APPENDIX D – CERTIFICATION LETTER:

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Calspan

March 31, 2014

To whom it may concern:

This letter is to certify that the Autogate Shallow Foundation M-30 VP-SF Barrier, provided by Autogate, was tested to the requirements of the ASTM standard F-2656-07, Standard Test Method for Vehicle Crash Testing of Perimeter Barriers, in place at the date of the test.

The test was performed at Calspan Corporation on March 25, 2014. The barrier was impacted by a truck weighing 6763.1 kg (14,910 lbs.) travelling at 53.15 kph (33.03 mph). Dynamic measurements of the test vehicle's payload (truck bed) prove forward motion was halted approximately 333 mm and 371 mm (respectively) before the one meter penetration line. As such, based on the truck mass, impact velocity and penetration into the protected zone, the barrier rating per the ASTM standard F-2656-07 is M30 – P1.

Calspan is accredited to ISO 17025 to perform ASTM F2656-07 testing by Perry Johnson Laboratory Accreditation, INC. under Certificate Number L13-137.

Respectfully,

Edward Dutton

Edward Dutton

Senior Test Engineer

Safer Highways…Safer Skies

Aerospace Sciences | Crash Research | Flight Research | Transportation Research

EXECUTIVE SUMMARY:

ASTM F2656-07:

The ASTM standard F2656-07, *Standard Test Method for Vehicle Crash Testing of Perimeter Barriers* was created to address a broad range of incident conditions by different vehicle types, at different impact velocities and to define acceptable penetration limitations to help define passive perimeter and active entry point barriers applicability based on the setback distance available at a particular site. This is accomplished by establishing a comprehensive range of test conditions, designations and penetration performance levels.

OBJECTIVE:

The objective of this test was to determine a penetration rating for the Autogate Shallow Foundation M-30 VP-SF barrier as tested per ASTM F2656-07, at the M30 test condition.

BACKGROUND:

This M30 test of the Autogate Shallow Foundation M-30 VP-SF barrier was conducted for Autogate by Calspan Corporation at their Buffalo, New York test site on March 25, 2014.

SUMMARY:

In accordance with the ASTM F2656-07 M30 test procedure the impact speed must be 45.0-60.0 kph (28.0 to 37.9 mph) and the medium duty truck's test weight must be within 6,800 ± 140 kg (15,000 ± 309 lb.). The barrier was impacted at a velocity of 53.15 kph (33.03 mph) by a medium duty truck whose test weight was 6763.1 kg (14,910 lb.).

RESULT:

The Autogate Shallow Foundation M-30 VP-SF barrier achieved a rating of P1, as established by ASTM F2656-07.

TEST PREPARATION & EXECUTION:

BARRIER INSTALLATION

A single Autogate Shallow Foundation M-30 VP-SF barrier was installed at Calspan's Buffalo test site by Autogate personnel and observed by a Calspan engineer.

The Autogate Shallow Foundation M-30 VP-SF barrier consists of a reinforced, concrete-encased steel base frame and above grade weldments that support a moveable barrier arm that crosses the road path.

The base frame is constructed from W12 steel I-beam and as assembled measures 247"W x 48.6"D x 12.06"H. The base frame is encased in a concrete pad measuring 228"W x 168"D x 20"H, and is reinforced using 5/8" dia. x 162" rebar and 4" x 4" wire mesh (3/16" diameter) that covers the full pad area. Attached to the base frame are two above ground weldments that serve as the operator and yoke attachment points for the barrier arm. The weldments on either side consist of square tube steel uprights measuring 8" x 8" x 56" x 0.50" wall thickness, with 3.31" radius notches cut to receive the barrier arm end pins. The uprights are reinforced with ½" and ¾" A36 steel bolster plates and gussets and were filled with concrete during installation. Installed, the operator and yoke end weldments are mounted 15' apart across the road path and the gate arm horizontal centerline rests 36" above grade. A 78"W x 64"D x 26" raised concrete pad on the right side of the barrier supports a mechanism for raising and lowering the barrier arm. The barrier arm consists of a 6061 aluminum rope housing weldment which measures 214-1/2" in length, with a pin-to-pin measurement of 200-1/2". Slung between two 2-1/2" diameter 4140 steel end pins is a high strength 451,582 ft-lb. rated 16-ply 5/8" diameter Yalex rope encased in an abrasion resistant Kevlar blend protective wrap. A steel collar retains the steel pins which hold the rope bands taut inside the barrier arm. A pin cover plate is welded to the shield retaining the pin and holding tension on the energy absorbing rope bands. During and impact the steel pins engage the embedments, which retains the barrier arm/rope assembly and arrests the vehicle.

Drawings defining the barrier's design can be found within Appendix C of this report.