

INFORMATION HANDOUT

For Contract No. 07-288504

At 07-LA-405-10.5/12.6

Identified by

Project ID 0700021105

MATERIALS INFORMATION

MANUFACTURER'S PLANS AND PARTS LIST FOR TYPE SCI-70GM SMART CUSHION

E-MAIL REGARDING GROUNDWATER, JUNE 2, 2014

HAZARDOUS WASTE ASSESSMENT ADDENDUM, DECEMBER 11, 2013

AND

HAZARDOUS WASTE ASSESSMENT, SEPTEMBER 3, 2013

WITH ATTACHMENTS: "ASBESTOS CONTAINING MATERIAL AND LEAD BASED PAINT SURVEY REPORT, TASK ORDER NO. 07 CONTRACT #07A3321" AND "ATL WORK ORDER NUMBER 1301963"

FOUNDATION REPORT

CHANGEABLE MESSAGE SIGN AT CARSON WEIGH STATION, NORTHBOUND ROUTE 405
OCTOBER 10, 2013

FOUNDATION REPORT

NORTHBOUND CARSON WEIGH STATION, ROUTE 405
MAY 28, 2013

SMART CUSHION INNOVATIONS™

The World's Only Speed-Dependent Crash Attenuators



The Smart Cushion Innovations (SCI) crash attenuator is a revolutionary, speed-dependent product that varies stopping resistance during an impact. The Smart Cushion Innovations (SCI) crash attenuator allows lighter and slower-moving vehicles to have longer ridedown distances and lower ridedown G forces.

Unlike fixed-resistance attenuators, the Smart Cushion Innovations (SCI) attenuator does not reach maximum stopping resistance unless a vehicle is traveling at the maximum design speed. This fully redirective, non-gating, bi-directional, impact attenuator was designed for maximum safety and reusability, as well as outstanding durability before, during and after an impact.

The SCI is the only attenuator with a reverse-tapered design to eliminate side panel stress during a collapse. It also has an extremely low angle of exit on side impacts (<math><1^\circ</math>) to keep vehicles from rebounding back into traffic and causing secondary accidents. This is the lowest angle of exit for any redirective attenuator on the market.



How It Works

The hydraulic porting of the attenuator ensures that the proper resistance is used to stop the vehicle before it reaches the end of the cushion's usable length.

The SCI was specifically designed for durability and resetability to enable resets to be performed in less than one hour. After a frontal impact, an experienced crew can perform the two-stage reset in less than 45 minutes. Side impacts within NCHRP 350 specifications should not damage the attenuator.

After an impact, the cushion requires a dual-stage pull-out with the replacement of two 1/4" shear bolts. The crash attenuator requires a minimal inventory of spare parts because of the new side panels' durability and the normal requirement of only two shear bolts on the frontal impact reset. Minimal damage means quick resetting and reduced worker exposure to traffic, as well as lower costs for traffic control, replacement parts and labor.



Ready To Install

SCI attenuators come fully assembled for a pick-and-set install. A typical installation can be performed in less than 1-1/2 hours. The units require no backstops for permanent or temporary construction applications.

NCHRP 350 Test Results

All NCHRP 350 tests were performed on the same unit in four consecutive days. All tests showed outstanding results for ridedown G forces and low angle of exit. There were no replacement parts required prior to the next test except for shear bolts.

"It's a very easy installation. We set the SCI impact attenuator with a truck-mounted crane, drove into the concrete surfacing and then did some epoxy work. The installation went real well and took about an hour. It would normally take longer for a different type of system. SCI manufactures a quality product and I'm sure they save many lives."

— Tyler Chicoine, Garcia-Chicoine Enterprises Inc., Lincoln, Nebraska

Repair Costs

Based on NCHRP 350 Test results, the **SCI100GM** required the following parts and labor:

NCHRP 350 TEST LEVEL III REPAIR RESULTS		Part Names	Cost	Repair Hrs.	Cost	Total Cost
#3-31	2000 kg vehicle 0 degree frontal impact at 102 km/h	2 – Shear Bolts	\$1	2 man hours	\$80	\$81
#3-32	820 kg vehicle 15 degree frontal impact at 101 km/h	2 - Shear Bolts	\$1	2 man hours	\$80	\$81
#3-33	2000 kg vehicle 15 degree frontal impact at 101 km/h	2 - Shear Bolts	\$1	2 man hours	\$80	\$81
#3-37	2000 kg vehicle 20 degree side impact at 99 km/h	0	\$0	0	\$0	\$0
#3-39	2000 kg vehicle 20 degree rev. side impact at 99 km/h	0	\$0	0	\$0	\$0

Test Levels Available

The **SCI70GM** is our Test Level 2 (45 MPH) attenuator and the **SCI100GM** is our Test Level 3 (62 MPH) attenuator. Both attenuators can protect a wide range of hazards including bridges, median barriers and highway signs.

The first speed-dependent, variable-resistance attenuator that can ramp resistance up or down to provide the smoothest ride down of any system on the market.

*"The **SCI100GM** unit has experienced three hits in a very short period. The first was well above the NCHRP 350 criteria. The crash used every bit of the capacity the unit has and I believe the driver survived because of the performance of the unit in extreme circumstances. The next two hits were within the NCHRP 350 criteria and the unit functioned as designed with very little repair cost. As we gain experience in resetting units, the job can be accomplished in less than 30 minutes for a majority of hits. Damage to the unit for the last two hits was limited to the shear pins and the chevron plate."*

— Ron Jones, Trafficade Services Inc., Phoenix, Arizona

Features



Support Gussets.

Gussets located behind the panels reduce gap formation and deformation to prevent snagging on reverse side impacts.



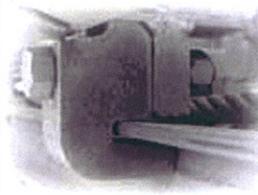
Stronger Side Panel.

Our panels are over 90% stronger than curved profiles. The profile allows the edges to be beveled, reducing the potential for snagging and damage on reverse-direction impacts. The panel also smoothly redirects vehicles on side impacts. The side panel is fabricated from 10-gauge, 60-ksi, minimum-yield steel with a G90 galvanized coating.



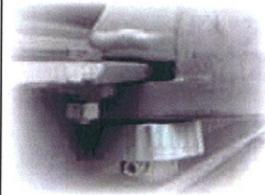
Cable & Cylinder System.

This system allows longer ridedown distances for smaller vehicles, as well as smoother ridedown with lower G forces for all vehicles. The cylinder's hydraulic porting assures a controlled ridedown by applying the necessary resistance required based on the speed of the vehicle.



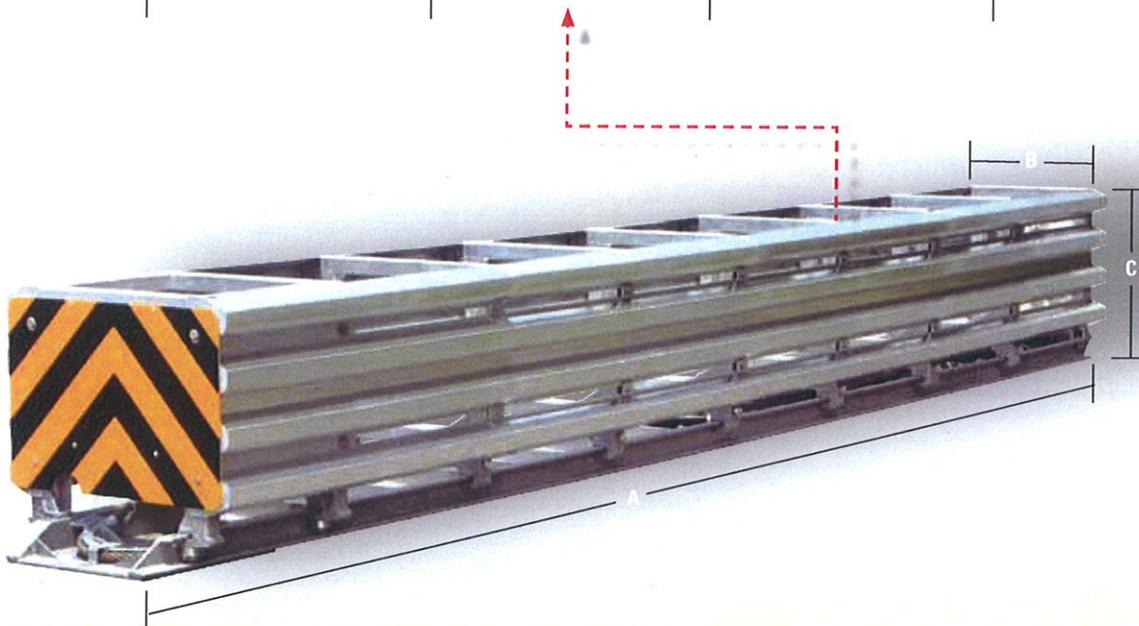
Side Guide Design.

This new design withstands side impacts with no damage. It also allows individual replacement of the support frames.



Front Rollers.

The roller guide design on the front sled produces a smooth, aligned collapse by reducing friction and binding.



SCI Dimensions	Test Level 2	Test Level 3
A	13' 6"	21' 6"
B	24"	24"
C	34"	34"
Weight	2470 lbs.	3450 lbs.

Weights are for attenuators only



SMART CUSHION INNOVATIONS™

Highlights

Safety Benefits

- ▶ Variable force (speed-dependent), not fixed force, provides consistent deceleration during ridedown.
- ▶ Longer ridedown distances and lower sustained G forces for lighter or slower-moving vehicles.
- ▶ Low angle of exit on side impacts (<1°) to keep vehicle from deflecting back into traffic.
- ▶ Quick and easy resetting for reduced worker exposure to traffic.
- ▶ Reduced out-of-service time to maximize highway safety.



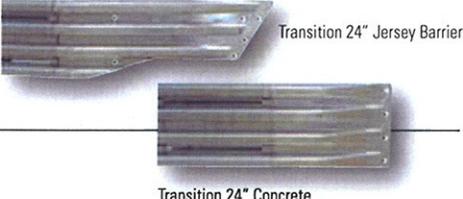
Cost Benefits

- ▶ Minimal replacement parts requirement reduces spare parts inventory and parts costs.
- ▶ Quick, easy resetting reduces labor and traffic control costs.
- ▶ The new, reverse-tapered design eliminates side panel stress on frontal impacts to reduce damage and system fatigue from multiple impacts.
- ▶ Low life cycle cost benefits increase dramatically as impacts occur.



About Work Area Protection Corporation

Work Area Protection Corporation is the international leader in traffic control devices and work zone safety products. Since 1969, we have been meeting customer needs and exceeding quality standards with a wide range of highway and construction safety products. We back those products with knowledgeable, personalized customer service and strong distributor support.

Part No.	Description	Weight
Attenuators		
9400	SCI100GM Attenuator 24" wide w/Concrete Anchors Test Level 3	3500 lbs.
9450	SCI100GM Attenuator 24" wide w/Asphalt Anchors Test Level 3	3575 lbs.
9451	SCI70GM Attenuator 24" wide w/Concrete Anchors Test Level 2	2500 lbs.
9452	SCI70GM Attenuator 24" wide w/Asphalt Anchors Test Level 2	2550 lbs.
Anchor Kits		
9401	Concrete Anchor Kit for SCI100GM	
9402	Asphalt Anchor Kit for SCI100GM	
9453	Concrete Anchor Kit for SCI70GM	
9454	Asphalt Anchor Kit for SCI70GM	
Accessories		
9406	Shear Bolt	
9424	Delineator Panel Yellow Test Level 3	
9456	Delineator Panel Yellow Test Level 2	
9439	Epoxy 22 oz. Cartridge Required for Attenuator Part No. 9400=4/9450=12/9451=3/9452=9	
9440	Nozzle Epoxy Mixing – 1 nozzle required per cartridge	
9444	Spare Parts Kit Test Level 3	
9458	Spare Parts Kit Test Level 2	
Transitions		
9431	Transition 24" Jersey Barrier - Right (viewed from front)	
9432	Transition 24" Jersey Barrier - Left (viewed from front)	
9433	Transition 24" Concrete - Left & Right	

Call for other transition design availability

Disclaimer

This product is only intended for use as a redirective impact attenuator. Installations must be performed according to manufacturer's specification. Improper installations, modifications or unintended use creates a hazardous condition that can cause personal injury, property damage or death. Any modification or unintended use of this product shall immediately void all manufacturers' warranties. SCI Products Inc. disclaims all liability for injuries to persons or property resulting from any modifications to, unintended use of or unspecified installation of this product.

Designs are subject to change without notice.

SMART CUSHION INNOVATIONS is a trademark of SCI Products Inc.

PATENT PENDING.



Permanent Message Boards • Attenuators • Speed Awareness Products • LED Signals • Advanced Warners



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SMART CUSHION INNOVATIONS

SCI100GM

General Specifications

DESCRIPTION:

The SCI100GM is a redirective, non-gating crash attenuator that consists of a base, supporting frames, a sled, side panels, a wire rope cable, sheaves and a shock arresting cylinder. The base is anchored to the mounting surface and provides support for the frames that are mounted on it. The support frames hold the side panels that provide an outer flat redirective surface for side impacts. The sled provides redirective support for side impacts and deceleration force for frontal impacts. It is designed for 24" applications. The SCI100GM telescopes rearward upon frontal impact and can be reset with minimal repair parts. It is NCHRP 350 Test Level 3 approved.

MATERIALS:

SCI100GM Impact Attenuator component parts shall meet the following requirements:

- A. **Shock Arresting Cylinder.** The cylinder shall be specially designed for different Test Levels and filled with an environmentally friendly, fire-resistant hydraulic fluid that will perform to a minimum saturated pour point temperature of -37 degrees C. (-35 degrees F.). The Shock Arresting Cylinder shall be a metered hydraulic cylinder that has internal ports engineered to reduce the speed of the vehicle to a predefined rate that is dependent on a combination of speed and mass. It translates its resistance (force) to the cable that is attached to the sled.
- B. **Cable.** The wire rope cable shall be a 28.6mm (1.125") 6 x 3 IWRC galvanized wire rope cable with a breaking strength of 58.96 metric tons (65 tons). It shall be attached to the sled with an Open Spelter Socket that has a 100% efficiency rating. It shall be reaved around the Shock Arresting Cylinder and terminated to the base with 4 wire rope clips.
- C. **Base.** The base shall be manufactured from 20.5kg/m (13.8lb/ft) steel channel. It shall include all cross bracing necessary to sustain its design criteria impacts without damage.
- D. **Side Panels.** The side panels shall be manufactured from ASTM A1011 Grade 60 Steel with an ASTM653 galvanized coating. The outer surface shall have four flat flutes to provide a substantial redirective bearing surface for side impacts. The outer trailing edge overlaps shall be formed to create a bend toward the inner panel to reduce snag potential on reverse side impacts. The angle of the outer flat surface to the flat side return wall shall be 19 – 22 degrees which provides an optimized angle for maximum rigidity to minimize damage and snag potential on side impacts. The outside trailing edge shall be longitudinally shorter than the inside trailing edge to produce a minimum of a 23 degree taper giving the attachment bolts more surface to hold the panels on the support frames with no overlap past the rear edge of the support frames to reduce snagging on reverse impacts.

- E. Support Frames.** The support frames shall be fabricated out of 63.5mm x 63.5mm x 4.7mm (2.5" x 2.5" x .187") tubular steel. The support frames provide a structure to mount and support the side panels. They will include outboard gussets to support the top and bottom panel flute to eliminate panel fold over at both locations caused by side impacts. They shall be attached to the base by the side guides using a 1" diameter Grade 8 bolt which allows the frames to slide longitudinally upon frontal impacts. The frames shall be designed to be individually replaced without removing other frames.
- F. Front Sled.** The front sled shall be fabricated out of 63.5mm x 63.5mm x 4.7mm (2.5" x 2.5" x .187") tubular steel. It shall have diagonal bracing to minimize distortion on angled hits, support impact of different vehicle heights, and transfer stopping force to the Spelter Socket attachment. The sled shall have four guide rollers to eliminate wedging on angled front impacts.
- G. Transition Panels.** The transition panels shall be manufactured from ASTM A1011 Grade 60 Steel with an ASTM123 galvanized coating. Three standard transition panels shall be available. These shall be: SCI100GM to Jersey Barrier, SCI100GM to Thrie Beam, and SCI100GM Concrete Transition (for vertical surfaces). Drawings are available for the Thrie Beam transition to be used with Thrie and W Beam Guardrail.
- H. Delineator Plate and ReflectORIZATION.** The front delineator plate shall be supplied in the color specified by the state or, if no color is specified, it shall be yellow. ReflectORIZATION shall be in accordance with state requirements.
- I. Metal Work.** All metal work, except side and transition panels, shall be fabricated from ASTM A36 steel. After fabrication, all metal work shall be hot dip galvanized in accordance with ASTM A123. Welding shall be performed by welders certified per AWS3G.
- J. Fasteners.** All bolts shall be American-made Standard Regular Bolts, unless indicated otherwise in the specification. Anchor bolts shall be anchored using an epoxy with an ultimate pullout load rating of 14,695kg (32,397 lbs) and ultimate shear load rating of 10,644 kg (23,467 lbs).

CONSTRUCTION DETAILS:

The SCI100GM shall be built either on existing concrete pad minimum 150 mm (6") deep or existing 150 mm (6") minimum asphalt (type 6 or 7) over 150 mm (6") minimum compacted subbase (minimum 95% of maximum theoretical density) or existing 150 mm (6") minimum asphalt (type 6 or 7) over 76 mm (3") minimum concrete . If new installation is necessary, then the preferred foundation would be a 150 mm (6") reinforced concrete pad per manufacturer's instructions.

Anchors shall be set into holes drilled with rotary impact drills, approved by the Engineer, of the sizes recommended by the manufacturer of the attenuator.

The SCI100GM shall be bolted in place in accordance with the attenuator manufacturer's instructions, but no sooner than seven days after placement of fresh concrete, without accelerators, and no sooner than three days after placement of concrete which has been batched with an approved accelerator.

If a transition is required, the appropriate manufacturer's standard transition shall be used.

Traffic protection devices, such as cones, drums, lights, signs, barricades, or other articles directed by the Engineer, shall be provided and maintained under their respective items. Those devices shall not be removed until the SCI100GM Impact Attenuator is fully operational and, in lighted areas or areas to be lighted, these articles shall also be maintained until the lighting system is operational.

QUALITY CONTROL:

1. All steel shall be fabricated from the specified material that is called out on the fabrication drawings.
2. All welding shall be performed by welders certified per AWS3G.
3. Material certifications shall be required from all vendors.
4. All attenuators shall be fabricated from the drawings of the NCHRP 350 tested unit.

TESTING AND CERTIFICATION:

The SCI100GM has passed all required tests and is certified for NCHRP 350 Test Level III. The letter of approval from the Federal Highway Administration is dated September 12, 2003 and has a designation of HSA-10/CC-85.

PERFORMANCE:

1. The SCI100GM is designed to meet the Test Level 3 performance criteria of the NCHRP 350 for redirective, non-gating crash cushions including, but not limited to, Occupant Risk Criteria and Redirective Criteria.
2. After impacts that are within the design parameters of vehicle mass and speed, the SCI100GM should not require the replacement of parts except for the Nose Plate and Mobile Sheave Shear Bolts. Side impacts may only require an inspection with no repair parts necessary.
3. Upon side impacts, vehicle exit angles should be <1 degree.

DIMENSIONS:

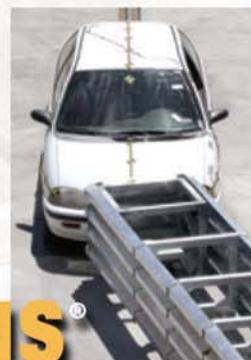
Width (Effective) -----	24" (610mm)
Length -----	21.5' (6.55m)
Height -----	33" (838mm)
Weight -----	3450 lb (1565kg)



SCI Products Inc.

**SCI70GM AND SCI100GM
DESIGN AND INSTALLATION
MANUAL**

**The World's Only
Speed-Dependent
Crash Attenuator**



SMART CUSHION INNOVATIONS®

NCHRP 350 Approved



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Work Area Protection

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SCI ATTENUATOR PARTS LIST A

EQUIPMENT LIST B

ATTENUATORS

SMART CUSHION®, TEST LEVEL 2 C

SMART CUSHION®, TEST LEVEL 3 D

FOUNDATIONS

Test Level 2 Foundation E1

Test Level 3 Foundation E2

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Gore Assembly F

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TRANSITIONS

Jersey/F Shape Barrier G

Concrete Block, 24 Inch (610 mm) H

Concrete Block, 30 Inch (762 mm) I

Concrete Block, 36 Inch (915 mm) J

Concrete Block, 30 Inch (762 mm), Flared K

Concrete Block, 36 Inch (915 mm), Flared L

Thrie-Beam M

W-Beam (Reverse Direction Traffic Design) N

Jersey/F Shape, Variable Width Base O

Median Barrier, Single Slope P

W-Beam 28 Inch Tall (no reverse direction traffic design) Q

W-Beam 32 Inch Tall (no reverse direction traffic design) R

Wide Block Spanner S

OVERVIEW

Product

The SMART CUSHION® impact attenuators are manufactured by SCI Products, Inc./Work Area Protection Corp. They are NCHRP Report 350, Test Levels 2 and 3 (TL2 and TL3) compliant (Models SCI 70 GM and SCI 100 GM, respectively) and are fully redirective, non-gating, and bi-directional. SMART CUSHION® impact attenuators are used to help protect motorists from hazards in both permanent and work zone locations. They can be attached to most types of median and roadside barriers.

The SMART CUSHION® attenuators use a patented system for stopping vehicles. The system is speed dependent and stops small and large vehicles by automatically regulating the stopping force exerted on a vehicle. Essentially, the system provides the necessary forces based on the speed of the vehicle automatically compensating for the mass of the vehicle.

The SMART CUSHION® attenuators are slightly tapered from front to rear. This allows the side panel sections to collapse over the next section without stress or damage. During collapse, the parts move freely past each other and do not become wedged during the impact.

Wide temperature variations and temperature extremes do not affect the performance of SMART CUSHION® impact attenuators. Temperature driven changes in viscosity of the fluid in the shock-arresting cylinder does not affect performance.

Maintenance

SMART CUSHION® impact attenuators are low-maintenance units. In a two-year in-service evaluation report submitted to the Federal Highway Administration, the average cost of parts to repair the SMART CUSHION® impact attenuator was \$39, excluding two catastrophic impacts. More than four out of five of the reported repairs only required two shear bolts costing under \$2. A trained, two-person maintenance crew can return most impacted SMART CUSHION® attenuators to full service within 30 minutes. This short repair time reduces the maintenance workers' exposure to traffic and minimizes motorist inconvenience. Side impacts usually result in no damage to the impact attenuator.

Crash Performance

The SMART CUSHION® impact attenuator broke new ground during NCHRP Report 350 crash testing. In the high-speed test, 100 kilometers per hour (63 miles per hour), the small vehicle's deceleration rate was significantly lower than any previously recorded value (-9.8 G's as compared to previous low of -13.4 G's). This means less impact forces on the vehicle's occupants and a reduced risk of injury and severity.

All the tests were conducted on the same SMART CUSHION® unit over four consecutive days with no damage to non-expendable parts. The only parts replaced after each crash test were the two shear bolts, costing less than \$2 for each reset.

SPECIFICATIONS

Description

The SMART CUSHION® is a re-directive, non-gating crash attenuator that consists of a base, supporting frames, a sled, side panels, a wire rope cable, sheaves, and a shock-arresting cylinder. The base is anchored to the mounting surface and provides support for the frames that are mounted on it. The support frames hold the side panels that provide a flat outer redirective surface for side impacts. The sled provides redirective support for side impacts and deceleration force for frontal impacts. The SMART CUSHION® telescopes rearward upon frontal impact and can be reset with minimal repair parts. It is NCHRP 350 approved at Test Levels 2 and 3.

System Dimensions & Weight

Table 2 – Dimensions & Weight

	SCI 70 GM	SCI 100 GM
Width	24 inch (610 mm)	24 inch (610 mm)
Length	13 ½ feet (4115 mm)	21 ½ feet (6550 mm)
Height	33 inch (840 mm)	33 inch (840 mm)
Weight	2465 lbs. (1120 kg)	3450 lbs. (1570 kg)
NCHRP 350, Test Level	2	3

DESIGN CRITERIA

General

SMART CUSHION® impact attenuators comply with NCHRP Report 350, TL2 and TL3, and are designed for work zone and permanent applications.

Foundations

Foundations must be a flat surface with longitudinal and cross slopes of 10:1 (horizontal: vertical) or less. SMART CUSHION® impact attenuators should not be located over drainage basins or expansion joints. Portland cement concrete foundation pads are preferred for permanent installations; asphaltic concrete foundation pads are appropriate for work zone installations.

The following table describes the foundations that may be used. See Appendices for drawings.

Table 1 – Foundations

Pad Material and Thickness	Anchor Embedment
6 inch (150 mm) reinforced PCC ¹	5 ½ inch (140 mm)
8 inch (205 mm) non-reinforced PCC	5 ½ inch (140 mm)
3 inch (75 mm) AC ^{2,3} over 3 inch (75 mm) non-reinforced PCC	16 ½ inch (420 mm)
6 inch (150 mm) AC over compacted subgrade ³	16 ½ inch (420 mm)
8 inch (205 mm) AC ³	16 ½ inch (420 mm)

Notes: 1. Portland cement concrete 2. Asphaltic concrete 3. Minimum compaction: 95% of optimal

Concrete compressive strength shall be 4000 psi (28 MPa) at 28 days.

Foundation lengths may vary when using wide transitions.

Support Structure

SMART CUSHION® impact attenuators are self-supporting and do not require an additional support structure.

Location

The SMART CUSHION® impact attenuator's location determines its position and transition requirements.

1. Approach Zone – SMART CUSHION® impact attenuators should not be placed directly behind raised curbs that exceed 4 inches in height. The longitudinal and cross slopes in front of the device should not exceed 10:1 (horizontal: vertical).
2. Barrier Width – SMART CUSHION® impact attenuators are 24 inch (610 mm) wide at the rear. Barriers 24 inch (610 mm) wide, or less, can be shielded without using a transition if there is no reverse direction traffic. Barriers that are wider than 24 inch (610 mm) and/or have reverse direction traffic require a transition, available from Work Area Protection Corp.
3. Barrier Height – SMART CUSHION® impact attenuators are approximately 33 ¾ inch (848 mm) high.
4. Barrier Shape – SMART CUSHION® transitions allow for connection to many barrier shapes.

Transition Design

SMART CUSHION® impact attenuators can be attached to many different barrier shapes. The attenuators are designed for direct attachment to 24 in wide barriers and Jersey/F-Shape barriers with base widths up to 27 ½ inch (700 mm). The SMART CUSHION® side panels move rearward beyond the end of the attenuator up to 30 inch (760 mm) upon impact. This area is known as the travel zone. SMART CUSHION® transitions provide this travel zone in front of wider barriers and obstacles.

See appendices for SMART CUSHION® transition drawings. Work Area Protection Corp. can design transitions for other frequently used applications. Contact us for details.

Transitions

Necessary Locations (see Figure 1 – Necessary Locations):

- There is reverse direction traffic within the clear zone .
- The barrier intrudes into the side panels' travel zone.

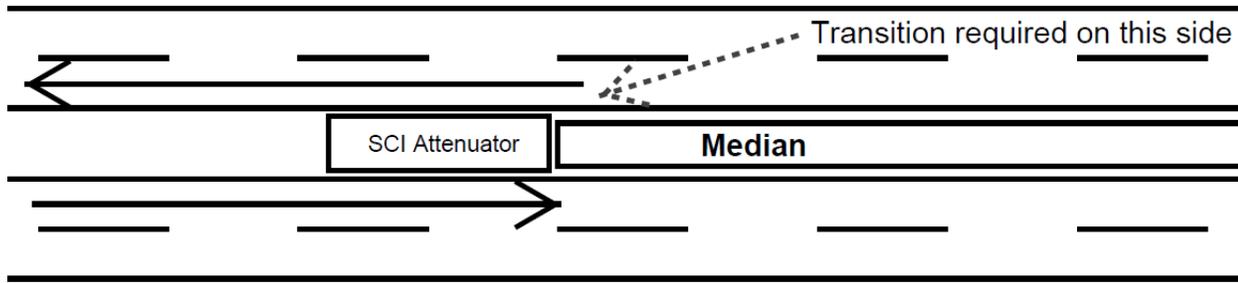


Figure 1 – Necessary Locations

Examples are median applications with bidirectional traffic, two lane roads with crossover potential, etc.

Unnecessary Locations (see Figure 2 – Unnecessary Locations):

- No reverse direction traffic within the clear zone.
- The barrier does not intrude into the side panels' travel zone.

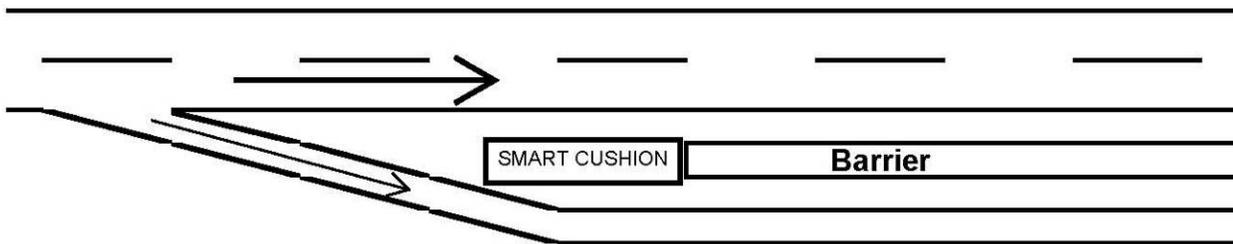


Figure 2 – Unnecessary Locations

Examples are traffic splits, shoulder applications with no crossover potential, one-way roads, etc.

Determining Side of Transition

The transition's side is determined by standing at the front of the attenuator looking rearward toward the barrier to choose between left and right.

Drawings

The following SMART CUSHION® transitions and layouts are available from Work Area Protection Corporation. Diagrams are shown in the Appendices as follows:

- Layout – Gore Assembly, Appendix F & F2 - Rigid design for wide obstacles
- Layout – Gore Assembly Calculations, Appendix F3 - Used to calculate longitudinal distances and parts requirements
- Transition - Jersey/F Shape, Appendix G - Used on standard Jersey/F shaped barriers with a 24 inch Base
- Transition - Concrete Block, 24 Inch, Appendix H - Used on 24 inch Concrete Block that must be 30 inch longitudinal length for our travel zone
- Transition - Concrete Block, 30 Inch, Appendix I - Used on 30 inch Concrete Block and will extend our installation length 38 inches
- Transition - Concrete Block, 36 Inch, Appendix J - Used on 36 inch Concrete Block and will extend our installation length 53 inches
- Transition - Concrete Block, 30 Inch, Flared, Appendix K - Used on 30 inch Concrete Block/Pillars and will extend our installation length 54 inches
- Transition - Concrete Block, 36 Inch, Flared, Appendix L - Used on 36 inch Concrete Block/Pillars and will extend our installation length 71 inches
- Transition – Thrie-Beam Rigid Assembly, Appendix M - Rigid design for possible reverse direction impacts
- Transition – W-Beam Rigid Assembly, Appendix N - Rigid design for possible reverse direction impacts
- Transition – Jersey, Median Barrier Variable Width, Appendix O - Used on Jersey Shape barrier with base widths of 30 - 38 inches wide.
- Transition – Single Slope Barrier, Appendix -P - Used on 42 inch and 48 inch Single Slope barrier up to 26 inches wide at the base
- Transition – W-Beam 28 Inch High, Appendix Q – Connection to 28 inch high W-Beam Guardrail with no reverse direction traffic
- Transition – W-Beam 32 Inch High, Appendix R – Connection to 32 inch high W-Beam Guardrail with no reverse direction traffic
- Transition – Wide Block Spanner, Appendix S – Connection to a wide Concrete Block for one sided protection

Installation

Installation and Performance Statements

Proper performance within these limits depends on correct installation of the system on an approved foundation. Any crash cushion not installed according to the drawings and the requirements of this installation manual may present an unsafe condition and should be reinstalled accordingly.

Impacts with vehicles whose size or mass are outside of those tested according to NCHRP 350 or with vehicles traveling at speeds greater than those tested according to NCHRP 350 will not necessarily produce results within the test criteria. The crash cushion is in conformance with all requirements of NCHRP 350 Levels 2 & 3 but is not guaranteed to safely stop a vehicle in a situation not encompassed by the test conditions.

Safety

All work during installation, repair and inspection of the crash cushion should be performed according to federal, state and local laws.

Equipment List

See Appendix B

Site Preparation

Check to make sure there are no drains, expansion joints, or buried conduit, cables or utility lines in the footprint space where the attenuator will be placed. Remove any curbs >4 inch or obstacles in front of or beside where attenuator will be installed for a minimum distance of 12 feet from any edge of the attenuator. Be sure to set up proper traffic control before beginning any installation or repair work at the site.

Foundations – (reference Appendices E1 and E2)

New foundations should be installed according to Appendix E – Foundation Drawing. Concrete should reach full cure strength before use. The surface of the foundation must be cleaned of all debris, dirt, mud, sand, etc., as the crash cushion must sit on a level plane, although longitudinal and/or cross slope of up to 10:1 (horizontal:vertical) is allowed.

Any of the following foundations will meet the minimum requirements:

- 6 inch reinforced concrete pad
- 8 inch non-reinforced concrete pad
- 3 inch asphalt over 3 inch of concrete
- 6 inch asphalt over 6 inch of compacted sub base
- 8 inch asphalt

Note: Concrete should be 28 MPa or 4000 psi minimum at full cure. The slope should not exceed 10:1.

Installing the crash cushion on an existing foundation may result in anchor bolt locations corresponding to rebar positions in the foundation. It may be necessary to use more elaborate drilling equipment than simply an impact drill with standard concrete bits.

Prior to installing the crash cushion on an existing foundation, the concrete must be thoroughly inspected for slope, signs of cracking, surface wear, shifting from original position, undercut of earth below or to the sides supporting the foundation, settling, and any other signs of age or deterioration which may make the foundation unusable. If any of these signs are evident, the foundation must be removed and a new one must be installed according to requirements stated. If prior bolt patterns are present, use proper engineering calculations to assure adequate strength in the new holes.

Placement of the Crash Cushion

Measure the correct distance and offset of the crash cushion according to the type of object being shielded and the type of transition being used. The dimensions shown on the transition drawings may be used as a guide for this. System drawings are also available.

The crash cushion is shipped in one piece, fully assembled. Use a choked four-point attachment on panel support frames 3 & 4 behind the sled for the Test Level 3 unit. The lift points on the Test Level 2 unit are the 1st and 2nd frames behind the sled. Lift the crash cushion off the transporting vehicle with a boom or forklift of sufficient capacity and place it in the position marked on the foundation.

Once in place, double-check the measurements to be sure of the proper location of the crash cushion.

Warning: On a full collapse, the last set of side panels will telescope 30 inches beyond the last terminal brace at the rear of the crash cushion. All objects that may interfere with this motion can affect the performance of and cause undue damage to the crash cushion.

Anchor Installation

Embedment Requirements are as follows:

1. 6 inch reinforced concrete pad – anchor embedment of 5 ½ inch and a torque value of 125 ft-lbs
2. 8 inch non-reinforced concrete pad – anchor embedment of 5 ½ inch and a torque value of 125 ft-lbs
3. 3 inch asphalt over 3 inch of concrete – anchor embedment of 16 ½ inch and a torque value of less than 10 ft-lbs
4. 6 inch asphalt over 6 in of compacted sub base – anchor embedment of 16 ½ inch and a torque value of less than 10 ft-lbs
5. 8 inch asphalt – anchor embedment of 16 ½ inch and a torque value of less than 10 ft-lbs

Using the holes in the base as a template, drill 7/8 inch diameter holes to the proper depth as previously defined. If the crash cushion is being installed on an existing foundation and the drills are hitting rebar, use a core drill or rebar cutter to ensure that straight, vertical holes are made at each location. Take care that the holes do not break out the bottom of the foundation as this may result in loss of epoxy during anchor placement.

Once the holes are drilled, clean the hole of all debris using suitable means. To ensure epoxy adhesion, concrete holes MUST be cleaned with a bottle brush to remove embedded dust, and a final check conducted that all holes are clean of debris and dry. Inject the epoxy into each hole at an angle to avoid air entrapment. Use a sufficient amount of epoxy so that the hole will be filled when the bolt is inserted. Screw the nut on the anchor bolt flush with the end, put the washer on the stud, and immediately insert the anchor stud all the way to the bottom while turning the anchor. This method assures the anchor bolts are vertically plumb and the threads are coated with epoxy. **Stud locations should not project more than ½ inch above the nut after final torque is completed.

There is a quantity of 48 anchors for the SCI 100 GM, TL-3 attenuator.

There is a quantity of 34 anchors for the SCI 70 GM, TL-2 attenuator.

The epoxy will be ready for bolt tightening after 30 minutes at 80 degrees F (27 degrees C). See the container label for other temperatures and bolt up times. Allow the epoxy to cure. Torque the anchor nuts to 170 N-m (125 ft-lbs). Substitute epoxy must match our specifications. Asphalt anchors are longer and should only be torqued to 10 ft-lbs.

Delineator Panel Attachment

Installation of the front delineation plate will be determined by the location of the attenuator and state regulations. A delineation plate is shipped with a yellow powder coat background and no striping. It is attached with four bolts. Applying the striping to the plate is easier while it is removed from the attenuator. Examples of the delineation plate are as follows:



Right Shoulder



Chevron (Gores)



Left Shoulder

Transition Installation

Transitions may be required. Any use of a crash cushion with a possible reverse direction impact will require a transition. In all applications, be sure to install the transition anchors that are exposed to traffic, so that there is no extension of the studs beyond the outside face of the nut. Refer to the transition drawings for details of the required anchor locations. For horizontal stud installation in concrete use mechanical anchors, or if using studs repeat the same epoxy installation process as the anchor bolts using plugs to retain the epoxy to secure the transition to the barrier. Transition drawings and parts explosions are in the appendices.

Final Inspection

After the anchor bolts have been tightened to the proper torque value, check that the crash cushion is not distorted in any way as might happen if the unit is secured to a foundation which is not a flat plane. Check that the front section is pulled out to within 1 inch of the front stop bolts and that no part of the unit has been damaged by shipping and handling. Verify that all assembly bolts are tight and have not come loose during shipping or installation. Finally, check that no tools or other equipment have been left within the crash cushion structure.

Resetting Crash Cushion after Impact

In the event of any impact, the crash cushion will require a full evaluation to determine the necessary repairs to return it to service. To do this, proceed as follows:

Site Preparation

Do not begin work until the area is declared safe and accessible.

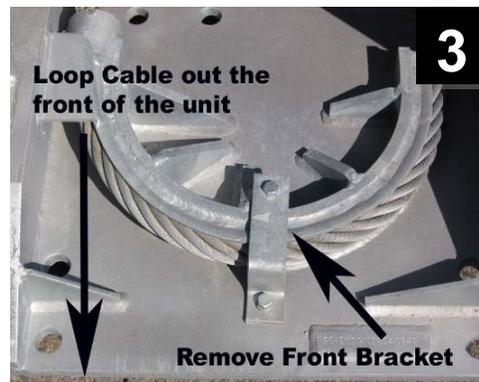
Re-Extension and Inspection after Frontal Impact

1. Remove the front delineator panel and attach pulling means to the bottom brace of the front sled.
2. Use wire or strap on the bottom brace at the front of the sled to hold the spelter socket



up in the air while pulling out or it will catch on the base frame cross braces.

3. Remove the front cable bracket that is located on the front sheave at the front of the attenuator.



4. Pull the sled forward one to two feet to give you slack on the cable.



5. If necessary, use two long-handled flat

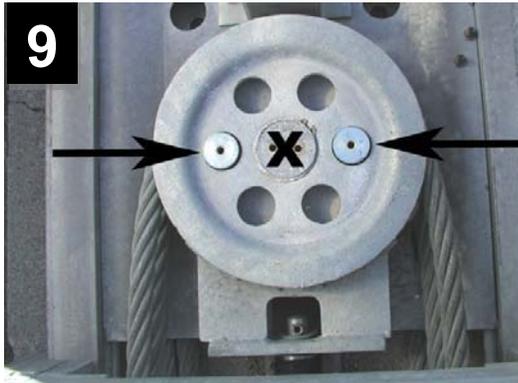


screwdrivers or Work Area Protection Corp's cable release tool to break cable loose from the sheave at the front of the attenuator if the zinc coating has attached the cable to the sheave. Start feeding the cable out of the front of the unit.

6. Pull the sled out the rest of the way in short smooth increments so you can help feed the cable out the front of the attenuator. This will give you a cable loop in front of the attenuator. When you are past the last cross brace, you will need to remove the

strap or wire to allow the cable to follow the path into the front sheave. The sled must be fully extended to replace the shear bolts. The sled should be approximately 1 inch from the stop bolts in the front.

7. During frame pullout, inspect front part of the cable from the spelter socket, as it will be partially obscured after extension of the mobile frames and sheaves. See the cable inspection procedure.
8. Remove the front and rear sheave cover plates at each end of the cylinder by removing the two hex bolts that hold them down.



9. Remove the anti-rotation pins, which are the two outer pins, inserted through the holes in the sheaves from both the front and back sheaves. This will be easily done with Work Area Protection Corp's anti-rotation pin removal tool. Caution: Do not remove the center pin. The rear pins are longer than the front sheave pins and cannot be intermixed so leave them by their locations.

10. Remove shear bolt remnants in the holes on both sides of the mobile sheaves. These are grade 8 bolts so they can be difficult to remove without a 90 degree pry bar with a claw to pry out.

11. Attach a pulling means to the shackle on the mobile sheave assembly. (See #10)
12. Slowly pull out the mobile sheaves. Do not stand inside the cable loop or be in the pulling strap danger zone.
13. Finish pulling out the mobile sheaves until you can see through the shear bolt holes but do not put in the shear bolts yet.
14. If the cable passes inspection, release any tension on your pulling strap and reinstall the anti-rotation pins in the front and back sheave assemblies and reinstall the cover plates for those sheaves using marine grade anti-seize on the bolt threads. The sheaves may be aligned by inserting a pry bar into the sheave holes. Work your way from the bottom up.
15. Put tension on your chain and replace the two ¼ inch Grade 8 shear bolts in the front corners of the mobile sheaves.
16. Inspect the cylinder, anchor bolts and side panels according to the subsequent procedures listed.

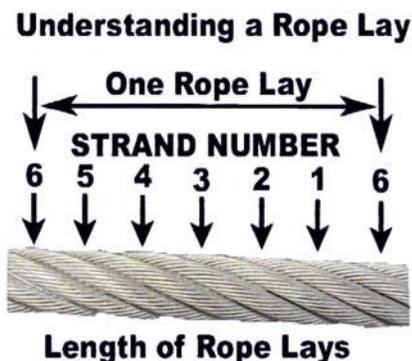


Side Impact Inspection and Repair

17. Inspect and replace any damaged side panels.
18. Inspect and replace any damaged side keeper bolts on all panels. There are three styles of side keeper bolts. The winged style is for the panel connected to the sled and bolts through the first frame behind the sled. The center side keepers have a ½ inch shoulder while the last side keeper, which is bolted to the terminal frame, has a ¼ inch shoulder.
19. Inspect and repair any damaged side guides.

Cable Inspection Procedure

The cable should be visually inspected for damage. The most common sign of rope deterioration is broken wires. The wire must be clean and not under tension to perform a visual inspection. The visual inspection should include looking for broken wire strands, localized wear or crowns. A sharp awl or marlin spike can be used to separate wires to check if internal damage is present, indicated by loose wires or crowns. If internal inspection shows any damage to any core wires, the cable should be replaced. If there are more than six random broken wires in one rope lay or three broken wires in one strand in one rope lay, the wire rope should be replaced. A rope lay is the length along the rope in which one strand makes a complete revolution around the rope.



Inspect the spelter socket for broken wires, damaged eyes or other fatigue. Any signs of broken wires at the spelter socket will require a new cable.

Cable damage is the indication of an over-design impact. The unit must be inspected by an authorized manufacturers' representative.

Cylinder Inspection

The cylinder should be inspected for:

- Dented or swollen tube jacket
- Visible cracks in any welds and fluid leakage from the welds
- Piston rod surface damage, bending or fluid leakage in seal area
- If fully collapsed or over design impact speed, disconnect piston rod from the mobile sheave after the unit is pulled out and push the piston rod in checking for free movement.

If any of these inspections are suspect, replace cylinder and have it examined by the manufacturer. Current models have PTFE seals with an unlimited static life.

Anchor Bolt Inspection

Anchor bolts may come loose or be damaged upon impact. These bolts may be replaced by welding a nut or putting a double nut on them and backing them out of the hole. Drill out the old epoxy and reinstall new bolts with new epoxy following previous instructions on page 9.

Side Panel Inspection

Side Panels are designed to nest and collapse with minimal or no damage upon frontal impact. The side keepers sustain a shock upon impact. These side keepers should be replaced if there are any signs of fatigue, bending or other visible damage. Inspect the side panels for any bending or torn metal. If damage is found, any side panel is removable by removing four bolts. It may be necessary to remove the bolts on the panel upstream to slide out a panel located in the middle of the unit. The side keepers used to hold the large front sled panels are different than the side keepers on the center panels. Also, the side keeper used on the last terminal brace, which is the rearmost support, has a shorter shoulder

($\frac{1}{4}$ inch vs. $\frac{1}{2}$ inch), as it does not have a panel overlap. These shoulders must seat into the outer overlapping panel and pin the inside panel to the frames using a torque value of 270 N-m (200 ft-lbs). Be careful not to pin the edge of the outside panel as it will restrict free sliding of that panel.

Side Guide Inspection

At the bottom of each support frame, there are two guides to stabilize and guide collapse of the attenuator. Inspect each side guide for damage. These guide assemblies are very rugged. If the side guides are not damaged they can be reused. The torque value for the side guides is 920 N-m (680 ft-lb). These side guides are stronger than the rail, so visually inspect the rail for crowns. Any crowning of the rail can be straightened.

Final Inspection

After the resetting of the crash cushion is complete, verify by visual inspection that all assembly bolts are tight and show no sign of damage. Finally, check that no tools and other equipment or debris have been left within the crash cushion structure. Verify that no other damage unrelated to the most recent impact has occurred and that no significant corrosion or other deterioration has taken place.

Non-Repairable Impacts

There can be instances where the impact is outside the scope of the crash cushion's design. This may render the crash cushion unsafe to reuse and it should be replaced.

APPENDIX A - SCI SMART CUSHION® ATTENUATOR PARTS LIST

Prod No.	Part No.	Description	Qty Per Unit TL2/TL3	Unit of Measure
270128	9400	Attenuator 24" wide w/Concrete Anchors TL3		
270127	9450	Attenuator 24" wide w/Asphalt Anchors TL3		
270126	9451	Attenuator 24" wide w/Concrete Anchors TL2		
270125	9452	Attenuator 24" wide w/Asphalt Anchors TL2		
270667	9401	Bolt Concrete Anchor 3/4" X 7" TL3 *(Included in P/N 9400)	*	KIT/48 pcs.
270663	9402	Bolt Asphalt Anchor 3/4" x 18" TL3 *(Included in P/N 9450)	*	KIT/48 pcs.
270666	9453	Bolt Concrete Anchor 3/4" X 7" TL2 **(Included in P/N 9451)	**	KIT/34 pcs.
270664	9454	Bolt Asphalt Anchor 3/4" x 18" TL2 **(Included in P/N 9452)	**	KIT/34 pcs.
270685	9404	Bolt Sled Side Panel	8	EACH
270677	9405	Bolt Front Stop	2	EACH
270683	9406	Bolt Shear	2	EACH
270687	9408	Bolt Terminal Brace	4	EACH
270770	9409	Brace Terminal	1	EACH
274915	9413	Strap Cylinder TL3	1	EACH
233936	9448	Strap Cylinder TL2	1	EACH
272214	9414	Frame Mobile #1 TL3	0/1	EACH
272215	9415	Frame Mobile #2 TL3	0/1	EACH
272216	9416	Frame Mobile #3 TL3	0/1	EACH
272217	9417	Frame Mobile #4 TL2 & TL3	1	EACH
272218	9418	Frame Mobile #5 TL2 & TL3	1	EACH
272219	9419	Frame Mobile #6 TL2 & TL3	1	EACH
272527	9421	Keeper Side #3 (Sled Panels) TL2 & TL3	4	EACH
272593	9422	Keeper Side #1 (Side Panels) TL2 & TL3	8/20	EACH
272595	9423	Keeper Side #2 (Rear Panels) TL2 & TL3	4	EACH
273378	9424	Panel Delineator (Painted Yellow) TL3	0/1	EACH
273386	9496	Panel Delineator (Painted Black) TL3		EACH
273381	9497	Panel Delineator Diamond Grade Chevron 6 inch stripes TL3		EACH
273383	9498	Panel Delineator Diamond Grade Left 6 inch stripes TL3		EACH
273389	9499	Panel Delineator Diamond Grade Right 6 inch stripes TL3		EACH
273380	9456	Panel Delineator (Painted Yellow) TL2	1/0	EACH
273385	9506	Panel Delineator (Painted Black) TL2		EACH
273382	9501	Panel Delineator Diamond Grade Chevron 6 inch stripes TL2		EACH
233928	9502	Panel Delineator Diamond Grade Left 6 inch stripes TL2		EACH
273388	9503	Panel Delineator Diamond Grade Right 6 inch stripes TL2		EACH
273401	9425	Panel Side TL2 & TL3	4/10	EACH
273402	9426	Panel Sled	2	EACH
273399	9427	Panel Rear	2	EACH
274649	9429	Sled (with guide rollers) 24" TL3	0/1	EACH
274648	9457	Sled (with guide rollers) 24" TL2	1/0	EACH
271242	9439	Epoxy 28 oz. Cartridge and Nozzle ***	***	EACH
272612	9515	Epoxy Kit for TL3 Concrete Attenuator		EACH
272610	9516	Epoxy Kit for TL3 Asphalt Attenuator		EACH
272611	9517	Epoxy Kit for TL2 Concrete Attenuator		EACH
272609	9518	Epoxy Kit for TL2 Asphalt Attenuator		EACH
273113	9440	Nozzle Epoxy Mixing ***	***	EACH
271946	9441	Dispenser Epoxy	0	EACH
270707	9443	Boot Cylinder TL3	1	EACH
233937	9449	Boot Cylinder TL2	0	EACH
272626	9444	Spare Parts Kit TL3	0	EACH

APPENDIX A - SCI SMART CUSHION® ATTENUATOR PARTS LIST (continued)

274747	9458	Spare Parts Kit TL2	0	EACH
272621	9488	Reset Parts Kit TL3	0	EACH
272620	9489	Reset Parts Kit TL2	0	EACH
273994	9495	Tool Anti Rotation Pin Removal	0	EACH
270069	9507	Anchor Drop In	0	EACH
273590	9508	Pin Anti-Rotation Front	0	EACH
273608	9509	Pin Anti-Rotation Rear	0	EACH
273667	9510	Plate Sheave Cover	0	EACH
233449	9524	PWB02 Block Out	0	EACH
275224	9525	Cable Release Tool	0	EACH
238247	9536	Shear Bolt Removal Tool	0	EACH
270952	9519	Hole Brush-Nylon	0	EACH
Transitions and Transition Parts				
275297	9431	Transition Jersey Barrier - Right	0	EACH
275294	9432	Transition Jersey Barrier - Left	0	EACH
275263	9433	Transition 24" Concrete - Left & Right	0	EACH
275298	9437	Transition Thrie & W Beam - Right	0	EACH
232971	9438	Transition Thrie & W Beam - Left	0	EACH
275309	9511	Transition W Beam 28" High Right	0	EACH
275307	9512	Transition W Beam 28" High Left	0	EACH
275311	9513	Transition W Beam 32" High Right	0	EACH
275310	9514	Transition W Beam 32" High Left	0	EACH
275279	9459	Transition Assembly 30" Concrete Straight Connection	0	EACH
275283	9460	Transition Assembly 36" Concrete Straight Connection	0	EACH
275278	9461	Transition Assembly 30" Concrete Outside Connection	0	EACH
275282	9462	Transition Assembly 36" Concrete Outside Connection	0	EACH
275288	9475	Transition Assembly Gore to End of Flared Transition	0	EACH
239542	9528	Transition Assembly Median Barrier Variable Width with Rub Rail	0	EACH
239545	9535	Transition Assembly Median Barrier Variable Width w/o Rub Rail	0	EACH
275265	9463	Transition 30" Concrete Straight Connection	0	EACH
275267	9464	Transition 36" Concrete Straight Connection	0	EACH
275266	9465	Transition 30" Concrete Outside Connection	0	EACH
275268	9466	Transition 36" Concrete Outside Connection	0	EACH
275304	9467	Transition Thrie & W Beam 10 Degree Flare - Right	0	EACH
275306	9468	Transition Thrie & W Beam 10 Degree Flare - Left	0	EACH
275291	9469	Transition Concrete Spanner Brace	0	EACH
275290	9470	Transition Concrete #1 Tapered Spanner Brace	0	EACH
233450	9471	Transition Concrete #2 Tapered Spanner Brace	0	EACH
275292	9472	Transition Gore Tapered #1 Spanner Brace	0	EACH
275293	9473	Transition Gore Tapered #2 Spanner Brace	0	EACH
270765	9474	Thrie Beam Concrete Leg Brace	0	EACH
275273	9493	Transition Median Barrier Variable Width - Right	0	EACH
275272	9494	Transition Median Barrier Variable Width - Left	0	EACH
239471	9526	Transition Support Bracket - Right	0	EACH
239472	9527	Transition Support Bracket - Left	0	EACH
275271	9480	Transition Rub Rail Median Barrier-Right	0	EACH
275270	9481	Transition Rub Rail Median Barrier-Left	0	EACH
275299	9490	Transition Single Slope 24-26 9/32" Wide Median Barrier - Right	0	EACH
275302	9491	Transition Single Slope 24-26 9/32" Wide Median Barrier - Left	0	EACH
251641	9537	Transition Spanner - Left & Right	0	EACH
O = Optional Revised 4-2013				

APPENDIX B - EQUIPMENT LIST

The following tools and equipment will be required to install and repair the Crash Cushion:

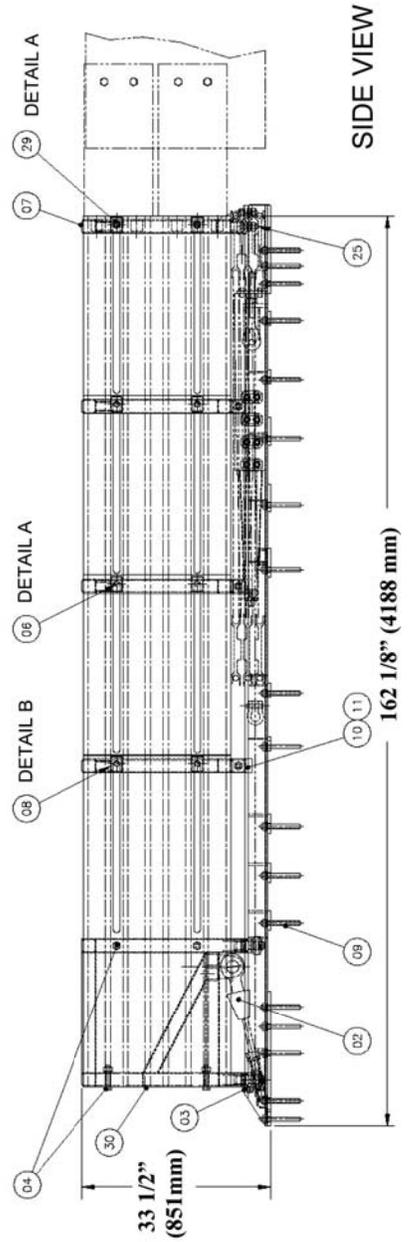
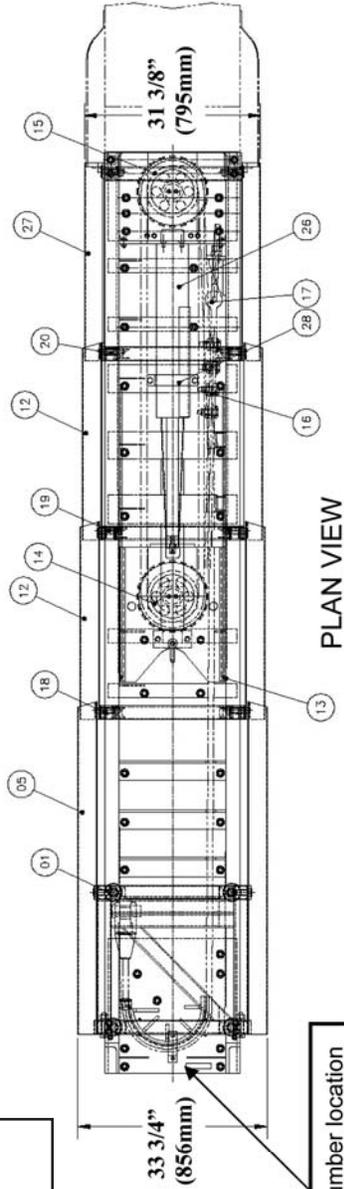
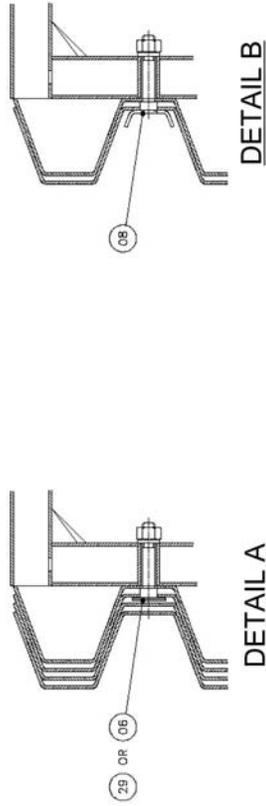
- Standard roadside work area safety equipment
- Personal safety equipment (gloves, latex gloves for epoxy, eye/face protection, etc.)
- Means of safely unloading 3500 lbs.
- Compressed air source/vacuum
- 1 inch bottle brush
- Safety goggles
- Four lifting slings or four-point sling
- Bosch rotary hammer drill 13 ½ amp #11263EVS Model 0 611 263 739 or equal
- 7/8 inch X 22 inch concrete drill bit for concrete installations or 7/8 inch X 28 inch drill bit for asphalt installations
- Renton rebar eater bit #RB-14 - 7/8 inch rebar cutter bit or equal
- 1 inch X 12 inch concrete drill bit for drop-in anchors on transitions
- Punch or setting tool for drop in anchors.
- ½ inch electric drill for rebar bit and bottle brush (cordless will work for bottle brush)
- Epoxy dispenser for 28 oz. dual cartridge system (have spare in case of malfunction)
- Socket wrench and breaker bar
- Torque wrench (225 ft-lb capacity) with 3 ft extension
- Measuring and layout equipment (tape measure, chalk line, markers, etc.)
- Combination wrenches, deep sockets (Including 7/16 inch - 5/8 inch, 1 ¼ inch, 1 ½ inch, 1 5/8 inch) and 3+ inch extension
- 5 foot wedge and round-ended pry bar
- Loctite #34395 marine grade anti-seize
- Suitable pulling means (strap or chain)
- 2 long-handled flat screwdrivers
- Misc. small tools (hammers, pliers, screwdrivers, vise grips, etc.)
- Bear claw pry bar to remove ¼ inch shear bolt remnants
- Anti-rotation pin removal tool
- Cable release tool
- Piece of wire to hold up spelter socket during pullout

This list is adequate for general installation and repair.

Depending on site conditions, additional tools and equipment may be required.

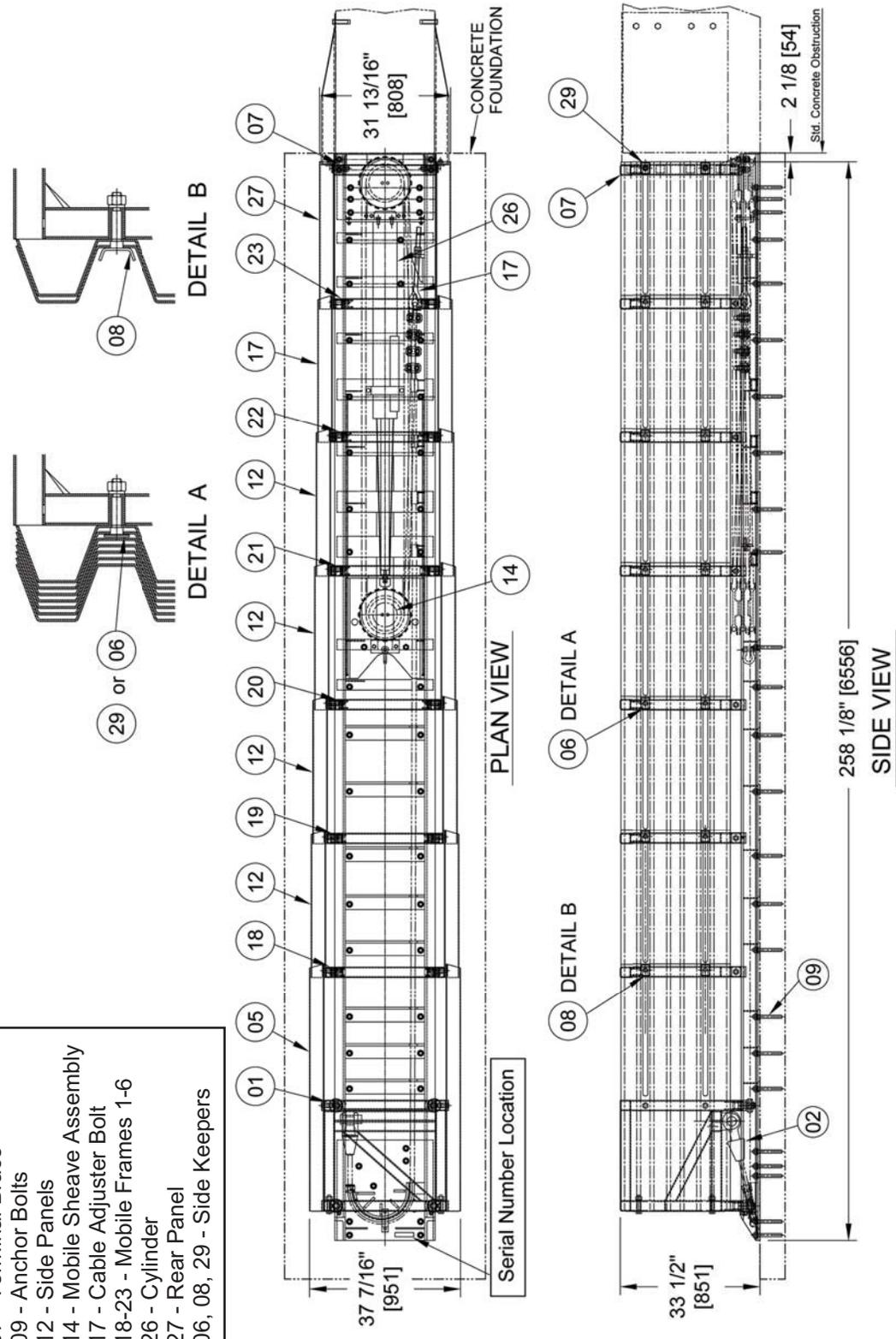
APPENDIX C - SMART CUSHION®, TEST LEVEL 2

PARTS LIST	
01	- Front Sled
02	- Cable Assembly
05	- Sled Panel
07	- Terminal Brace
09	- Anchor Bolts
12	- Side Panels
14	- Mobile Sheave Assembly
17	- Cable Adjuster Bolt
18-20	- Mobile Frames 4-6
26	- Cylinder
27	- Rear Panel
06, 08, 29	- Side Keepers



APPENDIX D - SMART CUSHION®, TEST LEVEL 3

PARTS LIST	
01	- Front Sled
02	- Cable Assembly
05	- Sled Panel
07	- Terminal Brace
09	- Anchor Bolts
12	- Side Panels
14	- Mobile Sheave Assembly
17	- Cable Adjuster Bolt
18-23	- Mobile Frames 1-6
26	- Cylinder
27	- Rear Panel
06, 08, 29	- Side Keepers



APPENDIX E1 - TEST LEVEL 2 FOUNDATION

Cross Slope at Top Surface not to Exceed 1 in 10
Foundation must be a Level Plane

*** Wide Hazards and Transitions may require
the foundation to be longer. See Transition Drawings.

SPECIFICATIONS

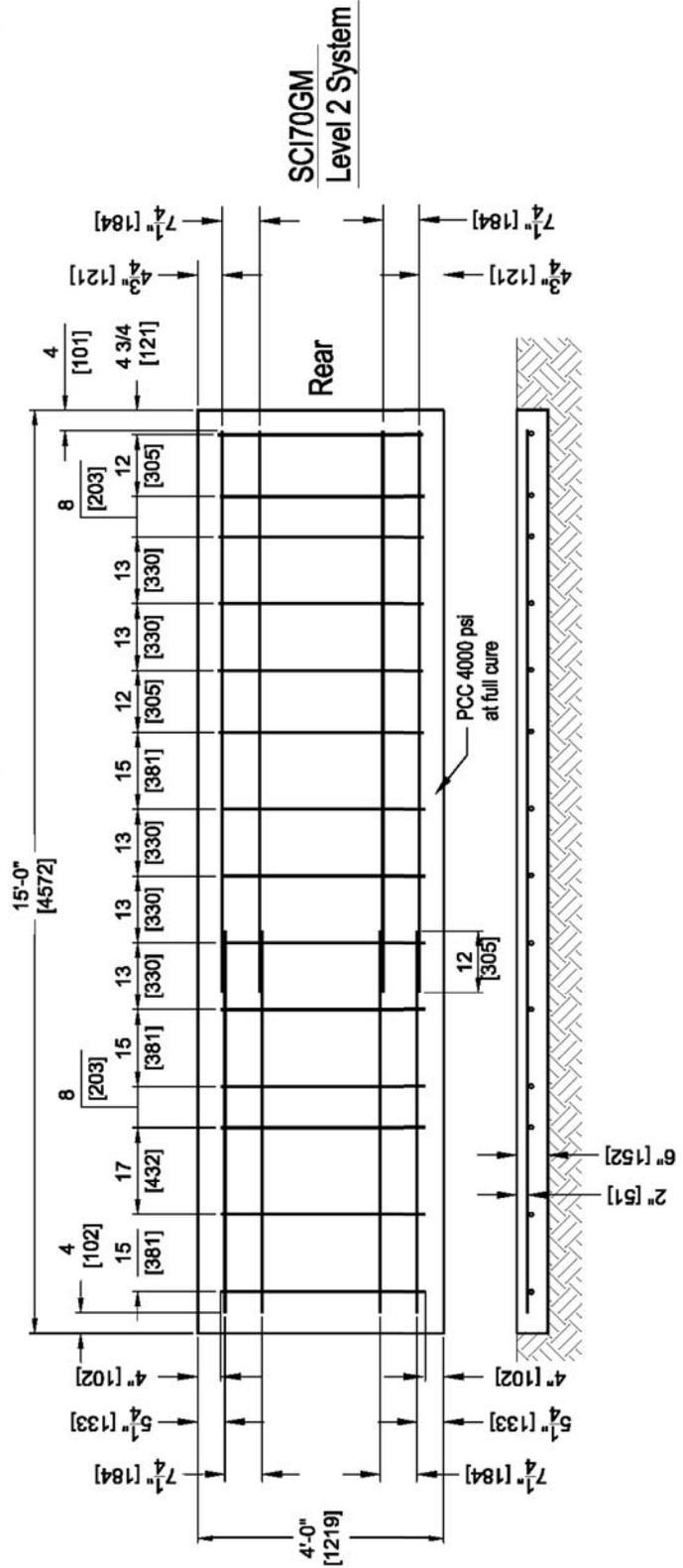
All reinforcing steel - straight #4 ASTM-A36

Embedment requirements:

- 6" reinforced concrete pad with anchor embedment of 5 1/2"
- 8" non-reinforced concrete pad with anchor embedment of 5 1/2"
- 3" asphalt over 3" concrete with anchor embedment of 16 1/2"
- 6" asphalt over 6" of compacted subbase with anchor embedment of 16 1/2"
- 8" asphalt with anchor embedment of 16 1/2"

The contractor shall furnish a certification for material installed to the following requirements:

- 6" reinforced concrete (PCC) sampling per ASTM C31-84, testing per ASTM C39-84
- 8" non-reinforced concrete (PCC) sampling per ASTM C31-84, testing per ASTM C39-84
- 3" asphalt over 3" concrete - Type SP 12.5 Level C or higher
- 6" asphalt over 6" of compacted subbase - same as above
- 8" asphalt (AC) - Type SP 12.5 Traffic Level C or higher



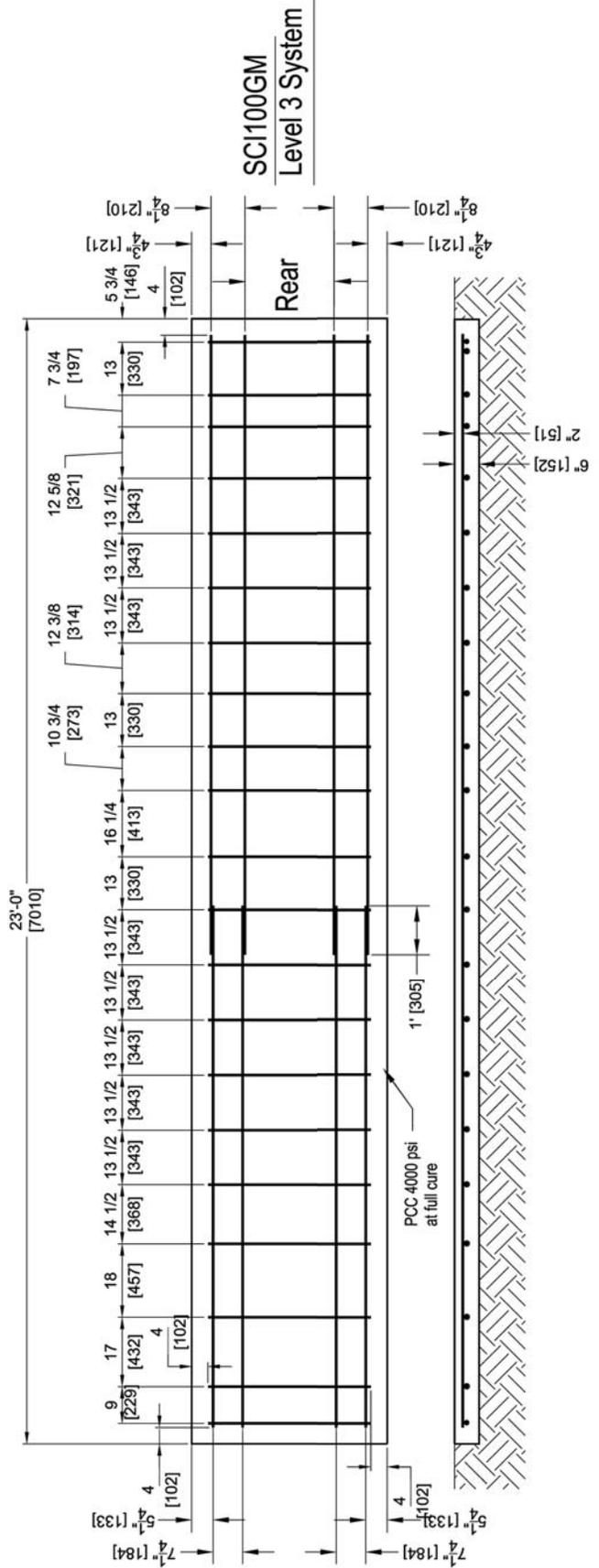
APPENDIX E2 - TEST LEVEL 3 FOUNDATION

**Cross Slope at Top Surface not to Exceed 1 in 10
Foundation must be a Level Plane**

SPECIFICATIONS
 All reinforcing steel - straight #4 ASTM-A36
 Embedment requirements:
 6" reinforced concrete pad with anchor embedment of 5 1/2"
 8" non-reinforced concrete pad with anchor embedment of 5 1/2"
 3" asphalt over 3" concrete with anchor embedment of 16 1/2"
 6" asphalt over 6" of compacted subbase with anchor embedment of 16 1/2"
 8" asphalt with anchor embedment of 16 1/2"

The contractor shall furnish a certification for material installed to the following requirements:
 6" reinforced concrete (PCC) sampling per ASTM C31-84, testing per ASTM C39-84
 8" non-reinforced concrete (PCC) sampling per ASTM C31-84, testing per ASTM C39-84
 3" asphalt over 3" concrete - Type SP 12.5 Level C or higher
 6" asphalt (AC) - Type SP 12.5 Traffic Level C or higher

*** * * * *** Wide Hazards and Transitions may require
 the foundation to be longer. See Transition Drawings.

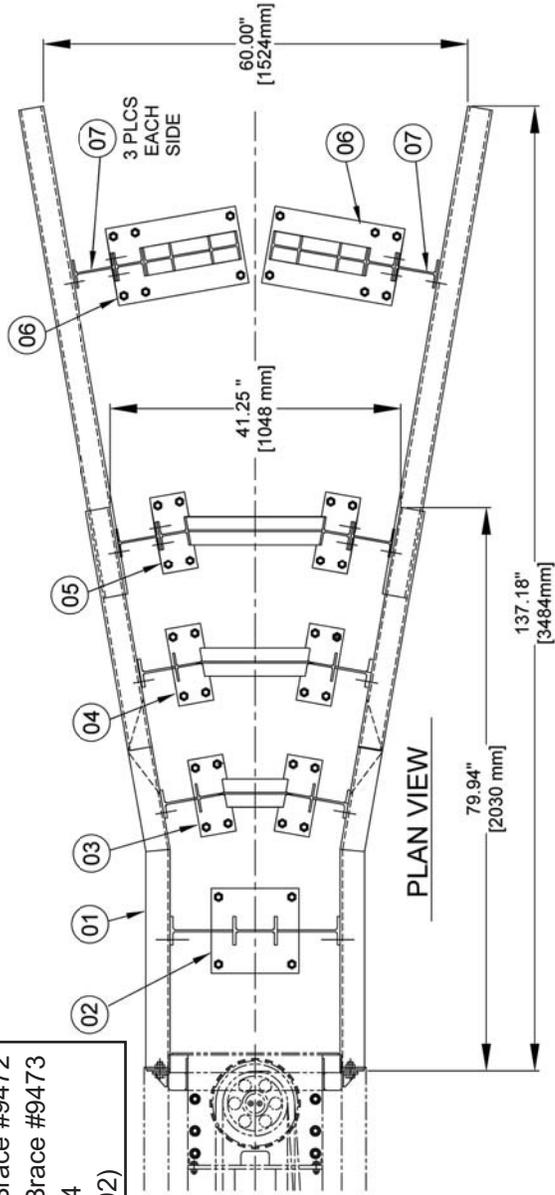


APPENDIX F - TRANSITION, GORE ASSEMBLY

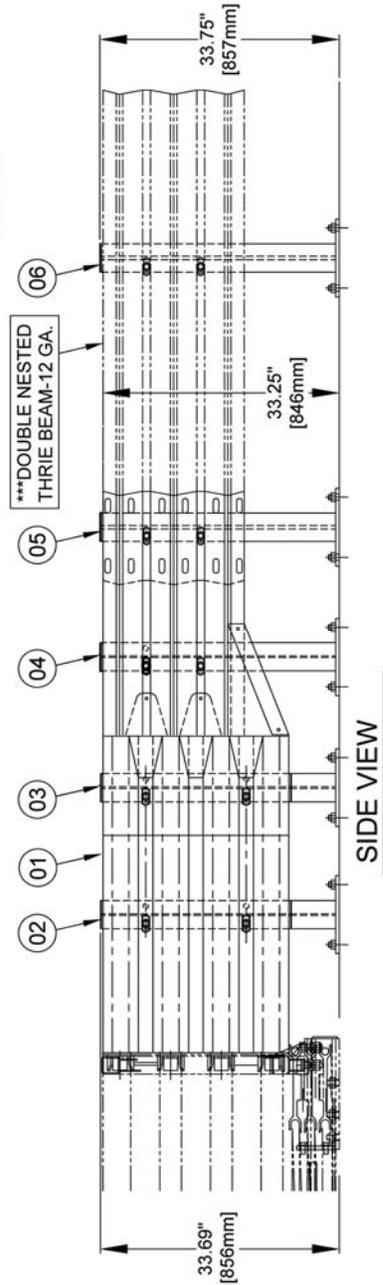
PARTS LIST

- Gore Assembly #9475
- 01 - Transition 10 Degree Flare Right #9467
- 01 - Transition 10 Degree Flare Left #9468
- 02 - Transition Concrete Spanner Brace #9469
- 03 - Transition Concrete #1 Spanner Brace #9470
- 04 - Transition Gore Tapered #1 Spanner Brace #9472
- 05 - Transition Gore Tapered #2 Spanner Brace #9473
- 06 - Thrie Beam Concrete Leg Brace #9474
- 07 - Thrie Beam Blockout (AASHTO PWB02)

***** SPLICE BOLTS AND GUARDRAIL SUPPLIED BY OTHERS*****



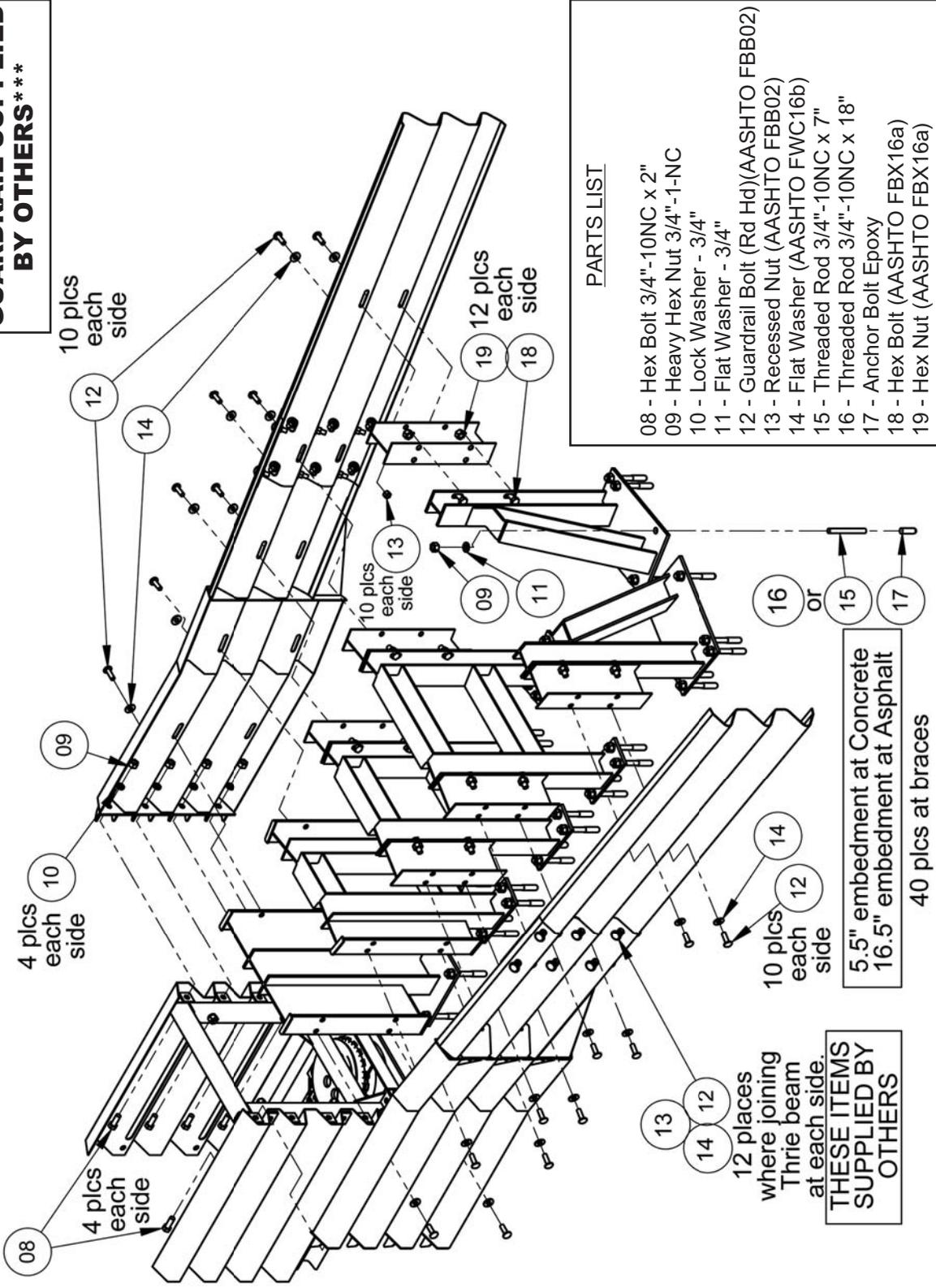
NOTES:
 1) DIMENSIONS SHOWN ARE FOR 60" WIDTH
 2) FOR EACH 1" OF WIDTH CHANGE, ADD OR SUBTRACT THE FOLLOWING:
 2.88" [73.15mm] TO LENGTH OF GUARDRAIL
 2.84" [72.13mm] TO OVERALL LENGTH
 3) ADD OR SUBTRACT ADDITIONAL POST ON EACH SIDE FOR EACH 13" [330mm] CHANGE IN WIDTH.
 4) GUARDRAIL TERMINATION - YOU MUST ADD THE GUARDRAIL OVERLAP LENGTH AND TERMINATE PER STATE REGULATIONS.



The use of the last brace will be determined by whether the Thrie Beam can be attached to the obstruction or not. If the Thrie Beam distance from the last brace is 40 inches or less and can be attached, you will not need a brace at the obstruction. If you cannot attach to the obstruction, you may need a brace and drill holes in the Thrie Beam at the furthest rearward location.

APPENDIX F(2) - TRANSITION. GORE ASSEMBLY

***** SPLICE BOLTS AND
GUARDRAIL SUPPLIED
BY OTHERS *****



- PARTS LIST**
- 08 - Hex Bolt 3/4" - 10NC x 2"
 - 09 - Heavy Hex Nut 3/4" - 1-NC
 - 10 - Lock Washer - 3/4"
 - 11 - Flat Washer - 3/4"
 - 12 - Guardrail Bolt (Rd Hd)(AASHTO FBB02)
 - 13 - Recessed Nut (AASHTO FBB02)
 - 14 - Flat Washer (AASHTO FWC16b)
 - 15 - Threaded Rod 3/4" - 10NC x 7"
 - 16 - Threaded Rod 3/4" - 10NC x 18"
 - 17 - Anchor Bolt Epoxy
 - 18 - Hex Bolt (AASHTO FBX16a)
 - 19 - Hex Nut (AASHTO FBX16a)

5.5" embedment at Concrete
16.5" embedment at Asphalt
40 plcs at braces

12 places
where joining
Thrie beam
at each side.
**THESE ITEMS
SUPPLIED BY
OTHERS**

APPENDIX F(3) - TRANSITION. GORE ASSEMBLY CALCULATIONS

SCI GM WIDE TRANSITION CALCULATIONS

Guardrail

12.6" Splice overlap at Transition end

Must add length for barrier overlap and end termination per state specifications

Longitudinal distance increases 2.84" for each 1" increase in width

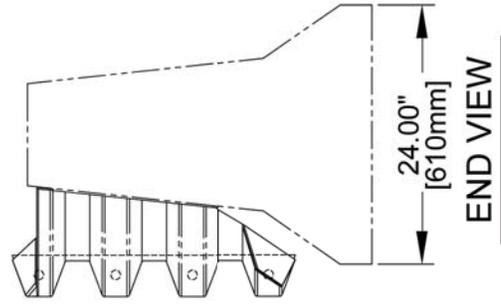
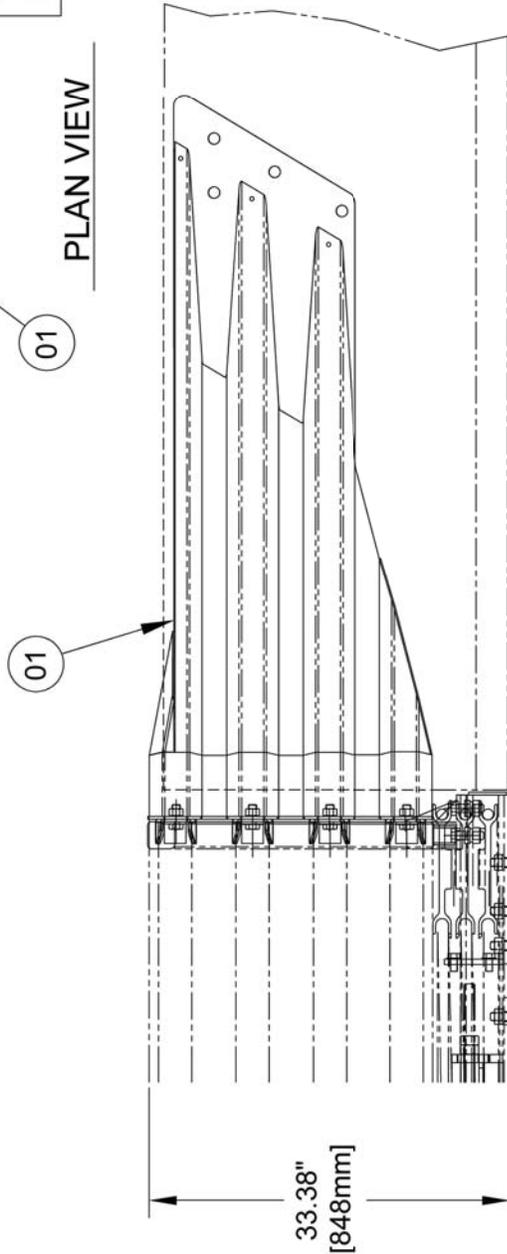
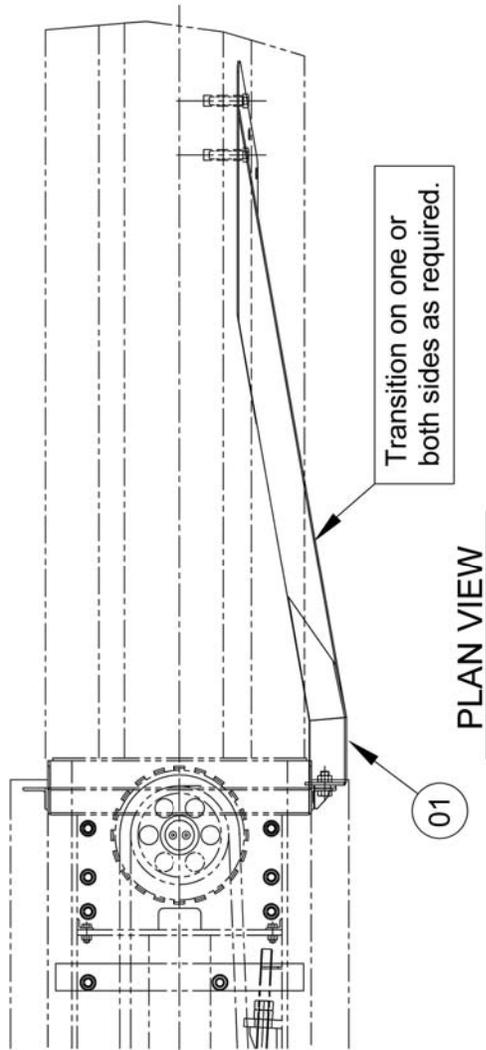
Thrie Beam Length increases 2.88" for each 1" increase in width

Gore Width Inches	Additional Long. Distance Inches	Additional Long. Distance Feet	Thrie Beam Length Inches	Overall System Length Feet	Additional Brace Count
41	79.2	6.6	12.6	28.1	All 4 Spanner Braces # 9469, 9470, 9472, 9473
48	99.1	8.3	32.8	29.8	All 4 Spanner Braces # 9469, 9470, 9472, 9473
55	118.9	9.9	52.9	31.4	Add 2-Thrie Beam Concrete Leg Brace #9474
60	133.1	11.1	67.3	32.6	Add 2-Thrie Beam Concrete Leg Brace #9474
68	155.8	13.0	90.4	34.5	Add 4-Thrie Beam Concrete Leg Brace #9474
69	158.6	13.2	93.2	34.7	Add 4-Thrie Beam Concrete Leg Brace #9474
81	192.7	16.1	127.8	37.6	Add 6-Thrie Beam Concrete Leg Brace #9474
88	212.5	17.7	148.0	39.2	Add 6-Thrie Beam Concrete Leg Brace #9474
94	229.5	19.1	165.2	40.6	Add 8-Thrie Beam Concrete Leg Brace #9474
100	246.5	20.5	182.5	42.1	Add 8-Thrie Beam Concrete Leg Brace #9474
107	266.4	22.2	202.7	43.7	Add 10-Thrie Beam Concrete Leg Brace #9474
112	280.6	23.4	217.1	44.9	Add 10-Thrie Beam Concrete Leg Brace #9474
120	303.3	25.3	240.1	46.8	Add 12-Thrie Beam Concrete Leg Brace #9474
126	320.3	26.7	257.4	48.2	Add 12-Thrie Beam Concrete Leg Brace #9474
133	340.1	28.3	277.6	49.9	Add 14-Thrie Beam Concrete Leg Brace #9474

APPENDIX G - TRANSITION, JERSEY/F SHAPE BARRIER

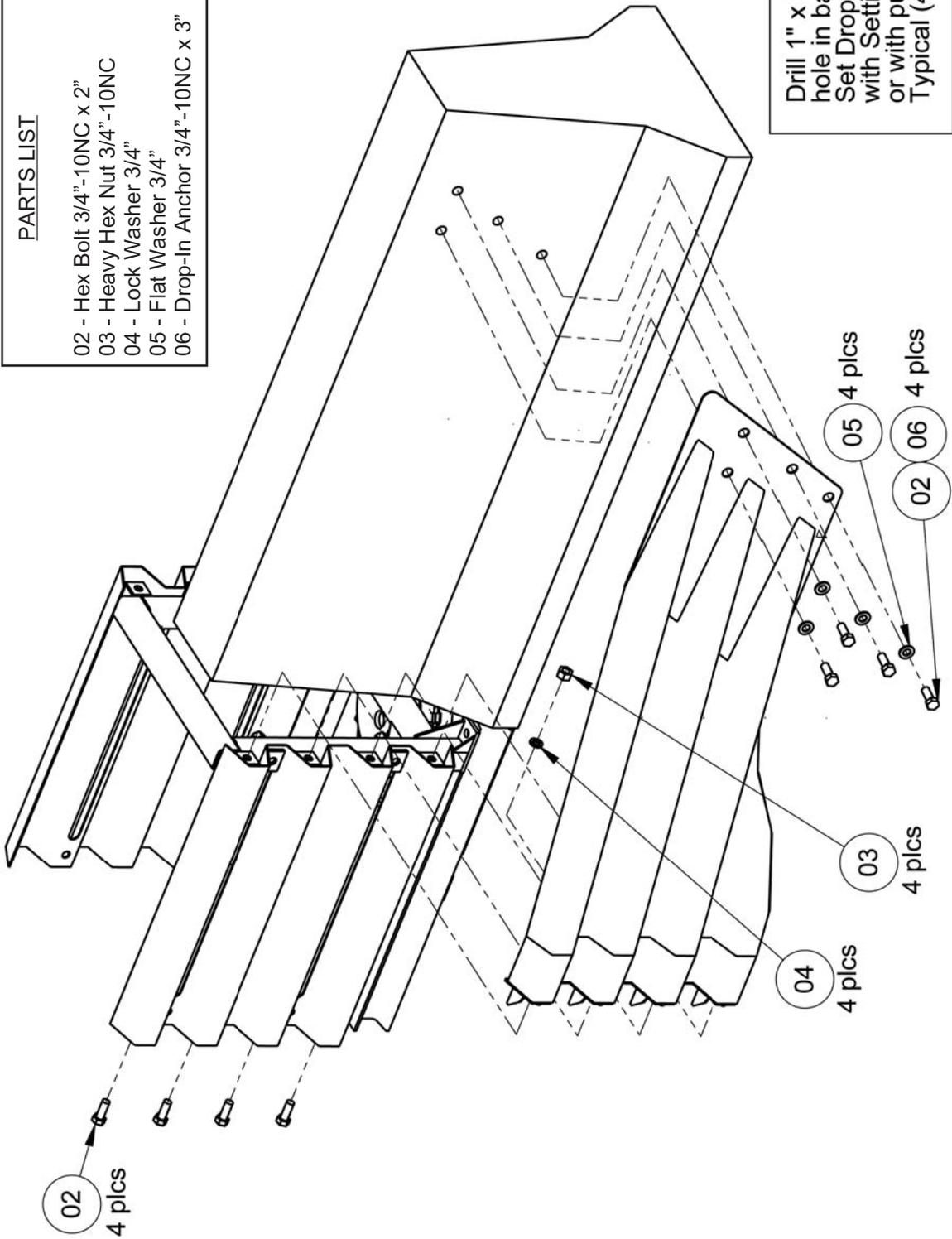
PARTS LIST

01	- Transition Jersey Barrier Right #9431
02	- Transition Jersey Barrier Left #9432



APPENDIX G(2) - TRANSITION, JERSEY/F SHAPE BARRIER

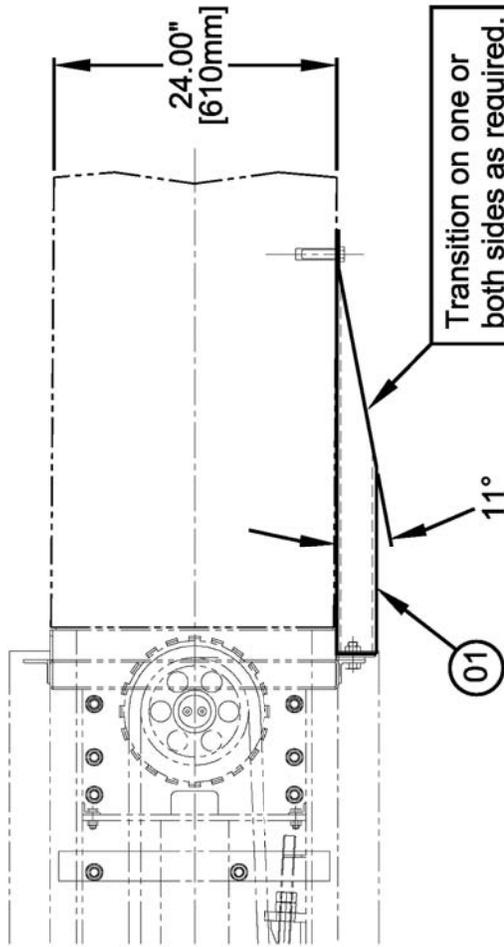
- PARTS LIST
- 02 - Hex Bolt 3/4"-10NC x 2"
 - 03 - Heavy Hex Nut 3/4"-10NC
 - 04 - Lock Washer 3/4"
 - 05 - Flat Washer 3/4"
 - 06 - Drop-In Anchor 3/4"-10NC x 3"



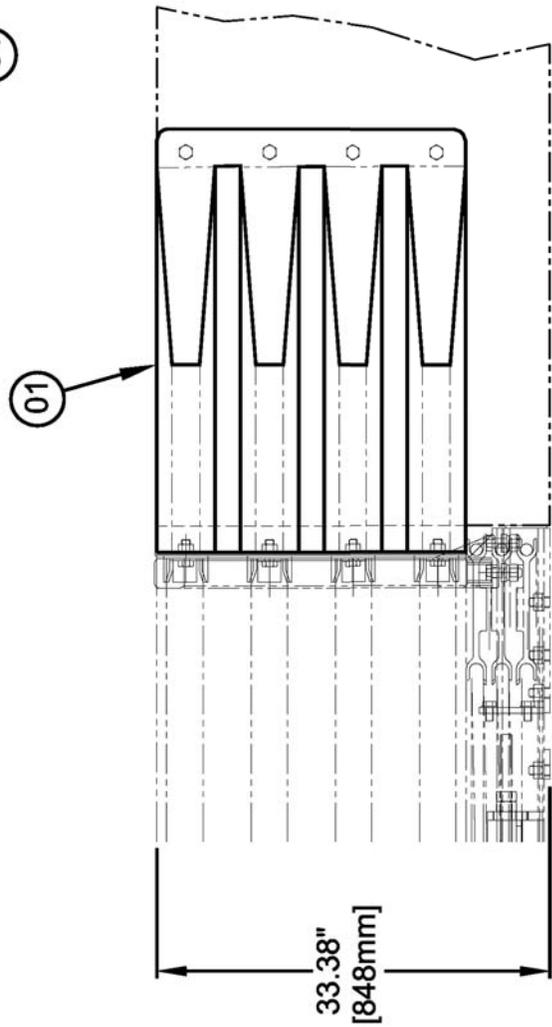
APPENDIX H - TRANSITION, CONCRETE BLOCK, 24 INCH (610mm)

PARTS LIST

01 - Transition Concrete Block Right or Left #9433

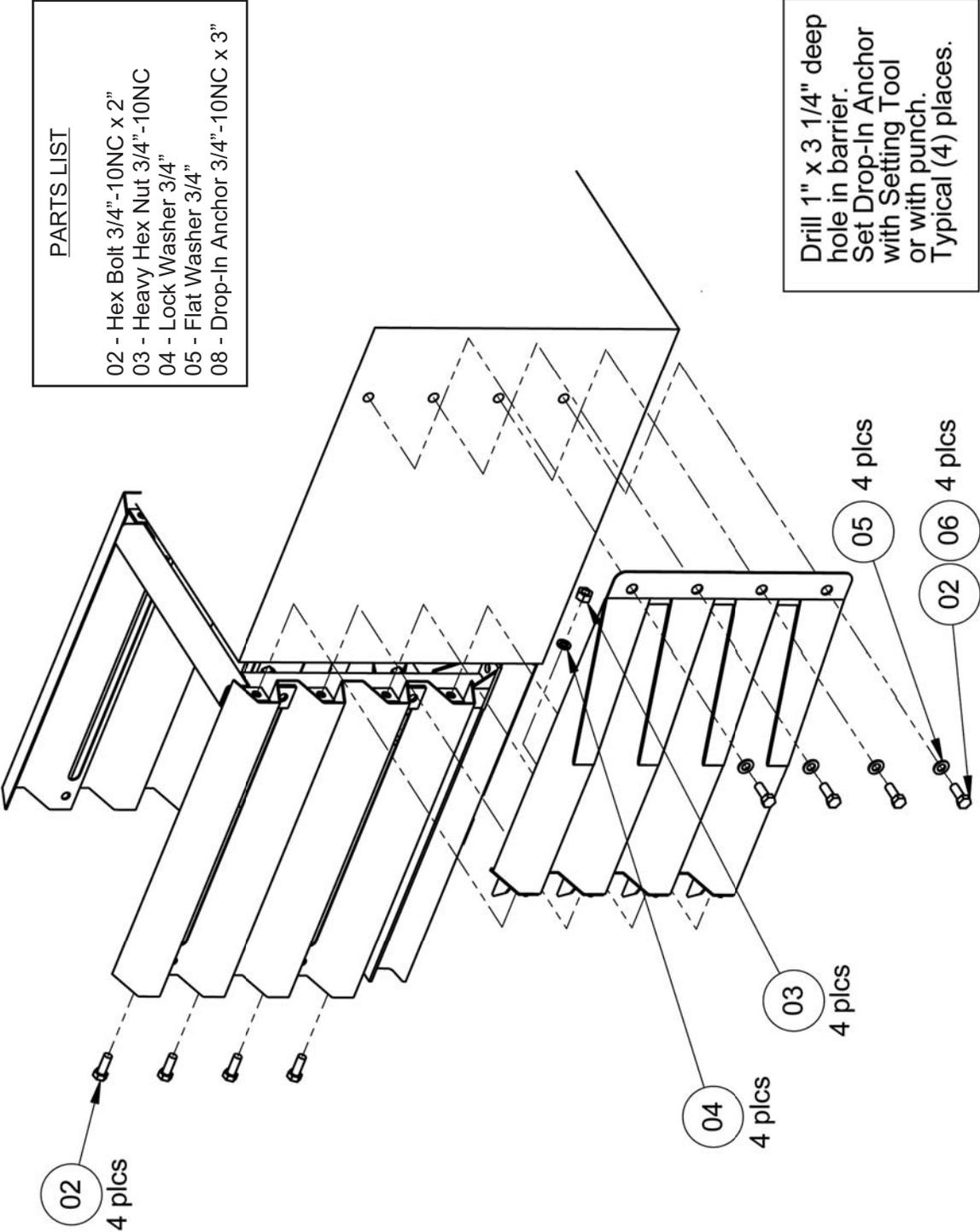


PLAN VIEW



SIDE VIEW

APPENDIX H(2) - TRANSITION, CONCRETE BLOCK, 24 INCH (610mm)



PARTS LIST

- 02 - Hex Bolt 3/4"-10NC x 2"
- 03 - Heavy Hex Nut 3/4"-10NC
- 04 - Lock Washer 3/4"
- 05 - Flat Washer 3/4"
- 08 - Drop-In Anchor 3/4"-10NC x 3"

Drill 1" x 3 1/4" deep hole in barrier. Set Drop-In Anchor with Setting Tool or with punch. Typical (4) places.

02 4 plcs

04 4 plcs

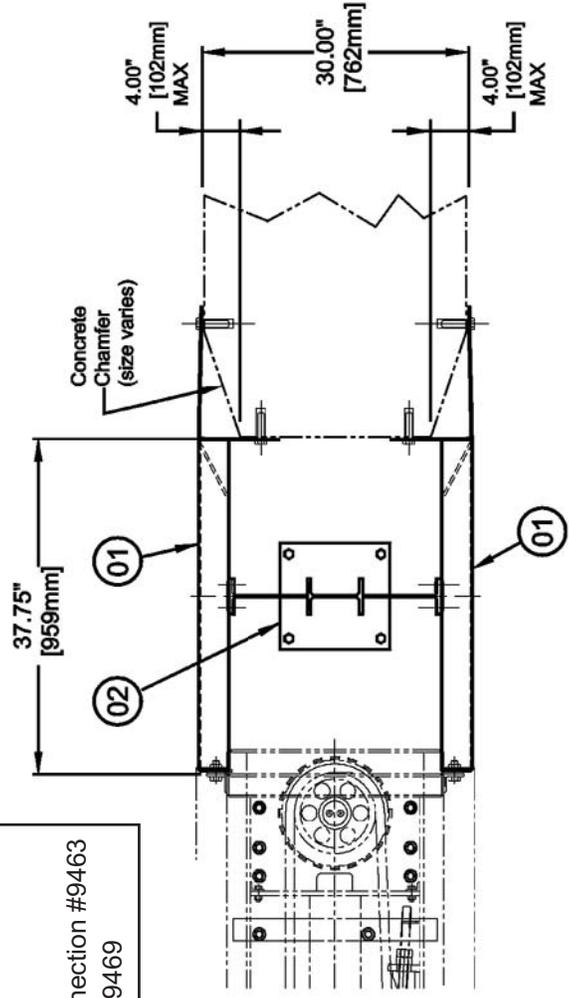
03 4 plcs

05 4 plcs

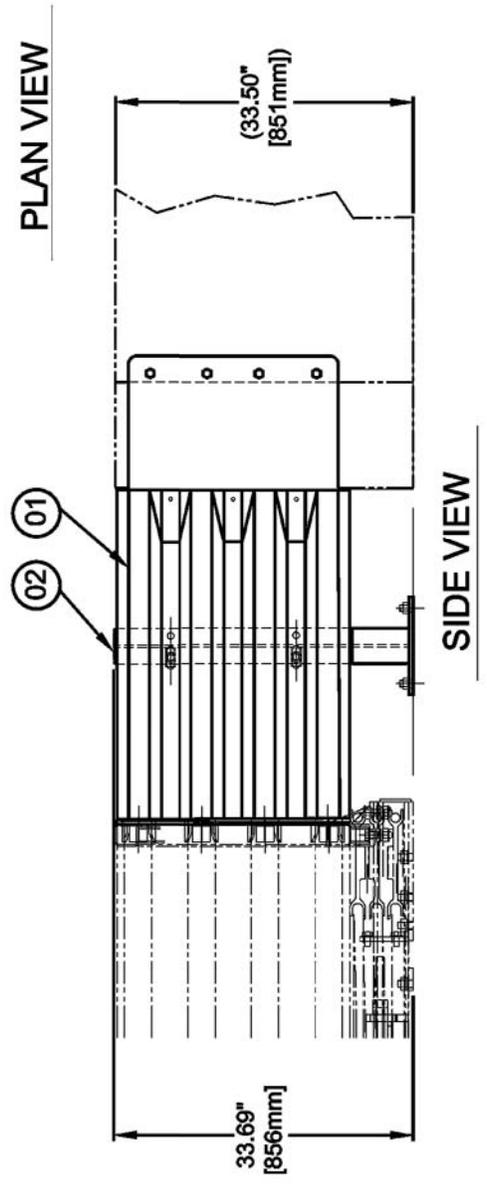
06 4 plcs

APPENDIX I - TRANSITION, CONCRETE BLOCK, 30 INCH (762mm)

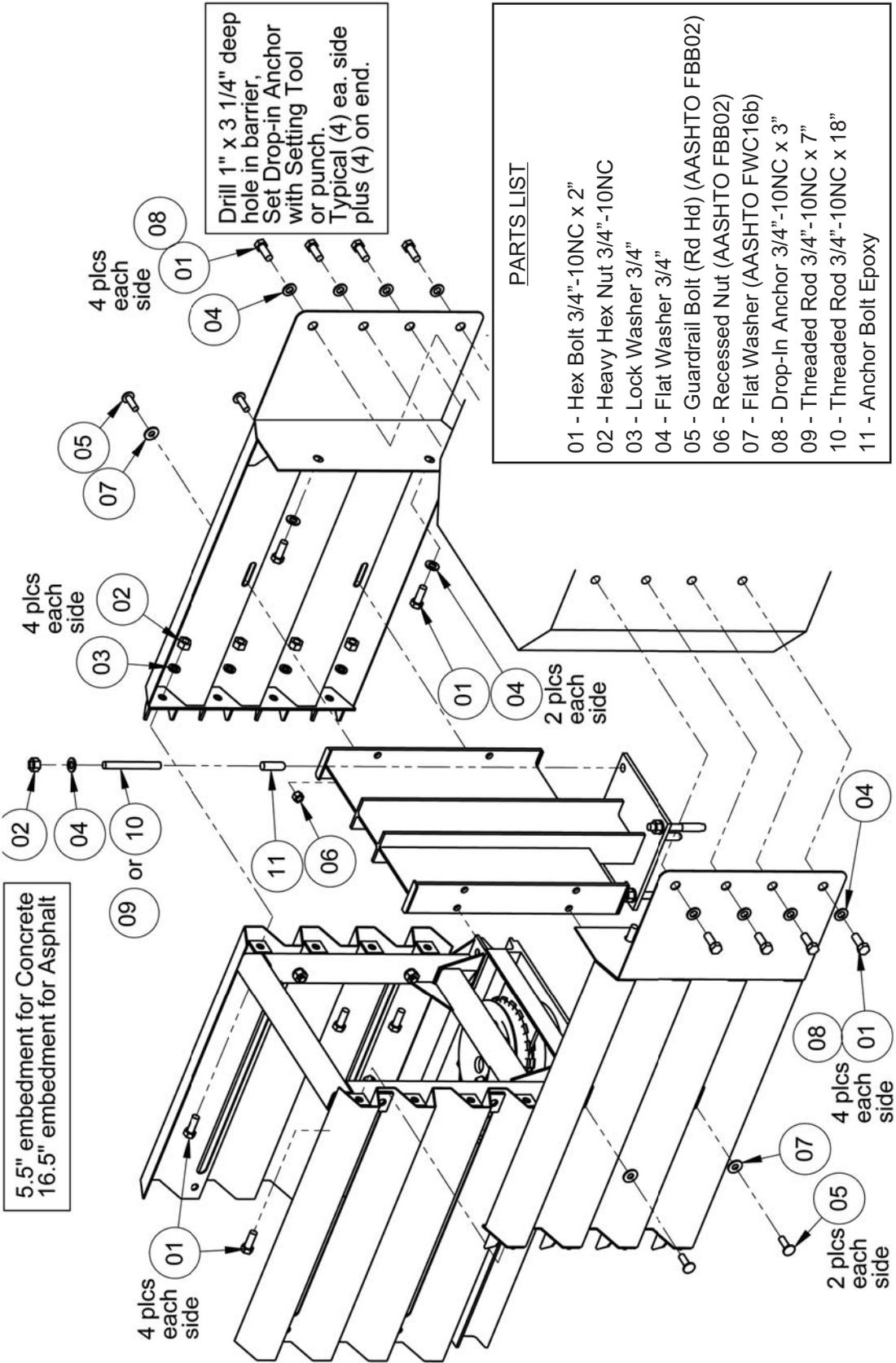
PARTS LIST
 Two Sided Full Assembly #9459
 01 - Transition 30" Concrete Straight Connection #9463
 02 - Transition Concrete Spanner Brace #9469



USED FOR:
 1. Unchamfered Concrete Block ***
 2. Chamfered Concrete Block ***
 ***Chamfer limited to <4"



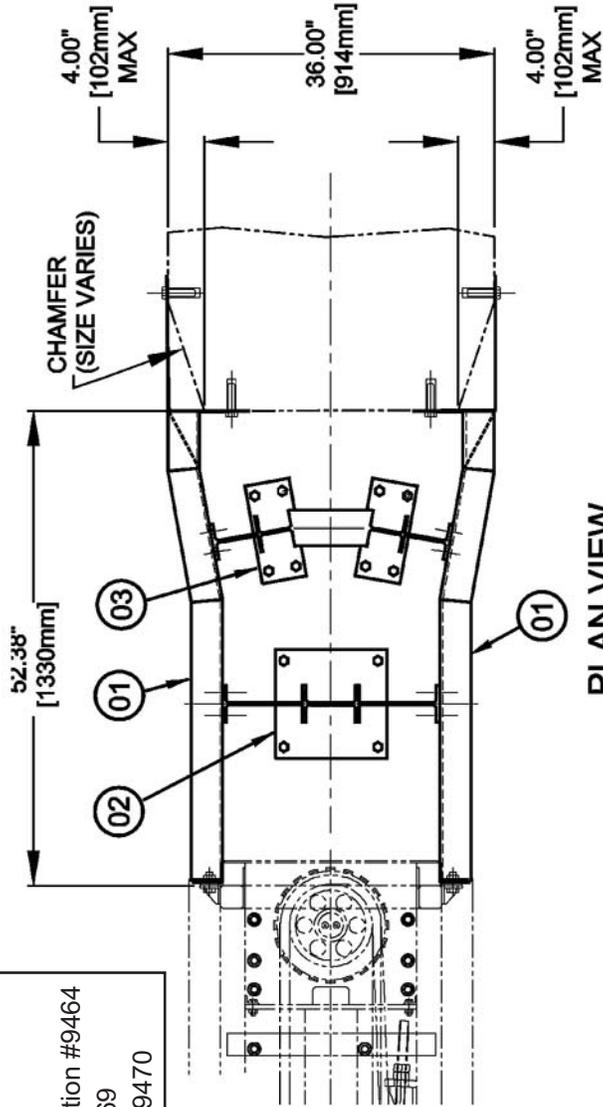
APPENDIX I(2) - TRANSITION, CONCRETE BLOCK, 30 INCH (762mm)



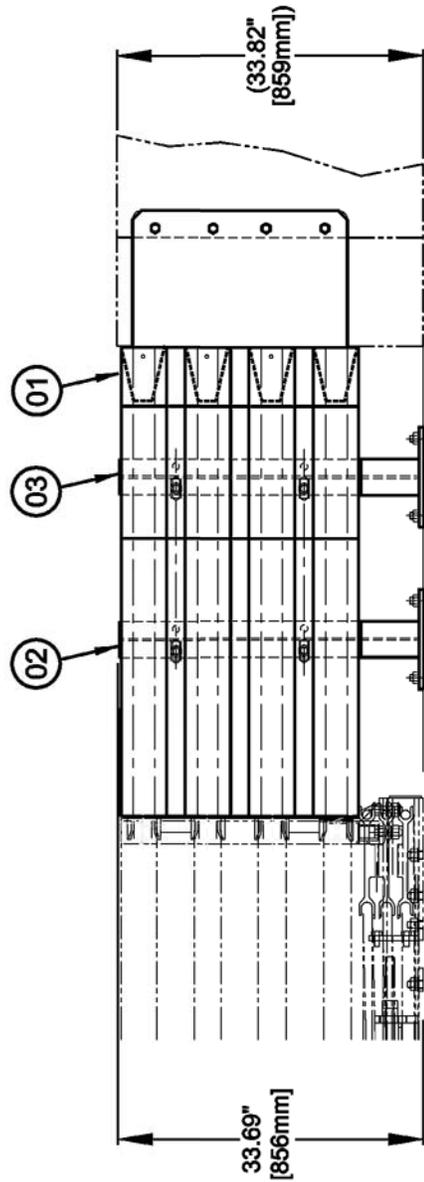
APPENDIX J - TRANSITION, CONCRETE BLOCK, 36 INCH (915mm)

PARTS LIST

- Two Sided Full Assembly #9460
- 01 - Transition 36" Concrete Straight Connection #9464
- 02 - Transition Concrete Spanner Brace #9469
- 03 - Transition Concrete #1 Spanner Brace #9470



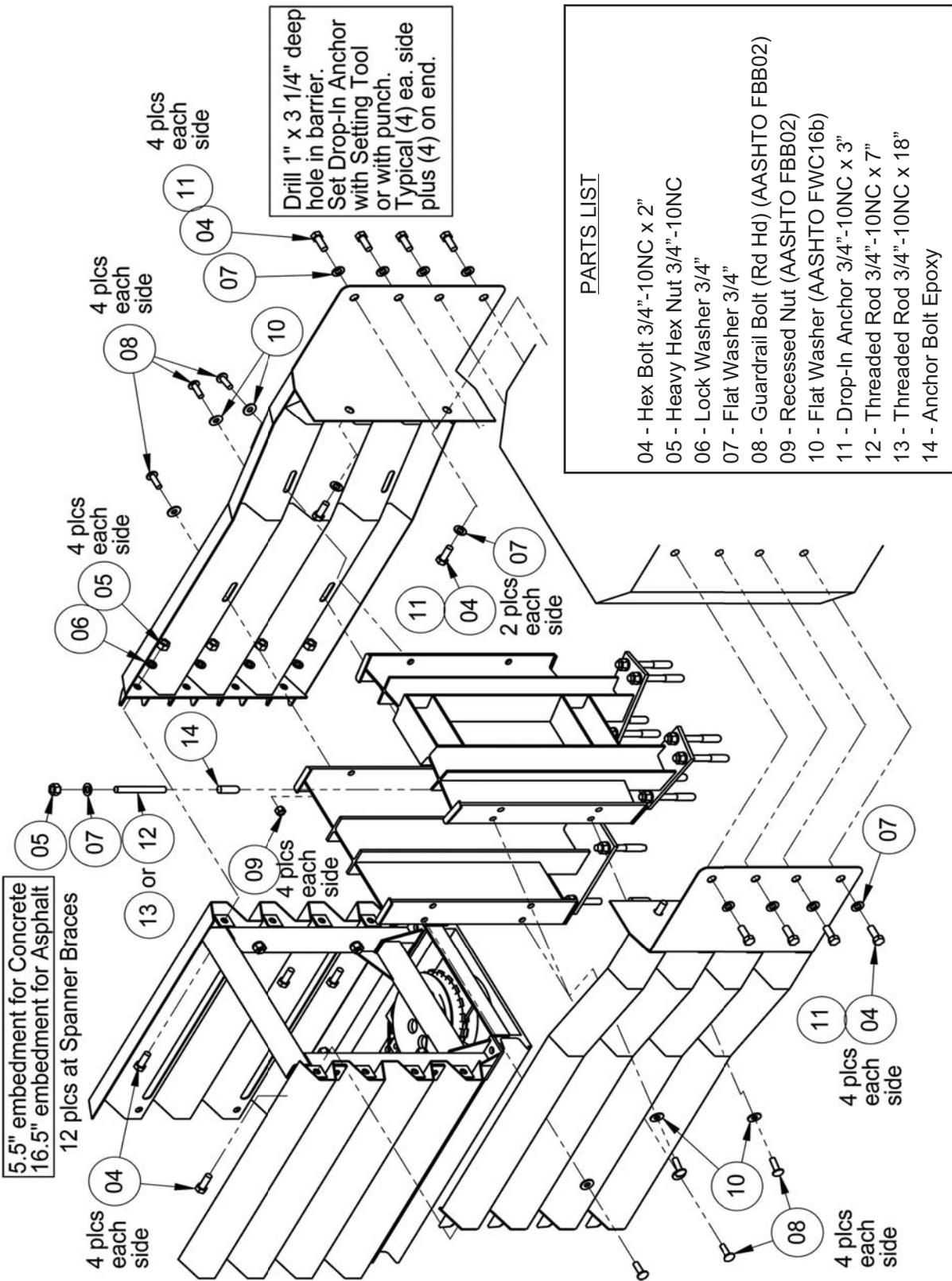
PLAN VIEW



SIDE VIEW

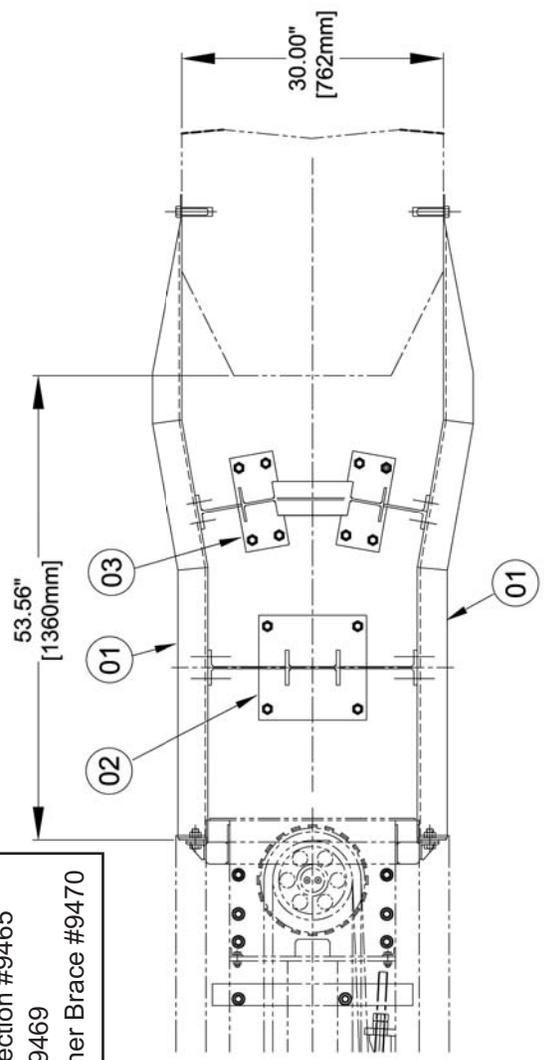
USED FOR:
 1. Unchamfered Concrete Block ***
 2. Chamfered Concrete Block ***
 *** Chamfer limited to <4"

APPENDIX J2 - TRANSITION, CONCRETE BLOCK, 36 INCH (915mm)

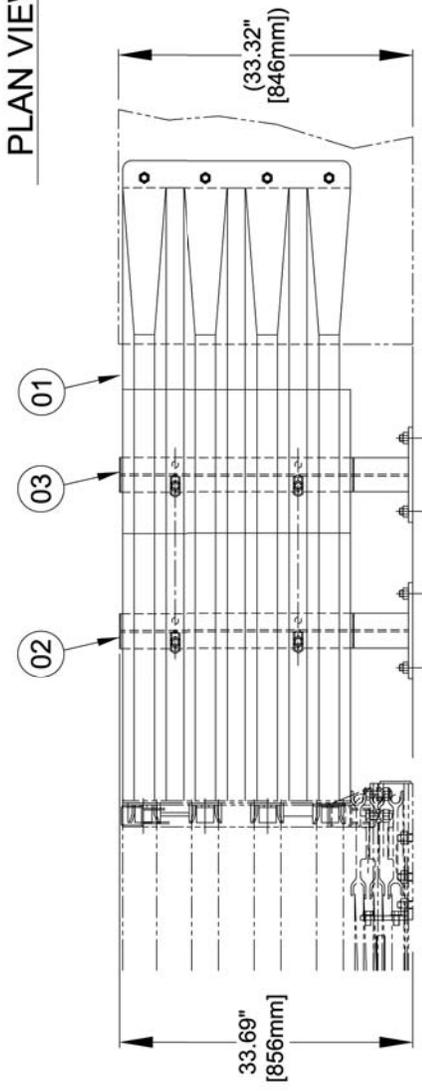


APPENDIX K - TRANSITION, CONCRETE BLOCK, 30 INCH (762mm) FLARED

- PARTS LIST
- Two Sided Full Assembly #9461
 - 01 - Transition 30" Concrete Outside Connection #9465
 - 02 - Transition Concrete Spanner Brace # 9469
 - 03 - Transition Concrete #1 Tapered Spanner Brace #9470



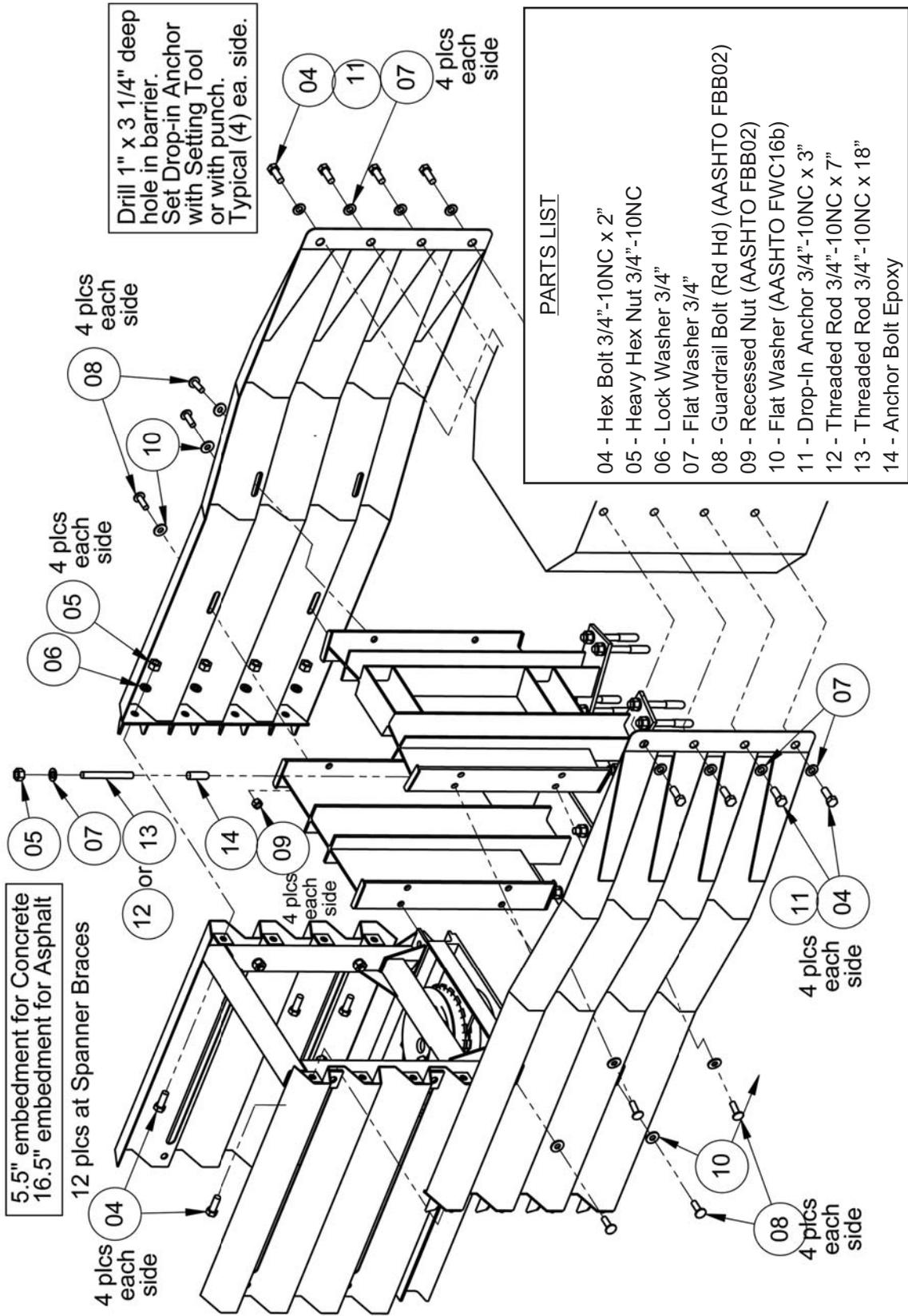
PLAN VIEW



SIDE VIEW

USED FOR:
 1. Unchamfered Concrete Block ***
 2. Chamfered Concrete Block ***
 *** Chamfer limited to <4"

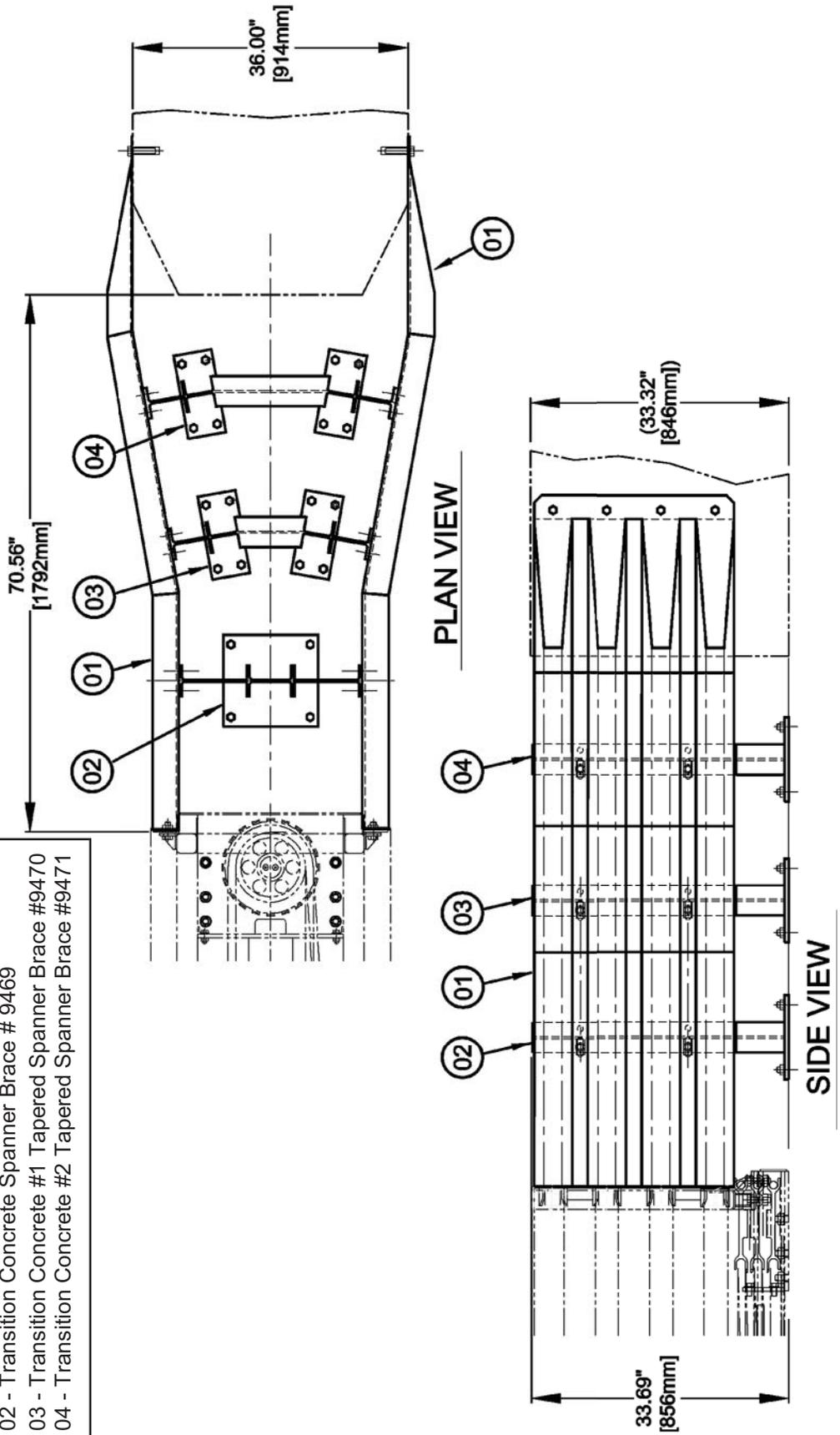
APPENDIX K(2) - TRANSITION, CONCRETE BLOCK, 30 INCH (762mm) FLARED



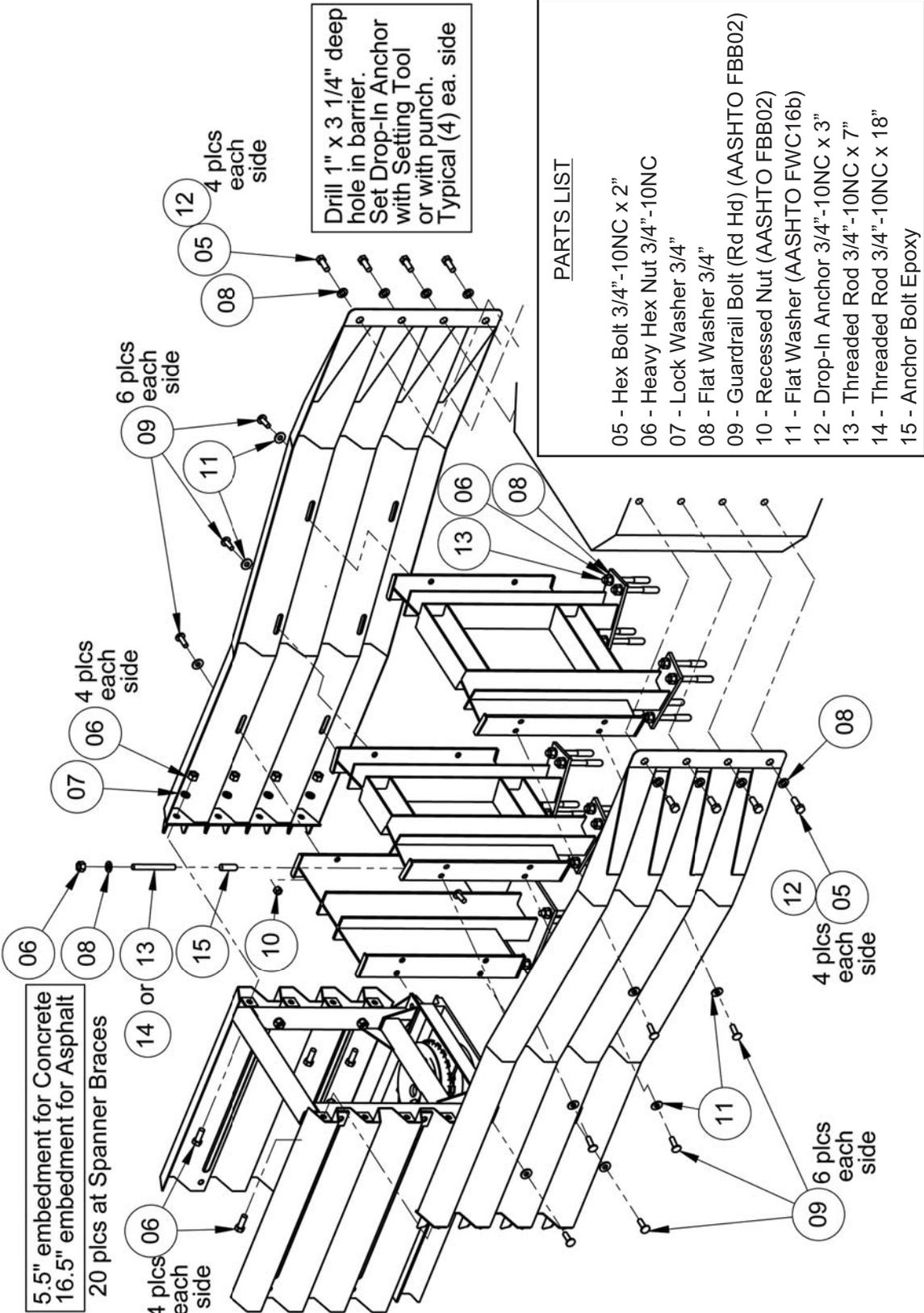
APPENDIX L - TRANSITION, CONCRETE BLOCK, 36 INCH (915mm) FLARED

PARTS LIST

Two Sided Full Assembly #9462
01 - Transition 36" Concrete Outside Connection #9466
02 - Transition Concrete Spanner Brace # 9469
03 - Transition Concrete #1 Tapered Spanner Brace #9470
04 - Transition Concrete #2 Tapered Spanner Brace #9471



APPENDIX L(2) - TRANSITION, CONCRETE BLOCK, 36 INCH (915mm) FLARED



5.5" embedment for Concrete
16.5" embedment for Asphalt
20 plcs at Spanner Braces

Drill 1" x 3 1/4" deep hole in barrier. Set Drop-In Anchor with Setting Tool or with punch. Typical (4) ea. side

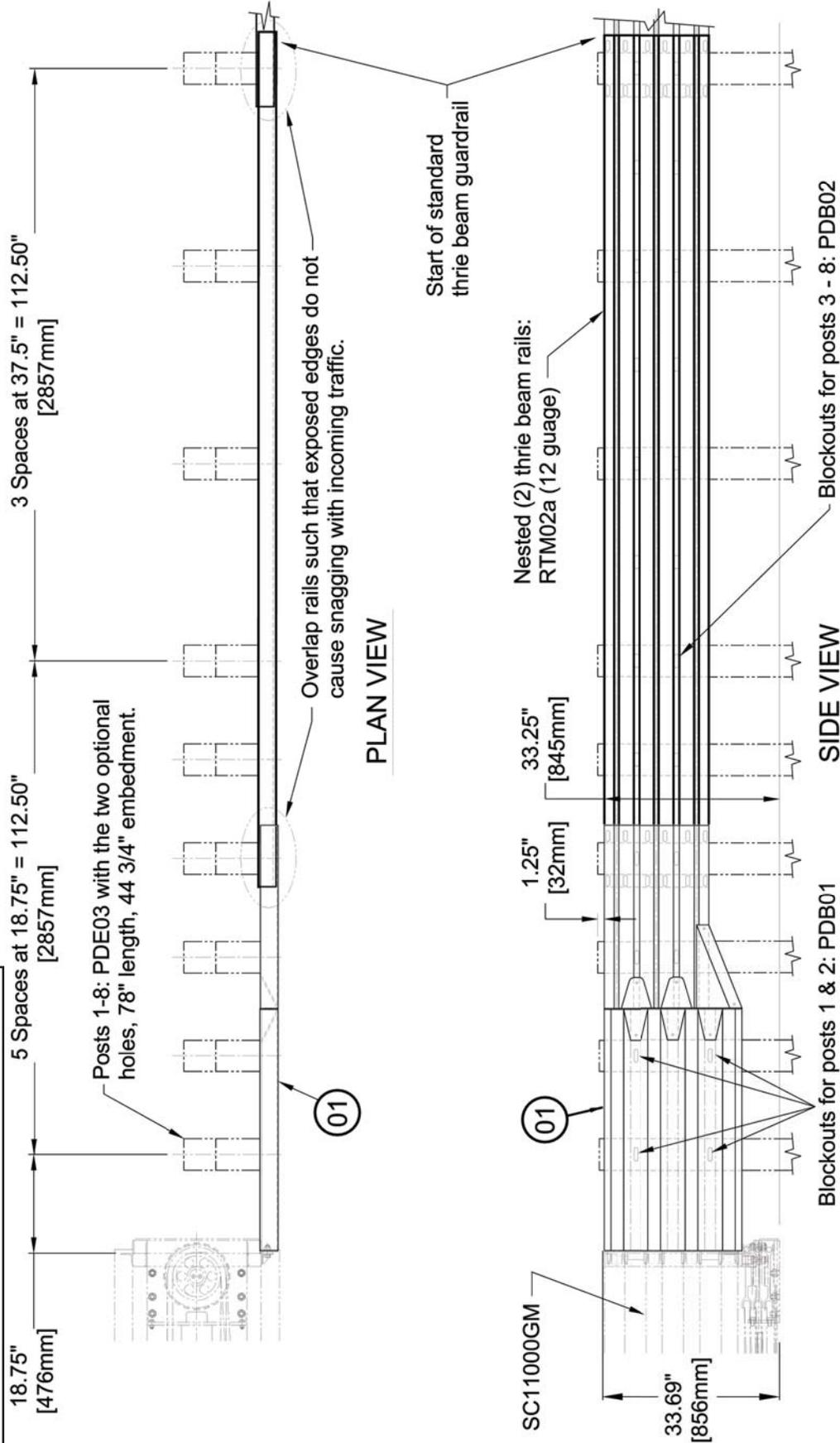
- PARTS LIST**
- 05 - Hex Bolt 3/4" - 10NC x 2"
 - 06 - Heavy Hex Nut 3/4" - 10NC
 - 07 - Lock Washer 3/4"
 - 08 - Flat Washer 3/4"
 - 09 - Guardrail Bolt (Rd Hd) (AASHTO FBB02)
 - 10 - Recessed Nut (AASHTO FBB02)
 - 11 - Flat Washer (AASHTO FWC16b)
 - 12 - Drop-In Anchor 3/4" - 10NC x 3"
 - 13 - Threaded Rod 3/4" - 10NC x 7"
 - 14 - Threaded Rod 3/4" - 10NC x 18"
 - 15 - Anchor Bolt Epoxy

APPENDIX M - TRANSITION, THRIE BEAM

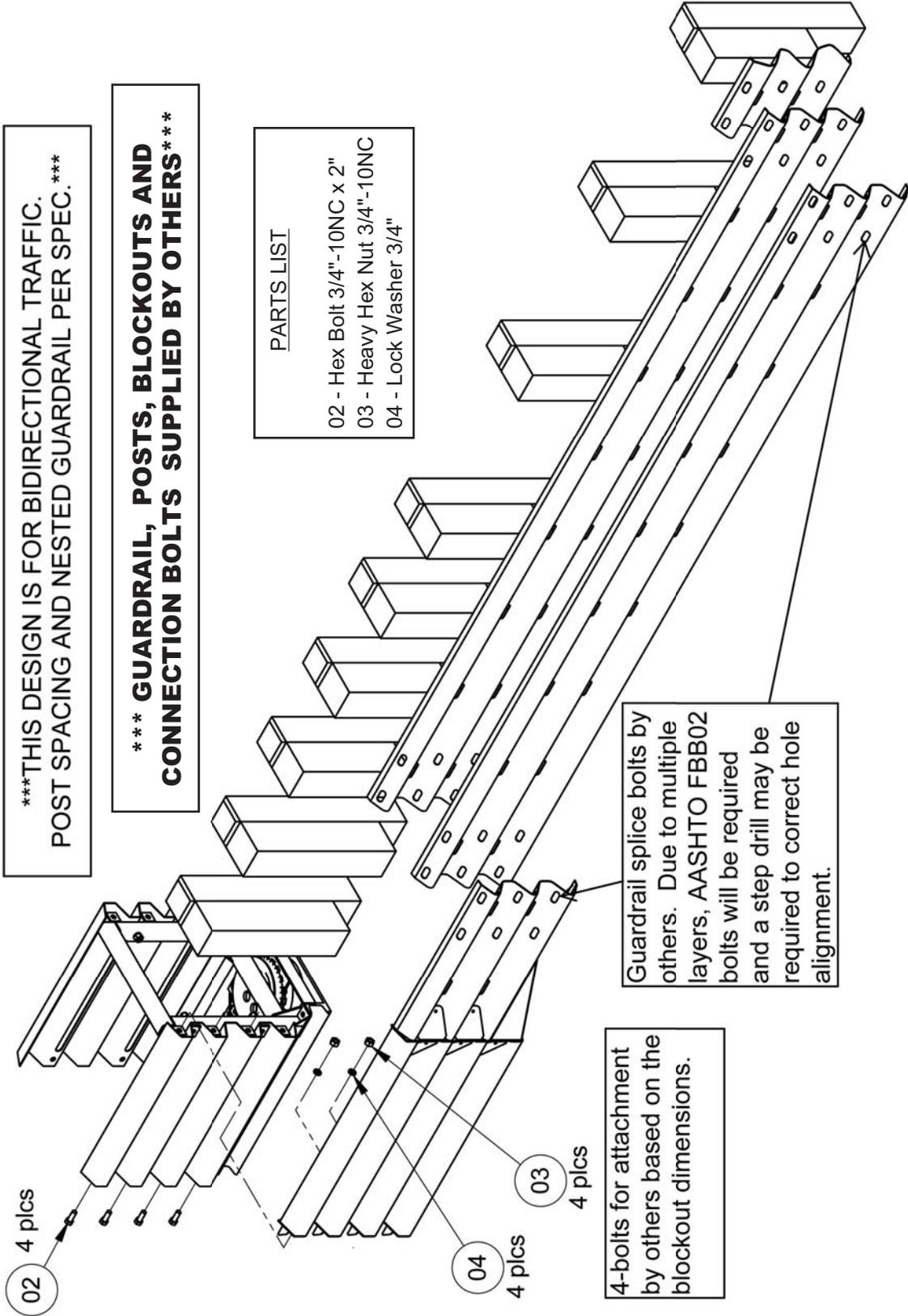
PARTS LIST

- 01 - Transition Thrie & W Beam - Right #9437
- 01 - Transition Thrie & W Beam - Left #9438

***** GUARDRAILS, POSTS, BLOCKOUTS AND CONNECTION BOLTS SUPPLIED BY OTHERS *****



APPENDIX M(2) - TRANSITION, THRIE BEAM



THIS DESIGN IS FOR BIDIRECTIONAL TRAFFIC. POST SPACING AND NESTED GUARDRAIL PER SPEC.

***** GUARDRAIL, POSTS, BLOCKOUTS AND CONNECTION BOLTS SUPPLIED BY OTHERS*****

PARTS LIST

- 02 - Hex Bolt 3/4"-10NC x 2"
- 03 - Heavy Hex Nut 3/4"-10NC
- 04 - Lock Washer 3/4"

Guardrail splice bolts by others. Due to multiple layers, AASHTO FBB02 bolts will be required and a step drill may be required to correct hole alignment.

4-bolts for attachment by others based on the blackout dimensions.

02 4 plcs

04 4 plcs

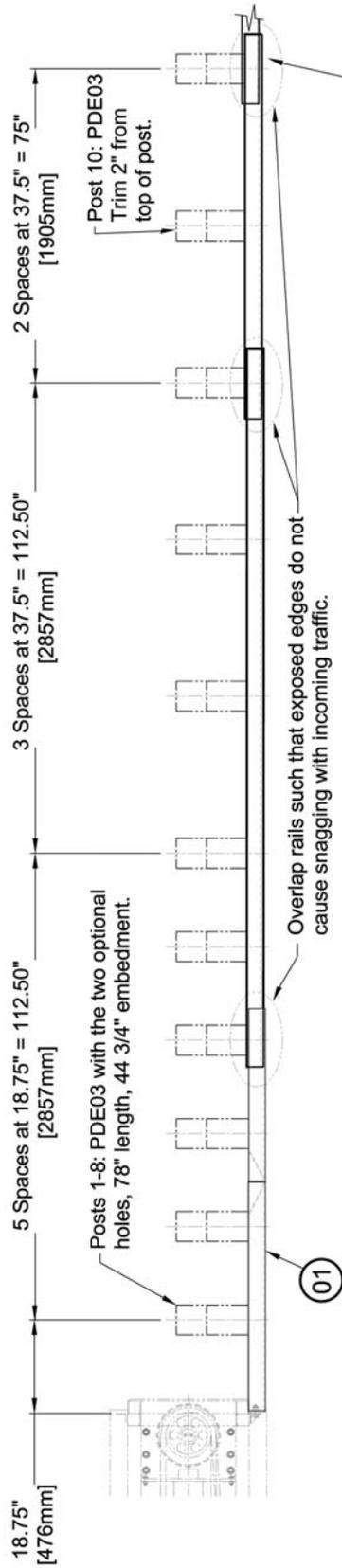
03 4 plcs

APPENDIX N - TRANSITION, W BEAM
***** FOR USE WITH REVERSE DIRECTION TRAFFIC *****

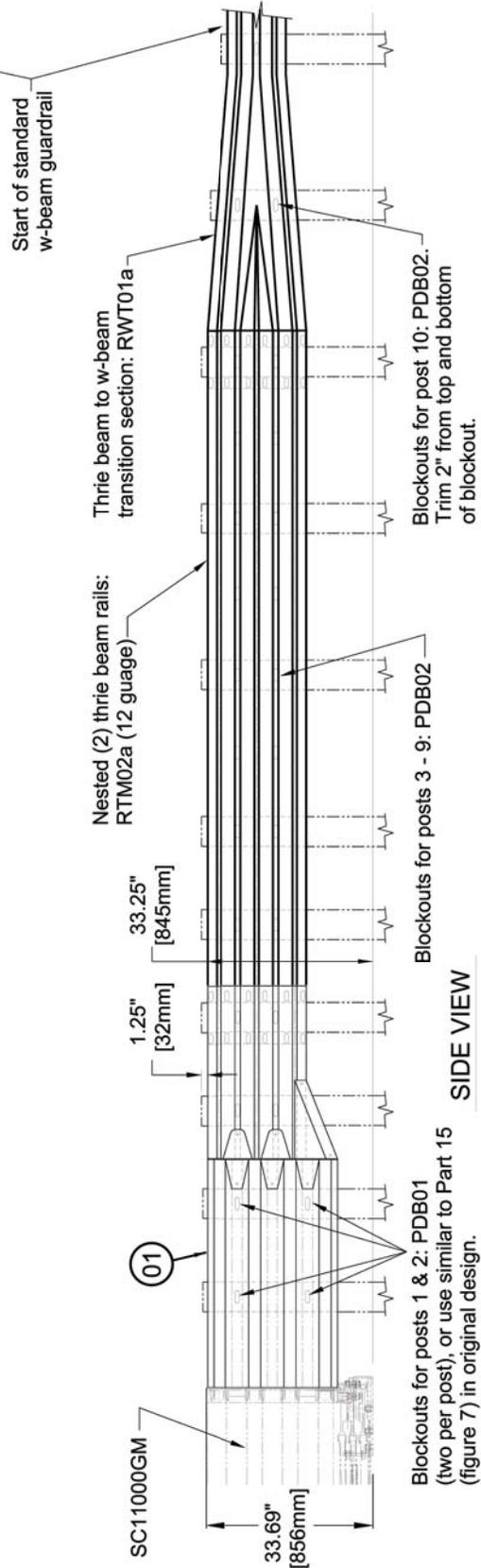
PARTS LIST

01 - Transition Thrie & W Beam - Right #9437
01 - Transition Thrie & W Beam - Left #9438

***** GUARDRAIL, POSTS, BLOCKOUTS AND CONNECTION BOLTS SUPPLIED BY OTHERS *****



PLAN VIEW



SIDE VIEW

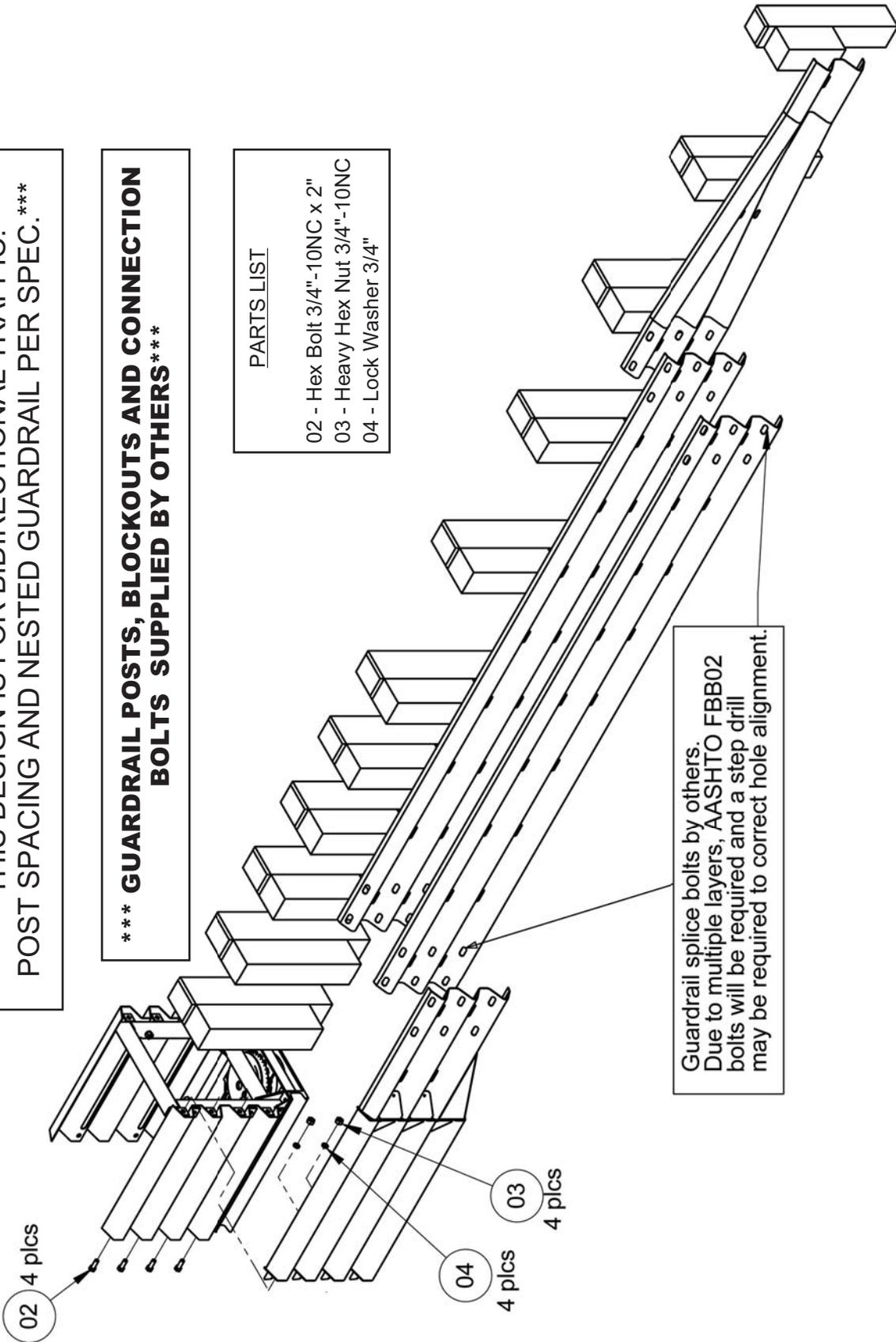
APPENDIX N(2) - TRANSITION, W BEAM

***THIS DESIGN IS FOR BIDIRECTIONAL TRAFFIC.
POST SPACING AND NESTED GUARDRAIL PER SPEC.***

*** **GUARDRAIL POSTS, BLOCKOUTS AND CONNECTION
BOLTS SUPPLIED BY OTHERS*****

PARTS LIST

02 - Hex Bolt 3/4"-10NC x 2"
03 - Heavy Hex Nut 3/4"-10NC
04 - Lock Washer 3/4"

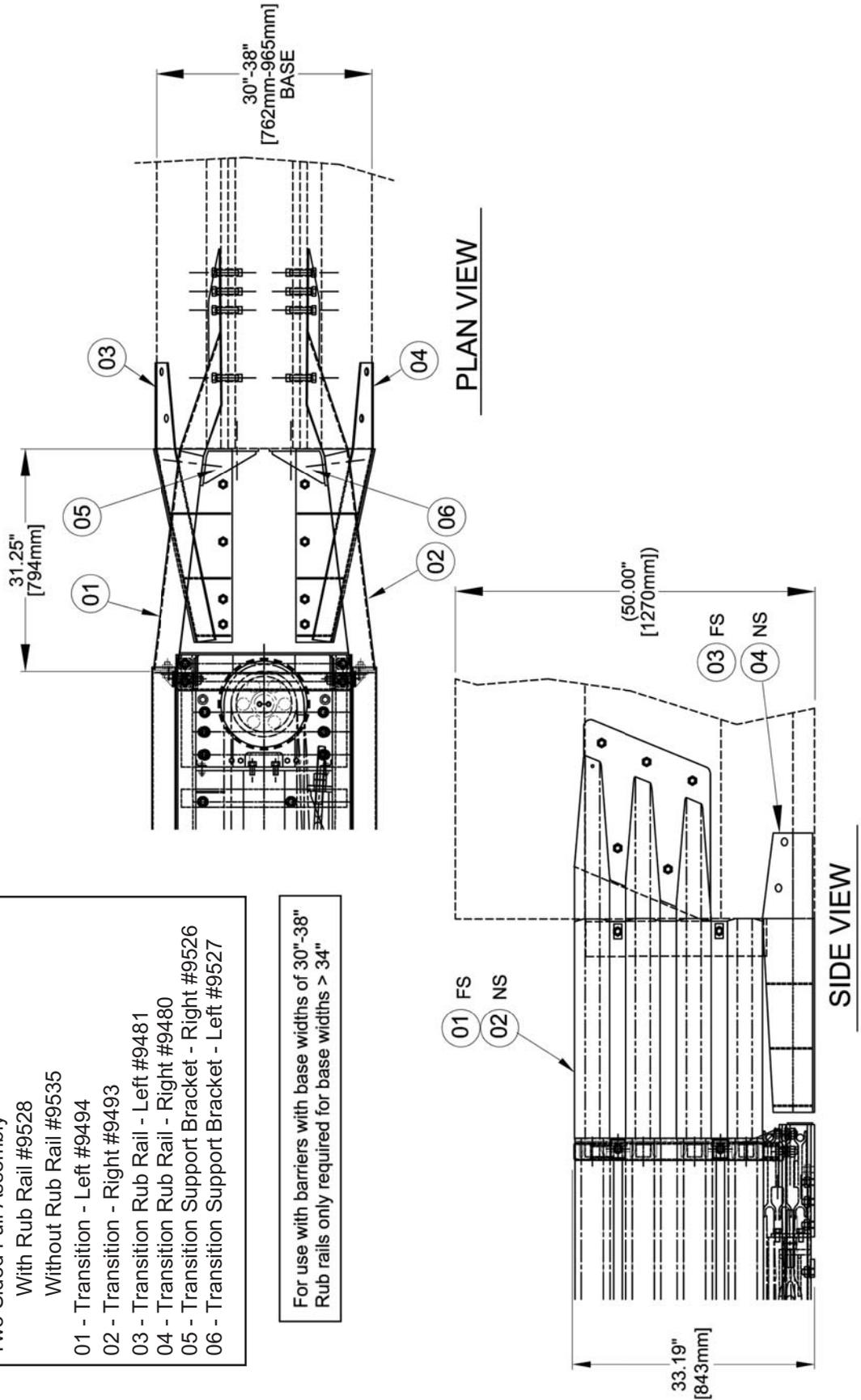


Guardrail splice bolts by others.
Due to multiple layers, AASHTO FBB02
bolts will be required and a step drill
may be required to correct hole alignment.

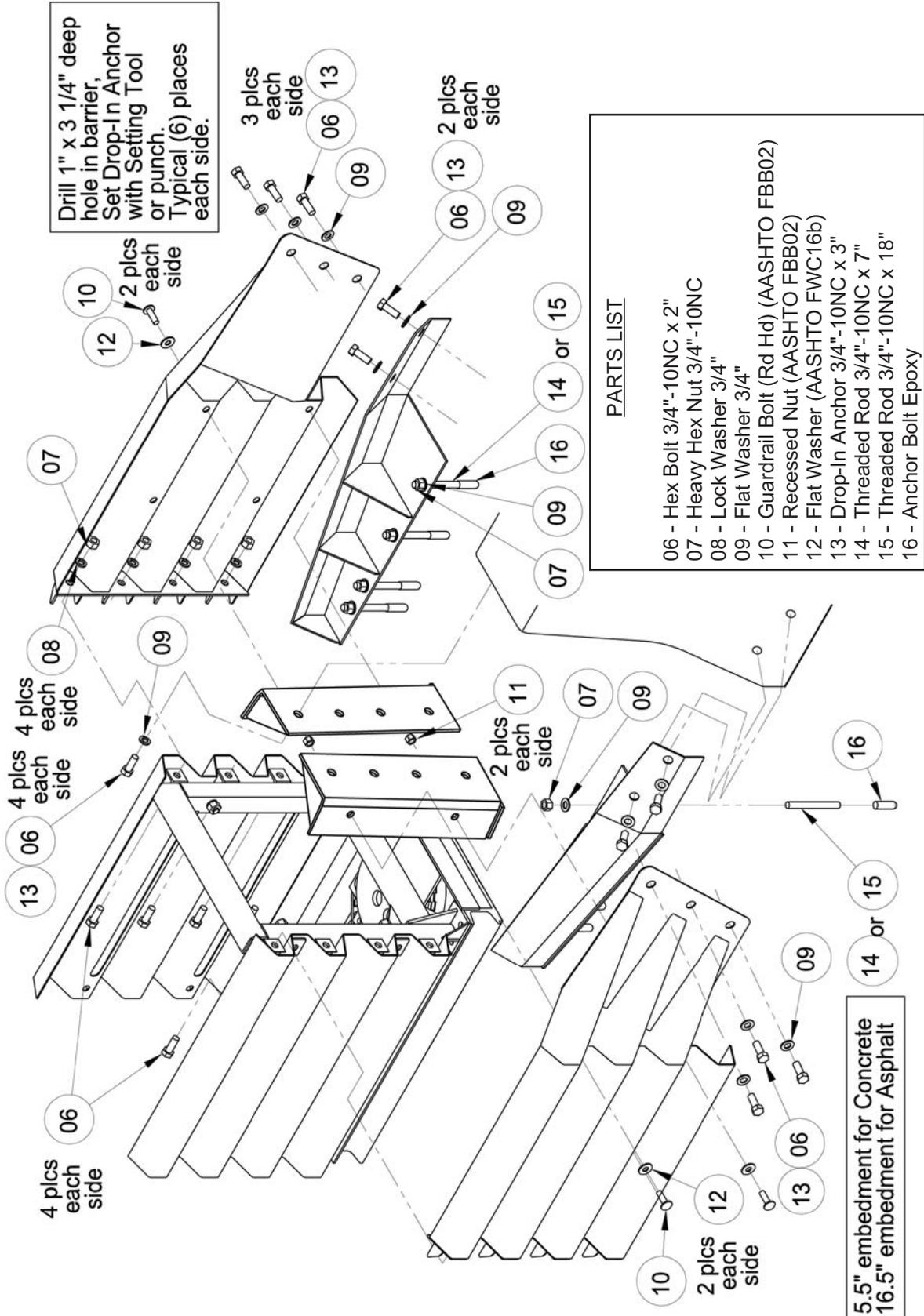
APPENDIX O - TRANSITION, JERSEY/F SHAPE, VARIABLE WIDTH BASE

- PARTS LIST**
- Double Sided Median Base 30"-38" Base:
 - Two Sided Full Assembly
 - With Rub Rail #9528
 - Without Rub Rail #9535
 - 01 - Transition - Left #9494
 - 02 - Transition - Right #9493
 - 03 - Transition Rub Rail - Left #9481
 - 04 - Transition Rub Rail - Right #9480
 - 05 - Transition Support Bracket - Right #9526
 - 06 - Transition Support Bracket - Left #9527

For use with barriers with base widths of 30"-38"
 Rub rails only required for base widths > 34"



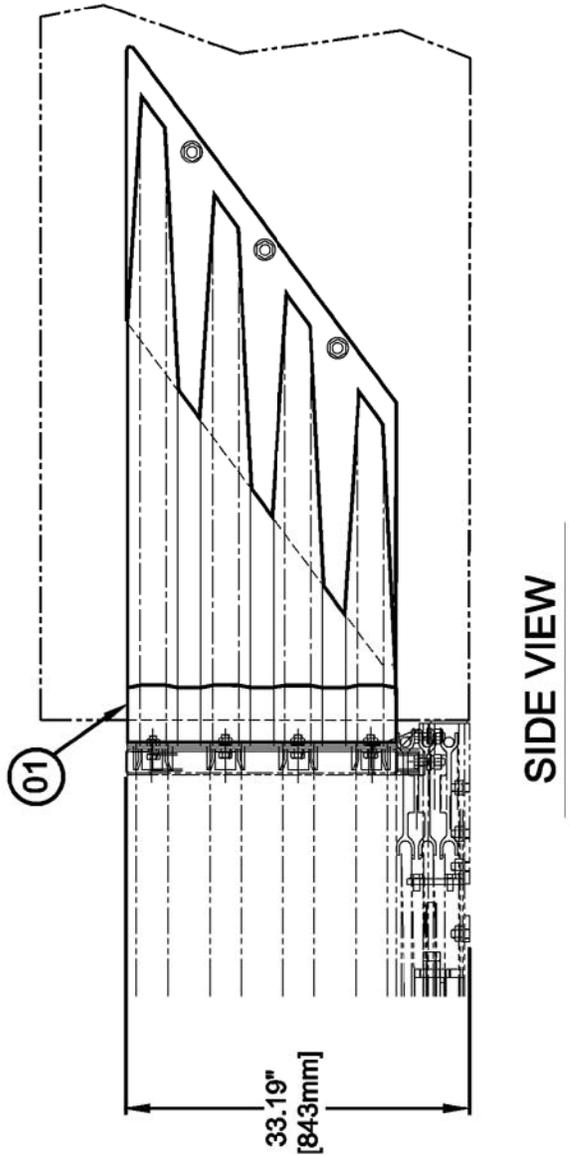
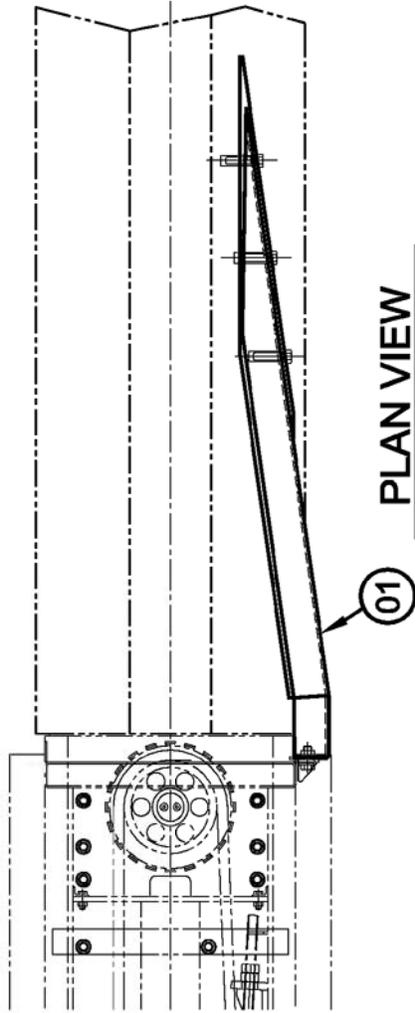
APPENDIX O(2) - TRANSITION, JERSEY/F SHAPE, VARIABLE WIDTH BASE



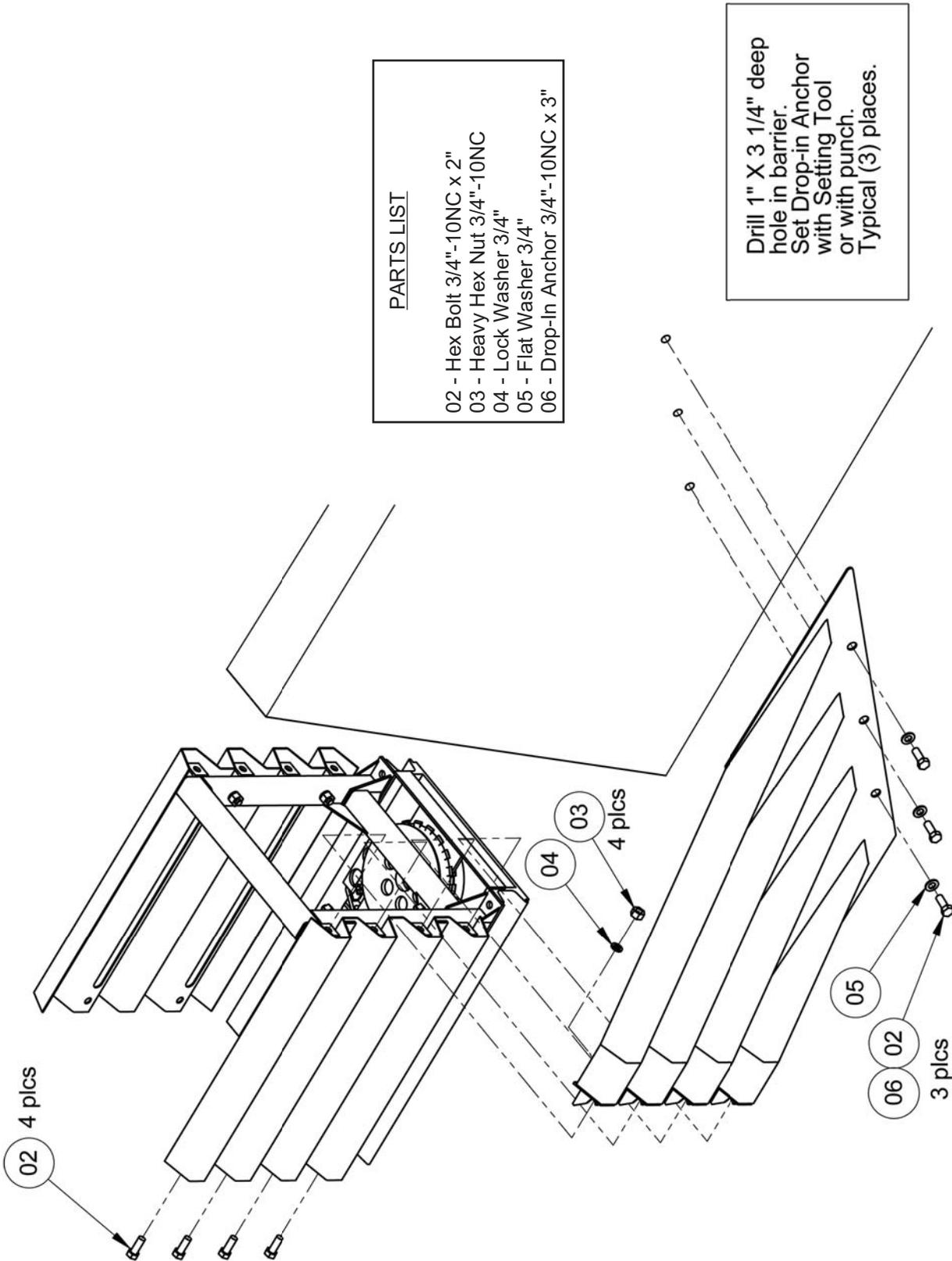
APPENDIX P - TRANSITION, MEDIAN BARRIER, SINGLE SLOPE

PARTS LIST

01 - Transition Single Slope Barrier - Right #9490
01 - Transition Single Slope Barrier - Left #9491



APPENDIX P(2) - TRANSITION, MEDIAN BARRIER, SINGLE SLOPE

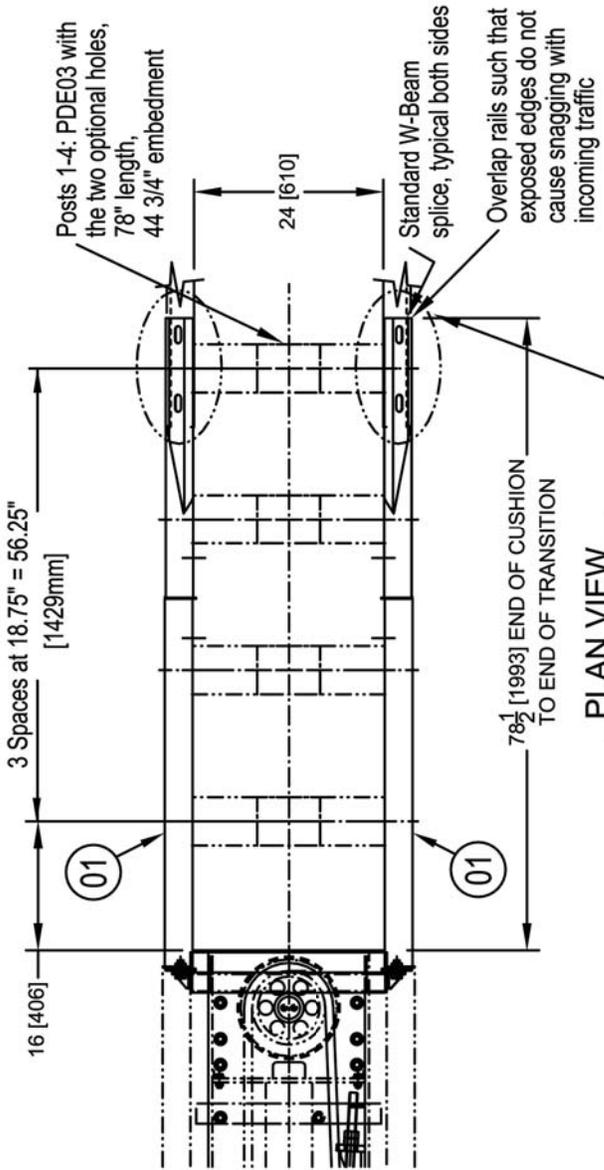


PARTS LIST

- 02 - Hex Bolt 3/4"-10NC x 2"
- 03 - Heavy Hex Nut 3/4"-10NC
- 04 - Lock Washer 3/4"
- 05 - Flat Washer 3/4"
- 06 - Drop-In Anchor 3/4"-10NC x 3"

Drill 1" X 3 1/4" deep hole in barrier. Set Drop-in Anchor with Setting Tool or with punch. Typical (3) places.

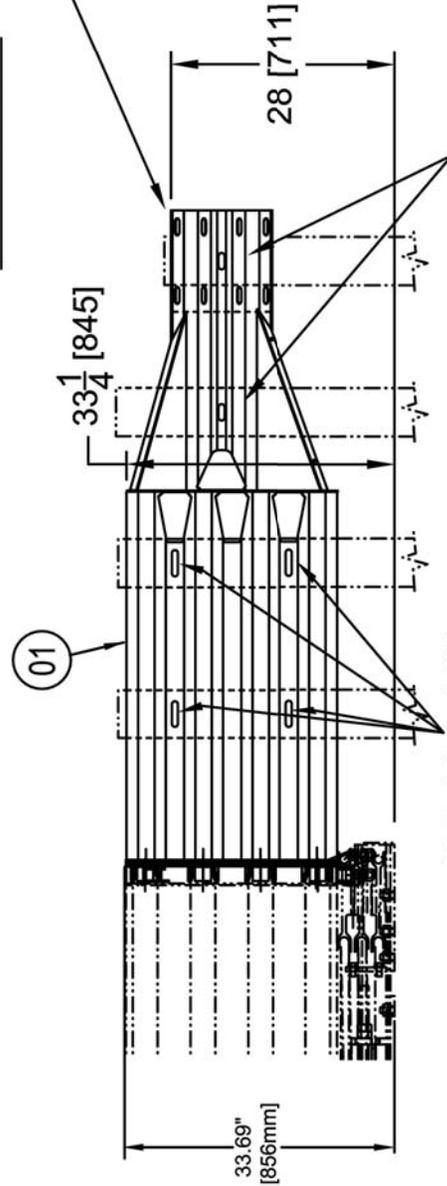
**APPENDIX Q - TRANSITION, W - BEAM 28 INCH HIGH
 FOR USE WITH NO REVERSE DIRECTION TRAFFIC**



PLAN VIEW

PARTS LIST

01 - Transition W Beam - Right #9511
01 - Transition W Beam - Left #9512



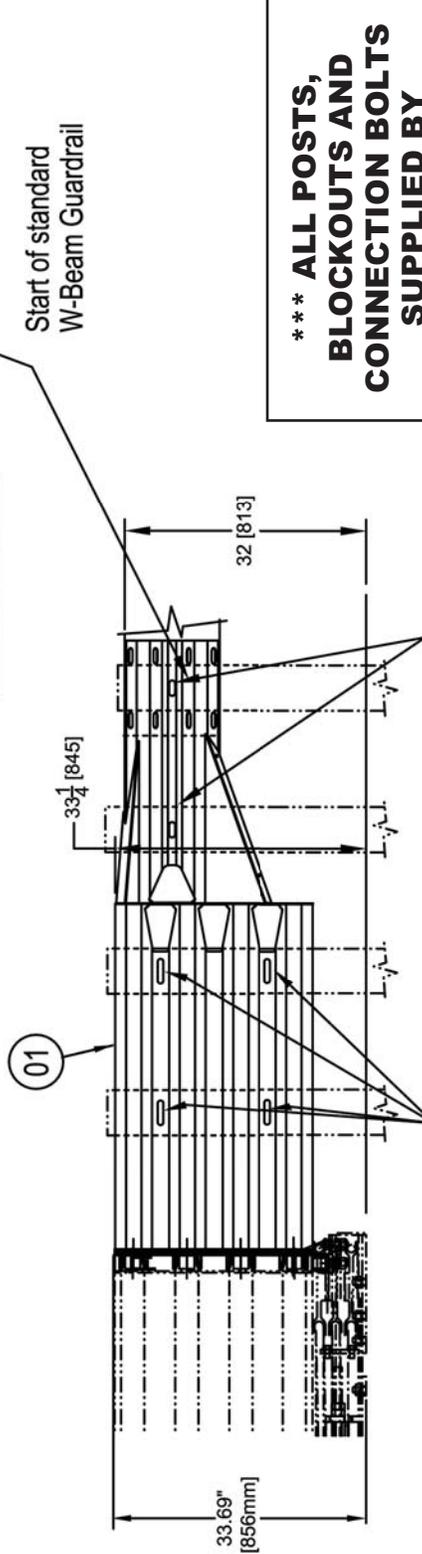
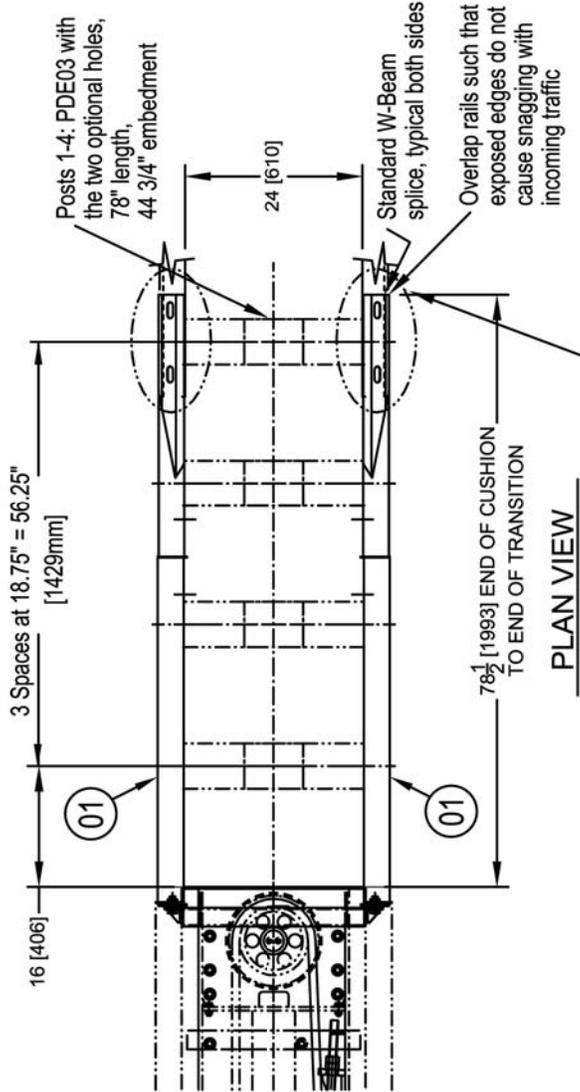
SIDE VIEW

Start of standard W-Beam Guardrail

***** ALL POSTS, BLOCKOUTS AND CONNECTION BOLTS SUPPLIED BY OTHERS *****

**APPENDIX R - TRANSITION, W - BEAM 32 INCH HIGH
 FOR USE WITH NO REVERSE DIRECTION TRAFFIC**

- PARTS LIST**
- 01 - Transition W Beam - Right #9511
 - 01 - Transition W Beam - Left #9512

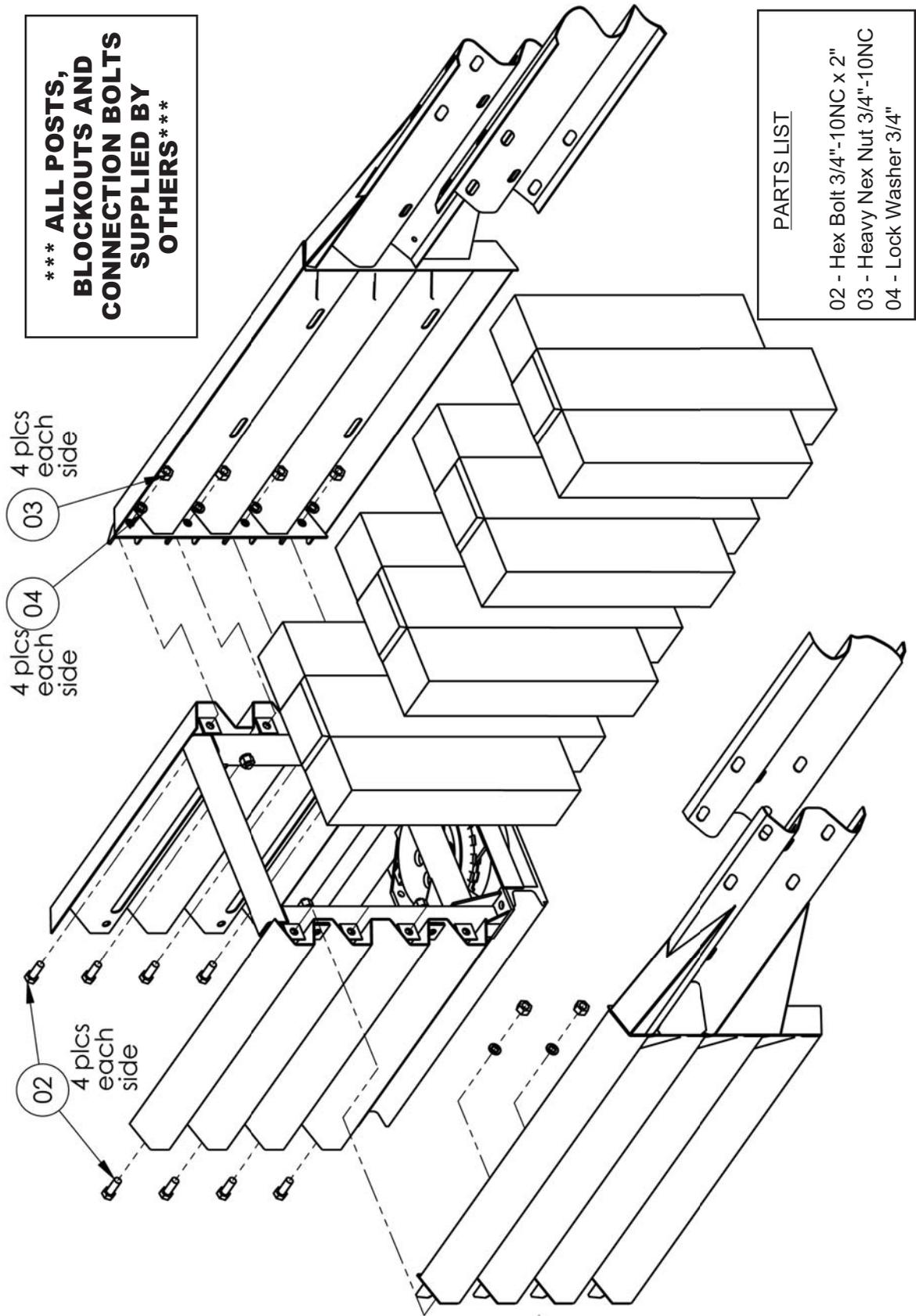


***** ALL POSTS,
 BLOCKOUTS AND
 CONNECTION BOLTS
 SUPPLIED BY
 OTHERS *****

Blockouts for posts 1&2:
 PDB01 (two per post, ea. side),
 or use similar to Part 15
 (figure 7) in original design.

Blockouts for posts 3 & 4: PDB01

APPENDIX Q(2) & R(2) - TRANSITION, W-BEAM 28" & 32" HIGH



***** ALL POSTS,
BLOCKOUTS AND
CONNECTION BOLTS
SUPPLIED BY
OTHERS*****

PARTS LIST
02 - Hex Bolt 3/4" - 10NC x 2"
03 - Heavy Nex Nut 3/4" - 10NC
04 - Lock Washer 3/4"

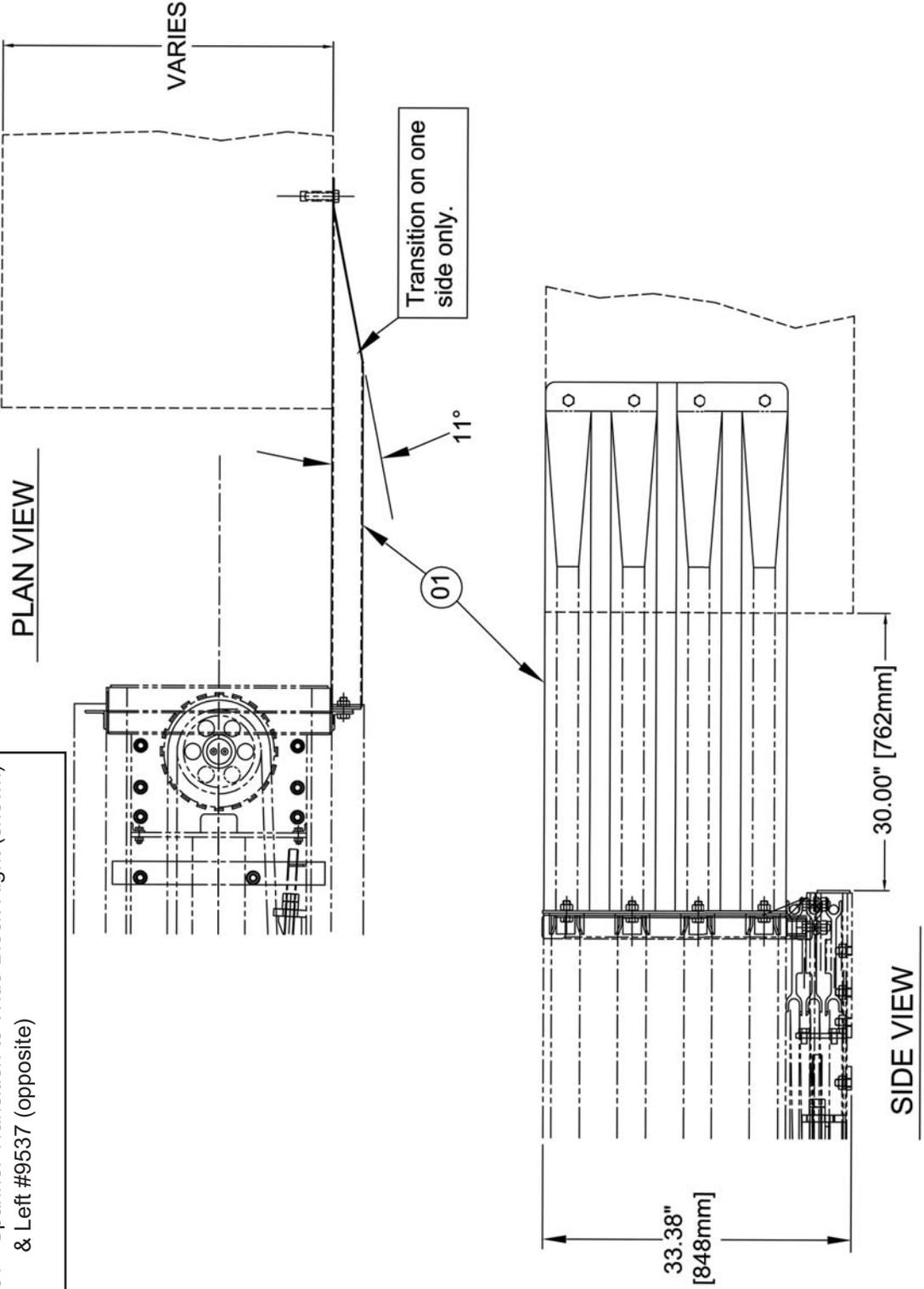
03
4 plcs
each
side

04
4 plcs
each
side

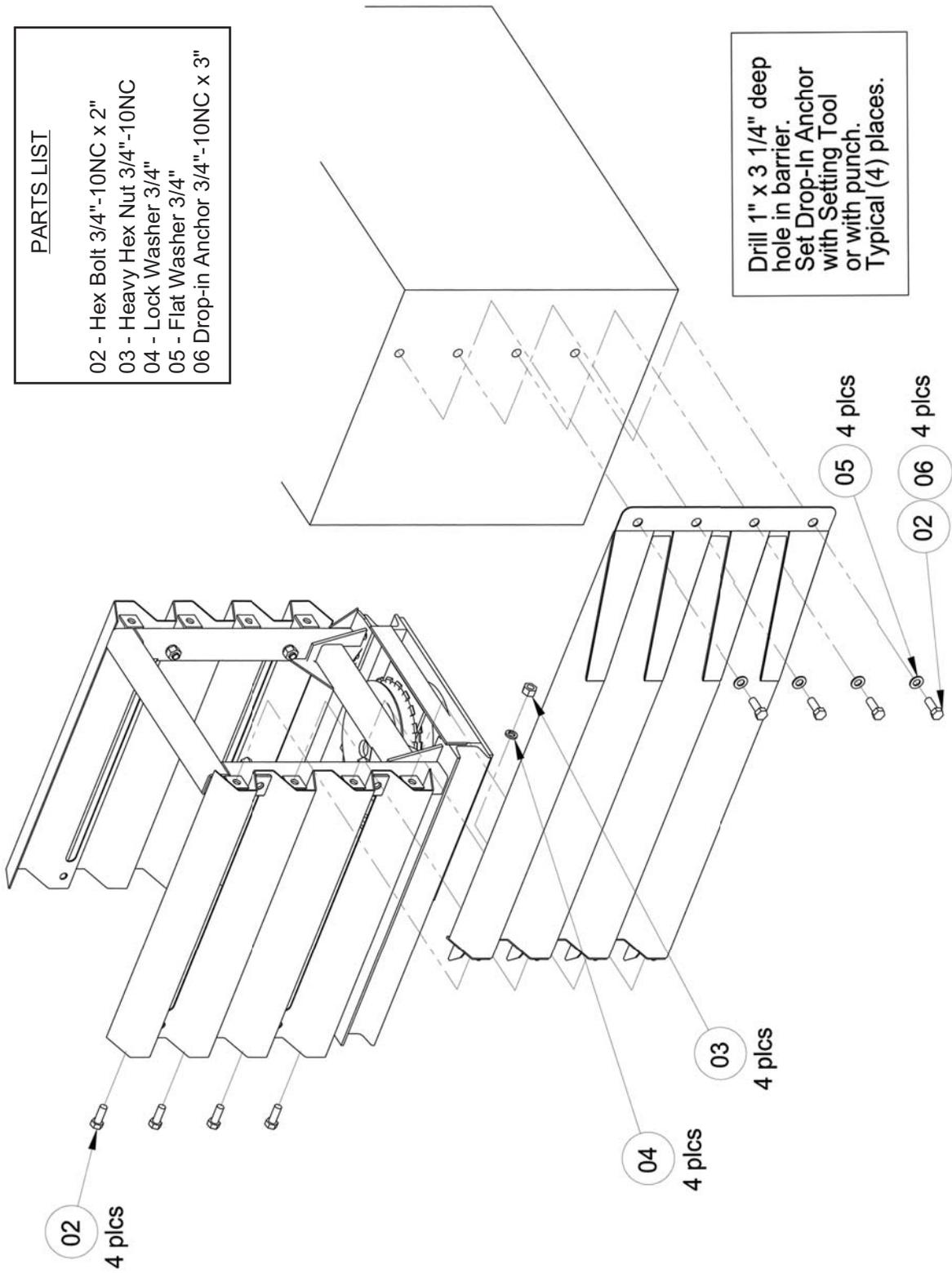
02
4 plcs
each
side

APPENDIX S - TRANSITION, WIDE BLOCK SPANNER

PARTS LIST
01 - Spanner Transition to Wide Block Right (shown)
& Left #9537 (opposite)



APPENDIX S(2) - TRANSITION, WIDE BLOCK SPANNER





SCI Products Inc.

SCI70/100GM CRASH CUSHION COMMERCIAL 1-YEAR WARRANTY

SCI PRODUCTS INC. warrants this product to be free from defects in material and workmanship under normal use and service for a period of one (1) year beginning on the date of installation. SCI PRODUCTS INC. will repair or replace without charge to the original customer any defective component. This is the sole and exclusive remedy.

This warranty is contingent upon proper use of the System and does not cover Systems that have been modified (including the addition of parts) without the approval of SCI PRODUCTS INC. or which are in need of repair due to damage from external cause, including accident, collision, improper handling, improper transporting, failure to properly maintain the System as recommended by SCI PRODUCTS INC., abuse, misuse or which have been damaged by outside parties not employed by SCI PRODUCTS INC., whether in installation or otherwise.

THIS IS A LIMITED WARRANTY AND IT IS THE ONLY WARRANTY MADE BY SCI PRODUCTS INC. SCI PRODUCTS INC. MAKES, AND CUSTOMER RECEIVES, NO OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. SCI PRODUCTS INC. SHALL HAVE NO LIABILITY WITH RESPECT TO ITS OBLIGATIONS UNDER THIS WARRANTY FOR CONSEQUENTIAL, EXEMPLARY OR INCIDENTAL DAMAGES EVEN IF IT HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THIS DOCUMENT WITH RESPECT TO THE PRODUCT INDICATED ABOVE. BUYER ACKNOWLEDGES THAT ANY STATEMENTS MADE WHICH ARE NOT FOUND IN THIS DOCUMENT ARE NOT PROMISES TO BE RELIED UPON.

THE BUYER AGREES TO INSPECT THE PRODUCT ON RECEIPT AS FULLY AS THE BUYER DESIRES AND TO NOTIFY SCI PRODUCTS INC. OF ANY REVEALED DEFECT.



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W o r k A r e a P r o t e c t i o n

ATT2013

Chen, Sam@DOT

From: Gonzales, Frank A@DOT
Sent: Monday, June 02, 2014 9:12 AM
To: Sutanto, Suliasti@DOT; Chan, Steve@DOT
Cc: Chowdhury, Mohammed A@DOT; Chen, Sam@DOT
Subject: RE: EA07288501 DCR comment relate to Has Waste Assessment

Suliasti,

During preliminary hazardous waste assessment regional groundwater was considered a potential concern after OED-HW learned of the on-ramp signs. However, the regional contamination was no longer an issue after construction details were provided to OED-HW.

Based on the latest sign structure plans and previous hazardous waste addendum (12/11/13) groundwater is not a concern anymore given the construction details of on-ramp sign foundations at sta 590+48.3.

Please contact me if you need further clarification or still have questions.

Regards,

Frank Gonzales, CHG
California Department of Transportation-District 7
Tel: 213-897-0936, Fax: 213-897-1634

From: Sutanto, Suliasti@DOT
Sent: Friday, May 30, 2014 8:10 AM
To: Chan, Steve@DOT
Cc: Chowdhury, Mohammed A@DOT; Gonzales, Frank A@DOT; Chen, Sam@DOT
Subject: RE: EA07288501 DCR comment relate to Has Waste Assessment

Attached, per your request, is the latest Structure PS&E plans.
See SES & SDS sheets for the sign structures plans.

Thank you,

Suliasti Sutanto, P.E.

D7 - Office of Traffic Design
(213) 897-0944

From: Chan, Steve@DOT
Sent: Thursday, May 29, 2014 2:39 PM
To: Sutanto, Suliasti@DOT
Cc: Chowdhury, Mohammed A@DOT; Gonzales, Frank A@DOT; Chen, Sam@DOT
Subject: FW: EA07288501 DCR comment relate to Has Waste Assessment

Suliasti,

Please provide us the latest structure plans for the sign structures that will be constructed as part of your project.

Thanks

From: Chen, Sam@DOT
Sent: Thursday, May 29, 2014 1:39 PM
To: Chan, Steve@DOT; Gonzales, Frank A@DOT
Cc: Sutanto, Suliasti@DOT
Subject: EA07288501 DCR comment relate to Has Waste Assessment

Steve and Frank-

Refer to DES-OE DCRD comment R-SPC7 for the subject project which stated:

The PS&E Hazardous Waste Assessment from OED dated 9/3/13 indicates possible groundwater contamination. Where is specifications for management of contaminated groundwater?

Please advise: Other than SSP14-11.03, 14-11.09 and 15-2.02C(2), what and where can we find the nSSP for groundwater contamination management purpose?

I've attached the said OED memo and the spec package we submitted to DES-OE here for your easy reference.
Thank you for the assistance.

Sam

Memorandum

*Flex your power!
Be energy efficient!*

To: Mohammed Chowdhury, STE
Office of Traffic Design

Date: December 11, 2013

Attn: Suliasti Sutanto, P.E.
Project Engineer

File: 07-LA-405 PM 11.7/11.9
Rehabilitate Commercial
Vehicle Enforcement
Facility on Route 405

EA: 07-333-288501

PN: 1846-0700021105-1

From: DEPARTMENT OF TRANSPORTATION
OED – HAZARDOUS WASTE BRANCH, SOUTH REGION, MS 16

Subject: *PS&E Hazardous Waste Assessment-Addendum (Update to Include Asbestos and Lead Based Paint Survey Evaluation)*

The Office of Environmental Design (OED) prepared this Hazardous Waste Assessment-Addendum to satisfy requirements concerning the existing inspection trailer at the Carson Commercial Vehicle Enforcement Facility (CVEF). The project proposes to rehabilitate and upgrade into current standards the existing Carson Commercial Vehicle Enforcement Facility (CVEF) on the NB Route 405 (San Diego Freeway) in the City of Carson, in Los Angeles County, adjacent to Del Amo Blvd Overcrossing (OC). The proposed project will address truck traffic related problems associated with truck weight, truck safety, and preserving Homeland Security at CVEF. The project is classified as a Category 5 Project as described in the Project Development Procedure Manual (PDPM). The project will be funded from reservation funds for the Truck Inspection Facility and Weight-In-Motion (WIM) Improvement Projects (321 Program) in 2013/14 Fiscal Year.

PROJECT BACKGROUND

In accordance with the draft PS&E package issued for review the following scope of the project includes: 1) construct a new Commercial Vehicle Inspection Booth; 2) install a new static truck weight scale; 3) install digital signs; 4) procure Adaptable Radiation Area Monitor (ARAM); 5) install Weight-in-Motion (WIM) System; 6) install Digital Video Traffic/ Security Monitor System; 7) replace concrete pavement for facility access road and weighing scale lane; 8) remove existing asphalt parking lot and replace with concrete, signing, and striping; 9) remove existing inspection trailer; and 10) remove and replace two new cantilever overhead (OH) sign structures along NB Rte 405 at SB Avalon Blvd to NB 405 On Ramp.

HAZARDOUS WASTE RE-ASSESSMENT (Asbestos and Lead Based Paint Survey):

This re-assessment includes asbestos and lead based paint surveys of the existing inspection trailer at the CVEF. The purpose of the Asbestos Containing Material (ACM) and Lead Based Paint (LBP) survey was to identify, estimate quantities, and assess the condition/friability of asbestos in suspect

structural components, the content of lead on painted surfaces of the CVEF structure prior to demolition and construction activities. A report was prepared under task order # 07-A3321-07 to evaluate ACM and LBP at the inspection trailer. The following report was prepared to satisfy the requirement: *Stantec Consulting Services, Inc., Asbestos Containing Material and Lead Based Paint Survey Report, Task Order #7, Contract #7A3321, dated December 5, 2013.*

Structural materials were visually inspected for asbestos using the methods presented in applicable sections of the Federal Asbestos Hazard Emergency Response Act (AHERA) regulations (40 CFR, Part 763). The principles presented under AHERA are generally accepted as the industry standard for ACM inspections. Suspect ACMs were also physically assessed for friability, condition, and disturbance factors.

Bulk samples of suspect ACM materials were collected and analyzed by Polarized Light Microscopy (PLM). The United States Environmental Protection Agency (US EPA) and State of California, Division of Occupational Safety and Health (Cal-OSHA) define an ACM as any material containing more than one percent asbestos (>1%).

In California, potential asbestos exposure in construction is regulated when construction, alteration, repair, maintenance, or renovation of structures, substrates, or portions thereof contain asbestos [8 CCR §1529 (a)(1)(C)]. Additionally, in California, materials containing greater than one-tenth of one percent (>0.1%) asbestos are regulated as Asbestos Containing Construction Materials (ACCMs). For the purpose of this report, materials with any detectable concentration of asbestos are considered positive.

With regard to LBP, Stantec made observations to assess the condition of painted surfaces of the Site, and was to collect paint chip samples of painted surfaces observed to be in fair and/or poor condition as defined within Chapter 5 of the United States, Housing and Urban Development (HUD) guidelines. Paint-chip samples were not collected from the Site as no interior or exterior painted surfaces were observed to be in fair/poor condition. Provided that the structural components are disposed with paint coating intact no special requirements for handling and management of painted structural components during demolition are recommended at this time. However, if Caltrans intends to strip the paint separately from the building materials, the paint should be containerized, tested, and profiled for disposition to evaluate whether the paint qualifies as either a California or RCRA hazardous waste based on soluble lead concentrations.

ACM SURVEY AND SAMPLING

Structural materials were visually inspected for asbestos using the methods presented in applicable sections of the Federal Asbestos Hazard Emergency Response Act (AHERA) regulations (40 CFR, Part 763). Reasonable efforts were made to locate and sample materials representative of the entire Site.

Bulk samples of visually identified homogeneous areas of suspect ACM were collected from areas that may be impacted by demolition activities. The EPA defines a homogeneous area as a surfacing material, thermal system insulation, or miscellaneous material that is uniform in color and texture. The use or application of the homogeneous area is also used to identify suspect ACMs.

At least one sample was collected from each suspect ACM. The sample was collected by removing a representative piece of material using hand tools and placing the sample in a plastic bag. The sample bag was sealed and labeled with a unique sample identification (ID) number along with other pertinent information including the project ID, sample date, material type.

A total of 40 bulk material samples were collected from 14 different homogeneous structural materials and analyzed by PLM. Sampling locations are shown in the attached figure.

All samples analyzed reported non-detect for asbestos. Asbestos was not detected in any of the samples.

LEAD BASED PAINT SURVEY

Stantec made observations to assess the condition of painted surfaces of the Site, and was to collect paint chip samples of painted surfaces observed to be in fair and/or poor condition as defined within Chapter 5 of the United States, Housing and Urban Development (HUD) guidelines. Paint-chip samples were not collected from the Site as no interior or exterior painted surfaces were observed to be in good/intact condition.

Paint-chip samples were not collected from the Site as no interior or exterior painted surfaces were observed to be in fair/poor condition. Provided that the structural components are disposed with paint coating intact no special requirements for handling and management of painted structural components during demolition are recommended at this time. However, if Caltrans intends to strip the paint separately from the building materials, the paint should be containerized, tested, and profiled for disposition to evaluate whether the paint qualifies as either a California or RCRA hazardous waste based on soluble lead concentrations.

CONCLUSIONS AND RECOMMENDATIONS

Based on OED evaluation and non – detect results for asbestos there does not appear to be a concern regarding ACM or LBP. Based on the good condition of the inspection trailer OED recommends the inspection trailer be reused at the CVEF or another location, if possible. The final Asbestos and Lead Based Paint Survey Report is attached herewith for your reference/use. This Addendum shall be included with the PS&E Hazardous Waste Assessment issued on 9/20/2013.

If you have any questions, I can be reached at steve.chan@dot.ca.gov 213-897-3646 or contact Frank Gonzales of my staff at frank.gonzales@dot.ca.gov 213-897-0936.

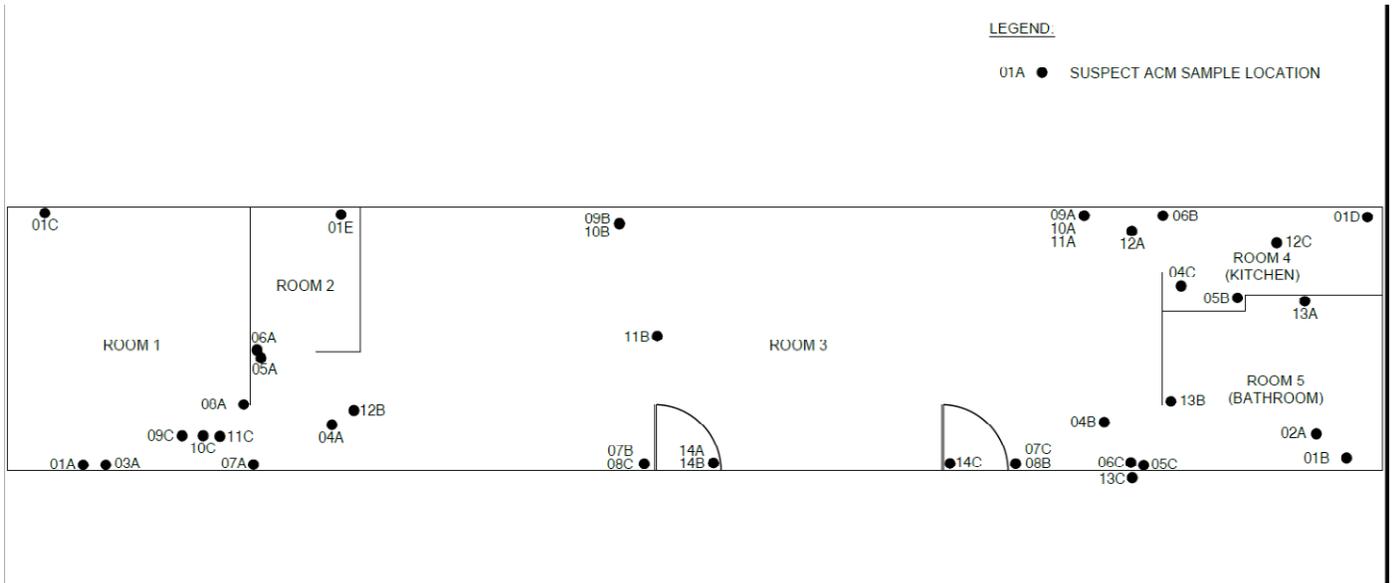


Steve Chan, P.E., STE
District Hazardous Waste Coordinator, South Region
Office of Environmental Design
Division of Design

EA 288501 (PN 0700021105-1)
PS&E Hazardous Waste Re-Assessment
December 11, 2013
Page 4

Reference/Attachment: *Stantec Consulting Services, Inc., Asbestos Containing Material and Lead Based Paint Survey Report, Task Order #7, Contract #07A3321, dated December 5, 2013.*

cc: File
District Office Engineer



Memorandum

*Flex your power!
Be energy efficient!*

To: Mohammed Chowdhury, STE
Office of Traffic Design

Date: September 3, 2013

Attn: Suliasti Sutanto, P.E.
Project Engineer

File: 07-LA-405 PM 11.7/11.9
Rehabilitate Commercial
Vehicle Enforcement
Facility on Route 405

EA: 07-333-288501
PN: 1846-0700021105-1

From: **DEPARTMENT OF TRANSPORTATION
OED – HAZARDOUS WASTE BRANCH, SOUTH REGION, MS 16**

Subject: *PS&E Hazardous Waste Assessment*

The Office of Environmental Design (OED) is in receipt of your request, dated May 22, 2013, for a Hazardous Waste Assessment on the above subject PS&E project. The project proposes to rehabilitate and upgrade into current standards the existing Carson Commercial Vehicle Enforcement Facility (CVEF) on the NB Route 405 (San Diego Freeway) in the City of Carson, in Los Angeles County, adjacent to Del Amo Blvd Overcrossing (OC). The proposed project will address truck traffic related problems associated with truck weight, truck safety, and preserving Homeland Security at CVEF. The project is classified as a Category 5 Project as described in the Project Development Procedure Manual (PDPM). The project will be funded from reservation funds for the Truck Inspection Facility and Weight-In-Motion (WIM) Improvement Projects (321 Program) in 2013/14 Fiscal Year.

PROJECT BACKGROUND

In accordance with the draft PS&E package issued for review the following scope of the project includes: 1) construct a new Commercial Vehicle Inspection Booth; 2) install a new static truck weight scale; 3) install digital signs; 4) procure Adaptable Radiation Area Monitor (ARAM); 5) install Weight-in-Motion (WIM) System; 6) install Digital Video Traffic/ Security Monitor System; 7) replace concrete pavement for facility access road and weighing scale lane; 8) remove existing asphalt parking lot and replace with concrete, signing, and striping; 9) remove existing inspection trailer; and 10) remove and replace two new cantilever overhead (OH) sign structures along NB Rte 405 at SB Avalon Blvd to NB 405 On Ramp. Refer to project Layout (L-1), EE1-3, and SDS-2 for site plan features of the proposed improvements.

HAZARDOUS WASTE ASSESSMENT:

Two areas shown on the preliminary/draft layout plan in the attachment are planned for excavation to approximately 1.5 feet for removal of existing soil and paving with joined plain concrete pavement (JPCP). In order to access the existing soil condition in these areas to determine whether

the excess excavated soil will require special handling and/or waste management, OED performed a limited soil investigation utilizing the Thermo Scientific Nitro XRF analyzer to screen the soil concentration, specifically the heavy metals in soil. Additionally, soil samples with elevated XRF screening values were submitted to perform laboratory analysis for total lead (TTLC) and soluble lead (STLC).

PRELIMINARY SOIL INVESTIGATION

The following tasks were performed by OED staff to evaluate the existing soil condition in areas planned for soil excavation and paving with JPCP.

1. Review preliminary contract plans submitted by your office on May 22, 2013.
2. Performed limited soil sample collection on July 1 and 2, 2013 at locations within the planned soil excavation areas at random locations at approximately 6-inches below ground surface within the areas designated as A and B. These soil samples were collected and scanned with the Thermo Scientific Nitro XRF Analyzer for the following metals: Lead (Pb), Molybdenum (Mo), Arsenic (As), Zirconium (Zr), Strontium (Sr), Uranium (U), Rubidium (Rb), Thorium (Th), Selenium (Se), Mercury (Hg), Zinc (Zn), Tungsten (W), Copper (Cu), Nickel (Ni), Cobalt (Co), Iron (Fe), Manganese (Mn).
3. Obtain laboratory analysis of soil samples for Total Threshold Limit Concentration (TTLC), Soluble Limit Threshold Concentration (STLC) and Waste Extraction Test using de-ionized water (DI-WET).

Per OED’s discussion with the Project Engineer, Suliasti Sutanto, the landscape area behind/around existing building (Area A) is approximately 8,870 FT² and unpaved (dirt) area on the island under bridge (Area B) is approximately 6,100 sq feet.

Sampling locations are shown in the attached figure. Sample results (both XRF analyzer and laboratory analysis) are summarized in the following table. Laboratory analytical data are attached for reference.

SAMPLE IDENTIFICATION	FIELD SCREENING LEAD VALUE (mg/kg)	LAB RESULT LEAD (TTLC) (mg/kg)	LAB RESULT LEAD (STLC) (mg/l)	DI-WET (mg/l)
A1	84.08			
A2	103.49			
A3	37.03			
A4	44.94			
A12		97	6.0 > 5.0	ND
B1	210.58			
B2	55.91			
B3	30.4			
B4	35.77			
B12		110	6.7 > 5.0	ND

Surface soils were first removed and samples were collected approximately 6-inches below ground surface (bgs). Samples were placed in re-sealable plastic bags, labeled, and returned to the District 7 office. Samples were scanned using the Thermo Scientific Nitro XRF analyzer to evaluate total metal content in the soil. Samples that exceeded 50 milligrams per kilogram (mg/kg) total lead were

submitted for laboratory analysis of soluble metals (STLC) and DI-WET. Field screening data and the laboratory analytical report are attached.

REGIONAL GROUNDWATER CONTAMINATION

Per OED's discussion with the Project Engineer, Suliasti Sutanto, two sign structures are proposed at SB Avalon Boulevard to NB Route 405 on-ramp. OED requested additional design information from your office to evaluate the sign structure improvement work.

Per OED's historical record review, there are multiple former landfills and other sources of shallow groundwater contamination in the area. Contamination is known to impact shallow groundwater over the region and should be considered when considering project requirements. If the sign structure requires a deep foundation that penetrates the groundwater table, it will likely require dewatering at some interval that may generate contaminated groundwater. In this instance, contaminated groundwater dewatering activities would need to be included in project costs and allow for a nonstandard special provision (NSSP) for dewatering and special handling/waste management of contaminated groundwater and possible impacted soil within the saturated zone. Any NSSP issued would require Caltrans HQ Division of Environmental Analysis's review and approval.

TREATED WOOD WASTE:

Replacement of metal beam guard rail (MBGR) is within the project scope. Treated wood waste (TWW) is generated when posts along MBGR, the beam barrier, piles, or roadside signs are removed. These wood products are typically treated with preserving chemicals that protect against insect attack and fungal decay. These chemicals may be hazardous (carcinogenic) and include, but are not limited to, arsenic, chromium, copper, creosote, and pentachlorophenol. The Department of Toxic Substances Control (DTSC) requires that TWW either be disposed of as a hazardous waste, or if not tested, the generator may presume that TWW is a hazardous waste (to avoid the time and expense involved in completing laboratory testing) and manage the waste by Alternative Management Standards (AMS). The AMS are described in the California Code of Regulations, Title 22, Division 4.5, Chapter 34.

NON-YELLOW STRIPING AND/OR PAVEMENT MARKING:

Residue from removing non-yellow (white/blue/black, etc) stripe and/or pavement marking contains lead at concentration levels below hazardous waste criteria. The residue is classified as nonhazardous; does not contain heavy metals in concentrations that exceed thresholds established by the Health and Safety Code and Title 22 California Code of Regulations; and is not regulated under the Federal Resource Conservation and Recovery Act (RCRA), 42 USC § 6901 et seq. The Contractor is required to prepare a project-specific Lead Compliance Plan (LCP) as required in Title 8 California Code of Regulations (8CCR), section 1532.1, "Lead" and Cal/OSHA Construction Safety Orders, Lead.

CONCLUSIONS AND RECOMMENDATIONS

Based on OED evaluation of the proposed scope of work the following project specific hazardous wastes of concern are assessed as follow:

Aerially-Deposited Lead (ADL)

Excess soil excavated in Areas A and B should be classified as California hazardous waste (Roadway/Structure Excavation Type Z-2) based on the STLC concentrations reported for soil samples (exceeding 5.0 mg/l threshold limit). Per confirmation with the Project Engineer, the excess ADL soil will not be reused on the project site (i.e. invoking the DTSC Lead Variance) and it shall be disposed of at a permitted off-site Class I disposal facility. The Contractor shall adhere/comply with conditions and requirements as stipulated in the attached standard special provision 14-11.03.

Regional Groundwater Contamination:

It is likely groundwater contamination will be encountered within the lower interval of the proposed deep foundation for the sign structures. Extracted groundwater would need to be tested and properly managed in accordance with applicable regulations for site health and safety, handling, and disposal.

Upon receive the final pile/footing design of the sign structures, OED will prepare a nonstandard special provision (NSSP) for management of contaminated groundwater and will submit to Caltrans HQ Division of Environmental Analysis for review and approval. Appropriate funding shall be allocated in the construction contract for management of extracted contaminated groundwater.

Treated Wood Waste & Non-Yellow Stripe and/or Pavement Marking

Treated wood waste (TWW) associated with the removal of existing metal beam guard rails (MBGRs) shall be handled and managed as hazardous waste in accordance with the attached standard specification 14-11.09. Removal of non-yellow stripe and/or pavement marking shall be handled in accordance with SSP 15-2.02C(2).

Refer to <http://sv08web/design/contractcost/> for the appropriate bid cost items as identified on the above assessment including preparation of project-specific Lead Compliance Plan (both ADL soil handling and non-yellow stripe/pavement marking removal). Additional funding shall be allocated for handling of contaminated groundwater once the NSSP is prepared and approved.

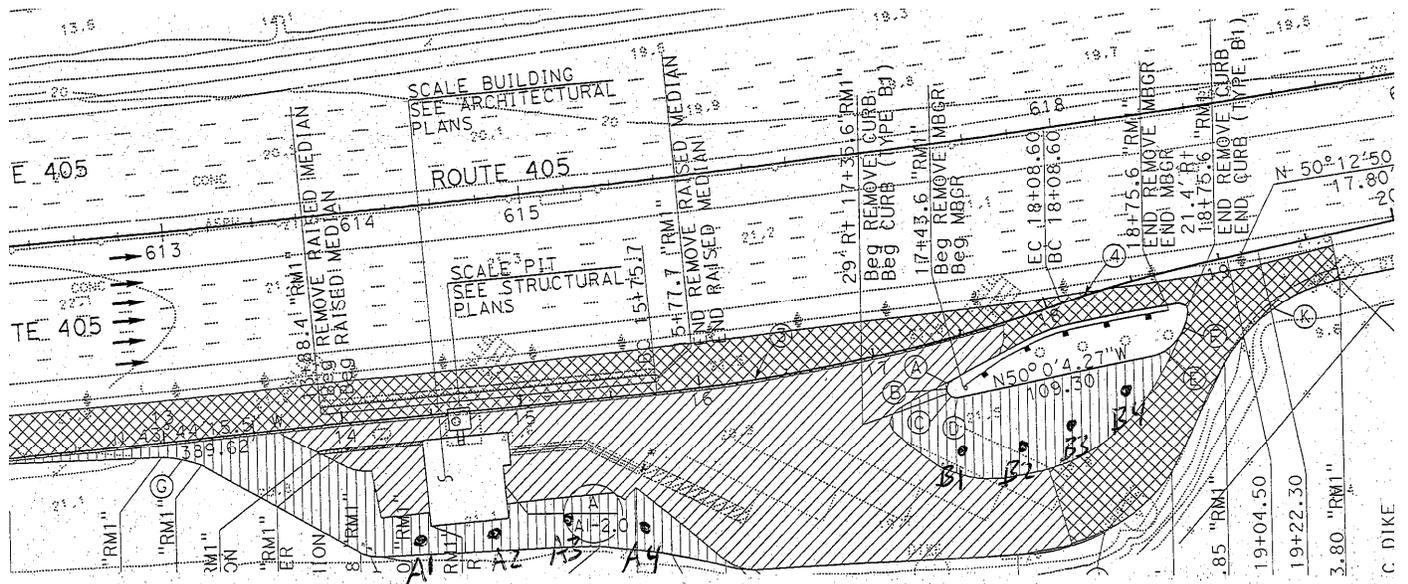
If you have any questions, I can be reached at steve.chan@dot.ca.gov 213-897-3646 or contact Frank Gonzales of my staff at frank.gonzales@dot.ca.gov 213-897-0936.



Steve Chan, P.E., STE
District Hazardous Waste Coordinator, South Region
Office of Environmental Design
Division of Design

cc: File

Attachment(s):SSP 14-11.03
SSP 14-11.09
SSP 15-2.02C(2)





ASBESTOS CONTAINING MATERIALS AND
LEAD BASED PAINT SURVEY REPORT
TASK ORDER NO. 07
CONTRACT #07A3321

ASBESTOS CONTAINING MATERIALS (ACM)
ROUTE 405; CVEF REHABILITATION PROJECT
LOCATION: 07-LA-405; PM 10.5
CARSON AREA, LOS ANGELES COUNTY,
CALIFORNIA
CHARGE DISTRICT AND PROJECT ID: 07-
0700021105
EA#: 28850

STANTEC PROJECT NO.: 185831007

SUBMITTED TO:
CALIFORNIA DEPARTMENT OF
TRANSPORTATION, DISTRICT 7 SOUTH
100 SOUTH MAIN STREET
LOS ANGELES, CALIFORNIA 90012

Submitted by:
Stantec Consulting Services Inc.
25864-F Business Center Drive
Redlands, California

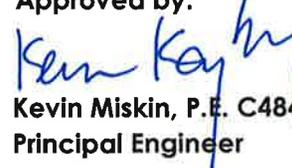
Prepared by:


Anne E. Perez
Associate Geologist

Reviewed by:


Jason Stagno
Associate Scientist, CAC

Approved by:


Kevin Miskin, P.E. C48458
Principal Engineer



December 5, 2013

EXECUTIVE SUMMARY

This Asbestos Containing Materials (ACM) and Lead Based Paint (LBP) Survey Report was prepared at the request of California Department of Transportation (Caltrans) District 7 and describes the results of an ACM and LBP survey performed on the Commercial Vehicle Enforcement Facilities (CVEF) mobile structure located adjacent to the northbound lanes of State Route 405 (SR405), in the city of Carson, Los Angeles County, California (Figure 1). The ACM/LBP surveys were performed to support Caltrans' proposed demolition of the structure and conducted pursuant to the provisions of Contract 07A3321.

The northbound SR405 CVEF mobile structure is currently being used by the California Highway Patrol (CHP). The CVEF structure is a freestanding modular trailer with exterior wood framing and siding. Interior walls consist of wood paneling, drywall, and fiber reinforced plastic (FRP).

The purpose of the ACM and LBP survey was to identify, estimate quantities, and assess the condition/friability of asbestos in suspect structural components, the content of lead on painted surfaces of the CVEF structure prior to demolition and construction activities. Caltrans will provide this information to the contractor for waste profiling and disposition, worker health and safety, and compliance with federal, state and local regulations.

Bulk samples of suspect ACM materials were collected and analyzed by Polarized Light Microscopy (PLM). The United States Environmental Protection Agency (US EPA) and State of California, Division of Occupational Safety and Health (Cal-OSHA) define an ACM as any material containing more than one percent asbestos (>1%).

In California, potential asbestos exposure in construction is regulated when construction, alteration, repair, maintenance, or renovation of structures, substrates, or portions thereof contain asbestos [8 CCR §1529 (a)(1)(C)]. Additionally, in California, materials containing greater than one-tenth of one percent (>0.1%) asbestos are regulated as Asbestos Containing Construction Materials (ACCMs). For the purpose of this report, materials with any detectable concentration of asbestos are considered positive.

Based on the findings of this survey, no asbestos-containing materials were identified. No additional assessment/survey appears warranted at this time. It should be noted however that the asbestos survey did not include underground utilities. This survey focused strictly on the CVEF structure. If during the course of a renovation/demolition project suspect ACMs are discovered at other locations within the project area that are not included within this report, those materials are to be assumed positive for asbestos unless additional sampling, analysis and/or assessment indicates otherwise.

With regard to LBP, Stantec made observations to assess the condition of painted surfaces of the Site, and was to collect paint chip samples of painted surfaces observed to be in fair and/or poor condition as defined within Chapter 5 of the United States, Housing and Urban Development (HUD) guidelines. Paint-chip samples were not collected from the Site as no interior or exterior painted surfaces were observed to be in fair/poor condition. Provided that the structural components are disposed with paint coating intact no special requirements for handling and management of painted structural components during demolition are recommended at this time. However, if Caltrans intends to strip the paint separately from the

building materials, the paint should be containerized, tested, and profiled for disposition to evaluate whether the paint qualifies as either a California or RCRA hazardous waste based on soluble lead concentrations.

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Appendix A – Photographic Record

Appendix B – Qualifications

Appendix C – Analytical Laboratory Reports and Chain-of-Custody Records

LIST OF ACRONYMS

ACM –	Asbestos Containing Material
ACCM –	Asbestos-Containing Construction Material
AHERA –	Asbestos Hazard Emergency Response Act
Cal-OSHA –	California Division of Occupational Safety and Health Administration
Caltrans –	California Department of Transportation, District 8
CCR –	California Code of Regulations
CFR –	Code of Federal Regulations
DOSH –	California Division of Occupational Safety and Health
DTSC –	Department of Toxic Substances Control
ELAP –	Environmental Laboratory Accreditation Program
EMC –	Environmental Management Consultant
ND –	None Detected
NESHAP –	National Emission Standard for Hazardous Air Pollutants
NVLAP –	National Voluntary Laboratory Accreditation Program
PLM –	Polarized Light Microcopy
QA/QC –	Quality Assurance/Quality Control
RACM –	Regulated Asbestos-Containing Material
SCAQMD –	South Coast Air Quality Management District
TSI –	Thermal System Insulation
US EPA –	United States Environmental Protection Agency

1.0 INTRODUCTION

This Asbestos Containing Materials (ACM) and Lead Based Paint (LBP) Survey Report was prepared at the request of California Department of Transportation (Caltrans) District 7 and describes the results of an ACM and LBP survey performed on the Commercial Vehicle Enforcement Facilities (CVEF) mobile structure located adjacent to the northbound lanes of State Route 405 (SR405), in the city of Carson, Los Angeles County, California (Figure 1). The ACM/LBP surveys were performed to support Caltrans' proposed demolition of the structure and conducted pursuant to the provisions of Contract 07A3321.

1.1 PROJECT DESCRIPTION

As part of proposed facility rehabilitation plans, Caltrans has determined that CVEF improvements are needed to upgrade and improve the overall condition of the facility. According to the Task Order No. 07 request, the rehabilitation work proposes to demolish the existing CVEF building. An ACM/LBP survey was conducted in support of the proposed project plans.

1.2 SITE DESCRIPTION

The northbound SR405 CVEF is currently being used by the California Highway Patrol (CHP) (Caltrans, 2011). The CVEF structure (Figure 2A) is a freestanding modular trailer with exterior wood framing and siding. Interior walls consist of wood paneling, drywall, and fiber reinforced plastic (FRP).

A photographic log of structural components and current Site conditions is provided in Appendix A.

1.3 OBJECTIVES

The objectives of the surveys were to identify, estimate quantities, and assess the condition/friability of asbestos in suspect structural components, the content of lead on painted surfaces of the Site structures, and to make general recommendations for handling and disposing of ACM and LBP containing materials. These objectives were met by completing the following tasks:

- Perform a visual inspection and destructive sampling for asbestos following criteria outlined in the Asbestos Hazard Emergency Response Act (AHERA) to identify sources of friable and non-friable ACMs.
- Collect bulk samples of suspect asbestos containing materials.
- Perform a visual inspection of the structures painted surfaces.
- Collect paint chip samples off painted surfaces in fair/poor condition if necessary.
- Submit bulk samples to a certified laboratory for analysis.
- Compile the findings into a report.
- Ensure the technical quality of all work by using AHERA-accredited Inspectors and Management Planners, Certified Consultants, and a proven Quality Assurance/Quality Control (QA/QC) Program.

1.4 FORMER REPORT REVIEW

No former ACM or LBP reports were provided for review.

2.0 ASBESTOS BACKGROUND

2.1 ASBESTOS

Asbestos is the name of a class of magnesium-silicate minerals that occur in fibrous form. Minerals that are included in this group are chrysotile, crocidolite, amosite, anthophyllite asbestos, tremolite asbestos, and actinolite asbestos. Although the chrysotile minerals are the most common type of asbestos found in the construction industry, all types of asbestos are regulated in the same manner. Asbestos has been used in thousands of different structural materials. Asbestos was added to structural materials to: increase fire-resistance, insulate against heat, cold and sound, resist corrosion, and increase tensile strength. Common structural materials that may contain asbestos include, but are not limited to the following: floor tile, floor sheeting, ceiling tile, mastics, roofing materials, fireproofing, acoustical treatments, gypsum board, pipe and boiler insulations. Adverse health effects have been associated with the inhalation of airborne asbestos. However, asbestos fibers that are tightly bound in structural materials, may not pose an exposure hazard, unless disturbed in such a way that releases airborne fibers (i.e., cutting, drilling, sanding, and other abrasive methods).

2.2 CURRENT REGULATIONS

The following sections summarize current state and federal regulations which contain requirements related to the performance of structural surveys for asbestos. These summaries are not intended to be all inclusive and do not contain every aspect of the regulations discussed. Regulations pertaining to the removal and disposal of ACMs are not included.

2.2.1 US EPA National Emission Standard for Hazardous Air Pollutants (NESHAPs), 40 CFR Part 61

Under the NESHAPs regulation, no visible emissions are allowed during facility demolition or renovation activities, which involve regulated asbestos-containing materials (RACMs). For this reason, all facilities must be surveyed for asbestos-containing materials prior to demolition or renovation. The EPA, and/or the local AQMD which has delegated authority from the EPA NESHAP, must be notified prior to any structural demolition, even if no asbestos-containing materials are present. Assessments are made by the inspector as to the condition of each material and whether or not the materials are "friable." The US EPA NESHAP regulation defines "friable" materials as:

*Materials that, when dry, **can** be crumbled, pulverized or reduced to a powder using hand pressure.*

Conversely, a non-friable material **cannot**, when dry, be crumbled, pulverized or reduced to a powder. NESHAP classifies non friable ACMs in two categories:

- Category I – asbestos containing packings, gaskets, asphalt roofing products and resilient floor coverings;
- Category II – All remaining types of non-friable ACM not included in Category I that when dry cannot be crumbled, pulverized, or reduced to powder by hand pressure.

RACM is classified as any manufactured material that contains greater than one percent asbestos by dry weight and is friable. Disturbed RACM must be disposed as hazardous waste. Category I and II non-friable ACM may be considered RACM under the following conditions:

- Friable asbestos-containing material;
- Category I non-friable ACM that has become friable;
- Category I non-friable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading; or
- Category II non-friable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the (mechanical) forces expected to act on the material in the course of demolition or renovation operations.

RACMs must be removed prior to renovation or demolition.

2.2.2 South Coast Air Quality Management District

The South Coast Air Quality Management District (SCAQMD) is a government agency that regulates sources of air pollution within Los Angeles County to protect public health. The District's regulating and enforcement authority comes from state law and, in certain cases, federal law.

SCAQMD Rule 1403 outlines requirements for demolition/renovation activities involving the removal or disturbance of ACMs, including notification requirements, ACM removal procedures, time schedules, ACM handling and cleanup procedures, and storage, disposal, and landfill requirements.

Rule 1403 is applicable to owners and operators of any demolition or renovation activity involving disturbance of ACMs. Among other requirements, notification is required to the district for planned renovation activities involving removal of more than 100 square feet of ACM. Failure to comply with Rule 1403 requirements could result in violations that carry daily penalties (penalties assessment is based upon the size of the project and severity of noncompliance).

The SCAQMD's Rule 403/Fugitive Dust was created to reduce the amount of particulate matter entrained in the ambient air as a result of man-made fugitive dust sources, such as road construction and grading. Although not specific to asbestos, Rule 403 outlines best available control measures that could apply to the disturbance of asbestos in soil.

2.2.3 Asbestos Hazard Emergency Response Act (AHERA), 40 CFR Part 763, Subpart E

The AHERA requires performance of asbestos surveys and the development of Asbestos Management Plans for all public and non-profit private schools, K-12, in the United States and its territories. Although this regulation applies to such schools only, the procedures mandated under AHERA are considered the industry standard and are applied to all surveys performed by Stantec in accordance with Federal OSHA mandates in 29 CFR 1926.1101, Subsections (k) (1), (2), and (5).

2.2.4 California Division of Occupational Safety and Health (DOSH a.k.a. Cal-OSHA)

Pursuant to Cal-OSHA standard 1529, an asbestos-containing material is any material containing greater than one percent (>1%) asbestos. However, for worker classifications, Cal-OSHA follows the California Health and Safety Code definition of ACCMs which are defined as any materials

with an asbestos content greater than one-tenth of one percent (>0.1%). The Cal-OSHA set forth licensing and work requirements for disturbance of ACMs and ACCMs. The requirements have been divided into four classes of work: Class I, Class II, Class III, and Class IV work. The materials are distinguished by their potential to release fibers when damaged. The Cal-OSHA prescribes specific engineering controls and work practices for each Class of work.

- Class I – This Class refers to removal of ACMs identified as Thermal System Insulation (TSI) or surfacing (sprayed-on or troweled-on) materials. These materials are generally considered friable.
- Class II – This Class refers to removal of ACMs identified that are not TSI or surfacing materials. These materials are generally considered non-friable.
- Class III – This Class refers to repair and maintenance operations of all identified ACMs.
- Class IV – This Class refers to incidental contact with identified ACMs such as custodial staff.

2.2.5 California Assembly Bill AB3713, Health and Safety Code Div. 20, Ch. 10.4, Sec. 25915-25924

The state of California has enacted legislation that requires owners, employers, lessees, etc. to notify tenants, employees and contractors of the presence of asbestos in both friable and non-friable forms. In addition, preventive maintenance activities must be developed and communicated to these parties. Notification is required 15 days after the identification of ACM in the building, and annually thereafter.

2.3 HAZARDOUS WASTE

The California Department of Toxic Substances Control (DTSC), a department of Cal EPA, has the regulatory and enforcement authority for hazardous wastes deposited or transported in California. DTSC regulates as "hazardous wastes" generated wastes containing more than one percent (>1%) asbestos that have been determined to be "friable." DTSC uses the same methods for determining percentage of asbestos and friability, as does the U.S. EPA. However, local agencies and Cal-OSHA may regulate waste handling and packaging even if the material contains one percent or less or is determined to be non-friable.

3.0 ACM SURVEY SCOPE OF WORK AND METHODOLOGY

The project team comprised the following Stantec staff under the direction of Mr. Jason Stagno, Associate Scientist and State of California, Cal-OSHA Certified Asbestos Consultant (CAC #12-4949) and State of California, Department of Public Health (CDPH) Lead Related Construction Inspector/Risk Assessor (LRCIA #19068): Mr. Dion Monge, Associate Scientist with Stantec, and Environmental Protection Agency (EPA) Asbestos Hazard Emergency Response Act (AHERA) Accredited Building Inspector and CDPH Lead Related Construction Sampling Technician (LRCST #T-19518. Qualifications are presented in Appendix B.

The ACM survey field activities consisted of a visual inspection and sampling of existing representative building materials to identify potential ACMs. Reasonable efforts were made to locate, sample, and/or identify suspect ACMs associated with the structures; however, during demolition activities, suspect ACMs may be uncovered or discovered in areas that are currently not readily accessible. If any suspect ACMs are uncovered or discovered, these suspect ACMs are assumed positive for asbestos until sampling and analysis indicates otherwise.

3.1 VISUAL INSPECTION

Structural materials were visually inspected for asbestos using the methods presented in applicable sections of the Federal Asbestos Hazard Emergency Response Act (AHERA) regulations (40 CFR, Part 763). The principles presented under AHERA are generally accepted as the industry standard for ACM inspections. Suspect ACMs were also physically assessed for friability, condition, and disturbance factors.

Reasonable efforts were made to locate and sample materials representative of the entire Site. However, Stantec did not attempt to access concealed materials or materials that were inaccessible due to safety considerations. For any structure, the existence of unique or concealed materials or debris is a possibility. It is common practice to collect additional bulk samples during actual abatement or demolition activities when hidden suspect ACMs are discovered.

3.2 BULK SAMPLING FOR ASBESTOS

Bulk samples of visually identified homogeneous areas of suspect ACM were collected from areas than may be impacted by demolition activities. The EPA defines a homogeneous area as a surfacing material, thermal system insulation, or miscellaneous material that is uniform in color and texture. The use or application of the homogeneous area is also used to identify suspect ACMs.

At least one sample was collected from each suspect ACM. The sample was collected by removing a representative piece of material using hand tools and placing the sample in a plastic bag. The sample bag was sealed and labeled with a unique sample identification (ID) number along with other pertinent information including the project ID, sample date, material type.

No attempt was made to replace or repair the sampled media. The removal of small pieces of building materials does not typically compromise structural integrity.

The materials sampled for this investigation are listed in Section 4.0.

3.3 ASBESTOS LABORATORY TESTING

Bulk samples were analyzed by EMC Analytical Laboratories of Phoenix, Arizona. EMC is accredited under the National Institute of Standards and Technology's National Voluntary Laboratory Accreditation Program (NVLAP), and the State of Arizona and California Department of Health Services Environmental Laboratory Accreditation Program (ELAP) for the analysis of asbestos in bulk building material samples.

All samples were analyzed using PLM techniques in accordance with methodology approved by the US EPA. Both the US EPA, under their asbestos National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations, and the SCAQMD define and regulate ACMs containing more than one percent (>1%) asbestos. In California, asbestos exposure during construction is regulated when construction, alteration, repair, maintenance, or renovation of structures, substrates, or portions thereof contain asbestos [§1529 (a)(1)(C)]. Additionally, materials containing greater than one-tenth of one percent (> 0.1%) are regulated as Asbestos Containing Construction Materials (ACCMs). For the purpose of this report, materials with any detectable concentration of asbestos are considered positive.

When "None Detected" (ND) appears in this report, it should be interpreted as meaning no asbestos was observed in the sample material above the reliable limit of detection for the PLM method which is material dependent and is less than one percent.

Copies of the laboratory reports are provided in Appendix C.

4.0 LEAD-BASED PAINT BACKGROUND

Lead is a pliable, soft metal that is used in the construction of pipes, rods, and containers. Before 1978, lead was a common ingredient in paint because it added strength, shine and extended the life of the paint. Lead-based paint is recognized as a potential health risk due to the known toxic effects of lead exposure (primarily through ingestion) on the central nervous system, kidneys, and blood stream. Concern for lead-based paint is primarily related to residential structures, which in addition, may apply to commercial structures. The risk of lead toxicity of lead-based paint varies based upon the condition of the paint and the year of its application.

4.1 CURRENT REGULATIONS

The following sections summarize current state and federal regulations which contain requirements regarding lead-based paint. These summaries are not intended to be all inclusive and do not contain every aspect of the regulations discussed.

4.1.1 Department of Housing and Urban Development

The *Guidelines for the Evaluation and Control of Lead-based Paint Hazards in Housing*, HUD, 1995 (revised September 1997) *Lead Requirements for Lead-based Paint Activities in Target Housing and Child-Occupied Facilities: Final Rule*, (40 CFR Part 745), US EPA, 29 August 1996, define Lead-Based Paint as: paint, varnish, shellac, or other coating on surfaces that contain 1.0 milligrams per square centimeter (mg/cm²), 5,000 parts per million (ppm), or more of lead or 0.5 percent or more lead by weight.

4.1.2 California Division of Occupational Safety and Health (DOSH a.k.a. Cal-OSHA)

Pursuant to Section 1532.1 in Title 8 of California Code of Regulations, construction employers are responsible for recognizing lead hazards and submitting samples of suspect materials to a US EPA lead accredited laboratory for analysis.

When lead is present on construction jobs the following is required:

- Housekeeping methods (including HEPA vacuuming, wet clean-up, or other effective methods) must be implemented to remove lead dust on surfaces;
- Hand and face washing facilities with soap and water must be provided for workers;
- Workers must receive training on lead hazards and how to protect themselves;
- Employee breathing-zone air sampling must be conducted to assess the amount of lead breathed by workers to determine protective measures and the type of respirator required for employee protection.

Special protective measures are required for highly hazardous tasks, commonly referred to as trigger tasks until employee airborne exposures to lead are determined to be below levels specified in Section 1532.1. Pre-job notification is required for all jobs involving trigger tasks. Written notification must be made to the local CAL/OSHA district office at least 24 hours before the job starts.

- Level 1 – Any of the following with lead-containing coating or materials: spray painting, manual demolition, manual scraping or sanding, use of a heat gun, power tool cleaning

with dust collection system. Minimum required protection is a half-face respirator with N-100, R-100, or P-100 filters.

- Level 2 - Any of the following with lead-containing coating or materials: using lead-containing mortar, lead burning, rivet busting, power tool cleaning without dust collection system, clean-up activities using dry expendable abrasives, abrasive blasting enclosure movement or removal. Minimum required protection is an air-supplied hood or helmet or loose fitting hood or helmet powered air-purifying respirator with N-100, R-100, or P-100 filters.
- Level 3 – Abrasive blasting, welding, cutting, or torch burning on structures where lead-containing coatings or materials are present. Minimum required protection is a half-mask supplied air respirator in a positive pressure mode.

All trigger tasks require: respirators, protective equipment, and clothing; clothing change areas; initial blood testing for lead and zinc protoporphyrin; basic lead hazard, respirator, and safety training; and warning signs.

If air sampling shows exposures to workers are above the permissible exposure limit (PEL), the following additional controls are required:

- Respirators appropriate to the levels of exposures measured;
- Clean areas for eating and clothing change;
- Showers;
- Full worker training;
- Medical monitoring with routine blood testing for lead and zinc protoporphyrin; and
- Certification by the California Department of Public Health for workers and supervisors working on jobs at residential and publicly accessible buildings.

4.1.3 Accreditation, Certification, and Work Practices for Lead-Based Paint and Lead Hazards (Title 17 California Code of Regulations, Division 1, Chapter 8)

Title 17 pertains to all public and residential buildings in California and is enforced by the California Department of Public Health (CDPH). Pursuant to Title 17, lead-based paint is defined as paint or other surface coatings containing an amount of lead equal to or greater than one milligram per square centimeter (1 mg/cm²), more than half of one percent (>0.5%) by weight, or 5,000 parts per million (5,000 ppm). Title 17 also defines a lead hazard as deteriorated lead-based paint, disturbing lead based paint or presumed lead-based paint without containment, or any other nuisances which may result in persistent or quantifiable lead exposure.

4.1.4 Hazardous Waste Regulations

Waste materials containing lead may be subject to regulations controlling the transportation and disposal of such materials. In California, the Department of Toxic Substances Control (DTSC) regulates the generation, transportation, treatment, storage and disposal of lead containing wastes that qualify as hazardous waste. Lead containing wastes may be classified as a hazardous waste based on toxicity characteristic by any one of the following Federal or State thresholds (California Code of Regulations, Title 22, Section 66261.24),

- Federal:
 - Toxicity Threshold = 5 milligrams per liter (mg/L) (Toxicity Leaching Characteristic Procedure [TCLP])
- California:
 - Total Threshold Limit Concentration = 1,000 mg/kg
 - Soluble Threshold Limit Concentration = 5 mg/L (California Waste Extraction Test)

In general, bulk demolition wastes do not exhibit sufficient lead concentration to be classified as a hazardous waste based on the above criteria as a result of the bulk weight of the waste in comparison to the weight of lead in the painted surface. However, if the paint is stripped, the paint and stripped media may be classified as a hazardous waste and regulations controlling the generation, storage, treatment, transportation and disposal of lead containing hazardous waste will need to be implemented and observed. Additional health and safety requirements and protocols may also be required to prevent exposure and spreading of the waste material.

Where possible, paint containing lead over 50 mg/kg should be disposed of as a bulk waste to avoid the generation of hazardous waste.

4.2 LEAD PAINT REMOVAL REQUIREMENTS

The Cal-OSHA Lead Standard states that work which involves the disturbance of materials containing more than 0.5 percent lead by weight, or if the permissible exposure limit of airborne lead particulate of 50 ug/m³ of air is exceeded, then the work must be conducted in accordance with the standard. HUD and Cal-OSHA have defined lead-based paint as any paint which contains more than 0.5 percent lead by weight.

LBP noted to be in a good, non-flaky condition that will be removed with the painted bulk material, would require no special handling of the painted surface prior to renovations or demolition. However, it is recommended that identified LBP in good condition be encapsulated by a paint film stabilizer prior to demolition. If the LBP paint would be disturbed and rendered in a flaky condition during demolition, removal of the paint prior to demolition is required.

5.0 LEAD-BASED PAINT SURVEY SCOPE OF WORK AND METHODOLOGY

5.1 VISUAL INSPECTION

Building materials were visually inspected for evidence of blistered or peeling paint. No painted surfaces exhibited evidence of peeling or blistering.

5.2 BULK SAMPLING FOR LBP

Stantec made observations to assess the condition of painted surfaces of the Site, and was to collect paint chip samples of painted surfaces observed to be in fair and/or poor condition as defined within Chapter 5 of the United States, Housing and Urban Development (HUD) guidelines. Paint-chip samples were not collected from the Site as no interior or exterior painted surfaces were observed to be in fair/poor condition.

6.0 ACM SURVEY RESULTS

A total of 40 bulk material samples were collected from 14 different homogeneous structural materials and analyzed by PLM. A copy of the laboratory report is provided in Appendix C. The sample locations are shown on the attached Figure 2B and photographs of sampled media are provided in Appendix A. The sample locations and laboratory results are summarized in Table 1.

The sampled materials included:

- Roof core (roofing and associated paper),
- Roofing mastic (roofing and nail penetration areas),
- Ceiling panels,
- Rolled vinyl flooring,
- Baseboard adhesive (associated with green and beige baseboards),
- Carpet glue,
- Insulation (in walls, above ceilings, duct insulation, circular ducting),
- Drywall, and
- Sheet vinyl (faux wood).

All samples analyzed reported non-detect for asbestos.

6.1 ASBESTOS RESULTS

Asbestos was not detected in any of the samples.

6.2 ASBESTOS RECOMMENDATIONS

Based on the findings of this survey, no asbestos-containing materials were identified. No additional assessment/survey appears warranted at this time. It should be noted however that the asbestos survey did not include underground utilities. If during the course of a renovation/demolition project suspect ACMs are discovered at other locations within the project area that are not included within this report, those materials are to be assumed positive for asbestos unless additional sampling, analysis and/or assessment indicates otherwise.

7.0 LBP SURVEY RESULTS

Stantec made observations to assess the condition of painted surfaces of the Site, and was to collect paint chip samples of painted surfaces observed to be in fair and/or poor condition as defined within Chapter 5 of the United States, Housing and Urban Development (HUD) guidelines. Paint-chip samples were not collected from the Site as no interior or exterior painted surfaces were observed to be in good/intact condition.

Paint-chip samples were not collected from the Site as no interior or exterior painted surfaces were observed to be in fair/poor condition. Provided that the structural components are disposed with paint coating intact no special requirements for handling and management of painted structural components during demolition are recommended at this time. However, if Caltrans intends to strip the paint separately from the building materials, the paint should be containerized, tested, and profiled for disposition to evaluate whether the paint qualifies as either a California or RCRA hazardous waste based on soluble lead concentrations.

8.0 REPORT LIMITATIONS

Reasonable efforts have been made to locate, sample, and/or identify suspect ACMs and LBP with the structure included in this project. For any structure, the existence of unique or concealed materials and debris is a possibility. In addition, sampling and laboratory analysis constraints typically hinder the investigation. Stantec does not warrant, guarantee or profess to have the ability to locate or identify all hazardous materials in a structure. The survey did not include underground utilities. Historically, some underground utility piping (e.g., Transite pipe) have been known to contain asbestos. If demolition of the structure includes removal of on-site portions of underground utilities, evaluation of the asbestos content of these components must be performed prior to the removal process. Suspect materials identified in these locations are assumed positive for asbestos until inspection, sampling and analysis indicates otherwise. This report is intended for use in planning and construction in accordance with the scope of the Task Order. If during the course of a renovation/demolition project suspect ACMs or LBP are discovered that are not included within this report, such materials should be treated accordingly until additional sampling, analysis and/or assessment can be performed.

Additionally, the passage of time may result in a change in the environmental characteristics at the structure included in this project. This report does not warrant against future operations or conditions that could affect the recommendations made. The results, findings, conclusions and recommendations expressed in this report are based only on conditions that were observed during the survey of the SR405 CVEF trailer and test results provided by EMC. These observations are time dependent, are subject to changing Site conditions, and revisions to federal, state, and local regulations. Reliance on this report by Third Parties (i.e., other than Caltrans) shall be at the Third Party's sole risk.

9.0 REFERENCES

National Emission Standard for Hazardous Air Pollutants (NESHAP), regulation 40 CFR Part 61.

The California Health and Safety Code 25915 (former Connelly Bill).

Asbestos Hazard Emergency Response Act (AHERA) Cal-OSHA standards, 1926.1101

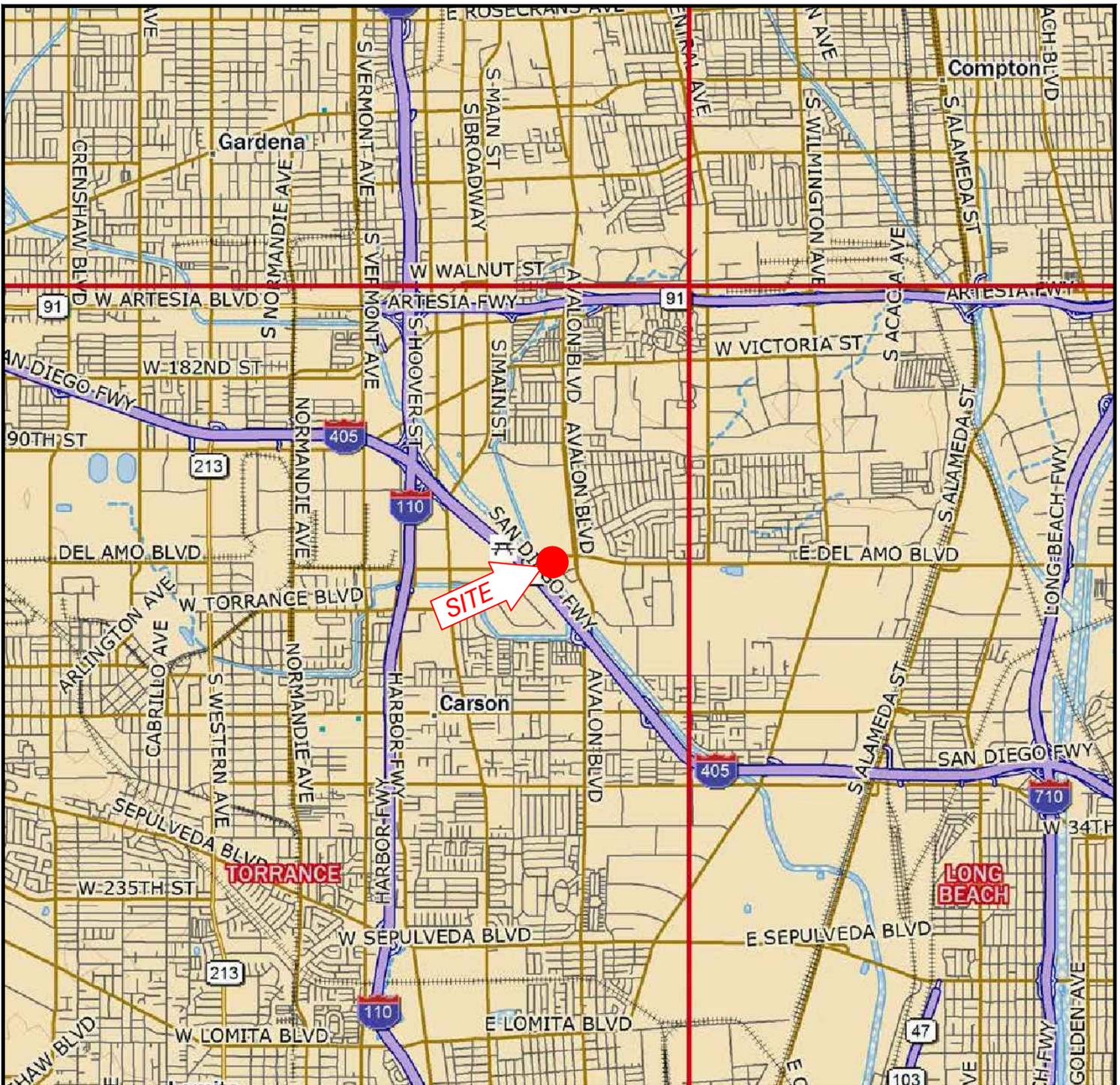
South Coast Air Quality Management District (SCAQMD) Rule 1403.

Guidelines for the Evaluation and Control of Lead-based Paint Hazards in Housing, HUD, 1995 (revised September 1997) *Lead Requirements for Lead-based Paint Activities in Target Housing and Child-Occupied Facilities: Final Rule*, (40 CFR Part 745), US EPA, 29 August 1996

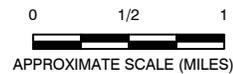
California Code of Regulations Section 1532.1, Title 8.

Caltrans, *Project Study Report, LA-405, Carson Commercial Vehicle Enforcement Facility (CVEF)*, July 2011.

FIGURES



CALIFORNIA



APPROXIMATE SCALE (MILES)



APPROXIMATE SCALE (FEET)

REFERENCE: DELORME TOPO MAP, TORRANCE, CALIFORNIA

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FOR: CALTRANS DISTRICT 7 07A3321
 ROUTE 405; CVEF REHABILITATION PROJECT
 LOCATION: 07-LA-405; PM 10.5
 CARSON AREA, LOS ANGELES COUNTY
 CALIFORNIA
 PN: 07-0700021105/ EA#: 28850

SITE LOCATION MAP
07A3321/TASK ORDER No. 07

FIGURE:

1

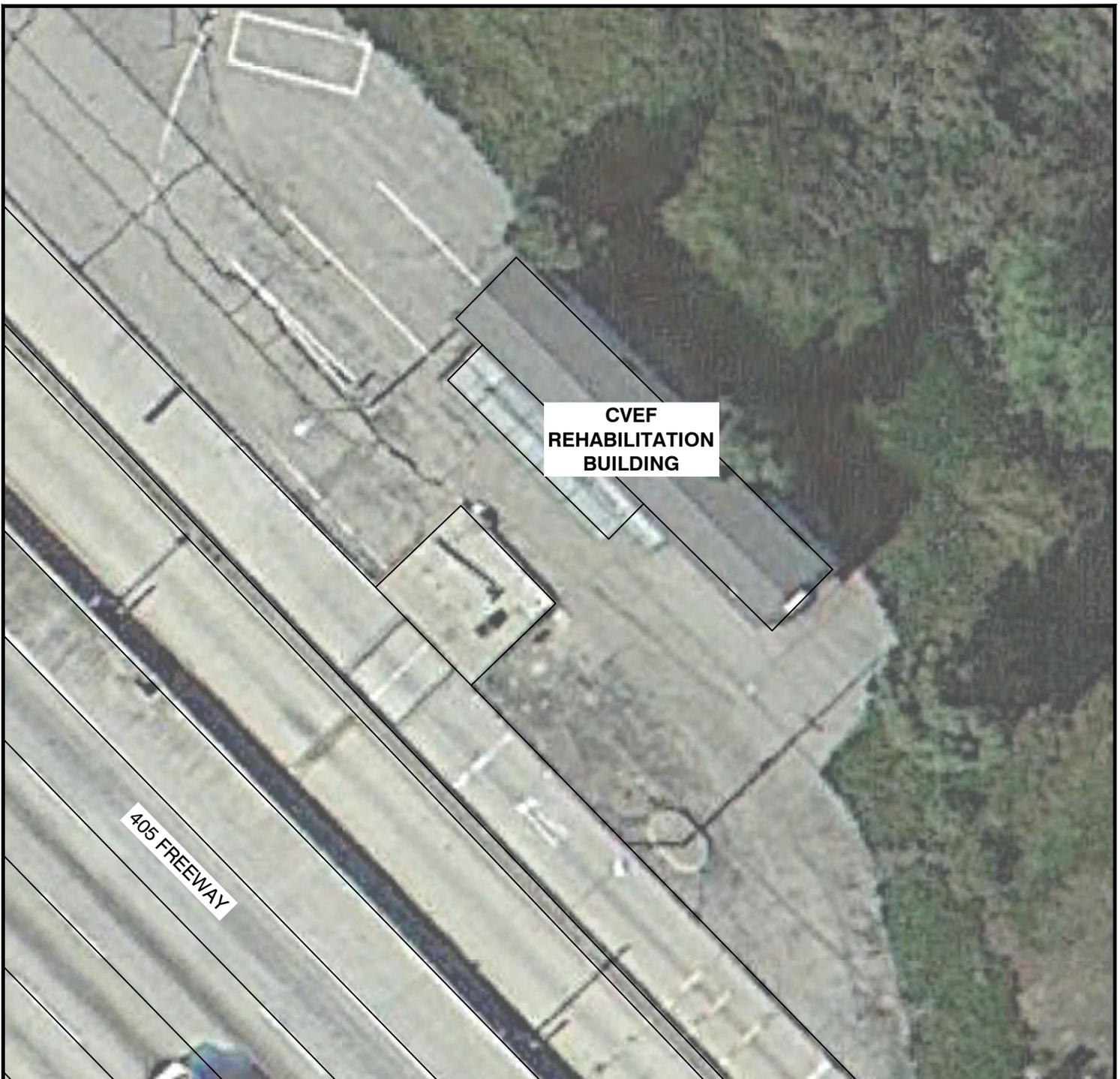
JOB NUMBER:
185831007

DRAWN BY:
STA

CHECKED BY:
AP

APPROVED BY:
AP

DATE:
12/02/13



**CVEF
REHABILITATION
BUILDING**

405 FREEWAY



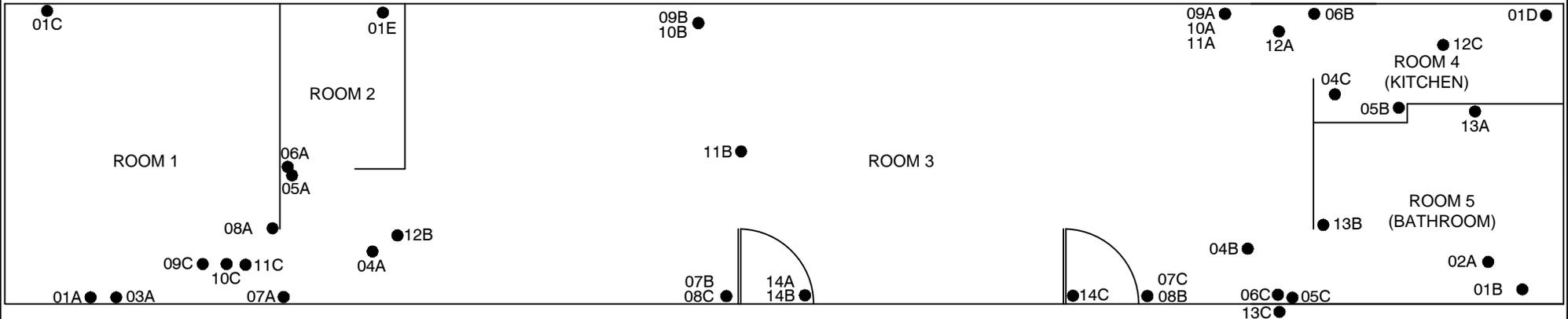
APPROXIMATE SCALE IN FEET

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	FOR: CALTRANS DISTRICT 7 07A3321 ROUTE 405; CVEF REHABILITATION PROJECT LOCATION: 07-LA-405; PM 10.5 CARSON AREA, LOS ANGELES COUNTY CALIFORNIA PN: 07-0700021105/ EA#: 28850			SITE VICINITY MAP ASBESTOS CONTAINING MATERIALS SURVEY 07A3321/TASK ORDER No. 07		FIGURE: 2A
	JOB NUMBER: 185831007	DRAWN BY: STA	CHECKED BY: AP	APPROVED BY: AP	DATE: 12/02/13	

LEGEND:

01A ● SUSPECT ACM SAMPLE LOCATION



APPROXIMATE SCALE IN FEET

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	FOR: CALTRANS DISTRICT 7 07A3321 ROUTE 405; CVEF REHABILITATION PROJECT LOCATION: 07-LA-405; PM 10.5 CARSON AREA, LOS ANGELES COUNTY CALIFORNIA PN: 07-0700021105/ EA#: 28850			SAMPLE LOCATION MAP ASBESTOS CONTAINING MATERIALS SURVEY 07A3321/TASK ORDER No. 07		FIGURE: <h1 style="text-align: center;">2B</h1>
	JOB NUMBER: 185831007	DRAWN BY: STA	CHECKED BY: AP	APPROVED BY: AP	DATE: 12/02/13	

TABLES

TABLE 1
ASBESTOS SAMPLE LOG AND ANALYSIS RESULTS
CARSON COMMERCIAL VEHICLE ENFORCEMENT FACILITY
LOCATION: 07-LA-405; PM 10.5
CHARGE DISTRICT/PROJECT ID: 07-0700021105
EA#: 28850
TASK ORDER #07; CONTRACT 07A3321

FIELD SAMPLE ID	SAMPLE DATE	LABORATORY SAMPLE ID	SAMPLE LOCATION	MATERIAL DESCRIPTION	ANALYSIS RESULTS	CONDITION FRIABLE YES/NO	IF ACM, ESTIMATED SQUARE FOOTAGE	HAZARD RATING
ROUTE 405; COMMERCIAL VEHICLE ENFORCEMENT FACILITY								
01A	11/20/2013	0134509-001	NW	LAYER 1: ROOFING, BLACK/GRAY	ND	NO	--	NA
				LAYER 2: ROOFING, BLACK	ND	NO	--	NA
				LAYER 3: ROOFING PAPER, BLACK	ND	NO	--	NA
01B	11/20/2013	0134509-002	SW	LAYER 1: ROOFING, BLACK/GRAY	ND	NO	--	NA
				LAYER 2: ROOFING, BLACK	ND	NO	--	NA
				LAYER 3: ROOFING, BLACK	ND	NO	--	NA
				LAYER 4: ROOFING PAPER, BLACK	ND	NO	--	NA
01C	11/20/2013	0134509-003	NE	LAYER 1: ROOFING, BLACK/GRAY	ND	NO	--	NA
				LAYER 2: ROOFING, BLACK	ND	NO	--	NA
				LAYER 3: ROOFING, BLACK	ND	NO	--	NA
				LAYER 4: ROOFING PAPER, BLACK	ND	NO	--	NA
01D	11/20/2013	0134509-004	SE	LAYER 1: ROOFING, BLACK/GRAY	ND	NO	--	NA
				LAYER 2: ROOFING, BLACK	ND	NO	--	NA
				LAYER 3: ROOFING, BLACK	ND	NO	--	NA
				LAYER 4: ROOFING PAPER, BLACK	ND	NO	--	NA
01E	11/20/2013	0134509-005	NORTH-CENTRAL	LAYER 1: ROOFING, BLACK/GRAY	ND	NO	--	NA
				LAYER 2: ROOFING, BLACK	ND	NO	--	NA
				LAYER 3: ROOFING PAPER, BLACK	ND	NO	--	NA
02A	11/20/2013	0134509-006	SW	ROOF PENETRATION MASTIC, BLACK/GRAY	ND	NO	--	NA
03A	11/20/2013	0134509-007	NW	ROOF MASTIC, OFF WHITE	ND	NO	--	NA
04A	11/20/2013	0134509-008	RM 3-WEST CORNER	18"X36" CEILING PANEL, WHITE/TAN	ND	NO	--	NA
04B	11/20/2013	0134509-009	RM 3-SOUTH CORNER	18"X36" CEILING PANEL, WHITE/GRAY	ND	NO	--	NA
04C	11/20/2013	0134509-010	RM 4-NW AREA	18"X36" CEILING PANEL, WHITE/GRAY	ND	NO	--	NA
05A	11/20/2013	0134509-011	RM 2-WEST CORNER	LAYER 1: ROLLED VINYL FLOORING, WHITE/GRAY/BLUE	ND	NO	--	NA
				LAYER 2: MASTIC, YELLOW	ND	NO	--	NA
05B	11/20/2013	0134509-012	RM 4-WEST CORNER	LAYER 1: ROLLED VINYL FLOORING, WHITE/GRAY/BLUE	ND	NO	--	NA
				LAYER 2: MASTIC, YELLOW	ND	NO	--	NA
05C	11/20/2013	0134509-013	RM 5-WEST CORNER	LAYER 1: ROLLED VINYL FLOORING, WHITE/GRAY/BLUE	ND	NO	--	NA
				LAYER 2: MASTIC, YELLOW	ND	NO	--	NA
06A	11/20/2013	0134509-014	RM 2-WEST CORNER	BASEBOARD ADHESIVE, WHITE	ND	NO	--	NA
06B	11/20/2013	0134509-015	RM 4-NORTH CORNER	BASEBOARD ADHESIVE, OFF WHITE	ND	NO	--	NA
06C	11/20/2013	0134509-016	RM 5-WEST CORNER	BASEBOARD ADHESIVE, OFF WHITE	ND	NO	--	NA
07A	11/20/2013	0134509-017	RM 1-SOUTH CORNER	BASEBOARD ADHESIVE, OFF WHITE/BEIGE	ND	NO	--	NA
07B	11/20/2013	0134509-018	RM 3-SOUTHWEST EDGE	BASEBOARD ADHESIVE, OFF WHITE/BEIGE	ND	NO	--	NA
07C	11/20/2013	0134509-019	RM 3-SOUTH NEAR CORNER	BASEBOARD ADHESIVE, OFF WHITE/BEIGE	ND	NO	--	NA
08A	11/20/2013	0134509-020	RM 1-SOUTHWEST	CARPET GLUE/DEBRIS, YELLOW	ND	NO	--	NA
08B	11/20/2013	0134509-021	RM 3-SOUTHWEST EDGE	CARPET GLUE, YELLOW	ND	NO	--	NA
08C	11/20/2013	0134509-022	RM 3-WEST	CARPET GLUE, YELLOW	ND	NO	--	NA
09A	11/20/2013	0134509-023	RM 3-SOUTHEAST	WALL INSULATION, YELLOW	ND	NO	--	NA
09B	11/20/2013	0134509-024	RM 3-NORTHEAST WALL	WALL INSULATION, YELLOW	ND	NO	--	NA
09C	11/20/2013	0134509-025	RM 1-SOUTHWEST	WALL INSULATION, YELLOW	ND	NO	--	NA
10A	11/20/2013	0134509-026	RM 3-SOUTHEAST	CEILING INSULATION, YELLOW	ND	NO	--	NA
10B	11/20/2013	0134509-027	RM 3-NORTHEAST WALL	CEILING INSULATION, YELLOW	ND	NO	--	NA
10C	11/20/2013	0134509-028	RM 1-SOUTH CORNER	CEILING INSULATION, YELLOW	ND	NO	--	NA
11A	11/20/2013	0134509-029	RM 3-SOUTHEAST	LAYER 1: DUCT INSULATION, YELLOW	ND	NO	--	NA
				LAYER 2: DUCT INSULATION WRAP, SILVER/TAN	ND	NO	--	NA
11B	11/20/2013	0134509-030	RM 3-CENTER	LAYER 1: DUCT INSULATION, YELLOW	ND	NO	--	NA
				LAYER 2: DUCT INSULATION WRAP, SILVER/TAN	ND	NO	--	NA
11C	11/20/2013	0134509-031	RM 1-SOUTH CORNER	LAYER 1: DUCT INSULATION, YELLOW	ND	NO	--	NA
				LAYER 2: DUCT INSULATION WRAP, SILVER/TAN	ND	NO	--	NA
12A	11/20/2013	0134509-032	RM 3-SOUTHEAST	CEILING INSULATION, YELLOW/TAN	ND	NO	--	NA
12B	11/20/2013	0134509-033	RM 3-WEST CORNER	CEILING INSULATION, YELLOW/TAN	ND	NO	--	NA
12C	11/20/2013	0134509-034	RM 4-NORTHEAST	CEILING INSULATION, YELLOW/TAN	ND	NO	--	NA
13A	11/20/2013	0134509-035	RM 5-NORTHEAST SIDE	DRYWALL(UNFINISHED), OFF WHITE/GRAY	ND	NO	--	NA
13B	11/20/2013	0134509-036	RM 5-WEST SIDE	DRYWALL(UNFINISHED), OFF WHITE/GRAY	ND	NO	--	NA
13C	11/20/2013	0134509-037	RM 5-WEST CORNER	DRYWALL(UNFINISHED), OFF WHITE/GRAY	ND	NO	--	NA
14A	11/20/2013	0134509-038	RM 3-NORTHWEST	LAYER 1: SHEET VINYL, WOOD GRAIN/WHITE	ND	NO	--	NA
				LAYER 2: MASTIC/LEVELING COMPOUND, OFF WHITE/GRAY	ND	NO	--	NA
14B	11/20/2013	0134509-039	RM 3-NORTHWEST	LAYER 1: SHEET VINYL, WOOD GRAIN/WHITE	ND	NO	--	NA
				LAYER 2: MASTIC/LEVELING COMPOUND, OFF WHITE/GRAY	ND	NO	--	NA
14C	11/20/2013	0134509-040	RM 3-SOUTHWEST	LAYER 1: SHEET VINYL, WOOD GRAIN/WHITE	ND	NO	--	NA
				LAYER 2: MASTIC/LEVELING COMPOUND, OFF WHITE/GRAY	ND	NO	--	NA

NOTES:

ND = No asbestos detected.

Asbestos sample locations are depicted on attached Figures.

Bulk sample analyses completed by polarized light microscopy (PLM).

NA = Not applicable since no asbestos was detected

Analytical documentation is in Appendix C

APPENDIX A
PHOTOGRAPHIC RECORD

**STANTEC CONSULTING SERVICES INC
PHOTOGRAPHIC RECORD**

Client: Calif. Department of Transportation, District 7

Job Number: 185831007

Site Name: Route 405 CVEF Rehabilitation Project

Location: 07-LA-405; PM 10.5; Carson Area,
Los Angeles County, California

Photographer: Dion Monge

Date: November 20, 2013

Photograph No. 1



VIEW OF CVEF MOBILE STRUCTURE, FACING NORTHEAST. ALL PAINTED SURFACES APPEARED IN GOOD CONDITION WITH NO EVIDENCE OF DETERIORATING PAINT.

Photograph No. 2



VIEW OF ROOFING MATERIALS, FACING SOUTHEAST. NO ASBESTOS DETECTED.

**STANTEC CONSULTING SERVICES INC
PHOTOGRAPHIC RECORD**

Client: Calif. Department of Transportation, District 7

Job Number: 185831007

Site Name: Route 405 CVEF Rehabilitation Project

Location: 07-LA-405; PM 10.5; Carson Area,
Los Angeles County, California

Photographer: Dion Monge

Date: November 20, 2013

Photograph No. 3



VIEW OF INTERIOR PORTION OF THE CVEF MOBILE STRUCTURE FROM ROOM 3 FACING TOWARD ROOMS 4 AND 5.

Photograph No. 4



VIEW OF SHEET VINYL FLOORING. NO ASBESTOS DETECTED.

**STANTEC CONSULTING SERVICES INC
PHOTOGRAPHIC RECORD**

Client: Calif. Department of Transportation, District 7

Job Number: 185831007

Site Name: Route 405 CVEF Rehabilitation Project

Location: 07-LA-405; PM 10.5; Carson Area,
Los Angeles County, California

Photographer: Dion Monge

Date: November 20, 2013

Photograph No. 5



FAUX WOOD SHEET VINYL FLOORING AND BOTH ENTRY DOORS. NO ASBESTOS DETECTED.

Photograph No. 6



GREEN BASEBOARD WITH MASTIC. NO ASBESTOS DETECTED.

**STANTEC CONSULTING SERVICES INC
PHOTOGRAPHIC RECORD**

Client: Calif. Department of Transportation, District 7

Job Number: 185831007

Site Name: Route 405 CVEF Rehabilitation Project

Location: 07-LA-405; PM 10.5; Carson Area,
Los Angeles County, California

Photographer: Dion Monge

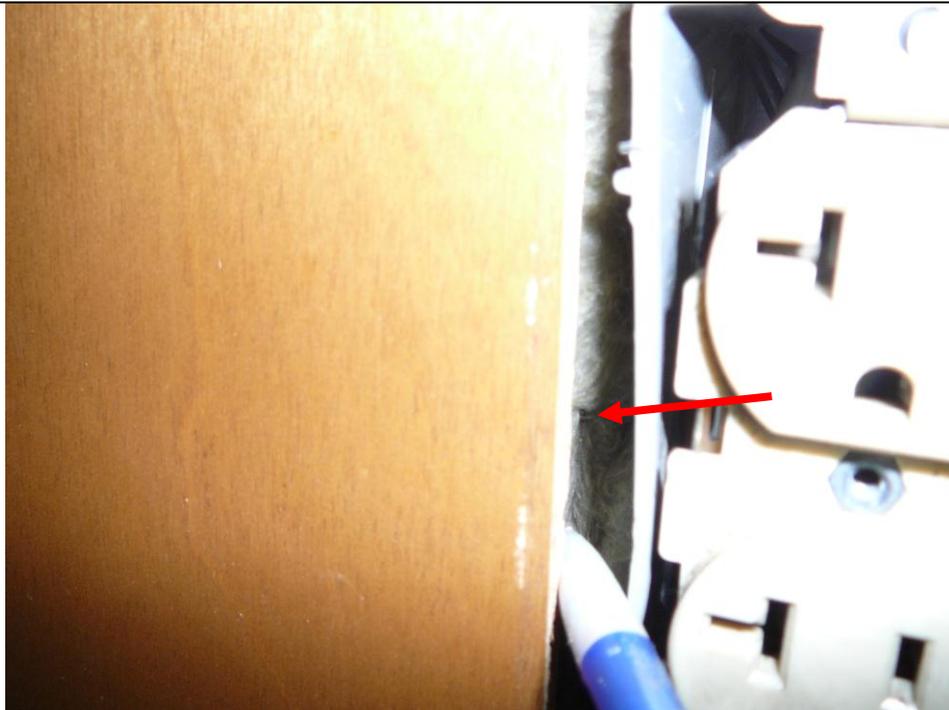
Date: November 20, 2013

Photograph No. 7



CEILING PANEL AND INSULATION ABOVE THE FALSE CEILING. NO ASBESTOS DETECTED.

Photograph No. 8



VIEW BEHIND THE WALL PANELING. NO DRYWALL OBSERVED BEHIND THE PANELING IN ROOMS 1 THROUGH 4. DRYWALL FOUND BEHIND FIBER REINFORCED PLASTIC PANELS OF ROOM 5 (RESTROOM) BUT NO ASBESTOS WAS DETECTED IN THE SAMPLES.

**APPENDIX B
QUALIFICATIONS**

Certifications
Jason J. Stagno

State of California
Division of Occupational Safety and Health
Certified Asbestos Consultant

Jason J Stagno



Name

Certification No. **12-4949**

Expires on **11/14/13**

This certification was issued by the Division of Occupational Safety and Health as authorized by Sections 7160 et seq. of the Business and Professions Code.

State of California Department of Public Health

**Lead-Related
Construction
Certificate**

Certificate
Type

Expiration
Date

Inspector Assessor 07/31/2014



Jason J. Stagno

ID #: 19068

APPENDIX C
ANALYTICAL LABORATORY REPORTS AND
CHAIN-OF-CUSTODY RECORDS

EMC LABS, INC.

9830 S. 51st Street, Suite B109, Phoenix, AZ 85044
Phone: 800-362-3373 or 480-940-5294 - Fax: (480) 893-1726

Laboratory Report
0134509

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client:	STANTEC CONSULTING	Job# / P.O. #:	
Address:	25867-F BUSINESS CENTER DRIVE	Date Received:	11/21/2013
	REDLANDS CA 92374	Date Analyzed:	11/25/2013
Collected:	11/20/2013	Date Reported:	11/25/2013
Project Name:	TASK ORDER NO. 7	EPA Method:	EPA 600/R-93/116
Address:		Submitted By:	DION MONGE
		Collected By:	

Lab ID Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents	
0134509-001 01A	NW	LAYER 1 Roofing, Black/ Gray	No	None Detected	Fibrous Glass	30%
					Carbonates Quartz Binder/Filler	70%
		LAYER 2 Roofing, Black	No	None Detected	Fibrous Glass	25%
					Carbonates Quartz Binder/Filler	75%
		LAYER 3 Roofing Paper, Black	No	None Detected	Cellulose Fiber	50%
					Carbonates Quartz Binder/Filler	50%
0134509-002 01B	SW	LAYER 1 Roofing, Black/ Gray	No	None Detected	Fibrous Glass	30%
					Carbonates Quartz Binder/Filler	70%
		LAYER 2 Roofing, Black	No	None Detected	Fibrous Glass	25%
					Carbonates Quartz Binder/Filler	75%
		LAYER 3 Roofing, Black	No	None Detected	Fibrous Glass	25%
					Carbonates Quartz Binder/Filler	75%
		LAYER 4 Roofing Paper, Black	No	None Detected	Cellulose Fiber	50%
					Carbonates Quartz Binder/Filler	50%

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0134509

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NVLAP#101926-0

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	REDLANDS CA 92374	Date Analyzed:	11/25/2013
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Project Name:	TASK ORDER NO. 7	EPA Method:	EPA 600/R-93/116
Address:		Submitted By:	DION MONGE
		Collected By:	

Lab ID Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents	
0134509-003 01C	NE	LAYER 1 Roofing, Black/ Gray	No	None Detected	Fibrous Glass	30%
					Carbonates Quartz Binder/Filler	70%
		LAYER 2 Roofing, Black	No	None Detected	Fibrous Glass	25%
					Carbonates Quartz Binder/Filler	75%
0134509-004 01D	SE	LAYER 3 Roofing, Black	No	None Detected	Fibrous Glass	25%
					Carbonates Quartz Binder/Filler	75%
		LAYER 4 Roofing Paper, Black	No	None Detected	Cellulose Fiber	65%
					Carbonates Quartz Binder/Filler	35%
0134509-004 01D	SE	LAYER 1 Roofing, Black/ Gray	No	None Detected	Fibrous Glass	30%
					Carbonates Quartz Binder/Filler	70%
		LAYER 2 Roofing, Black	No	None Detected	Fibrous Glass	25%
					Carbonates Quartz Binder/Filler	75%
0134509-004 01D	SE	LAYER 3 Roofing, Black	No	None Detected	Fibrous Glass	25%
					Carbonates Quartz Binder/Filler	75%
		LAYER 4 Roofing Paper, Black	No	None Detected	Cellulose Fiber	65%
					Carbonates Quartz Binder/Filler	35%

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NVLAP#101926-0

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	REDLANDS CA 92374	Date Analyzed:	11/25/2013
Collected:	11/20/2013	Date Reported:	11/25/2013
Project Name:	TASK ORDER NO. 7	EPA Method:	EPA 600/R-93/116
Address:		Submitted By:	DION MONGE
		Collected By:	

Lab ID Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents	
0134509-005 01E	NORTH-CENTRAL	LAYER 1 Roofing, Black/ Gray	No	None Detected	Fibrous Glass	30%
					Carbonates Quartz Binder/Filler	70%
		LAYER 2 Roofing, Black	No	None Detected	Fibrous Glass	25%
					Carbonates Quartz Binder/Filler	75%
		LAYER 3 Roofing Paper, Black	No	None Detected	Cellulose Fiber	65%
					Carbonates Quartz Binder/Filler	35%
0134509-006 02A	SW	Roof Penetration Mastic, Black/ Gray	No	None Detected	Cellulose Fiber	5%
					Gypsum Quartz Binder/Filler	95%
0134509-007 03A	NW	Roof Mastic, Off White	No	None Detected	Carbonates Gypsum Quartz Binder/Filler	100%
0134509-008 04A	RM 3-W. CORNER	18"x36" Ceiling Panel, White / Tan	No	None Detected	Cellulose Fiber Mineral Wool	75% 2%
					Carbonates Perlite Gypsum Binder/Filler	23%
0134509-009 04B	RM 3-S. CORNER	18"x36" Ceiling Panel, White/ Gray	No	None Detected	Cellulose Fiber Mineral Wool	75% 2%
					Carbonates Perlite Gypsum Binder/Filler	23%

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Collected:	11/20/2013	Date Reported:	11/25/2013
Project Name:	TASK ORDER NO. 7	EPA Method:	EPA 600/R-93/116
Address:		Submitted By:	DION MONGE
		Collected By:	

Lab ID Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents	
0134509-010 04C	RM 4-NW AREA	18"x36" Ceiling Panel, White/ Gray	No	None Detected	Cellulose Fiber Mineral Wool Carbonates Perlite Gypsum Binder/Filler	75% 2% 23%
0134509-011 05A	RM 2-W. CORNER	LAYER 1 Rolled Vinyl Flooring, White/ Gray/ Blue	No	None Detected	Cellulose Fiber Synthetic Fiber Fibrous Glass Carbonates Diatoms Gypsum Binder/Filler	10% 5% 3% 82%
		LAYER 2 Mastic, Yellow	No	None Detected	Cellulose Fiber Fibrous Glass Gypsum Quartz Binder/Filler	3% 1% 96%
0134509-012 05B	RM 4-W. CORNER	LAYER 1 Rolled Vinyl Flooring, White/ Gray/ Blue	No	None Detected	Cellulose Fiber Synthetic Fiber Fibrous Glass Carbonates Diatoms Gypsum Binder/Filler	10% 5% 3% 82%
		LAYER 2 Mastic, Yellow	No	None Detected	Cellulose Fiber Synthetic Fiber Gypsum Quartz Binder/Filler	2% 2% 96%

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Collected:	11/20/2013	Date Reported:	11/25/2013
Project Name:	TASK ORDER NO. 7	EPA Method:	EPA 600/R-93/116
Address:		Submitted By:	DION MONGE
		Collected By:	

Lab ID Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents
0134509-013 05C	RM 5-W. CORNER	LAYER 1 Rolled Vinyl Flooring, White/ Gray/ Blue	No	None Detected	Cellulose Fiber 10% Synthetic Fiber 5% Fibrous Glass 3% Carbonates Diatoms Gypsum Binder/Filler 82%
		LAYER 2 Mastic, Yellow	No	None Detected	Cellulose Fiber 5% Synthetic Fiber 2% Carbonates Diatoms Gypsum Quartz Binder/Filler 93%
0134509-014 06A	RM 2-W. CORNER	Baseboard Adhesive, White	No	None Detected	Carbonates Gypsum Binder/Filler 100%
0134509-015 06B	RM 4-N. CORNER	Baseboard Adhesive, Off White	No	None Detected	Gypsum Carbonates Binder/Filler 100%
0134509-016 06C	RM 5-W. CORNER	Baseboard Adhesive, Off White	No	None Detected	Cellulose Fiber <1% Carbonates Binder/Filler 99%
0134509-017 07A	RM 1-S. CORNER	Baseboard Adhesive, Off White/ Beige	No	None Detected	Carbonates Gypsum Binder/Filler 100%
0134509-018 07B	RM 3-SW EDGE	Baseboard Adhesive, Off White/ Beige	No	None Detected	Carbonates Gypsum Binder/Filler 100%

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Collected:	11/20/2013	Date Reported:	11/25/2013
Project Name:	TASK ORDER NO. 7	EPA Method:	EPA 600/R-93/116
Address:		Submitted By:	DION MONGE
		Collected By:	

Lab ID Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents	
0134509-019 07C	RM 3-S. NEAR CORNER	Baseboard Adhesive, Off White/ Beige	No	None Detected	Carbonates Gypsum Binder/Filler	100%
0134509-020 08A	RM 1-SW	Carpet Glue/Debris, Yellow	No	None Detected	Cellulose Fiber Gypsum Carbonates Binder/Filler	10% 90%
0134509-021 08B	RM 3-SW	Carpet Glue, Yellow	No	None Detected	Synthetic Fiber Gypsum Quartz Carbonates Binder/Filler	<1% 99%
0134509-022 08C	RM 3-W.	Carpet Glue, Yellow	No	None Detected	Cellulose Fiber Gypsum Quartz Binder/Filler	<1% 99%
0134509-023 09A	RM 3-SE	Wall Insulation, Yellow	No	None Detected	Fibrous Glass Cellulose Fiber Gypsum	98% 1% 1%
0134509-024 09B	RM 3-NE WALL	Wall Insulation, Yellow	No	None Detected	Fibrous Glass Gypsum	98% 2%
0134509-025 09C	RM 1-SW	Wall Insulation, Yellow	No	None Detected	Fibrous Glass Carbonates	99% 1%
0134509-026 10A	RM 3-SE	Ceiling Insulation, Yellow	No	None Detected	Fibrous Glass Gypsum	98% 2%

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Project Name:	TASK ORDER NO. 7	EPA Method:	EPA 600/R-93/116
Address:		Submitted By:	DION MONGE
		Collected By:	

Lab ID Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents	
0134509-027 10B	RM 3-NE WALL	Ceiling Insulation, Yellow	No	None Detected	Fibrous Glass Cellulose Fiber Gypsum Carbonates	97% <1% 2%
0134509-028 10C	RM 1-S. CORNER	Ceiling Insulation, Yellow	No	None Detected	Fibrous Glass Gypsum	99% 1%
0134509-029 11A	RM 3-SE	LAYER 1 Duct Insulation, Yellow	No	None Detected	Fibrous Glass Gypsum	98% 2%
		LAYER 2 Duct Insulation Wrap, Silver/Tan	No	None Detected	Cellulose Fiber Fibrous Glass Aluminum Gypsum Binder/Filler	25% 10% 65%
0134509-030 11B	RM 3-CENTER	LAYER 1 Duct Insulation, Yellow	No	None Detected	Fibrous Glass Gypsum	98% 2%
		LAYER 2 Duct Insulation Wrap, Silver/Tan	No	None Detected	Cellulose Fiber Fibrous Glass Aluminum Gypsum Binder/Filler	25% 10% 65%
0134509-031 11C	RM 1-S. CORNER	LAYER 1 Duct Insulation, Yellow	No	None Detected	Fibrous Glass Gypsum	99% 1%
		LAYER 2 Duct Insulation Wrap, Silver/Tan	No	None Detected	Cellulose Fiber Fibrous Glass Aluminum Gypsum Binder/Filler	25% 10% 65%
0134509-032 12A	RM 3-SE	Ceiling Insulation, Yellow/Tan	No	None Detected	Fibrous Glass Gypsum	97% 3%
0134509-033 12B	RM 3-W. CORNER	Ceiling Insulation, Yellow/Tan	No	None Detected	Fibrous Glass Gypsum	97% 3%

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Laboratory Report
0134509

Bulk Asbestos Analysis by Polarized Light Microscopy

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Collected:	11/20/2013	Date Reported:	11/25/2013
Project Name:	TASK ORDER NO. 7	EPA Method:	EPA 600/R-93/116
Address:		Submitted By:	DION MONGE
		Collected By:	

Lab ID Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents	
0134509-034 12C	RM 4-NE	Ceiling Insulation, Yellow/Tan	No	None Detected	Fibrous Glass Cellulose Fiber Gypsum Carbonates	95% 2% 3%
0134509-035 13A	RM 5-NE SIDE	Drywall (Unfinished), Off White/ Gray	No	None Detected	Cellulose Fiber Gypsum Mica Carbonates Quartz Binder/Filler	10% 90%
0134509-036 13B	RM 5-W. SIDE	Drywall (Unfinished), Off White/ Gray	No	None Detected	Cellulose Fiber Gypsum Mica Carbonates Quartz Binder/Filler	10% 90%
0134509-037 13C	RM 5-W. CORNER	Drywall (Unfinished), Off White/ Gray	No	None Detected	Cellulose Fiber Gypsum Mica Carbonates Quartz Binder/Filler	10% 90%
0134509-038 14A	RM 3-NW	LAYER 1 Sheet Vinyl, Wood Grain/White	No	None Detected	Cellulose Fiber Carbonates Gypsum Binder/Filler	25% 75%
		LAYER 2 Mastic/ Leveling Compound, Off White/ Gray Note: Difficult to separate adjacent layers	No	None Detected	Cellulose Fiber Carbonates Gypsum Quartz Binder/Filler	2% 98%

EMC LABS, INC.

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Project Name:	TASK ORDER NO. 7	EPA Method:	EPA 600/R-93/116
Address:		Submitted By:	DION MONGE
		Collected By:	

Lab ID Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents	
0134509-039 14B	RM 3-NW	LAYER 1 Sheet Vinyl, Wood Grain/White	No	None Detected	Cellulose Fiber Carbonates Gypsum Binder/Filler	25% 75%
		LAYER 2 Mastic/ Leveling Compound, Off White/ Gray Note: Difficult to separate adjacent layers	No	None Detected	Cellulose Fiber Carbonates Gypsum Quartz Binder/Filler	<1% 99%
0134509-040 14C	RM 3-SW	LAYER 1 Sheet Vinyl, Wood Grain/White	No	None Detected	Cellulose Fiber Carbonates Gypsum Binder/Filler	25% 75%
		LAYER 2 Mastic/ Leveling Compound, Off White/ Gray Note: Difficult to separate adjacent layers	No	None Detected	Cellulose Fiber Carbonates Gypsum Quartz Binder/Filler	2% 98%



Analyst - Kurt Kettler



Signatory - Lab Manager - Ken Scheske

Distinctly stratified, easily separable layers of samples are analyzed as subsamples of the whole and are reported separately for each discernible layer. All analyses are derived from calibrated visual estimate and measured in area percent unless otherwise noted. The report applies to the standards or procedures identified and to the sample(s) tested. The test results are not necessarily indicative or representative of the qualities of the lot from which the sample was taken or of apparently identical or similar products, nor do they represent an ongoing quality assurance program unless so noted. These reports are for the exclusive use of the addressed client and that they will not be reproduced wholly or in part for advertising or other purposes over our signature or in connection with our name without special written permission. The report shall not be reproduced except in full, without written approval by our laboratory. The samples not destroyed in testing are retained a maximum of thirty days. The laboratory measurement of uncertainty for the test method is approximately less than 1 by area percent. Accredited by the National Institute of Standards and Technology, Voluntary Laboratory Accreditation Program for selected test method for asbestos. The accreditation or any reports generated by this laboratory in no way constitutes or implies product certification, approval, or endorsement by the National Institute of Standards and Technology. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government. Polarized Light Microscopy may not be consistently reliable in detecting asbestos in floor coverings and similar non friable organically bound materials.

CHAIN OF CUSTODY
 EMC Laboratories
 9830 S. 51ST St., Ste B-109
 Phoenix, AZ 85044
 (800) 362-3373 Fax (480) 893-1726

LAB#: 134509
 TAT: 2 days
 Rec'd: NOV 21 P.M.
 EMC USE ONLY

COMPANY NAME: Stantec

BILL TO: _____ (If Different Location)

same

CONTACT: Anne Perez

Phone/Fax: 909 335 6116

Email: anne.perez@stantec.com

Now Accepting: VISA - MASTERCARD

Price Quoted: \$ _____ / Sample \$ _____ / Layers

COMPLETE ITEMS 1-4: (Failure to complete any items may cause a delay in processing or analyzing your samples)

1. **TURNAROUND TIME:** [4hr rush] [8hr rush] [1-Day] [2-Day] [3-Day] [5-Day] [6-10 Day]

****Prior confirmation of turnaround time is required

****Additional charges for rush analysis (please call marketing department for pricing details) needed by 11/26-AM

****Laboratory analysis may be subject to delay if credit terms are not met

2. **TYPE OF ANALYSIS:** [Bulk-PLM] [Air-PCM] [Lead] [Point Count] [Fungi: AOC, W-C, Bulk, Swab, Tape]

3. **DISPOSAL INSTRUCTIONS:** _____ [Dispose of samples at EMC] / [Return samples to me at my expense]

(If you do not indicate preference, EMC will dispose of samples 60 days from analysis.)

4. Project Name: Task Order 7

P.O. Number: _____ Project Number: _____

EMC SAMPLE #	CLIENT SAMPLE #	DATE & TIME SAMPLED	LOCATION/MATERIAL TYPE	Samples Accepted Yes / No	AIR SAMPLE INFO / COMMENTS		
					ON	OFF	FLOW RATE
40	01A	11-20-13	see attach logs	Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
40	14C	↓		0 N			

SPECIAL INSTRUCTIONS:

Sample Collector: (Print) Dion Mungl (Signature) [Signature]

Relinquished by: [Signature] Date/Time: 11-20-13, 1:00 Received by: Diana Federico Date/Time: 11/21/13

Relinquished by: Diana Federico Date/Time: 11/21/13 Received by: [Signature] Date/Time: 11/25/13

Relinquished by: _____ Date/Time: _____ Received by: _____ Date/Time: _____

** In the event of any dispute between the above parties for these services or otherwise, parties agree that jurisdiction and venue will be in Phoenix, Arizona and prevailing party will be entitled to attorney's fees and court costs.



Asbestos Bulk Sample Log

25864 Business Center Drive, Ste F
Redlands, CA 92374
Tel: (909) 335-6116
Fax: (909) 335-6120

Project Name: Task Order No. 7

Site Name: Rte 405 - CVEF Rehabilitation

Date: 11/20/13

Project #:

Site Address: 07-LA-405; PM 10.5

Inspector: D.Monge

Carson Area, LA County, CA

MATERIAL	
HA#	D1
Material Type:	roof Core
Color:	Gray/black
Description:	Roofing and assoc. paper
Estimated Total Qty.:	965SF

MATERIAL LOCATIONS			
Floor #	Location	Quantity Estimate	Cond.
	on roof	965SF	G

SAMPLES	
Sample #	Sample Location
01 A	NW
01 B	SW
01 C	NE
01 D	SE
01 E	North-central
F	
G	

Notes:

HAZARD ASSESSMENT		
	Yes	No
Friable:		<input checked="" type="radio"/>
Contact by Maintenance:	<input checked="" type="radio"/> Low	Med High
Vibration:	Low	<input checked="" type="radio"/> Med High
Air Movement:	Low	<input checked="" type="radio"/> Med High

Relinquished By:

Date: 11-20-13

Received By: Diana Federico

Date: 11/21/13



Asbestos Bulk Sample Log

134509
25864 Business Center Drive, Site F
Redlands, CA 92374
Tel: (909) 335-6116
Fax: (909) 335-6120

Project Name: Task Order No. 7

Site Name: Rte 405 - CVEF Rehabilitation

Date: 11/20/13

Project #: _____

Site Address: 07-LA-405; PM 10.5

Inspector: D.Monge

Carson Area, LA County, CA

MATERIAL	
HA#	02
Material Type:	mastic
Color:	gray/black
Description:	assoc. w/ roof penetration
Estimated Total Qty.:	< 6 LF

MATERIAL LOCATIONS			
Floor #	Location	Quantity Estimate	Cond.
	roof on penetrations	< 6 LF	G

SAMPLES	
Sample #	Sample Location
02A	SW
B	
C	
D	
E	
F	
G	

Notes:

HAZARD ASSESSMENT		
	Yes	No
Friable:		<input checked="" type="radio"/>
Contact by Maintenance:	<input checked="" type="radio"/> Low	Med High
Vibration:	Low	<input checked="" type="radio"/> Med High
Air Movement:	Low	<input checked="" type="radio"/> Med High

Relinquished By:

Date: 11-20-13

Received By: Diana Federico

Date: 11/21/13



Asbestos Bulk Sample Log

25864 Business Center Drive, Ste F
Redlands, CA 92374
Tel: (909) 335-6116
Fax: (909) 335-6120

Project Name: Task Order No. 7
Project #:

Site Name: Rte 405 - CVEF Rehabilitation
Site Address: 07-LA-405; PM 10.5
Carson Area, LA County, CA

Date: 11/20/13
Inspector: D.Monge

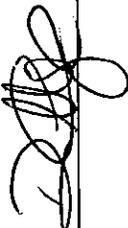
MATERIAL	
HA#	05
Material Type:	rolled vinyl flooring
Color:	White w/ blue fleck
Description:	rolled flooring
Estimated Total Qty.:	130 SF

MATERIAL LOCATIONS			
Floor #	Location	Quantity Estimate	Cond.
	Room #2	30 SF	G
	Room #4	50 SF	G
	Room #5	50 SF	G

SAMPLES	
Sample #	Sample Location
05 A	Room 2 - W corner
05 B	Room 4 - W corner
05 C	Room 5 - W corner
D	
E	
F	
G	

Notes:

HAZARD ASSESSMENT		
	Yes	No
	Friable:	
Contact by Maintenance:	Low	High
	Med	High
Vibration:	Low	High
	Med	High
Air Movement:	Low	High
	Med	High

Relinquished By:  Date: 11-20-13 Received By: Diana Fedorova Date: 11/21/13
 Page 5 of 14



Asbestos Bulk Sample Log

25864 Business Center Drive, Site F
Redlands, CA 92374
Tel: (909) 335-6116
Fax: (909) 335-6120

134509

Project Name: Task Order No. 7 Site Name: Rte 405 - CVEF Rehabilitation Date: 11/20/13
Project #: Site Address: 07-LA-405; PM 10.5 Inspector: D.Monge
Carson Area, LA County, CA

MATERIAL	
HA#	06
Material Type:	Base board adhesive
Color:	white
Description:	white adhesive assoc. w/ green baseboard
Estimated Total Qty.:	

MATERIAL LOCATIONS			
Floor #	Location	Quantity Estimate	Cond.
	Room #2	14	9
	Room #4	15	
	Room #5	16	

SAMPLES	
Sample #	Sample Location
06 A	Room 2 - W corner
06 B	Room 4 - N corner
06 C	Room 5 - W corner
D	
E	
F	
G	

Notes:

HAZARD ASSESSMENT		
	Yes	No
Friable:		<input checked="" type="radio"/>
Contact by Maintenance:	<input checked="" type="radio"/> Low	Med High
Vibration:	Low	<input checked="" type="radio"/> Med High
Air Movement:	<input checked="" type="radio"/> Low	Med High

Relinquished By: [Signature] Date: 11-20-13 Received By: Diana Ferrero Date: 11/21/13
Page 6 of 14

1345-009



Asbestos Bulk Sample Log

25864 Business Center Drive, Site F
Redlands, CA 92374
Tel: (909) 335-6116
Fax: (909) 335-6120

Project Name: Task Order No. 7 Site Name: Rte 405 - CVEF Rehabilitation Date: 11/20/13
Project #: _____ Site Address: 07-LA-405; PM 10.5 Inspector: D.Monge
Carson Area, LA County, CA

MATERIAL	
HA#	07
Material Type:	Baseboard Adhesive
Color:	off white
Description:	off white adhesive assoc. w/ beige baseboard
Estimated Total Qty.:	

MATERIAL LOCATIONS			
Floor #	Location	Quantity Estimate	Cond.
	Room #1		G
	Room #3		G

SAMPLES	
Sample #	Sample Location
07 A	Room 1 - S corner
07 B	Room 3 - SW edge
07 C	Room 3 - S corner
D	
E	
F	
G	

Notes:

HAZARD ASSESSMENT		
	Yes	No
Friable:		<input checked="" type="radio"/>
Contact by Maintenance:	<input checked="" type="radio"/> Low	<input type="radio"/> Med <input type="radio"/> High
Vibration:	<input type="radio"/> Low <input checked="" type="radio"/> Med	<input type="radio"/> High
Air Movement:	<input checked="" type="radio"/> Low <input type="radio"/> Med	<input type="radio"/> High

Relinquished By: [Signature] Date: 11-20-13 Received By: Diana Fedorova Date: 11/21/13
Page 2 of 14



Asbestos Bulk Sample Log

25864 Business Center Drive, Ste F
Redlands, CA 92374
Tel: (909) 335-6116
Fax: (909) 335-6120

Project Name: Task Order No. 7

Site Name: Rte 405 - CVEF Rehabilitation

Date: 11/20/13

Project #:

Site Address: 07-LA-405; PM 10.5

Inspector: D. Monge

Carson Area, LA County, CA

MATERIAL	
HA#	08
Material Type:	Carpet Glue
Color:	yellow
Description:	yellow glue assoc. w/ carpet
Estimated Total Qty.:	750 sf

MATERIAL LOCATIONS			
Floor #	Location	Quantity Estimate	Cond.
	Room # 1	100 SF	G
	Room # 3	650 SF	G

SAMPLES	
Sample #	Sample Location
08 A	Room 1-SW
08 B	Room 3-SW
08 C	Room 3-W
D	
E	
F	
G	

Notes:

HAZARD ASSESSMENT		
	Yes	No
Friable:		<input checked="" type="radio"/>
Contact by Maintenance:	<input checked="" type="radio"/> Low	<input type="radio"/> Med <input type="radio"/> High
Vibration:	<input type="radio"/> Low	<input checked="" type="radio"/> Med <input type="radio"/> High
Air Movement:	<input checked="" type="radio"/> Low	<input type="radio"/> Med <input type="radio"/> High

Relinquished By:

Date: 11-20-13

Received By: Diana Federico

Date: 11/20/13



Asbestos Bulk Sample Log

25864 Business Center Drive, Ste F
Redlands, CA 92374
Tel: (909) 335-6116
Fax: (909) 335-6120

134509

Project Name: Task Order No. 7

Site Name: Rte 405 - CVEF Rehabilitation

Date: 11/20/13

Project #:

Site Address: 07-LA-405, PM 10.5

Inspector: D.Monge

Carson Area, LA County, CA

MATERIAL	
HA#	09
Material Type:	insulation
Color:	yellow
Description:	in walls
Estimated Total Qty.:	900 SF

MATERIAL LOCATIONS			
Floor #	Location	Quantity Estimate	Cond.
	behind walls	900 SF	G

SAMPLES	
Sample #	Sample Location
09 A	Room 3 - SE
09 B	Room 3 - NE wall
09 C	Room 1 - SW
D	
E	
F	
G	

Notes:

HAZARD ASSESSMENT		
	Yes	No
Friable:		<input checked="" type="radio"/>
Contact by Maintenance:	<input checked="" type="radio"/> Low	Med High
Vibration:	<input checked="" type="radio"/> Low	Med High
Air Movement:	<input checked="" type="radio"/> Low	Med High

Relinquished By:

Date: 11-20-13

Received By: Diana Fedorico

Date: 11/20/13



Asbestos Bulk Sample Log

25864 Business Center Drive, Ste F
Redlands, CA 92374
Tel: (909) 335-6116
Fax: (909) 335-6120

Project Name: Task Order No. 7

Site Name: Rte 405 - CVEF Rehabilitation

Date: 11/20/13

Project #:

Site Address: 07-LA-405, PM 10.5

Inspector: D.Monge

Carson Area, LA County, CA

MATERIAL	
HA#	11
Material Type:	insulation
Color:	yellow
Description:	duct insulation
Estimated Total Qty.:	300SF

MATERIAL LOCATIONS			
Floor #	Location	Quantity Estimate	Cond.
	Duct insulation above ceiling	300SF	G

SAMPLES	
Sample #	Sample Location
11 A	Room 3 - SE
11 B	Room 3 - center
11 C	Room 1 - corner
D	
E	
F	
G	

Notes:

HAZARD ASSESSMENT		
	Yes	No
Friable:		<input checked="" type="radio"/>
Contact by Maintenance:	<input checked="" type="radio"/> Low	<input type="radio"/> Med <input type="radio"/> High
Vibration:	<input checked="" type="radio"/> Low	<input type="radio"/> Med <input type="radio"/> High
Air Movement:	<input checked="" type="radio"/> Low	<input type="radio"/> Med <input type="radio"/> High

Relinquished By:

Date: 11-20-13

Received By: Diana Fedorova

Date: 11/20/13



Asbestos Bulk Sample Log

Asbestos Bulk Sample Log

25864 Business Center Drive, Ste F
 Redlands, CA 92374
 Tel: (909) 335-6116
 Fax: (909) 335-6120

Project Name: Task Order No. 7

Site Name: Rte 405 - CVEF Rehabilitation

Date: 11/20/13

Project #: _____

Site Address: 07-LA-405; PM 10.5

Inspector: D.Monge

Carson Area, LA County, CA

MATERIAL	
HA#	12
Material Type:	Insulation
Color:	yellow
Description:	circular ducting
Estimated Total Qty.:	200SF

MATERIAL LOCATIONS			
Floor #	Location	Quantity Estimate	Cond.
	above ceiling	200SF	G

SAMPLES	
Sample #	Sample Location
12A	Room 3 - SE
12B	Room 3 - W corner
12C	Room 4 - NE
D	
E	
F	
G	

Notes:

HAZARD ASSESSMENT		
	Yes	No
Friable:		<input checked="" type="radio"/>
Contact by Maintenance:	<input checked="" type="radio"/> Low	<input type="radio"/> Med <input type="radio"/> High
Vibration:	<input checked="" type="radio"/> Low	<input type="radio"/> Med <input type="radio"/> High
Air Movement:	<input type="radio"/> Low <input type="radio"/> Med	<input checked="" type="radio"/> High

[Signature]

Relinquished By: Diana Federico

Date: 11-20-13

Date: 11/20/13

July 11, 2013

Anne Perez
Stantec
25864-F Business Center Drive
Redlands, CA 92374
Tel: (909) 255-8202
Fax:(909) 335-6120

ACCREDITED IN ACCORDANCE WITH
nelac
ELAP No.: 1838
NELAP No.: 02107CA
CSDLAC No.: 10196
ORELAP No.: CA300003
TCEQ No.: T104704502

Re: ATL Work Order Number : 1301963
Client Reference : 185831004

Enclosed are the results for sample(s) received on July 03, 2013 by Advanced Technology Laboratories. The sample(s) are tested for the parameters as indicated on the enclosed chain of custody in accordance with applicable laboratory certifications. The laboratory results contained in this report specifically pertains to the sample(s) submitted.

Thank you for the opportunity to serve the needs of your company. If you have any questions, please feel free to contact me or your Project Manager.

Sincerely,



Eddie Rodriguez
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and its absence renders the report invalid. Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Conference and/or applicable state-specific certification programs. The report cannot be reproduced without written permission from the client and Advanced Technology Laboratories.



Certificate of Analysis

Stantec
25864-F Business Center Drive
Redlands , CA 92374

Project Number : 185831004
Report To : Anne Perez
Reported : 07/11/2013

SUMMARY OF SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
A-12	1301963-01	Soil	7/01/13 13:30	7/03/13 12:29
B-12	1301963-02	Soil	7/02/13 8:00	7/03/13 12:29

CASE NARRATIVE

Sample Receiving/General Comments:

Documentation pertaining to additional analyses/change order available upon request.

Results were J-flagged. "J" is used to flag those results that are between the PQL (Practical Quantitation Limit) and the calculated MDL (Method Detection Limit). Results that are "J" flagged are estimated values since it becomes difficult to accurately quantitate the analyte near the MDL.



Certificate of Analysis

Stantec
25864-F Business Center Drive
Redlands , CA 92374

Project Number : 185831004
Report To : Anne Perez
Reported : 07/11/2013

Client Sample ID A-12
Lab ID: 1301963-01

Lead by ICP-AES EPA 6010B

Analyst: SB

Analyte	Result (mg/kg)	PQL (mg/kg)	MDL (mg/kg)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Lead	97	1.0	NA	1	B3G0077	07/08/2013	07/08/13 12:40	

STLC Metals by ICP-AES by EPA 6010B

Analyst: AG

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Lead	6.0	1.0	NA	20	B3G0156	07/10/2013	07/10/13 10:37	



Certificate of Analysis

Stantec
25864-F Business Center Drive
Redlands , CA 92374

Project Number : 185831004
Report To : Anne Perez
Reported : 07/11/2013

Client Sample ID B-12

Lab ID: 1301963-02

Lead by ICP-AES EPA 6010B

Analyst: SB

Analyte	Result (mg/kg)	PQL (mg/kg)	MDL (mg/kg)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Lead	110	1.0	NA	1	B3G0077	07/08/2013	07/08/13 12:42	

STLC Metals by ICP-AES by EPA 6010B

Analyst: AG

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Lead	6.7	1.0	NA	20	B3G0156	07/10/2013	07/10/13 10:12	



Certificate of Analysis

Stantec
 25864-F Business Center Drive
 Redlands , CA 92374

Project Number : 185831004
 Report To : Anne Perez
 Reported : 07/11/2013

QUALITY CONTROL SECTION

Lead by ICP-AES EPA 6010B - Quality Control

Analyte	Result (mg/kg)	PQL (mg/kg)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD	RPD Limit	Notes
---------	-------------------	----------------	----------------	------------------	----------------	-----------------	-----	--------------	-------

Batch B3G0077 - EPA 3050 Modified

Blank (B3G0077-BLK1)

Prepared: 7/8/2013 Analyzed: 7/8/2013

Lead ND 1.0 NR

LCS (B3G0077-BS1)

Prepared: 7/8/2013 Analyzed: 7/8/2013

Lead 53.1836 1.0 50.0000 106 80 - 120

Duplicate (B3G0077-DUP1)

Source: 1301963-02

Prepared: 7/8/2013 Analyzed: 7/8/2013

Lead 81.7937 1.0 112.604 NR 31.7 20 R

Matrix Spike (B3G0077-MS1)

Source: 1301963-02

Prepared: 7/8/2013 Analyzed: 7/8/2013

Lead 288.637 1.0 250.000 112.604 70.4 51 - 106

Matrix Spike Dup (B3G0077-MSD1)

Source: 1301963-02

Prepared: 7/8/2013 Analyzed: 7/8/2013

Lead 294.738 1.0 250.000 112.604 72.9 51 - 106 2.09 20



Certificate of Analysis

Stantec
 25864-F Business Center Drive
 Redlands , CA 92374

Project Number : 185831004
 Report To : Anne Perez
 Reported : 07/11/2013

STLC Metals by ICP-AES by EPA 6010B - Quality Control

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
---------	------------------	---------------	----------------	------------------	-------	-----------------	-----	--------------	-------

Batch B3G0156 - STLC Extraction

Blank (B3G0156-BLK1)

Prepared: 7/10/2013 Analyzed: 7/10/2013

Lead	ND	1.0			NR				
------	----	-----	--	--	----	--	--	--	--

LCS (B3G0156-BS1)

Prepared: 7/10/2013 Analyzed: 7/10/2013

Lead	2.00936	1.0	2.00000		100	80 - 120			
------	---------	-----	---------	--	-----	----------	--	--	--

Duplicate (B3G0156-DUP1)

Source: 1301963-02

Prepared: 7/10/2013 Analyzed: 7/10/2013

Lead	7.31520	1.0		6.74925	NR		8.05	20	
------	---------	-----	--	---------	----	--	------	----	--

Matrix Spike (B3G0156-MS1)

Source: 1301963-02

Prepared: 7/10/2013 Analyzed: 7/10/2013

Lead	8.65188	1.0	2.50000	6.74925	76.1	33 - 131			
------	---------	-----	---------	---------	------	----------	--	--	--

Matrix Spike Dup (B3G0156-MSD1)

Source: 1301963-02

Prepared: 7/10/2013 Analyzed: 7/10/2013

Lead	8.77722	1.0	2.50000	6.74925	81.1	33 - 131	1.44	20	
------	---------	-----	---------	---------	------	----------	------	----	--



Certificate of Analysis

Stantec
25864-F Business Center Drive
Redlands , CA 92374

Project Number : 185831004
Report To : Anne Perez
Reported : 07/11/2013

Notes and Definitions

R	RPD value outside acceptance criteria. Calculation is based on raw values.
ND	Analyte not detected at or above reporting limit
PQL	Practical Quantitation Limit
MDL	Method Detection Limit
NR	Not Reported
RPD	Relative Percent Difference
CA1	CA-NELAP (CDPH)
CA2	CA-ELAP (CDPH)
OR1	OR-NELAP (OSPHL)
TX1	TX-NELAP (TCEQ)

- Notes:
- (1) The reported MDL and PQL are based on prep ratio variation and analytical dilution.
 - (2) The suffix [2C] of specific analytes signifies that the reported result is taken from the instrument's second column.

July 23, 2013

Anne Perez
Stantec
25864-F Business Center Drive
Redlands, CA 92374
Tel: (909) 255-8202
Fax:(909) 335-6120



Re: ATL Work Order Number : 1301963
Client Reference : 185831004

Enclosed are the results for sample(s) received on July 03, 2013 by Advanced Technology Laboratories. The sample(s) are tested for the parameters as indicated on the enclosed chain of custody in accordance with applicable laboratory certifications. The laboratory results contained in this report specifically pertains to the sample(s) submitted.

Thank you for the opportunity to serve the needs of your company. If you have any questions, please feel free to contact me or your Project Manager.

Sincerely,

Eddie Rodriguez
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and its absence renders the report invalid. Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Conference and/or applicable state-specific certification programs. The report cannot be reproduced without written permission from the client and Advanced Technology Laboratories.



Certificate of Analysis

Stantec
25864-F Business Center Drive
Redlands , CA 92374

Project Number : 185831004
Report To : Anne Perez
Reported : 07/23/2013

SUMMARY OF SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
A-12	1301963-01	Soil	7/01/13 13:30	7/03/13 12:29
B-12	1301963-02	Soil	7/02/13 8:00	7/03/13 12:29

CASE NARRATIVE

Sample Receiving/General Comments:

Documentation pertaining to additional analyses/change order available upon request.

Results were J-flagged. "J" is used to flag those results that are between the PQL (Practical Quantitation Limit) and the calculated MDL (Method Detection Limit). Results that are "J" flagged are estimated values since it becomes difficult to accurately quantitate the analyte near the MDL.



Certificate of Analysis

Stantec
25864-F Business Center Drive
Redlands , CA 92374

Project Number : 185831004
Report To : Anne Perez
Reported : 07/23/2013

Client Sample ID A-12

Lab ID: 1301963-01

STLC DI Metals by ICP-AES by EPA 6010B

Analyst: AG

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Lead	ND	1.0	0.056	20	B3G0364	07/21/2013	07/22/13 10:02	



Certificate of Analysis

Stantec
 25864-F Business Center Drive
 Redlands, CA 92374

Project Number : 185831004
 Report To : Anne Perez
 Reported : 07/23/2013

Client Sample ID B-12
Lab ID: 1301963-02

STLC DI Metals by ICP-AES by EPA 6010B

Analyst: AG

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Lead	ND	1.0	0.056	20	B3G0364	07/21/2013	07/22/13 10:11	

QUALITY CONTROL SECTION

STLC DI Metals by ICP-AES by EPA 6010B - Quality Control

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD RPD	RPD Limit	Notes
---------	------------------	---------------	----------------	------------------	----------------	-----------------	------------	--------------	-------

Batch B3G0364 - STLC DI Extraction

Blank (B3G0364-BLK1)				Prepared: 7/21/2013 Analyzed: 7/22/2013					
Lead	ND	1.0							NR
LCS (B3G0364-BS1)				Prepared: 7/21/2013 Analyzed: 7/22/2013					
Lead	2.10648	1.0	2.00000		105	80 - 120			
Duplicate (B3G0364-DUP1)				Source: 1301963-01 Prepared: 7/21/2013 Analyzed: 7/22/2013					
Lead	ND	1.0		ND	NR				20
Matrix Spike (B3G0364-MS1)				Source: 1301963-01 Prepared: 7/21/2013 Analyzed: 7/22/2013					
Lead	2.57431	1.0	2.50000	ND	103	70 - 130			
Matrix Spike Dup (B3G0364-MSD1)				Source: 1301963-01 Prepared: 7/21/2013 Analyzed: 7/22/2013					
Lead	2.52666	1.0	2.50000	ND	101	70 - 130	1.87		20



Certificate of Analysis

Stantec
25864-F Business Center Drive
Redlands , CA 92374

Project Number : 185831004
Report To : Anne Perez
Reported : 07/23/2013

Notes and Definitions

ND Analyte not detected at or above reporting limit
PQL Practical Quantitation Limit
MDL Method Detection Limit
NR Not Reported
RPD Relative Percent Difference
CA1 CA-NELAP (CDPH)
CA2 CA-ELAP (CDPH)
OR1 OR-NELAP (OSPHL)
TX1 TX-NELAP (TCEQ)

Notes:
(1) The reported MDL and PQL are based on prep ratio variation and analytical dilution.
(2) The suffix [2C] of specific analytes signifies that the reported result is taken from the instrument's second column.

Memorandum

*Flex your power!
Be energy efficient!*

To: MR. MOHAMMED CHOWDHURY
Office of Traffic Design, Chief
District 07

Date: October 10, 2013

File: 07-LA-405, PM 10.5/12.6
07-288501 (0700021105)
Changeable Message Sign

Attention: Suliasti Sutanto

From: DEPARTMENT OF TRANSPORTATION
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design – South 1
Branch D

Subject: Foundation Report, Changeable Message Sign at Carson Weigh Station, Northbound Route 405.

INTRODUCTION

Based on the request of District 7 Office of Traffic Design dated September 10, 2013, this Foundation Report (FR) was prepared for Changeable Message Sign (CMS) along Interstate 405 (LA-405) as a part of Carson Weigh Station reconstruction, located in City of Carson, Los Angeles County.

SCOPE OF WORK

The scope of work for the current study included performing the following tasks:

- a. Review of the pertinent literature and current plans, and existing Log of Test Boring from Torrance Lateral (Bridge No.53-1513).
- b. Field reconnaissance by an engineer to observe the existing conditions at the proposed overhead signs site;
- c. Preparation of this foundation report.

PROJECT DESCRIPTION

The proposed California Highway Patrol (CHP) Office Building and Weigh Scale structures will be constructed at the existing maintenance station located along northbound Route 405 south of East Del Amo Boulevard Overcrossing in City of Carson. The proposed CMS sign will be located at Station 590+48.3 (Rte. 405 Center Line) and will be supported by a single cast-in-drilled-hole (CIDH) pile. OH sign offset from centerline was not provided in the plans. The type of structure, location, and type of foundation for the standard design is presented in Table 1.

Table 1 - General Information for Carson Weigh Station CMS Sign

Sign Type	Location	Type of Foundation	Pile Diameter (ft)	Foundation Depth (ft)	Standard Specification (2010) Sheet No.
CMS	Sta. 590+48.3 (Rte. 405 CL)	CIDH PILE	4	18	S135

FIELD INVESTIGATION AND TESTING PROGRAM

Due to time constraints, subsurface exploration was not performed for the subject overhead sign. As-Built Log of Test Borings (LOTBs) for the Torrance Lateral Bridge (Bridge No.53-1513) were used for design of proposed overhead sign structure. A summary of borings used is shown in Table 2.

Table 2- As-Built Boring Information Torrance Lateral Bridge No. 53-1513 (1959)

Boring No	Route 405 Center Line Station (ft)	Offset (ft)	Top of Boring Elevation (ft)	Approximate Depth (ft)	Groundwater Surface Elevation (ft)	Date Drilled
B-8	589+89	40 Rt.	21.6	55	Not Encountered	9/10/59
B-12	590+50	30 Rt.	10.3	25	-12.5	9/29/59
B-2	591+30	78 Rt.	10.1	55	Not Encountered	4/8/59
B-1	590+45	54 Lt.	9.75	62	+1.25	4/8/59

SITE GEOLOGY AND SUBSURFACE CONDITIONS

Regional Geology

The site is within the Los Angeles Basin geomorphic province. The Los Angeles Basin is an alluvium filled basin that is up to several miles thick at its deepest point. The basin is located at the boundary of the Peninsular Ranges and Transverse Ranges geomorphic provinces. The faults and subsurface features within the basin are subparallel to the San Andreas Fault, which is similar to the Peninsular Ranges province.

The project site is located north of the Port of Los Angeles and northeast of the Palos Verdes Hills. The site is located between the Newport-Inglewood Fault Zone and the Compton and Palos Verdes Faults. The Dominguez Channel is directly northeast of the 405 freeway alignment in this area.

Site Geology

The site is mapped by the Dibblee Geological Foundation on the Palos Verdes Peninsula and Vicinity map of 1999 as being underlain by Quaternary alluvium composed mostly of loamy clay of valley and flood plain deposits. Locally, the freeway is underlain by artificial embankment fill.

Subsurface Conditions

Based on the As-Built LOTBs for Torrance Lateral Bridge, subsurface soils at the proposed CMS location consist of embankment fill (possibly medium dense silty sand and gravel/brick fragments-see Reference 1) to approximate elevation of +10.0 ft. The underlying soils (native) consist of soft to very soft silty/sandy clay to approximate elevation of +0.0 ft. Below this elevation consist of interbeds of soft to very stiff silty/sand clay and medium dense to dense clayey/silty sand to maximum depth drilled (elevation -50.0).

Ground Water

Ground water was encountered at an elevation of +2.1 ft. during the investigation for the Torrance Lateral Bridge in 1959. A ground water map for a former Texaco station at the intersection of Perry St. and Carson St. was found through the State Waterboard Geotracker website. It shows a maximum ground water elevation of about +11 feet msl (mean sea level) with ground water elevation decreasing towards the Dominguez Channel during monitoring in 2011. A ground water map for a Union 76 gas station at Carson St and the SB 405 was also found through the State Waterboard Geotracker website. It shows a maximum ground water elevation of about +7 ft. msl with ground water elevation decreasing to the north during monitoring in the first quarter of 2012.

During our field investigation for the Carson Weigh Station (Reference 1), ground water was not encountered in any of our borings to a maximum depth of 51.5' (elevation -27.3). It should be noted that ground water levels can fluctuate with the change of season and other factors.

Liquefaction Evaluation

Due to the high fines content of the soils at the site, the risk of liquefaction at the site is considered to be low.

CORROSION EVALUATION

Soil samples from nearby Carson Weigh Station site were tested in the laboratory for corrosion potential. The test results indicate that the soil at the site is corrosive to foundation elements (See Reference 1).

FOUNDATION RECOMMENDATIONS

The following recommendations is based on; 1)As-Built LOTBs presented in Table 1 of this report, 2) Elevation Layout (SDS-2), Layout Plan (L-1), and “Base Plate Reactions” provided by Office of Traffic Design via email dated September 10, 2013.

The axial pile capacity evaluation for the proposed CIDH piles was performed using SHAFT for Windows, V5.0 by ENSOFT Inc. The lateral load-deformation response of single pile was analyzed utilizing the LPILE plus for Windows, V5.0 by ENSOFT Inc.

Table 3- Foundation Design Loads Provided by Office of Traffic Design

WSMS Sign Location	Bending Moment at Pile Head (Kip-Ft.)	Shear Force at Pile Head (Kips)	Axial Load (Kip)
Sta. 590+48.3 (Rte. 405 CL)	207	7	14

Table 4- Pile Data Table

CMS Sign Location	Pile Type	Approx. ¹ Cut Off Elevation (ft)	Required Factored Nominal Resistance		Design Tip Elevation (ft)	Specified Tip Elevation (ft)
			Strength Limit			
			Compression (Kips) ($\phi=0.7$)	Tension (Kips) ($\phi=0.7$)		
Sta. 590+48.3 (Rte. 405 CL)	4.0' /CIDH (STD Sheet S135)	26.0	20.0	N/A	8.0 (a) 8.0 (c) 8.0 (d)	8.0

Note:

1. Design tip elevation is controlled by (a) Compression, (c) Settlement, (d) Lateral Loads.
2. Cut off elevation was estimated based on Layout Plan L-1 provided by District 7 Office of Traffic Design.

Permissible settlement under Service Load was considered to be 1 inch. Lateral deflection due to shear force at pile head was determined to be less than 0.5 inch. Maximum bending moment due to shear force is approximately 316 kips-in occurring at 7 feet depth.

CONSTRUCTION CONSIDERATIONS

The following recommendations are made for CIDH piles installation and construction, and are recommended to be incorporated in the Special Provisions of the project.

- a. The contractor shall be required to clean out the bottom of the shaft prior to placing the cage and the concrete.
- b. Concrete placement for construction of the CIDH piling shall be completed within the same day that excavation of the drilled hole has been completed.
- c. Caving is anticipated during excavation of the pile boring and during CIDH piles construction. A method of caving control, such as using temporary casing, should be considered by the contractor.
- d. Groundwater or perched water may encounter during drilling for CIDH borehole.

If you have any questions or comments, please call Mushtaq Ahmed at 213-620-2132 or Shiva Karimi at 213-620-2146.

Prepared by: Date: 10/10/2013

Reviewed by: Date: 10/10/2013

M. Mushtaq

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Prepared by: Date: 10/10/2013

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cc: Structure Construction R.E. pending File (RE_Pending@dot.ca.gov)
Structure Design –TBD
GS Corporate – Roy_Bibbens

Reference:

- 1. Foundation Report for Northbound Carson Weigh Station, Route 405, prepared by OGDS1, dated May 28, 2013.

Memorandum

*Flex your power!
Be energy efficient!*

To: MOHAMMED CHOWDHURY
Senior Transportation Engineer
District 7 Design

Date: May 28, 2013
File: 07-LA-405, PM 11.7
EA: 07-288501

Attention: Suliasti Suntano

Northbound Carson Weigh Station

From: DEPARTMENT OF TRANSPORTATION
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design – South 1
Branch D

Subject: Foundation Report for Northbound Carson Weigh Station, Route 405

INTRODUCTION

As requested by Office of Structure Design (OSD) in a memorandum dated October 29, 2012, the office of Geotechnical Design South 1 (OGDS1) has prepared this Foundation Report for the proposed Northbound Carson Weigh Station located at northbound Route 405 in City of Carson. **This report only addresses OGDS1's recent field investigation, laboratory test results, and preliminary recommendations, and will be revised upon receiving detailed structural design loads from OSD.**

SCOPE OF WORK

Tasks completed by OGDS1, Branch D included the following:

1. Review of pertinent information from As-Built Plans/records at the project area.
2. Field reconnaissance by an engineer, drilling, logging, and sampling of three hollow-stem auger borings at the site.
3. Laboratory testing of selected samples to characterize the subsurface materials.
4. Review of the regional geology and seismicity.
5. Preliminary foundation recommendations and construction considerations.

PROJECT DESCRIPTION

The proposed Northbound Carson Weigh Station will be constructed at the location of existing California Highway Patrol (CHP) trailer and asphalt concrete paved area situated along northbound Route 405 approximately 300 feet south of East Del Amo Boulevard Overcrossing (Bridge No. 53-2831), in City of Carson. The proposed weigh station will include a one story office building to accommodate CHP inspection facility, and a truck weigh scale pit adjacent to the office building (Draft N/B Carson Weigh Station plans, Sheet Nos. A-1, A-2, ST1-1, ST1-2, and ST1-4, provided by OSD, plotted on 10/29/12).

The proposed office building will be made of precast panels walls and roof and will be supported by spread footings about 2 ft below grade with anticipated applied load of approximately 1500 to 2500 psf. The proposed truck weigh scale pit will be approximately 12 ft by 12 ft with 7 to 10 feet depth (emails communications with Mr. Edgardo Isidro of OSD, dated 10/29/12, 2/28/13, and 5/7/13).

Based on the Typical Cross Section Plan (Sheet No. X-1, plotted May 14, 2013) provided to OGDS1 by District 7 Office of Traffic Design, it is also proposed to construct a paved roadway on the north east side of the office building. The proposed paved roadway will be adjacent to a descending existing 2H:1V slope. This slope is approximately 16 feet high and connects the site to a flat area next to the concrete paved Dominguez channel.

FIELD INVESTIGATION AND TESTING PROGRAM

The field investigation consisted of drilling three 8 inch diameter, hollow-stem auger borings to the maximum depth of 51.5 ft. below surface. The augers were advanced in to the ground from a truck mounted drill rig. A representative of OGDS1 logged and sampled the borings using the Standard Penetration Test (SPT) and modified California Drive sampler having internal diameters of 1.4 and 2.0 inches, respectively. In general, samples were obtained at 5-foot intervals. Both SPT and modified California samplers were driven for 1.5 feet of penetration using successive blows from a 140-lb, hammer falling for 30 inches. The efficiency of the hammer as estimated by the Foundation Testing Branch of Caltrans was noted during the exploration and is presented in the boring logs. Following drilling, sampling, and logging, the borings were backfilled with soil cuttings and capped with cement slurry.

Following drilling, the Office of Survey, District 7 established the location and elevation of the borings. Borings information, including the total depth, stationing, offset and the ground surface elevations are summarized in Table 1 below.

Table 1 – Summary of Borings

Boring No.	Date Drilled	Station	Offset	Elevation (ft.)	Total Depth	Groundwater Elevation (ft)
A-12-001	12-11-12	614+69	126 ft Rt	24.2 ft	51.50 ft	N/A
A-12-002	12-11-12	614+90	164 ft Rt	24.2 ft	21.50 ft	N/A
A-12-003	12-12-12	614+13	162 ft Rt	23.8 ft	21.50 ft	N/A

LABORATORY TESTING PROGRAM

Selected soil samples were sent to the Department's Transportation Laboratory in Sacramento for testing. All laboratory tests were performed in accordance with current ASTM standard procedures and California Test Methods. The summarized laboratory test data are shown in Table 2.

Table 2 – Summary of Laboratory Tests

Test	Standard	No. of Tests
Mechanical Analysis	CTM 202, 203	9
Atterberg	CTM 204	8
Unit Weight	CTM 212	1
Moisture	CTM 226	10
Corrosion	CTM 417, 422, 532	7
Consolidation	ASTM D2435	1
Triaxial	ASTM D2850	1

SITE GEOLOGY AND SUBSURFACE CONDITIONS

Regional Geology

The site is within the Los Angeles Basin geomorphic province. The Los Angeles Basin is an alluvium filled basin that is up to several miles thick at its deepest point. It is located at the boundary of the Peninsular Ranges and Transverse Ranges geomorphic provinces. The faults and subsurface features within the basin are subparallel to the San Andreas Fault, which is similar to the Peninsular Ranges province.

The project site is located north of the Port of Los Angeles and northeast of the Palos Verdes Hills. The site is located between the Newport-Inglewood Fault Zone and the Compton and Palos Verdes Faults. The Dominguez Channel is directly northeast of the proposed weigh station.

Site Subsurface Conditions

Based our recent field investigation, approximately 18 ft of fill underlies the site. Fill material consists of hard sandy lean clay, and medium dense to dense sandy silt/silty sand with gravel and with asphalt and red brick fragments (up to 1.5" in diameter). Below the fill material, alluvium consisting of medium stiff fat to lean clay was encountered to a maximum depth of 51.5 ft drilled.

Groundwater

Groundwater was not encountered in any of the three borings drilled during OGDS1 subsurface investigation to a maximum depth of 51.5 ft.

CORROSIVITION EVALUATION

Soil samples from Boring Nos. 1, 2, and 3 of the subject site were tested in the laboratory for corrosion potential. The test results summarized in Table No.3 indicate that the soil at the site is corrosive to foundation elements.

Table 3 – Corrosion Testing Summary

Boring	Sample Depth (ft)	pH	Minimum Resistivity (ohm-cm)	Sulfate Content (ppm)	Chloride Content (ppm)
A-12-001	5-6.5	8.14	6795	N/A*	N/A
A-12-001	40-41.5	8.36	104	7800	4500
A-12-001	45-46.5	8.22	137	4100	3275
A-12-002	15-16.5	7.96	1257	N/A	N/A
A-12-002	20-21.5	8.13	699	783	107
A-12-003	10-11.5	7.85	1110	N/A	N/A
A-12-003	20-21.5	7.93	678	1230	68

*Samples are only tested for Sulfates and Chlorides if the Minimum Resistivity is less than 1000 ohm-cm.

Note: For structural elements, the Department considers a site corrosive if one or more of the following conditions exists: pH is 5.5 or less, chloride concentration is 500 ppm or greater, sulfate concentration is 2000 ppm or greater. MSE backfill shall conform to the requirements of section 47-2.02 Structure Backfill in the Standard Specification.

SEISMICITY

Faulting and Seismicity

The site is located at about 2.2 miles (3.38 km) from the rupture surfaces of Newport Inglewood Fault, which is the nearest active fault to the site. The Maximum Magnitude (M_{Max}) of Newport Inglewood Fault as presented in Caltrans ARS Online Tool V2.1.05 (2013) is 7.2. Based on the Next Generation Attenuation (NGA) relationships, we estimate that an M_{Max} event associated could generate a design Peak Ground Acceleration (PGA) of 0.5g at the site. Based on the above information, we recommend using a magnitude of 7.2 and a PGA of 0.5g for the seismic design.

Based on International Building Code (IBC) 2012 Edition, following information pertains to the site (Latitude 33.84597 and Longitude -118.26939):

Site Soil Class= D, Stiff Soil

$S_S= 1.624g$

$S_I= 1.60g$

$S_{MS}=1.624g$

$S_{MI}=0.908g$

$S_{DS}=1.082g$

$S_{D1}=0.605g$

Potential Seismic Hazards

No groundwater was encountered in three borings to the maximum depth of 51.5 feet drilled. The 7.5-minute Los Angeles Quadrangle of the Seismic Hazard Zone Maps (Davis, 1999) also indicates that the site is not underlain by potentially liquefiable soils. Considering this, we are of the opinion that the potential for liquefaction at the site is low. Consequently, the potential for seismically induced impacts such as settlement and lateral deformation of subsurface materials is remote.

Surface Fault Rupture Hazard

The project site is not located within any CGS designated Earthquake Fault Zone (EFZ) or directly underlain by any fault considered active (Davis 1999). Therefore, the possibility of surface fault rupture hazard at the site is considered low.

SLOPE STABILITY ANALYSIS

Global Stability of existing 2H:1V slope on north east side of the proposed weigh station was evaluated assuming a soil cohesion of 50 psf and a friction angle of 32 degrees utilizing SLOPEW computer program. The stability analysis indicated that the slope has a factor of safety in excess of 1.5 and 1.1 under static and design seismic conditions, respectively.

FOUNDATION RECOMMENDATIONS

Design loads applied to proposed weigh station foundation (AASHTO LRFD 2007) are not available at the time of this investigation. **This report will be revised upon receiving service, strength, and extreme state loads from project designer.**

The following preliminary recommendations are based on the 1) OGDS1 current site investigation, 2) draft N/B Carson Weigh Station plans, Sheet Nos. A-1, A-2, ST1-1, ST1-2, and ST1-4, provided by OSD, plotted on 10/29/12, and 3) Email communications with Mr. Edgardo Isidro of OSD, dated 10/29/12, 2/28/13, and 5/7/13.

- In order to provide uniform support for the building slab and foundations, remedial grading consisting of overexcavation and backfilling is required. A minimum depth of 2 ft should be overexcavated below bottom of the proposed building footings and floor slabs and backfilled with approved fill compacted to 95% relative compaction. Lateral extent of overexcavation should be 4 ft minimum beyond building perimeters and to at least 4 ft beyond footing edges, where possible.
- Maximum allowable bearing pressure of 2500 psf may be used in the design of continuous and spread footings when supported on the above mentioned approved compacted fill.
- For design of scale pit retaining walls, equivalent fluid pressure of 35 psf and 375 psf may be used for active and passive pressure, respectively.
- Provisions should be made for control of drainage and surface water around buildings. Concentrated drainage, such as rainwater from gutter and downspouts, scuppers, and roof valleys should be diverted away from foundations and **face of the existing 2H:1V slope** by means of concrete splash blocks and/or other approved devices.

CONSTRUCTION CONSIDERATIONS

1. Quality control should be practiced to ensure that bottom of the footing excavation is level and clear of any loose debris. Should any large rock/debris be found at the bottom of the footing elevations, the contractor should be prepared to remove, and replace with granular material at 95% relative compaction.
2. The fill is to be constructed in accordance with Section 19 of the Standard Specification and other requirements as directed by the Design Engineer.
3. Excavations of site soils should be temporarily shored or sloped in accordance with Cal OSHA requirements.
4. Caltrans Utilities should be consulted prior to commencement of earthwork relative to abandonment/relocation of the existing underground utilities within the zone of proposed construction.

For further information, contact M. Mushtaq Ahmed at 213-620-2132 or Shiva Karimi at 213-620-2146.

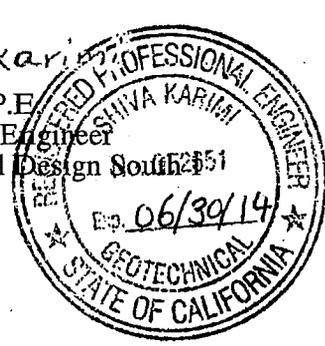
Prepared by: Date: 5/28/2013

Reviewed by: Date: 5/28/2013

M. Mushtaq Ahmed
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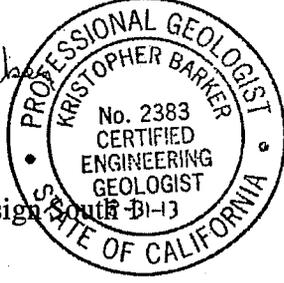


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Prepared by: Date: 5/28/2013

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