HCM and enable a side-by-side assessment of their operations in contrast to traditional designs.

### Pooled Fund Study Partner States

Alabama, California, Colorado, Florida, Missouri, North Carolina, Nevada, Ohio, Washington, Wisconsin



## Intersections / Interchanges



### Project Tasks

The project consists of seven tasks. Task 1 includes administrative activities throughout the duration of the project. Task 2 involves identifying knowledge and methodology gaps in the current 2010 HCM, formulating an analysis framework, and identifying field data collection necessary to address knowledge and methodology gaps. Task 3 will determine the applicability of existing HCM models to the new designs, and will decide whether data is on hand, or if field data collection and simulation are needed. In Task 4, the project team will reduce and analyze field data collected for development of HCM procedures during Task 3 and prepare a report consisting of new or modified HCM procedures for each intersection/interchange type. Task 5 will involve updating existing HCS modules to incorporate the newly developed methods for alternative intersections/interchanges. Tasks 6 and 7 will produce outreach videos from simulation and the final project report in the form of draft HCM Chapter(s) for each alternative intersection/interchange type.

**The new HCM guidance and procedures resulting from this project will assist agencies in evaluating capacity and quality of service for the design and operation of alternative intersections/interchanges.**

**HCS 2010 / HCM 2010 Training**

Register online:

[mctrans.ce.ufl.edu/training](http://mctrans.ce.ufl.edu/training)

**McTrans Center**  
University of Florida  
Civil & Coastal Engineering  
PO Box 116585  
Gainesville FL 32611-6585



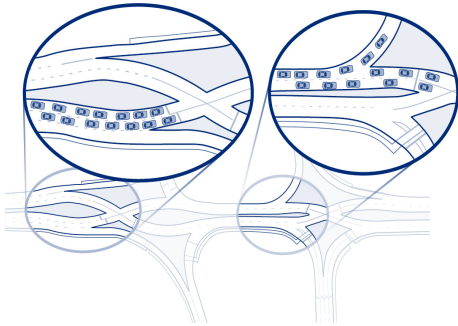
Phone: 352-392-0378  
Toll-Free: 1-800-226-1013  
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# Alternative Intersections / Interchanges

## Milestones Achieved and Next Steps

**Proposed Adaptations to the HCM.** The project team, working closely with the advisory and review group, identified and documented knowledge and methodology gaps in the current HCM methodology and developed proposed methodological adaptations for the four alternative intersection/interchange designs.

**Field Data Collection and Analysis.** The project team began a comprehensive field data collection effort prior to the start of summer at various locations across the country. Using high-definition, wide angle video cameras, field staff collected high-resolution video at 1080 pixels and 30 frames per second as well as sample speed and travel time data using high-grade global positioning system (GPS) equipment to support video calibration. The research team will use the data to address knowledge and methodology gaps, which in turn will drive the adaptations to the HCM.



**Stakeholder and Highway Capacity and Quality of Service (HCQS) Committee Outreach and Coordination.** The project team has developed a clear plan to facilitate feedback and input from the various stakeholder groups involved in the project and the HCQS Committee, which will be key to the adoption of extensions and adaptations to the HCM. Key activities to date and planned in the near future include:

- Facilitate discussion of proposed adaptations to HCM Methods – Completed on June 12, 2013, TFHRC.
- Facilitate discussion of analysis methodology for proposed adaptations to HCM Methods – July 25, 2013, TFHRC.
- Present draft data collection and analysis plan at the Summer Meeting of the HCQS committee – August 1-2, 2013: Brooklyn, NY.

## To Contribute to the Discussion

**Inform**— Provide effective marketing and outreach material outlining progress on HCM guidance for alternative designs.

**Educate**— Provide working tools to State and local agencies and roadway practitioners for use on existing or new alternative design projects.

**Interact**— Generate effective outreach efforts to allow practitioners and researchers opportunities to interact and discuss issues and opportunities surrounding alternative designs.

**Influence**— Create opportunities for diverse groups to influence development of HCM guidance for and field deployments of alternative intersections / interchanges.

**Collaborate**— Provide a platform for collaboration among various groups with an interest in alternative designs.

**Partner**— Work with various agencies and individuals to enhance the value of HCM tools available to support the operations of and analysis needs for alternative designs.

The project team is maintaining an online collaboration tool to facilitate announcements, forums, and file sharing with project stakeholders, including the advisory and review groups. The research team intends to provide project updates and facilitate feedback in the following forums:

- Webinar: Proposed Analysis Methodology for Adaptations to HCM Methods – July 25, 2013
- 2013 Summer Meeting of the HCQS Committee – July 31 – Aug 3, 2013, Brooklyn, NY
- Webinar: Review of HCM Report with Proposed Adaptations – TBD, September – November 2013
- 2014 TRB HCQS Workshop – January 2014
- 2014 Summer Meeting of the HCQS Committee – July/August 2014.

For more information on the project, please contact:

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## Tutorials

### Signalized Intersection Analysis

<http://mctrans.ce.ufl.edu/tutorials/StreetsTutorial.wmv>

### Urban Streets Optimization

<http://mctrans.ce.ufl.edu/tutorials/OptimizationTutorial.wmv>

### 2010 HCM Workshop Online

### Step-by-Step Data Coding

Free Access

### Strategies and Options

Free Access

### HCM 2010 Overview