

## Administering the 30-foot Moving Average Low Pass Filter Leave-out

### Introduction:

This document provides guidance for administering the 30-foot Moving Average Low Pass (MALP) Filter Leave-out, one of the conditions for which the smoothness of hot mix asphalt (HMA) pavements may be evaluated, in accordance with Construction Procedure Directive (CPD) 21-13, "Smoothness Leaveout," using a 12-foot straightedge instead of an inertial profiler. This document is provided because of the challenges of determining which locations qualify for this leave-out.

### Background:

The 30-foot MALP Filter Leave-out was added to the list of leave-out locations in December, 2020. CPD 21-13 provides direction to include this leave-out in existing contracts when requested by the contractor as a no cost change order.

This leave-out addresses locations at which the surface being overlaid has wavelength features that are significant enough to require more than a single lift of HMA to meet inertial profiling smoothness thresholds. These locations are still required to meet the 12-foot straightedge smoothness thresholds. Figures 1, 2, and 3 are photos of pavements with these longer wavelength features. There will be locations that will qualify for this leave-out that aren't as obvious as those visible in Figures 1, 2 and 3.

### Example locations that qualified for the 30-foot MALP Leave-out:



Figure 1



Figure 2



Figure 3

The updated specifications or change order issued in accordance with CPD 21-13 include the leave-out by adding the following item to the list of items in the second paragraph of Section 36-3.01D(3)(b)(i) "General":

"Areas of hot mix asphalt with a single opportunity within 20 feet of locations where localized roughness exceeds 160 inches per mile on the BASELINE profile after filtering the profile with the ProVAL Moving Average Low Pass (MALP) filter with a 30-foot short cutoff wavelength"

Use these steps to evaluate the BASELINE profile for locations that meet the requirements of this leave-out:

1. Within ProVAL, click the "Editor" button.
2. In the "File" field, select the "BASELINE" profile from the drop-down selection menu. If there is no BASELINE profile, select the EXIST profile.
3. Click the "Navigate" button, then select "Filtering."
4. In the "Filter Type" field, select "Moving Average Low Pass."
5. In the "Short Cutoff Wavelength (ft)" field, enter "30."
6. To generate an artificially smoothed profile (\*.ppf), click the "Filter" button.
7. To save the artificially smoothed profile to the current ProVAL project file (\*.pvp), click the "Save" button. Once the file is saved, you will see it in the "File" field with the text "MALP" appended to the file name you selected in Step 2.
8. Then save the ProVAL project file (\*.pvp) with this profile added to it.
9. Use the Ride Quality module with the following selections;
  - a. Analysis Type set as "Continuous"
  - b. Ride Quality Index set as "IRI"
  - c. Threshold set to "160.0" in/mi
  - d. Segment Length set to "25.0" feet

Then open the artificially smoothed profile (\* MALP.ppf) and evaluate both the left and right wheel paths to determine the limits where localized roughness exceeds 160 inches per mile.

10. Define the start and stop position of each leave-out by extending the section limits determined in Step 9 by adding 20 feet in each direction.
11. Compare the BASELINE profiles and the PAVE, FINAL profiles, or both, for differences in distance measuring instrument (DMI) stationing. Add the leave-outs to the PAVE, FINAL profiles, or both, by adjusting the stationing determined in Step 10 to account for the difference in stationing between the BASELINE and PAVE, FINAL profiles, or both.