U.S. Department
of Transportation
Federal Highway Administration

1200 New Jersey Ave., SE
Washington, D.C. 20590

JUN 17 2016

In Reply Refer To:
HOTO-1

Mr. Roger A. Wentz
President & CEO
American Traffic Safety Services Association
15 Riverside Parkway, Suite 100
Fredericksburg, VA 22406-1022

Dear Mr. Wentz:

The Federal Highway Administration (FHWA) has reviewed your request for a modification to Interim Approval 14, which allows for the use of green-colored pavement in bicycle lanes and bicycle lane extensions. Specifically, modifications were requested to the color box defining the allowable color range of green-colored pavement under the Interim Approval and to the nighttime chromaticity requirement.

The color box defined for green-colored pavement was developed based on a sample of green colors in use internationally. The intent was to confine the color range available to limit confusion for road users and provide manufacturers and agencies with a clear specification. Initial consultations with industry groups had indicated that manufacturers would be able to meet the requirements of the resulting color box. However, without any data available on in-service, weathered materials, determining definitive limits for the color box was problematic.

In coordination with the American Traffic Safety Services Association, the FHWA learned that almost all products on the market, when newly applied, fall within a small area of the published color box. Manufacturers reported that it was too difficult to achieve uniformity between batches of product that was colored toward the upper end of the published color box. Therefore, most products start out in the lower end of the box when first applied.

The FHWA has received data from industry tests of several provided green pavement coloring materials, all of which, when first applied, produce a color within the current published color box. Accelerated ultraviolet (UV) exposure testing shows that as these materials were exposed to UV light simulating in-service conditions, their color gradually fell below the lower end of the published color box. This effect was consistent across many of the tested products.

In order to ensure that field installations of green-colored pavement are uniform throughout their service life, the FHWA is extending the limits of the approved color box for green-colored pavement to account for in-service wear based on UV exposure. The limits of the published color box will expand at this time rather than exclude any color range that was previously allowed.

The FHWA was also asked to evaluate the need for a nighttime chromaticity requirement. While daytime chromaticity requirements are measured with a very specific test using a single illumination source, nighttime chromaticity can be influenced heavily by the type of light source used. The FHWA's testing uses a single source, an incandescent lamp, which cannot mimic all possible sources of illumination. Because the variability in nighttime conditions and light sources precludes using the daytime color range,

and because retroreflectivity is not required when installing green-colored pavement, the FHWA is rescinding the requirement for nighttime chromaticity.

With this Official Ruling, the FHWA makes the following revisions to Interim Approval 14:

1. The daytime chromaticity coordinates for the color used for green-colored pavement shall be as follows:

1		2		3		4	
X	Y	X	Y	X	Y	X	Y
0.230	0.754	0.266	0.460	0.367	0.480	0.444	0.583

These coordinates include the original published color box plus the additional area in the revised color box.

2. The nighttime chromaticity requirements provided in Interim Approval 14 are rescinded. There will be no nighttime chromaticity requirement for green-colored pavement. All installations must still meet the daytime requirement.

While this revision allows for the published color box to remain while adding new range to accommodate in-service wear, it is likely that future editions of the MUTCD will restrict the color box to better reflect the range of products available. At this time, the future daytime chromaticity requirements are expected to be as suggested in the revised color box:

1		2		3		4	
X	Y	X	Y	X	Y	X	Y
0.230	0.714	0.266	0.460	0.367	0.480	0.367	0.583

Since these results and this interpretation are based upon simulated in-service wear, before making a final update for future editions for the MUTCD, the FHWA will request in-service field data on installations of green-colored pavement to ensure that in-service wear is corresponding to the test results.

For recordkeeping purposes, we have assigned the following official ruling number and title: "9(09)-86(I) – Chromaticity Requirements for Green-Colored Pavement." Please refer to this number and title in any future correspondence regarding this topic.

Sincerely yours,

Mark R. Kehrli
Director, Office of Transportation
Operations