

**PAVEMENT MARKINGS AND SIGNING TO SUPPORT SENATE BILL 120.**

**Submitted for consideration by the  
Delaware Department of Transportation (DelDOT)**

**By**

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**Proposal Summary** – Senate Bill 120, recently signed by the Governor into law, allows bicyclists to both use the shoulder, as well as travel straight through an intersection from a lane otherwise designated as a right-turn only lane. This research will investigate signing and striping options for intersections. The Delaware Manual on Uniform Traffic Control Devices specifies five basic requirements for a traffic control device – fulfill a need; command attention; convey a clear, simple meaning; command respect from road users; and give adequate time for proper response. This research will work under these five basic principles in developing new markings to meet the requirements of Senate Bill 120

**Problem Statement**

Although new designs of intersections typically include separate bicycle lanes, the vast majority of existing intersections do not. This is a significant concern for Delaware's biking community. Many roadways have paved shoulders between intersections, but often this space is converted to a right-turn only lane at the intersection. Recently, the Governor signed into law Senate Bill 120 which clarifies that bicyclists are legally allowed to both use the shoulder, as well as travel straight through an intersection from a lane otherwise designated as a right-turn only lane.

Although the state code has been changed, there is a question as to whether special traffic control devices (including signing and striping) are needed to convey the message to both drivers and bicyclists that bicyclists are allowed to be in the right-turn only lane (even if they are traveling through the intersection). If special traffic control devices are needed, what form should they take? Should the striping specifically funnel bicyclists towards the left side of a right-turn only lane? Or should a neutral striping configuration be used which does not show a preference as to where the bicyclists should laterally position themselves. The Delaware Manual on Uniform Traffic Control Devices specifies five basic requirements for a traffic control device – fulfill a need; command attention; convey a clear, simple meaning; command respect from road users; and give adequate time for proper response.

**Objective**

This research will work under these five basic principles in developing new markings to meet the requirements of Senate Bill 120.

### **Proposed Research.**

This research will begin with reviews of past studies and FHWA approved Requests to Experiment (RTE) that involve shared bike / vehicle lanes and Bike Markings, particularly around intersections. The requesting or reporting agencies will be contacted for lessons learned and data that they wish they had collected during pre-project surveys. These will include the RTE Columbia, MO filed with FHWA in February, 2009 and the 2004 Final Report on Pavement Markings by the City of San Francisco, CA. Areas that have experience adopting new pavement marking systems in this area will also be contacted, including Baltimore, MD and Philadelphia, PA. DeIDOT has already proposed four alternatives for consideration. A fifth striping and signing option would be to maintain the existing practice. Once these reports and interviews have been collected and reviewed, a survey instrument will be developed to examine driver and cyclist opinions of the current striping and signing practices as well as the four proposed alternative designs. The survey will be intended to collect data from each group to identify if the marking provides a clear and unambiguous message and if the message isn't clear, what else could the marking indicate. The survey will also do side by side comparisons of the marking and signing options to see which have preference with each group. The side by side would consist of photoshop'ed images showing comparisons of two treatments. Based on the survey results, a presentation will be made to determine the next course of action. If the preferred option is to maintain the existing striping and signing plans, then a final report will be prepared for DeIDOT at this point.

Once the treatment options are narrowed to one or two possibilities, then DeIDOT will select locations to test the new alternative. Based on survey results, locations will be chosen to test the new plans with a variety of variables. Some of these variables might include high vs. moderate bicycle volumes, high vs. moderate vehicle volumes, high vs. moderate vehicle speeds, and urban vs. suburban locations. This example set of variables would result in eight test sites. Once DeIDOT develops plans and re-stripes and re-signs the new intersections, portable video cameras would be set up at each location to record driver and cyclist behavior. If practical, cyclists will also be asked to complete short surveys once they are past the intersection, collection their opinions of the new markings. The collected video will be analyzed for driver and cyclist behavior, looking for evidence of confusion by either party of what to do or what to expect, and any driver / cyclist conflicts or incidents.

The results of all the surveys, interviews and video analysis will be prepared into a final report and delivered to DeIDOT. This work will be done with the assistance of groups like Bike Delaware and the responsible departments within DeIDOT. Because this research involves survey data, it will require review for approval of Institute Review Board for exemption from human subjects' procedures (<http://www.udel.edu/research/preparing/humansub-protocolreview.html>).

**Benefits and Deliverables**

The results of all the surveys, interviews and video analysis will be prepared into a final report and delivered to DelDOT. This work will be done with the assistance of groups like Bike Delaware and the responsible departments within DelDOT.

**Project Personnel**

Mark Luszczyk will serve as the project manager for this work with Dr. Rusty Lee working as the principal investigator. One graduate student will also be assigned to the project.