

First, check the Pavement Program's Smoothness Website at <https://maintenance.onramp.dot.ca.gov/paveprogram/pavement-smoothness> to verify that this is the most recent version of these nSSP's. If not, download the most recent version of these nSSP's and use those in your project.

Use nSSP when project has obtained Approval from Sponsor. Memo dated 2/14/19 giving blanket approval can be considered as approval, but notify HQ through [nssp.submittals@dot.ca.gov](mailto:nssp.submittals@dot.ca.gov) email address that this nSSP will be used so that projects with this nSSP can be tracked. NSSP 36-3.01 is required when using this nSSP. Include Supplemental funds for Smoothness Incentive/Disincentive as shown below:

Target MRI (in/mi)	Supplemental Funds Formula
60	\$9,000 X Pavement Lane Miles
75	\$4,500 X Pavement Lane Miles
% Improvement < 0.3'	\$4,500 X Pavement Lane Miles
% Improvement ≥ 0.3'	\$9,000 X Pavement Lane Miles

In Supplemental funds include item 066393 Hot Mix Asphalt Smoothness Incentive Include the "HMA Smoothness Incentive," item in your supplemental justification memo.

If plans show corrective grinding is required, include Bid Item:

**390021A FULL WIDTH SEGMENT CORRECTION**

And/or

**390025A PARTIAL WIDTH SEGMENT CORRECTION.**

Replace section 39-2.01A(4)(i)(iii) with:

**39-2.01A(4)(i)(iii) Pavement Smoothness**

**39-2.01A(4)(i)(iii)(A) General**

Schedule smoothness testing with the Engineer. Unless otherwise authorized, all smoothness testing must be performed in the presence of the Engineer.

Measure smoothness of new pavement alignment or pavement realignment with an inertial profiler. The Department determines smoothness pay adjustments using the Target 60 Pay Adjustment table in section 39-2.01A(4)(i)(iii)(B).

Measure smoothness of pavement constructed on existing pavement surfaces with an inertial profiler. The Department determines pay adjustments as shown in the applicable Pay Adjustment table.

Measure smoothness of:

1. Existing asphalt concrete surface before performing any work on the surface and provide the Engineer the result labeled as the "EXIST" inertial profiler data file. Notify the Engineer if mean roughness index (MRI) results vary more than 10 percent from the MRI information provided by the Department at the time of advertisement. For projects suspended for more than 30 days, measure the smoothness of the existing surface that has not received an HMA overlay and provide the Engineer the result labeled as "EXISTR" inertial profiler data file. Use the segment MRIs from this profile as the MRI0.

2. Existing pavement segments if structural repairs such as remove and replace asphalt concrete or leveling courses are made and provide the Engineer the result labeled as "BASELINE" inertial profiler data file.
3. Pavement segments, exclusive of OGFC on new HMA, before performing any HMA smoothness corrections and provide the Engineer the result labeled as "PAVE" inertial profiler data file.
4. Pavement segments, exclusive of OGFC on new HMA, after performing any HMA smoothness corrective work and provide the Engineer the results labeled as "FINAL" inertial profiler data file. Use the "PAVE" inertial profiler data as the "FINAL" inertial profiler data if there is no corrective work in the segment.
5. Pavement segments of OGFC before performing any OGFC smoothness correction. Profile the sections and provide the Engineer the result labeled as "PAVEO" inertial profiler data file.
6. Pavement segments of OGFC after performing any OGFC smoothness corrective work and provide the Engineer the result labeled as "FINALO" inertial profiler data file. Use the "PAVEO" inertial profiler data file as the "FINALO" inertial profiler data file when no corrective work in the segment is performed.

MRI<sub>0</sub> is the lower MRI value from the "EXIST" and "BASELINE" profiles for the 0.1-mi segment and must be used to determine the applicable section:

#### HMA Pay Adjustment

Total asphalt thickness (ft) <sup>a</sup>	MRI <sub>0</sub> (in/mi)	HMA final MRI (in/mi) adjustment table	Applicable section
≥ 0.30	<165	Target 60 Pay Adjustment	39-2.01A(4)(i)(iii)(B)
	≥165	Percent Improvement Pay Adjustment	39-2.01A(4)(i)(iii)(D)
< 0.30	<135	Target 75 Pay Adjustment	39-2.01A(4)(i)(iii)(C)
	≥135	Percent Improvement Pay Adjustment	39-2.01A(4)(i)(iii)(D)

<sup>a</sup> Total HMA thickness exclusive of OGFC

Notify the Engineer 10 days before collecting inertial profiler data. Allow the Engineer 2 days after receipt of your data to complete inertial profiler verification of all data except the "FINAL" inertial profiler data. Allow the Engineer 10 days after receipt of your data to complete verification of "FINAL" inertial profiler data.

If accepted by the Engineer, the Department uses your inertial profiler data for acceptance and determination of the payment adjustment.

Segments may be correctively ground to improve pay adjustments to full pay. The Department does not allow corrective grinding into positive pay adjustments. The Department determines positive pay adjustment segments before any corrective grinding. Correction of areas of localized roughness in positive pay adjustment segments cannot improve pay.

Corrective Actions:

1. Correction may be diamond grinding or remove and replace at your option.
2. Corrective grinding must comply with section 39-2.01C(16).
3. When OGFC is being placed over the surface of HMA, these requirements apply to the HMA surface of which the OGFC is being placed on. Smoothness requirements for OGFC are specified in section 39-2.04A(4)(c)(iii).

#### **39-2.01A(4)(i)(iii)(B) Pay Adjustments for Target MRI 60**

The Department applies the following pavement smoothness pay adjustments to 0.1-mi segments based on your verified inertial profiler data:

### Target 60 Pay Adjustment

MRI <sub>SEG</sub> (in/mi)	Pay adjustment per 0.1 mi	Corrective action <sup>a</sup>
≤ 45.00	+ \$900.00	None
45.01 – 55.00	+ ((55.00 – MRI <sub>SEG</sub> ) x \$90.00)	None
55.01 - 65.00	Full Pay	None
65.01 – 80.00	- ((MRI <sub>SEG</sub> – 65.00) x \$190.00)	Optional
> 80.00	Not Applicable	Mandatory

<sup>a</sup>See 39-2.01A(4)(i)(iii) Pavement Smoothness

No areas of localized roughness over 160 IRI are allowed.

### 39-2.01A(4)(i)(iii)(C) Pay Adjustments for Target MRI 75

The Department applies the following pavement smoothness pay adjustments to 0.1-mi segments based on your verified inertial profiler data:

### Target 75 Pay Adjustment

MRI <sub>SEG</sub> (in/mi)	Pay adjustment per 0.1 mi	Corrective action <sup>a</sup>
≤ 60.00	+ \$450.00	None
60.01 – 70.00	+ ((70.00 – MRI <sub>SEG</sub> ) x \$45.00)	None
70.01 - 80.00	Full Pay	None
80.01 – 90.00	- ((MRI <sub>SEG</sub> – 80.00) x \$135.00)	Optional
> 90.00	Not Applicable	Mandatory

<sup>a</sup> See 39-2.01A(4)(i)(iii) Pavement Smoothness

No areas of localized roughness over 160 IRI are allowed.

### 39-2.01A(4)(i)(iii)(D) Acceptance Criteria using Percent Improvement

The Department applies pavement smoothness pay adjustments to 0.1-mi segments based on your verified inertial profiler data. The Department determines payment adjustments using a percent of target MRI (PoT). The target MRI (MRI<sub>t</sub>) is determined based on the "EXIST" or "BASELINE" MRI (MRI<sub>0</sub>) exclusive of the OGFC and the number of opportunities as shown in the following table:

### Target MRI (MRI<sub>t</sub>)

Number of opportunities	Target MRI (MRI <sub>t</sub> )
1	= 0.3 x MRI <sub>0</sub> + 35
2	= 0.09 x MRI <sub>0</sub> + 45.5
3	= 0.027 x MRI <sub>0</sub> + 48.7

Note: If the calculated MRI<sub>t</sub> is less than 60, use MRI<sub>t</sub> = 60 for HMA thickness ≥ 0.3'.

If the calculated MRI<sub>t</sub> is less than 75, use MRI<sub>t</sub> = 75 for HMA thickness < 0.3'.

Opportunities for improving smoothness include:

1. A single lift of asphalt: Where an HMA layer thickness allows the layer to be placed in more than 1 lift, the number of opportunities will be equal to the maximum number of lifts the layer can be broken into regardless of aggregate size chosen.
2. Micro milling or cold planing not in the same shift as the paving: When you choose to micro mill or cold plane and pave in the same shift, but have the option to micro mill or cold plane and pave in different shifts, the micro milling or cold planning will still be considered a separate opportunity.

Determine the Percent of Target MRI (PoT) of each completed 0.1-mi segment of lane using the following equation:

$$(\%)PoT = (MRI_{SEG} / MRI_t) \times 100 \text{ rounded to the nearest tenth of 1 percent}$$

where:

$MRI_{SEG}$  = the MRI of each 0.1-mi section of completed lane after all corrections.

Payment adjustments for each 0.1-mi segment of lane will be made as shown in the following table:

**Percent Improvement Pay Adjustment**

PoT	Payment adjustment per 0.1 mi per lane $\geq 0.30'$	Payment adjustment per 0.1 mi per lane $< 0.30'$	Corrective action in fixed increment <sup>a</sup>
$PoT \leq 75$	\$900.00	\$450.00	May only grind areas to meet localized roughness thresholds
$75 < PoT \leq 90$	$\$900.00 - (PoT - 75.00) \times \$60.00$	$\$450.00 - (PoT - 75.00) \times \$30.00$	May only grind areas to meet localized roughness thresholds
$90 < PoT \leq 110$	Full Pay	Full Pay	May only grind areas to meet localized roughness thresholds
$110 < PoT \leq 125$	$-(PoT - 110.00) \times (\$190.00)$	$-(PoT - 110.00) \times (\$90.00)$	Corrective Actions permitted
If $MRI_{SEG} \leq 90$ in/mi and $PoT > 125$	$-(PoT - 110.00) \times (\$190.00)$	$-(PoT - 110.00) \times (\$90.00)$	Corrective Actions permitted
If $MRI_{SEG} > 90$ in/mi and $PoT > 125$	Not Applicable	Not Applicable	Mandatory Correction

<sup>a</sup> 39-2.01A(4)(i)(iii)(A) General

No areas of localized roughness (ALR) greater than  $ALR_{MAX}$  are allowed.  $ALR_{MAX}$  is the greater value of 160 in/mi or calculated value using the following equation:

$$ALR_{MAX} = 2.1 \times MRI_t$$

**39-2.01A(4)(i)(iii)(E) Verification Testing**

The Engineer verifies your inertial profiler data under section 36-3.01D(3)(b)(ii).

**Replace section 39-2.01C(3)(d) with:**

**39-2.01C(3)(d) Reserved**

**Replace section 39-2.01C(3)(e) with:**

**39-2.01C(3)(e) Prepaving Corrections**

**39-2.01C(3)(e)(i) General**

Section 39-2.01C(3)(e) applies to existing asphalt concrete surfaces if a bid item for the following is shown in the Bid Item List:

1. Full Width Segment Correction
2. Partial Width Segment Correction

When micro milling is used, the paving equipment and operation must conform with the requirements in section 39-3.04C. The micro milling drum must have cutting teeth that are:

1. Tungsten-carbide or diamond tipped
2. Spaced no greater than 1/4-inch apart on center
3. Configured such that the deviation in elevation between any 2 teeth does not exceed 1/16 inch

Dispose of grinding or micro milling residue.

Pave within 7 days of prepaving corrections.

The final pavement surface must comply with section 39-2.01A(4)(i)(iii).

### **39-2.01C(3)(e)(ii) Full Width Segment Correction**

Full Width Segment Correction applies to the full width and length of a specified 0.1-mi segment where a bid item for Full Width Segment Correction is shown on the Bid Item List and locations shown on the plans. Full Width Segment Correction is:

1. Diamond grinding the entire segment surface or
2. Micro milling the entire segment surface not in the same shift as the paving

When full width segment corrections are made to the existing pavement use the EXIST profile as the "BASELINE" profile. The Full Width Segment Correction is considered an opportunity for improvement.

### **39-2.01C(3)(e)(iii) Partial Width Segment Correction**

Partial Width Segment Corrections applies to existing asphalt concrete segments if a bid item for Partial Width Segment Corrections number of 0.1-mi sections is shown on the Bid Items List.

Develop a correction plan and provide to the Engineer 5 days before making segment corrections. Include the maximum removal depth according to the ProVAL smoothness assurance analysis grinding report or other 3D modeling software report. Do not remove more than 15 percent of the existing pavement thickness.

Correction includes:

1. Diamond grinding in the wheel paths or cold planer or paver smoothness referencing locations.
2. Micro milling in the wheel paths or cold planer or paver smoothness referencing locations.
3. 3D modeling of the existing roadway and subsequent automatic machine guidance of either cold planer, paver, or both.
4. Alternative method of correction authorized by the Engineer that complies with final HMA pavement smoothness requirements.

Upon authorization of your correction plan, correct the existing roadway.

For HMA layer thickness, exclusive of the OGFC, greater than or equal to 0.30 ft including corrections, the final pavement surface must comply with 39-2.01A(4)(i)(iii)(B).

For HMA layer thickness, exclusive of the OGFC, less than 0.30 ft including corrections, the final pavement surface must comply with section 39-2.01A(4)(i)(iii)(C).

Notify the Engineer of those areas where existing pavement depth limits a 0.1-mi segment correction. The Engineer may order you to:

1. Not perform correction of the 0.1-mi segment. The "EXIST" profile MRI will be the  $MRI_0$ . Final pavement surface must comply with section 39-2.01A(4)(i)(iii)(D).
2. Correct to a limited depth and measure smoothness of the corrected areas with an inertial profiler. The profile after making correction will be the "BASELINE" profile. Final pavement surface must comply with section 39-2.01A(4)(i)(iii)(D). Do not consider this correction as an opportunity for the percent improvement  $MRI_t$  determination.
3. Correct by a different method and measure smoothness of the corrected 0.1-mi segment with an inertial profiler. Corrective work performed by a different method is change order work. The profile after making correction will be the "BASELINE" profile. Final pavement surface must comply with section 39-2.01A(4)(i)(iii)(D).

**Replace section 39-2.04A(4)(c)(iii) with:**

**39-2.04A(4)(c)(iii) Pavement Smoothness of OGFC**

**39-2.04A(4)(c)(iii)(A) General**

The pavement smoothness of a 0.1 mi segment of OGFC must comply with the requirements shown in the following table:

**OGFC Pavement Smoothness Acceptance Criteria**

OGFC placement on	Applicable section
Existing pavement	39-2.04A(4)(c)(iii)(B)
Existing Pavement with Cold Plane	39-2.04A(4)(c)(iii)(C)
HMA Overlay or New Construction	39-2.04A(4)(c)(iii)(D)

Corrective action is required only to reduce ALR below the maximum allowed. Corrective action must not reduce pavement thickness more than allowed in section 39-2.01C(16). Correction may be diamond grinding or remove and replace at your option. The maximum pay adjustment for remove and replace areas is full pay.

**39-2.04A(4)(c)(iii)(B) OGFC Paved on Existing Pavement**

The Department applies pavement smoothness pay adjustments to 0.1-mi segments based on your verified profiler data. The Department determines pay adjustments using a percent of target MRI (PoT). The target MRI for OGFC ( $MRI_{TO}$ ) is determined using the following equation:

$$MRI_{TO} = 0.3 \times MRI_0 + 35. \text{ If the calculated } MRI_{TO} \text{ is less than } 75 \text{ in/mi, use } MRI_{TO} = 75 \text{ in/mi}$$

where:

$$MRI_0 = \text{"BASELINE" MRI}$$

Determine the Percent of Target MRI (PoT) of each completed 0.1-mi segment of lane using the following equations:

$$(\%) PoT = (MRI_{SEGO} / MRI_{TO}) \times 100 \text{ rounded to the nearest tenth of 1 percent}$$

where:

$$MRI_{SEGO} = \text{MRI of each 0.1-mi segment from PAVE profile for OGFC paving}$$

Payment adjustments for each 0.1-mi segment of lane will be made as shown in the following table:

**Percent Improvement Pay Adjustment**

PoT	Payment adjustment per 0.1 mi per lane	Corrective action in fixed increment
$PoT \leq 75\%$	\$450.00	May only grind to meet ALR thresholds
$75\% < PoT \leq 90\%$	$\$450.00 - (PoT - 75.00) \times \$30.00$	May only grind to meet ALR thresholds
$90\% < PoT \leq 110\%$	Full Pay	May only grind to meet ALR thresholds
$110\% < PoT \leq 125\%$	$-(PoT - 110.00) \times (\$90.00)$	May only grind to meet ALR thresholds
$PoT > 125\%$	$-(PoT - 110.00) \times (\$90.00)$	May only grind to meet ALR thresholds

Corrective action required only to reduce ALR below the maximum allowed. Corrective action must not reduce pavement thickness more than allowed in section 39-2.01C(16). Correction may be diamond

grinding or remove and replace at your option. The maximum pay adjustment for remove and replace areas is full pay.

No areas of localized roughness greater than  $ALR_{MAX}$  is allowed.  $ALR_{MAX}$  is the greater value of 160 in/mi or calculated value using the following equation:

$$ALR_{MAX} = 2.1 \times MRI_{TO}$$

**39-2.04A(4)(c)(iii)(C) OGFC Paved on Existing Pavement with a Cold Planed Surface**

The following pavement smoothness pay adjustments will be applied to segments where a bid item for cold plane asphalt concrete applies:

**Target 75 Pay Adjustment**

$MRI_{SEG}$ (in/mi)	Pay adjustment per 0.1 mi	Corrective action
$\leq 60.00$	+ \$450.00	May only grind to meet ALR thresholds
60.01 –70.00	+ $((70.00 - MRI_{SEGO}) \times \$45.00)$	May only grind to meet ALR thresholds
70.01 - 80.00	Full Pay	May only grind to meet ALR thresholds
$> 80.00$	- $((MRI_{SEGO} - 80.00) \times \$135.00)$	May only grind to meet ALR thresholds

$MRI_{SEGO}$  = MRI of each 0.1-mi segment from PAVE profile for OGFC paving.

Corrective action is required only to reduce ALR below the maximum allowed. Corrective action must not reduce pavement thickness more than allowed in section 39-2.01C(16). Correction may be diamond grinding or remove and replace at your option. The maximum pay adjustment for remove and replace areas is full pay.

No areas of localized roughness over 160 IRI are allowed.

**39-2.04A(4)(c)(iii)(D) OGFC Paved on New Construction or HMA Overlay**

Pavement smoothness of OGFC placed on new construction or HMA overlay must comply with the following requirements for a 0.1-mi section:

The Department applies pavement smoothness pay adjustments to 0.1-mi segments based on your verified inertial profiler data.

The Department determines payment adjustments using a percent of targeted MRI (PoT) for the OGFC. The  $MRI_{TO}$  of the segment must be less than or equal to  $MRI_{FINALHMA}$ .

Determine the Percent of Target MRI (PoT) of each completed 0.1-mi segment of lane using the following equations:

$$(\%) PoT = (MRI_{SEGO} / MRI_{TO}) \times 100 \text{ rounded to the nearest tenth of 1 percent}$$

where:

$MRI_{SEGO}$  = MRI of each 0.1-mi segment from PAVE profile for OGFC paving.

$MRI_{TO}$  = Final MRI of HMA layer where OGFC is placed on ( $MRI_{FINALHMA}$ )

Pay adjustments for each 0.1-mi segment of lane will be made as shown in the following table:

**Percent Improvement Pay Adjustment**

PoT	Payment adjustment per 0.1 mi per lane	Corrective grinding in fixed increment
$PoT \leq 100\%$ of $MRI_{TO}$	Full Pay	May only grind to meet ALR thresholds
$PoT > 100\%$ of $MRI_{TO}$	$-(PoT-100.00) \times (\$100.00)$	May only grind to meet ALR thresholds

Corrective action is required only to reduce ALR below the maximum allowed. Corrective action must not reduce pavement thickness more than allowed in section 39-2.01C(16). Correction may be diamond grinding or remove and replace at your option. Remove and replace areas maximum pay adjustment is full pay.

No areas of localized roughness over 160 in/mi are allowed.