November 22, 2021

Mr. Henry A. Ross
Plasticade
100 Howard Avenue, Des Plaines
IL 60018
USA

Dear Mr. Ross:

This letter is in response to your May 19, 2021 request for the Federal Highway Administration (FHWA) to review a roadside safety device, hardware, or system for eligibility for reimbursement under the Federal-aid highway program. This FHWA letter of eligibility is assigned FHWA control number WZ-427 and is valid until a subsequent letter is issued by FHWA that expressly references this device.

**Decision**

The following device is eligible within the length-of-need, with details provided in the form which is attached as an integral part of this letter:
- Plasticade SS621A Sign Stand with Aluminum Sign Panels at 84 inches

**Scope of this Letter**

To be found eligible for Federal-aid funding, new roadside safety devices should meet the crash test and evaluation criteria contained in the American Association of State Highway and Transportation Officials’ (AASHTO) Manual for Assessing Safety Hardware (MASH). However, the FHWA, the Department of Transportation, and the United States Government do not regulate the manufacture of roadside safety devices. Eligibility for reimbursement under the Federal-aid highway program does not establish approval, certification or endorsement of the device for any particular purpose or use.

This letter is not a determination by the FHWA, the Department of Transportation, or the United States Government that a vehicle crash involving the device will result in any particular outcome, nor is it a guarantee of the in-service performance of this device. Proper manufacturing, installation, and maintenance are required in order for this device to function as tested.

This finding of eligibility is limited to the crashworthiness of the system and does not cover other structural features, nor conformity with the Manual on Uniform Traffic Control Devices.
Eligibility for Reimbursement

Based solely on a review of crash test results and certifications submitted by the manufacturer, and the crash test laboratory, FHWA agrees that the device described herein meets the crash test and evaluation criteria of the AASHTO’s MASH. Therefore, the device is eligible for reimbursement under the Federal-aid highway program if installed under the range of tested conditions.

Name of system: Plasticade SS621A Sign Stand with Aluminum Sign Panels at 84 inches
Type of system: Work Zone
Test Level: Test Level 3
Testing conducted by: Texas A&M Transportation Institute (TTI)
Date of request: May 19, 2021

FHWA concurs with the recommendation of the accredited crash testing laboratory on the attached form.

Full Description of the Eligible Device

The device and supporting documentation, including reports of the crash tests or other testing done, videos of any crash testing, and/or drawings of the device, are described in the attached form.

Notice

This eligibility letter is issued for the subject device as tested. Modifications made to the device are not covered by this letter. Any modifications to this device should be submitted to the user (i.e., state DOT) as per their requirements.

You are expected to supply potential users with sufficient information on design, installation and maintenance requirements to ensure proper performance.

You are expected to certify to potential users that the hardware furnished has the same chemistry, mechanical properties, and geometry as that submitted for review, and that it will meet the test and evaluation criteria of AASHTO’s MASH.

Issuance of this letter does not convey property rights of any sort or any exclusive privilege. This letter is based on the premise that information and reports submitted by you are accurate and correct. We reserve the right to modify or revoke this letter if: (1) there are any inaccuracies in the information submitted in support of your request for this letter, (2) the qualification testing was flawed, (3) in-service performance or other information reveals safety problems, (4) the system is significantly different from the version that was crash tested, or (5) any other information indicates that the letter was issued in error or otherwise does not reflect full and complete information about the crashworthiness of the system.
Standard Provisions

- To prevent misunderstanding by others, this letter of eligibility designated as FHWA control number WZ-427 shall not be reproduced except in full. This letter and the test documentation upon which it is based are public information. All such letters and documentation may be reviewed upon request.

- This letter shall not be construed as authorization or consent by the FHWA to use, manufacture, or sell any patented system for which the applicant is not the patent holder.

- This FHWA eligibility letter is not an expression of any Agency view, position, or determination of validity, scope, or ownership of any intellectual property rights to a specific device or design. Further, this letter does not impute any distribution or licensing rights to the requester. This FHWA eligibility letter determination is made based solely on the crash-testing information submitted by the requester. The FHWA reserves the right to review and revoke an earlier eligibility determination after receipt of subsequent information related to crash testing.

Sincerely,

Michael S. Griffith
Director, Office of Safety Technologies
Office of Safety

Enclosures
Request for Federal Aid Reimbursement Eligibility of Highway Safety Hardware

Date of Request: May 19, 2021

Name: Henry A. Ross
Company: Plasticade
Address: 100 Howard Avenue, Des Plaines, IL 60018
Country: U.S.A.

To: Michael S. Griffith, Director
   FHWA, Office of Safety Technologies

I request the following devices be considered eligible for reimbursement under the Federal-aid highway program.

**Device & Testing Criterion** - Enter from right to left starting with Test Level

<table>
<thead>
<tr>
<th>System Type</th>
<th>Submission Type</th>
<th>Device Name / Variant</th>
<th>Testing Criterion</th>
<th>Test Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>'WZ': Crash Worthy Work Zone Traffic Control Devices</td>
<td>☑ Physical Crash Testing ☐ Engineering Analysis</td>
<td>Plasticade* SS621A Sign Stand with Aluminum Sign Panels at 84 inches</td>
<td>AASHTO MASH</td>
<td>TL3</td>
</tr>
</tbody>
</table>

By submitting this request for review and evaluation by the Federal Highway Administration, I certify that the product(s) was (were) tested in conformity with the AASHTO Manual for Assessing Safety Hardware and that the evaluation results meet the appropriate evaluation criteria in the MASH.

**Individual or Organization responsible for the product:**

| Contact Name: | Henry A. Ross | Same as Submitter ✗ |
| Company Name: | Plasticade | Same as Submitter ✗ |
| Address: | 100 Howard Avenue, Des Plaines, IL 60018 | Same as Submitter ✗ |
| Country: | U.S.A. | Same as Submitter ✗ |

Enter below all disclosures of financial interests as required by the FHWA `Federal-Aid Reimbursement Eligibility Process for Safety Hardware Devices' document.

Texas A&M Transportation Institute (TTI) was contracted by Plasticade* to perform full-scale crash testing of the Plasticade* SS621A Sign Stand with Aluminum Sign Panels at 84 inches. There are no shared financial interests in the Plasticade* SS621A Sign Stand with Aluminum Sign Panels at 84 inches by TTI, or between Plasticade* and TTI, other than the costs involved in the actual crash tests and reports for this submission to FHWA.

**690900-PLC 25-26-27**
PRODUCT DESCRIPTION

CRASH TESTING

By signature below, the Engineer affiliated with the testing laboratory, agrees in support of this submission that all of the critical and relevant crash tests for this device listed above were conducted to meet the MASH test criteria. The Engineer has determined that no other crash tests are necessary to determine the device meets the MASH criteria.

Engineer Name: D. Lance Bullard, Jr., P.E.

Engineer Signature: D. Lance Bullard, Jr.  Digitally signed by D. Lance Bullard, Jr. Date: 2021.05.13 13:27:58 -05'00'

Address: 1254 Avenue A, Bldg 7091, Bryan, Texas 77807  Same as Submitter □

Country: U.S.A.  Same as Submitter □

A brief description of each crash test and its result:

<table>
<thead>
<tr>
<th>Required Test Number</th>
<th>Narrative Description</th>
<th>Evaluation Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-70 (1100C)</td>
<td>3-70 MASH states that Test 3-70 for small vehicles is considered optional for workzone traffic control devices weighing less than 220 lb, because velocity changes during low-speed impacts with free-standing, lightweight features will be within acceptable limits. The Plasticade® SS621A Sign Stand weighed 60.8 lb (excluding the sand bags). Therefore, MASH Test 3-70 was not performed on this traffic control device. Non-critical, not conducted</td>
<td>Non-Critical, not conducted</td>
</tr>
<tr>
<td>Required Test Number</td>
<td>Narrative Description</td>
<td>Evaluation Results</td>
</tr>
<tr>
<td>----------------------</td>
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</tr>
<tr>
<td>MASH Test 3-71</td>
<td>involves an 1100C vehicle weighing 2420 lb ±55 lb impacting the traffic control device at an impact speed of 62 mi/h ±2.5 mi/h. Per MASH recommendations, the device was tested at critical impact angles (CIAs) of 90° ±1.5° and 0° ±1.5°. The results of test 690900-PLP25 conducted on February 24, 2021 are found in TTI Test Report number 690900-PLP25-27. In this test, a sign stand with an 080 aluminum sign panel mounted 84 inches from grade to the bottom of sign was impacted. The test vehicle was traveling at an impact speed of 60.8 mi/h when it contacted the sign stand at an impact angle of 90°. Brakes on the vehicle were applied after loss of contact with the sign stand, and the vehicle came to rest 330 ft downstream of the point of impact and 4 ft to the right of centerline of the initial vehicle path. Maximum exterior crush to the vehicle was 2.0 inches in the front plane 13 inches to the left of centerline at bumper height. No occupant compartment deformation or intrusion occurred. No fuel tank damage was observed. The results of test 690900-PLP26 conducted on February 24, 2021 are found in TTI Test Report number 690900-PLP25-27. In this test, a sign stand with an 080 aluminum sign panel mounted 84 inches from grade to the bottom of sign was impacted. The test vehicle was traveling at an impact speed of 60.9 mi/h when it contacted the sign stand at an impact angle of 0°. Brakes on the vehicle were applied after the vehicle exited the test site, and the vehicle came to rest 352 ft downstream of the point of impact and 2 ft to the right of centerline of the initial vehicle path. Maximum exterior crush to the vehicle was 2.0 inches in the front plane 13 inches to the right of centerline at bumper height. No occupant compartment deformation or intrusion occurred. No fuel tank damage was observed. MASH does not require instrumentation of the vehicle when impacting lightweight, freestanding work zone traffic control devices weighing less than 220 lb, therefore the occupant risk factors were not calculated for these tests. The Plasticade® SS621A Sign Stand with Aluminum Sign Panels at 84 inches weighed 60.8 lb (excluding the sand bags). The device performed acceptably for MASH test 3-71 with impact angles of 90° and 0°.</td>
<td>PASS</td>
</tr>
</tbody>
</table>
MASH Test 3-72 involves a 2270P vehicle weighing 5000 lb ±110 lb impacting the traffic control device at an impact speed of 62 mi/h ±2.5 mi/h. Per MASH recommendations, the device was tested at critical impact angles (CIAs) of 90° ±1.5° and 0° ±1.5°.

The results of test 690900-PLP27 conducted on February 24, 2021 are found in TTI Test Report number 690900-PLP25-27. In this test, a sign stand with an 080 aluminum sign panel mounted 84 inches from grade to the bottom of sign was impacted.

The test vehicle was traveling at an impact speed of 62.7 mi/h when it contacted the first sign stand at an impact angle of 90°.

The vehicle was traveling at an impact speed of 62.0 mi/h when it contacted the second sign stand at an impact angle of 0°.

Brakes on the vehicle were applied after exiting the test site, and the vehicle came to rest 365 ft downstream of the point of impact and 4 ft to the right of centerline of the initial vehicle path. Maximum exterior crush to the vehicle was 0.5 inch in the front plane in several locations at bumper height and hood height. No occupant compartment deformation or intrusion occurred. No fuel tank or floor pan damage was observed.

MASH does not require instrumentation of the vehicle when impacting lightweight, freestanding work zone traffic control devices weighing less than 220 lb, therefore the occupant risk factors were not calculated for this test. The Plasticade® SS621A Sign Stand with Aluminum Sign Panels at 84 inches weighed 60.8 lb (excluding the sand bags). The device performed acceptably for MASH test 3-72 with impact angles of 90° and 0°.

Full Scale Crash Testing was done in compliance with MASH by the following accredited crash test laboratory (cite the laboratory’s accreditation status as noted in the crash test reports.):
ATTACHMENTS

Attach to this form:
1) Additional disclosures of related financial interest as indicated above.
2) A copy of the full test report, video, and a Test Data Summary Sheet for each test conducted in support of this request.
3) A drawing or drawings of the device(s) that conform to the Task Force-13 Drawing Specifications [Hardware Guide Drawing Standards]. For proprietary products, a single isometric line drawing is usually acceptable to illustrate the product, with detailed specifications, intended use, and contact information provided on the reverse. Additional drawings (not in TF-13 format) showing details that are relevant to understanding the dimensions and performance of the device should also be submitted to facilitate our review.

FHWA Official Business Only:

<table>
<thead>
<tr>
<th>Eligibility Letter</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>Date</td>
</tr>
</tbody>
</table>

Submit Form
General Information
Test Agency: Texas A&M Transportation Institute (TTI)
TTI Test No.: 690900-PLP25
Test Date: 2021-02-24

Test Article
Type: Work-Zone Traffic Control Device
Name: Plasticade® SS621A sign stand with aluminum sign panel
Installation Height: 84 inches to bottom of sign panel
Material or Key Elements: 48-inch diamond-shaped aluminum sign panel on 4-legged stand with TPU Wind Sleeve

Soil Type and Condition: Concrete pavement, dry; four 40-lb sand bags

Test Vehicle
Type/Designation: 1100C
Make and Model: 2015 Nissan Versa
Curb: 2315 lb
Test Inertial: 2441 lb
Dummy: 165 lb
Gross Static: 2606 lb

Impact Conditions
Speed: 60.8 mi/h
Angle: 90°
Kinetic Energy: 302 kip-ft

Exit Conditions
Speed: 60.5 mi/h

Post-Impact Trajectory
Stopping Distance: 330 ft downstream
4 ft right

Maximum Test Debris Scatter
Sign Stand: 330 ft downstream
4 ft right

Vehicle Damage
VDS: 12FL1
CDC: 12FLEN1
Max. Exterior Deformation: 2.0 inches
OCDI: FS000000
Max. Occupant Compartment Deformation: None
Windshield Damage: None

Figure 5.6. Summary of Results for MASH-2016 Test 3-71 at 90 Degrees on Plasticade® SS621A Sign Stand with Aluminum Sign Panel Mounted at 84 inches.
Figure 6.6. Summary of Results for MASH Test 3-71 at 0 Degrees on Plasticade® SS621A Sign Stand with Aluminum Sign Panel Mounted at 84 inches.
### General Information

- **Test Agency:** Texas A&M Transportation Institute (TTI)
- **Test Standard Test No.:** MASH-2016 Test 3-72 at 90° and 0°
- **TTI Test No.:** 690900-PLP27
- **Test Date:** 2021-02-24

### Test Article

- **Type:** Work-Zone Traffic Control Device
- **Name:** Plasticade® SS621A sign stand with aluminum sign panel
- **Installation Length:** 84 inches to bottom of sign panel
- **Material or Key Elements:** 48-inch diamond-shaped aluminum sign panel on 4-legged stand with TPU Wind Sleeve

### Soil Type and Condition

- Concrete pavement, dry; four 40-lb sand bags

### Test Vehicle

- **Type/Designation:** 2270P
- **Make and Model:** 2015 RAM 1500
- **Curb:** 5147 lb
- **Dummy:** No dummy
- **Gross Static:** 5034 lb
- **Impact Conditions:**
  - **Speed Sign Stand #1:** 62.7 mi/h
  - **Angle Sign Stand #1:** 90°
  - **Speed Sign Stand #2:** 62.0 mi/h
  - **Angle Sign Stand #2:** 0°
- **Kinetic Energy #1 & #2:** 662 kip-ft / 647 kip-ft

### Exit Conditions

- **Speed Sign Stand #1:** 62.0 mi/h
- **Speed Sign Stand #2:** 60.7 mi/h

### Post-Impact Trajectory

- **Stopping Distance:** 365 ft downstream
- **Maximum Test Debris Scatter:**
  - Sign Stand #1: 4 ft right
  - Sign Stand #2: 3 ft left
- **Vehicle Damage:**
  - **VDS:** 12FR1
  - **CDC:** 12FREN1
  - **Max. Exterior Deformation:** 0.5 inch
  - **OCDI:** None
  - **Max. Occupant Compartment Deformation:** None
  - **Windshield Damage:** None

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**Figure 7.6. Summary of Results for MASH-2016 Test 3-72 at 90 Degrees and 0 Degree on Plasticade® SS621A Sign Stand with Aluminum Sign Panel Mounted at 84 inches.**