

CAT[®] 350 System

TANGENT DOUBE-SIDED END TERMINAL

PRODUCT DESCRIPTION ASSEMBLY MANUAL

CAT[®]-350 System

Tangent Double-Sided End Terminal

The Crash Cushion Attenuating Terminal ("CAT[®]") has been tested to National Cooperative Highway Research Program ("NCHRP") Report 350 criteria and has been deemed eligible for Federal-aid reimbursement on the National Highway System ("NHS") by the Federal Highway Administration ("FHWA").

Product Description

Assembly Manual



15601 Dallas Parkway
Suite 525
Addison, Texas 75001



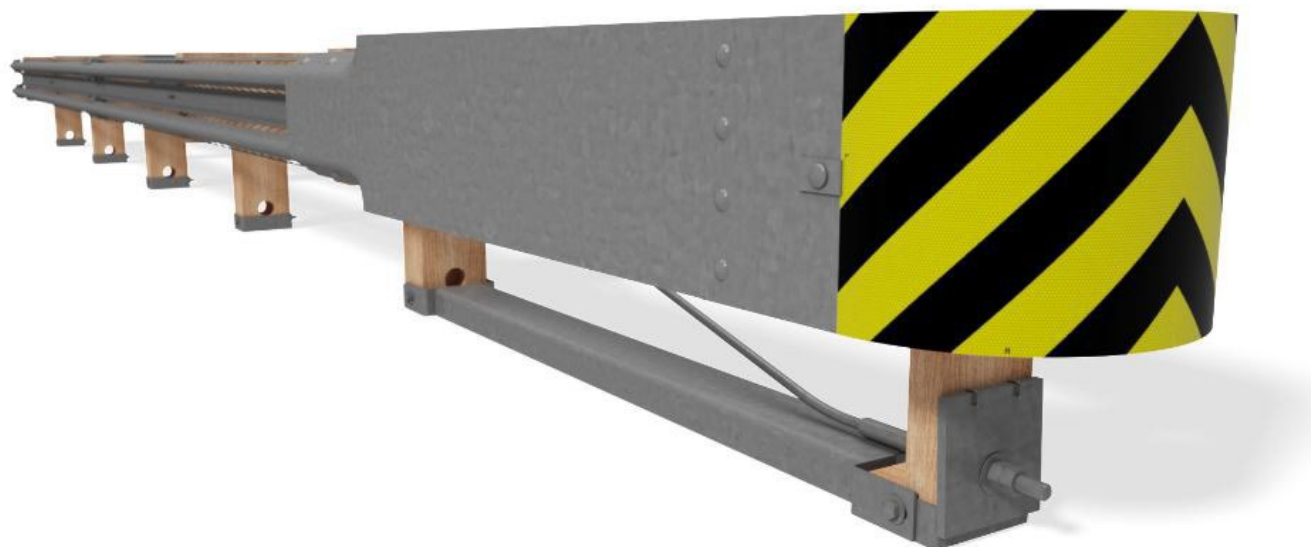
Warning: The local highway agency, distributors, owners, and contractors are **RESPONSIBLE** for the assembly, maintenance, and repair of the CAT[®]. Failure to fulfill these **RESPONSIBILITIES** with respect to the assembly, maintenance, and repair of the CAT[®] could result in serious injury or death.



Important: These instructions are for standard assembly specified by the appropriate highway agency. In the event the specified system assembly, maintenance, or repair would require a deviation from standard assembly parameters, contact a Valtir, LLC ("Valtir") representative. This system has been deemed eligible by the FHWA for use on the NHS under strict criteria utilized by that agency.

This manual must be available to the worker overseeing and/or assembling the product at all times. For additional copies, contact Valtir at (888) 356-2363 or visit [Valtir.com/Products](https://www.valtir.com/Products).

The information contained in this manual supersedes all previous versions. The instructions, illustrations, and specifications are based on the latest CAT[®] System information available to Valtir at publication. We reserve the right to make changes at any time. Please visit [Valtir.com/product-category/end_terminals](https://www.valtir.com/product-category/end_terminals) to confirm the latest revision.



CAT®

Crash Cushion/Attenuating Terminal

Crash Cushion Attenuating *Terminal*

The CAT® is a tangent, double-sided, re-directive/gating and energy absorbing attenuator/end terminal available for use with various longitudinal highway barriers, in either unidirectional or bidirectional traffic applications.

Table of Contents

CAT® ACRONYMS	4
Customer Service Contacts	4
Limitations and Warnings	5
Overview	6
Recommended Tools	7
Site Preparation	8
Post Placement	9
Rigid Pavement and Rock	9
Inspect Shipment	9
CAT® System Components/Hardware	12
Assembly Steps	17
STEP 1A: CAT® and CAT® Tail – Post Layout 1-8 Connecting To 27 3/4" [705 mm] High Downstream Single/Double Sided Guardrail	18
STEP 1B: CAT® and CAT® Tail – Post Layout 1-11 Connecting To 31" [787 mm] High Downstream Single/Double Sided Guardrail	19
STEP 2A: CAT® Tail - Post Assembly 7 & 8 Connecting To 27 3/4" [705 mm] High Downstream Single/ Double Sided Guardrail	20
STEP 2B: CAT® Tail - Post Assembly 7-11 Connecting To 31" [787 mm] High Down Stream Guardrail	21
STEP 3: CAT® Tube Assembly Short Tube 4'-6" [1.37 m] with Soil plate; Long Tube 6'-0" [1.83 m]	22
STEP 4A: CAT® Post and Offset Block Assembly (Posts 3, 5, & 6)	23
STEP 4B: CAT® Post Assembly (Post 4)	24
STEP 4C: CAT® Post and Strut Assembly (Posts 1 & 2)	25
STEP 5A: CAT® Tail - Guardrail Assembly Connecting To 27 3/4" [705 mm] High Downstream Single Sided Guardrail	26
STEP 5B: CAT® Tail Anchor Bracket Assembly (For 27 3/4" [705 mm] High Downstream Single Sided Guardrail Assembly)	27
STEP 5C: CAT® Tail - Anchor Assembly Connecting To 27 3/4" [705] High Downstream Single Sided Guardrail	28
STEP 6: CAT® Tail - Guardrail Assembly Connecting To 27 3/4" [705 mm] High Downstream Double Sided Guardrail	29
STEP 7A: CAT® Tail - Guardrail Assembly Connecting To 31" [787 mm] High, 8" [200 mm] Offset Blocks, MGS Downstream Guardrail	30
STEP 7B: CAT® Tail - Guardrail Assembly Connecting To 31" [787 mm] High, 12" [300 mm] Offset Blocks, MGS Downstream Guardrail	31
STEP 8: CAT® Tail - Guardrail Assembly With 9'- 4 1/2" Guardrail Panel Connecting To 31" [787 mm] High Downstream MGS Guardrail	32
STEP 9A: CAT® 10 Gauge, Slotted/Welded Guardrail-2 Assembly	33
STEP 9B: CAT® Splice Assembly (At Post 6)	34
STEP 10A: CAT® 12 Gauge, Slotted Guardrail-1 Assembly	35
STEP 10B: CAT® Splice Assembly (At Post 4)	36
STEP 10C: CAT® Spacer Assembly	37
STEP 11: CAT® Nose Plate (10 Gauge) Assembly	38
STEP 12: CAT® Side Plate (10 Gauge) Assembly	39
STEP 13: CAT® Anchor Cable Assembly	40
STEP 14: CAT® Restraining Road Assembly (Posts 3 & 5)	41
STEP 15: CAT® Knock Out Tube/Post Plate Assembly (Posts 4 & 6)	42
STEP 16: CAT® Delineation	43
CAT® System Assembly Checklist (File with Project Records)	44
CAT® System Repair Checklist (File with Maintenance Records)	45
CAT® System Routine Inspection Checklist (File with Maintenance Records)	46
APPENDIX A: AASHTO Roadside Design Guide Roadside (Shoulder) Grading Detail	47
APPENDIX B: AASHTO Roadside Design Guide Median Grading Detail	48
APPENDIX C: CAT® SS245 Repair Kit1 and CAT® Hardware Bags	49
NOTES	50

CAT® ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
BLON	Beginning Length of Need
CAT®	Crash Cushion Attenuating Terminal
CFR	Code of Federal Regulation
FHWA	Federal Highway Administration
MUTCD	Manual on Uniform Traffic Control Devices
NCHRP	National Cooperative Highway Research Program
NHS	National Highway System
OSHA	Occupational Safety & Health Administration
PPE	Personal Protective Equipment
TL-3	Test Level-3
Valtir	Valtir, LLC

Customer Service Contacts

Valtir is committed to the highest level of customer service. Feedback regarding the CAT®, its assembly procedures, supporting documentation, and performance is always welcome. Additional information can be obtained from the contact information below:

Valtir

Telephone	(888) 356-2363 (USA) +1 214 589 8140 (International)
Contact Link	Valtir.com/Contact
Website:	www.Valtir.com

Valtir, LLC
15601 Dallas Parkway
Suite 525
Addison, TX 75001

Limitations and Warnings

Valtir, in compliance with NCHRP Report 350, contracts with ISO 17025 A2LA accredited testing laboratories to perform crash tests, evaluate tests, and submit the test results to the FHWA for review.

The CAT® System has been deemed eligible by FHWA as meeting the requirements and guidelines of NCHRP Report 350, Test Level 3 ("TL-3"). These tests typically evaluate product performance defined by NCHRP Report 350 involving a range of vehicles on roadways, from lightweight cars (approx. 800 kg [1,800 lb.]) and full size pickup trucks (approx. 2,000 kg [4400 lb.]) at 100 kph [62 mph].

The CAT® is tested pursuant to the test matrix criteria of NCHRP Report 350 as designated by FHWA. The FHWA tests are not intended to represent the performance of systems when impacted by every vehicle type or in every impact condition existing on the roadway. Every departure from the roadway is a unique event.

Valtir expressly disclaims any warranty or liability for injury or damage to persons or property resulting from any impact, collision or harmful contact with its products, other vehicles, or nearby hazards or objects by any vehicle, object or person, whether or not the products were assembled in consultation with Valtir or by third parties.

The CAT® is intended to be assembled, delineated, and maintained within the state/specifying agency and federal guidelines. It is important for the state/specifying agency to select the most appropriate product configuration for site specifications.

The state/specifying agency's careful evaluation of the site layout, vehicle population type and speed, traffic direction, and visibility are some of the elements that require evaluation in the selection of a highway product. For example, curbs could cause an untested effect on an impacting vehicle.

After an impact with the system, all debris must be removed from the area immediately in compliance with the most applicable state/specifying agency policy. The specified CAT® must be evaluated and restored to its original specified condition or replaced as the state/specifying agency determines/requires, as soon as possible. Product selection, approval, proper installation, and maintenance of any highway product is the sole responsibility of the state/specifying agency.



Safety Alert Symbols appear throughout this manual and indicate Danger, Warning, Caution or Important statements. Failure to read and follow these warnings could result in serious injury or death in the event of a vehicle impact with the system.

WARNING: Do not assemble, maintain, or repair the CAT® until you have read this manual thoroughly and completely understand it. Ensure that all Danger, Warning, Caution, and Important statements within the manual are completely followed. Please call Valtir at (888) 356-2363 if you have any questions about instructions in this manual.

WARNING: Safety measures incorporating appropriate traffic control devices and personal protective equipment ("PPE") specified by the state/specifying agency must be used to protect all personnel while at the assembly, maintenance, or repair site. Work gloves, apron, eye protection, safety-toe shoes, and back protection shall be used.

WARNING: Ensure the assembly site meets all appropriate Manual on Uniform Traffic Control Devices ("MUTCD") and the state/specifying agency standards.

WARNING: Use only Valtir parts that are specified by Valtir for use with the CAT® for assembling, maintaining, or repairing the CAT®. Do not utilize or otherwise commingle parts from other systems even if those systems are other Valtir Systems. Such configurations have not been tested, nor have they been approved for use. Assembly, maintenance or repairs using unspecified parts or accessories is strictly prohibited. Failure to follow this warning could result in serious injury or death in the event of a vehicle impact with such an UNACCEPTED system.

WARNING: Do NOT modify the CAT® in any way.

IMPORTANT: Valtir makes no recommendation whether use or reuse of any part of the CAT® is appropriate or acceptable after system impact. It is the responsibility of the state/specifying agency and its engineers to make that determination.

IMPORTANT: It is the responsibility of owner, state/specifying agency, or specifier to inspect the CAT® after assembly is complete to ensure the instructions provided in this manual have been strictly followed.

Overview

The CAT® is a tangent, double-sided, re-directive/gating and energy absorbing attenuator/end terminal available for use with various longitudinal highway barriers, in either unidirectional or bidirectional traffic applications.

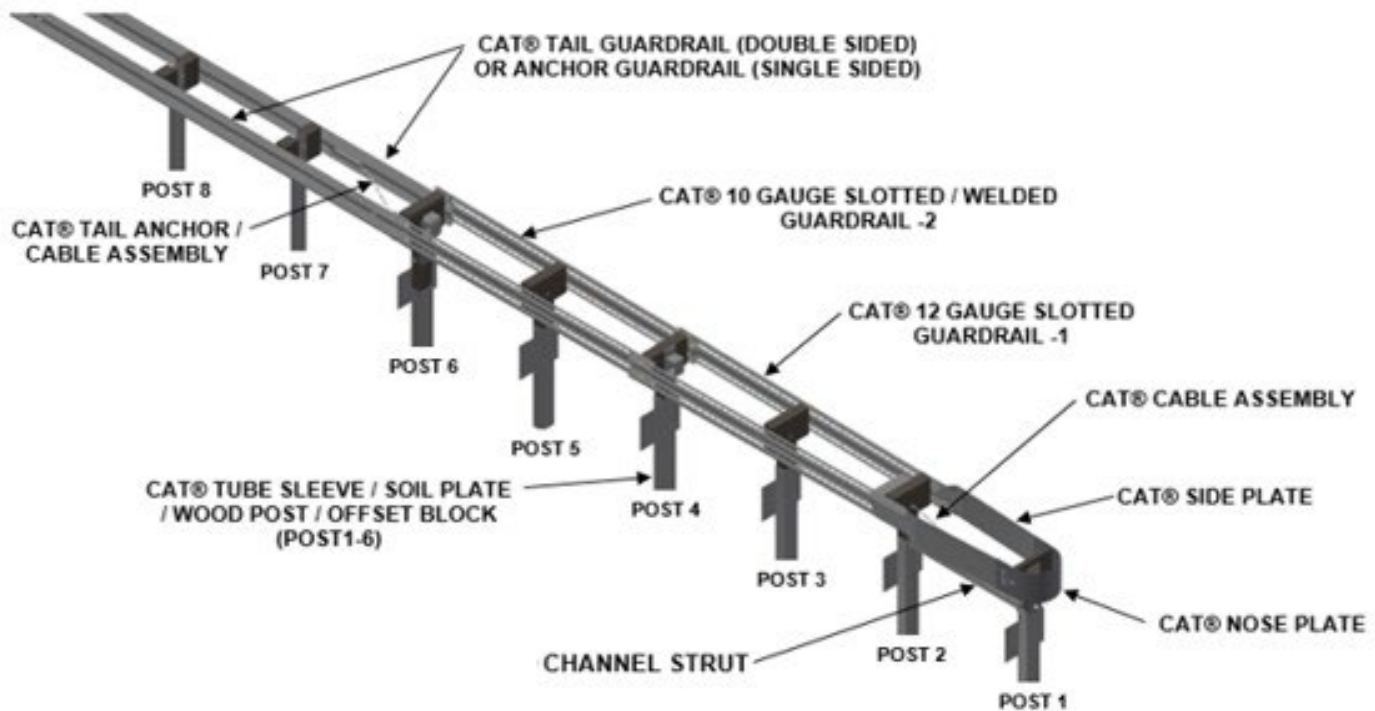
The CAT® consists of CAT® 10/12 gauge slotted guardrail, CAT® 10 gauge nose/side plates, channel strut, CAT® anchor cable, CAT® treated wood posts/blocks, tube sleeves and various other required hardware accessories.

The CAT® requires a 12'-6" [3.81 m] CAT® Tail; Single Sided or Double Sided.

The Single Sided CAT® Tail is used when the CAT® is connected to a single sided guardrail assembly.

- Ensure this CAT® Tail is **not** used in a median application where the opposing traffic can impact the blunt end of the CAT® Tail Guardrail, if it is inside the Clear Zone as defined by Roadside Design Guide (latest edition).
- See drawing SS220 when using 27 3/4" [705 mm] height downstream single sided guardrail assembly. The Double Sided CAT® Tail is used when the CAT® is connected to a double sided guardrail assembly.
- See drawing SS224 when using 27 3/4" [705 mm] height downstream double sided guardrail assembly.
- See drawing SS695/SS696 when using 31" [787 mm] height downstream double sided guardrail assembly.

When used with rigid barriers, (i.e. concrete barrier, wall or bridge pier) a semi to rigid barrier transition will be required (see state/specifying agency standards) as well as an appropriate CAT® Tail.



CAT® and CAT® Tail System

Reference Drawings: CAT®: SS245 / SS552; CAT® Tail: SS220 / SS224 / SS695 / SS696

Recommended Tools

Documentation

- Manufacturer's CAT® System Product Description Assembly Manual (Current Version).
- CAT® System Drawing(s). Current Version of Applicable CAT® and CAT® Tail Drawing.

Personal Protective Equipment

- Eye Protection
- Work Gloves
- Safety-Toe Shoes
- Back Protection
- Hard Hat
- Reflective Vest
- Apron

Miscellaneous

- Traffic Control Equipment and Plan per state/specifying agency standards and the MUTCD.
- SAE Combination Wrench Set
- Socket Set & Socket Wrench
- Hammer
- Chalk Line
- Tape Measure
- Marking Paint and Pen
- Straight Edge
- Level
- Plumb Line
- Post Pounder (commonly used for driving posts)
- Auger
- Soil Tamper
- 5/8" Alignment Tool (Drift Pin)
- Locking Pliers
- Abrasive Blade or Other Tool
- Drill & 3/16" Drill Bit

Note: The provided list of tools is a general recommendation and should not be considered an extensive list. Depending on specific site conditions and the complexity of the assembly specified by the state/specifying agency, the required tools may vary. Decisions as to what tools are needed to perform the job are entirely the responsibility of the state/specifying agency and the selected contractor performing the assembly of the system at the state/specifying agency's site.

Site Preparation

The CAT® is a tangent, double-sided, re-directive/gating and energy absorbing attenuator/end terminal available for use with various longitudinal highway barriers, in either unidirectional or bidirectional traffic applications.

It may be specified for use by the state/specifying agency in conjunction with strong post W-beam guardrail systems on the roadside or median of a roadway. The decision to specify the CAT® for a particular project is the responsibility of the state/specifying agency design engineer who must ensure that the most appropriate attenuator/end terminal has been selected for the specific site conditions.

The CAT® is designed to be attached to strong post W-beam guardrail systems that have been accepted under NCHRP Report 350 crash test criteria that use either no offset blocks, 8" [203 mm] offset blocks or 12" [305 mm] offset blocks.



Important: The CAT® must not be attached directly to a weak post W-beam guardrail system without an approved weak-post-to-strong-post transition plus a minimum of 12'-6" [3.81 m] strong post W-beam guardrail with 6'-3" [1.91 m] post spacing. The 12'- 6" [3.81 m] strong post W-beam guardrail must be placed between the CAT® Tail and the weak-post- to-strong-post transition.



Important: The CAT® must not be attached directly to Thrie Beam, Thrie Beam Transition, or to a post which is stronger/stiffer than a standard W-beam W6x8.5# [W150x13] or W6x9# [W150x13.5] guardrail post. A minimum of 6'-3" [1.91 m] strong post single ply W-beam guardrail must be placed between the CAT® Tail and the Thrie Beam transition (or stronger/stiffer post).



Important: When used with rigid barriers, (i.e. concrete barrier, wall or bridge pier) a semi to rigid barrier transition will be required (see state/specifying agency standards) as well as an appropriate CAT® Tail.



Important: Ensure this CAT® Tail is not used in a median application where the opposing traffic can impact the blunt end of the CAT® Tail Guardrail, if it is inside the Clear Zone as defined by Roadside Design Guide (latest edition).



Important: Ensure that the CAT® application conforms to the AASHTO Roadside Design Guide, current edition.



Important: Valtir does not direct grading. Proper site grading must be accomplished before assembly of the CAT® in accordance with local guidelines OR the AASHTO Roadside Design Guide (see Appendix A and B), whichever is more stringent. Failure to follow this warning could result in serious injury or death in the event of a vehicle impact with the system.



Important: The Beginning Length of Need ("BLON") for the CAT® was established during NCHRP Report 350 Test 3-35 at Post #4, which is 18'-9" [5.71 m] from the center of Post #1.

Post Placement

The CAT® tube sleeves are inserted into the soil using an auger or post pounding equipment for placement. If an auger is used, ensure diameter is large enough to allow for proper compaction of state/specifying agency approved fill material. All CAT® posts must be assembled within established standard construction tolerances, including being relatively plumb. Compaction for all posts must be within the state/specifying agency guidelines.



Danger: It is the responsibility of the installer to ensure all above & below ground utilities as well as drainage structures are located, marked, and identified prior to using an auger or post pounding tool in accordance with state/ specifying agency guidelines. Failure to follow this warning could result in serious injury or death.

Rigid Pavement and Rock

If rigid pavement (e.g. concrete or asphalt) of any thickness is encountered within the system pay length, ensure a proper “leave-out” area (the specified size of open space as defined in the AASHTO Roadside Design Guide) and per the state/specifying agency is provided around the posts and filled with the state/ specifying agency approved backfill material.

If rock is encountered at post locations 3-8, refer to the state/specifying agency guidelines and the AASHTO Roadside Design Guide for requirements for embedment depth into the rock and size of the hole. If rock is encountered at post locations 1-2, auger a hole in the rock large enough for full post embedment and proper compaction of approved fill material.



Drilling Holes into rock

Caution: It is the responsibility of the installer to consult Occupational Safety & Health Administration (“OSHA”) silica respiratory standard 29 Code of Federal Regulation (“CFR”) 1910.134 for debris removal and ensure compliance.

Inspect Shipment

Carefully unpack and inspect all components for damage. Check the received parts against the packing list supplied with the system. If any parts are damaged, missing, or unspecified; do not attempt to assemble the system and contact Valtir immediately (p. 4).



Warning: Use only Valtir parts that are specified by Valtir for use with the CAT® for assembling, maintaining, or repairing the CAT®. Do not utilize or otherwise commingle parts from other systems even if those systems are other Valtir Systems.

ID	CAT® COMPONENTS/HARDWARE	PN	SS245	SS552
A	CAT® 12 Gauge, Slotted Guardrail-1, 12'-6" [3.810 m]	31G	2	2
B	CAT® 10 Gauge, Slotted/Welded Guardrail-2, 12'-6" [3.810 m]	130A	2	2
D	4'-6" Tube Sleeve [1.372 m]	740G	6	0
E	CAT® Wood 3'-6" [1.067 m] Post, #1 (Notched Post)	3075B	1	1
F	CAT® Wood 3'-6" [1.067 m] Post, #2 - #6	3074B	5	5
G	CAT® 10 Gauge Side Plate	984G	2	2
H	Wood Offset Block for Posts 2-6	3101B	10	10
J	CAT® Wood Offset Block For Post 1	3100B	2	2
K	Channel Strut	9852A	1	1
L	6'-0" [1.829 m] Tube Sleeve	749G	0	6
M	CAT® 10 Gauge Nose Plate	983G	1	1
N	CAT® Cable Assembly 3/4" x 8'-0" [19 mm x 2.44 m]	3012G	1	1
O	Soil Plate-18" x 24" x 1/4" [460 mm x 610 mm x 6 mm]	769G	6	0
P	3/8" x 2" Lag Screw at Posts 4 & 6	3263G	4	4
Q	8" X 8" x 5/8" [200 mm x 200 mm x 16 mm] Bearing Plate (At Post 1)	782G	1	1
R	5/8" x 25" GR Bolt	3650G	2	2
S	3/8" Round Washer at Posts 4 & 6	3255G	4	4
T	1" Hex Nut (At Cable Ends)	3910G	4	4
U	5/8" x 1.25" GR Bolt	3360G	16	16
V	1" Round Washer (At Cable Ends)	3900G	2	2
W	5/8" x 1.5" Hex Bolt	3380G	8	8
X	CAT® Pipe Sleeve-2" x 5 1/2" [50 mm x 140 mm]	705G	1	1
Y	5/8" x 7.5" Hex Bolt	3478G	13	7
AA	5/8" Round Washer	3300G	20	20
BB	5/8" GR Hex Nut	3340G	85	79
CC	5/8" x 9.5" Hex Bolt	3497G	6	6
DD	CAT® 6" [150 mm] Sleeve (Knockout Tube) 6" x 8" [150 mm x 200 mm]	9921G	2	2
EE	CAT® 3/16" x 2" x 10" [5 mm x 50 mm x 250 mm] Plate Washer	19259G	32	32
FF	CAT® 1/2" x 3" x 7" [12 mm x 75 mm x 175 mm] Post Plate at Post 4	19261G	2	2
GG	CAT® 1" x 2 .5" [25 mm x 62 mm] Pipe Sleeve at Post 1	19271G	1	1
HH	3/8" Hex Nut	4252G	8	8
JJ	3/8" Lock Washer	4258G	4	4
KK	CAT® 3/8"x 24.5" [10 mm x 620 mm] Restraint Rod	3275G	2	2
LL	3/16" x 1.75" x 3" [5 x 44 x 75 mm] Rectangular Washer	3320G	4	4
MM	5/8" x 1.75" Hex Bolt CAT®	3395G	32	32
NN	5/8" x 24" Hex Bolt	4640G	8	8
OO	Bent Plate Sleeve Post 1	9916A	1	1
UU	CAT® Spacer Channel	9915A	1	1
ZZ	18" x 18" [450 mm x 450 mm] Yellow/Black Reflector	3177B	2	2
A1	16" x 16" [400 mm x 400 mm] Yellow/Black Reflector	6665B	2	2

Note: See Appendix C for individual Post Hardware Bags and Above Ground Repair Kit.

ID	CAT® TAIL COMPONENTS / HARDWARE FOR 27 3/4" DOWNSTREAM HEIGHT GUARDRAIL INSTALLATION	PN	SS220 (Single Sided Tail)	SS224 (Double Sided Tail)
C	CAT® Tail Guardrail 12'-6" [3.810 m]	9G	1	2
I	Cable Anchor Bracket	701A	1	0
Q	8" X 8" x 5/8" [200 mm x 200 mm x 16 mm] Bearing Plate (At Post 6)	782G	1	0
T	1" Hex Nut (At Cable Ends)	3910G	4	0
U	5/8" x 1.25" GR Bolt	3360G	8	16
V	1" Round Washer (At Cable Ends)	3900G	2	0
W	5/8" x 1.5" Hex Bolt	3380G	8	0
X	CAT® Pipe Sleeve-2" Std. x 5 1/2" [50 mm x 140 mm] at Post 6	705G	1	0
AA	5/8" Round Washer	3300G	4	4
BB	5/8" GR Hex Nut	3340G	20	20
LL	3/16" x 1.75" x 3" [3mm x 44 mm x 75 mm] Rectangular Washer	3320G	4	4
PP	CAT® Tail Anchor Guardrail 12'-6" [3.810 m]	21G	1	0
QQ	6'-0" [1.829 m] Steel Post	533G	2	2
RR	Cable Anchor 3/4" x 6'-6" [19 mm x 1.981 m]	3000G	1	0
SS	Wood Offset Block 14" x 6" x 8" [350 mm x 150 mm x 200 mm]	4076B	4	4
TT	5/8" x 10" GR Bolt A307	3500G	4	4

ID	CAT® TAIL COMPONENTS/HARDWARE FOR 31" DOWNSTREAM HEIGHT GUARDRAIL INSTALLATION	PN	SS695 (For 12" MGS)	SS696 (For 8" MGS)
U	5/8" x 1.25" GR Bolt	3360G	48	48
Z	12'-6" [3.810 m] Guardrail	11G	4	4
AA	5/8" Round Washer	3300G	10	10
BB	5/8" GR Hex Nut	3340G	58	58
LL	3/16" x 1.75" x 3" [3mm x 44 mm x 75 mm] Rectangular Washer	3320G	4	4
QQ	6'-0" [1.829 m] Steel Post	533G	5	5
SS	Wood Offset Block 14" x 6" x 8" [350 mm x 150 mm x 200 mm]	4076B	2	10
TT	5/8" x 10" GR Bolt A307	3500G	4	10
VV	9'-4.5" [2.858 m] Guardrail	10967G	2	2
WW	Wood Offset Block 14" x 6" x 12" [350 mm x 150 mm x 300 mm]	4660B	8	0
XX	5/8" X 14" GR Bolt A307	3540G	4	0
YY	5/8" X 12" GR Bolt A307	3520G	4	0

Additional CAT® Related Materials				
CAT® Repair Kit for SS 245 (Above Ground Only)		50425L	1	1
CAT® Bundled Wood Products for Posts 1-6		6298B	1	1
CAT® Can Hardware Kit		43660G	1	1


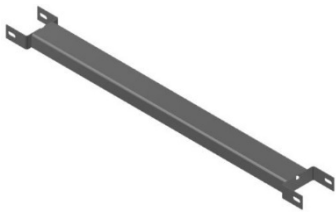

Note: See Appendix C for individual Post Hardware Bags and Above Ground Repair Kit.



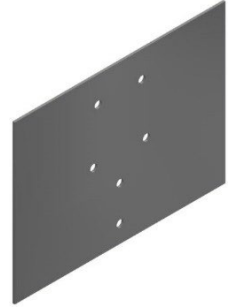
CAT® System Components/Hardware




Below is a pictorial depiction of the components/hardware for CAT®. Please see the Valtir drawings and pages 10, 11 and 49 of this manual for specific lists of components/hardware and quantities required for CAT® selected to be assembled.



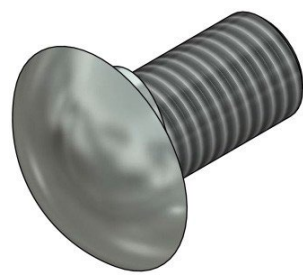
Note: The following components/hardware are not shown to scale.


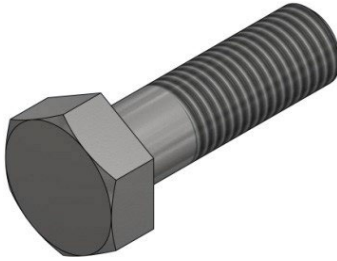

ID: A	PN: 31G	ID: B	PN: 130A	ID: C	PN: 9G
CAT® 12 Gauge, Slotted/Welded Guardrail-1, 12'-6"		CAT® 10 Gauge, Slotted/Welded Guardrail-2, 12'-6"		CAT® Tail 12 Gauge Guardrail, 12'-6"	
ID: D	PN: 740G	ID: E	PN: 3075B	ID: F	PN: 3074B
4'-6" Tube Sleeve		CAT® Wood 3'-6" Post, #1 (Notched)		CAT® Wood 3'-6" For Posts 2-6	
ID: G	PN: 984G	ID: H	PN: 3101B	ID: I	PN: 701A
CAT® 10 Gauge Side Plate		Wood Offset Block Posts 2-6		Cable Anchor Bracket	

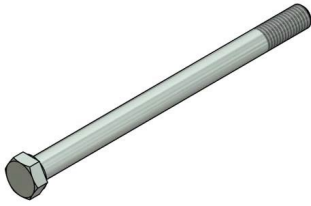
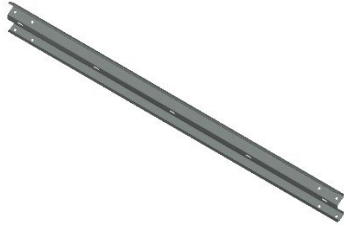

ID: J	PN: 3100B	ID: K	PN: 9852A	ID: L	PN:749G
					
CAT® Wood Offset Block Post 1		Channel Strut		6'-0" Tube Sleeve	

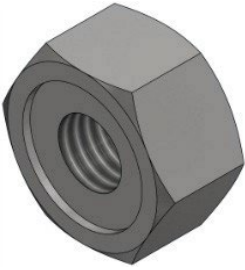
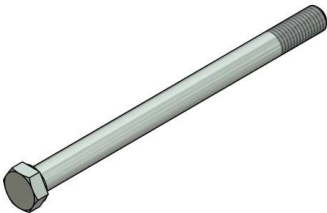

ID: M	PN: 983G	ID: N	PN: 3012G	ID: O	PN:769G
					
CAT® 10 Gauge Nose Plate		CAT® Cable Assembly 3/4" x 8'-0"		Soil Plate-18" x 24" x 1/4"	

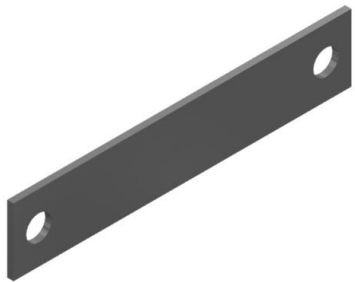
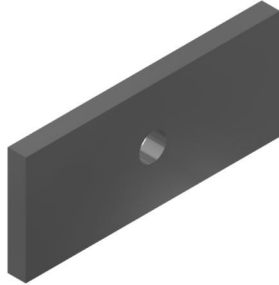

ID: P	PN: 3263G	ID: Q	PN: 782G	ID: R	PN: 3650G
					
3/8" x 2" Lag Screw		8" x 8" x 5/8" Bearing Plate		5/8" x 25" GR Bolt	

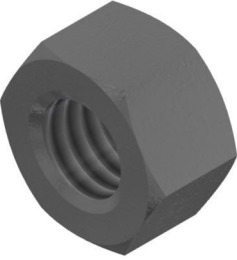


ID: S	PN: 3255G	ID: T	PN: 3910G	ID: U	PN: 3360G
					
3/8" Round Washer		1" Hex Nut		5/8" x 1.25" GR Bolt	



ID: V	PN: 3900G	ID: W	PN: 3380G	ID: X	PN: 705G
					
1" Round Washer		5/8" x 1.5" Hex Bolt		CAT® Pipe Sleeve 2" x 5.5"	


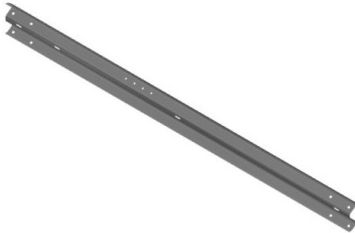
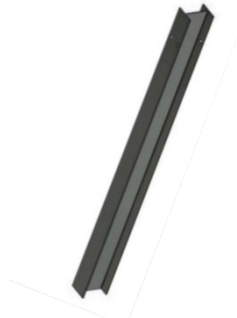
ID: Y	PN: 3478G	ID: Z	PN: 11G	ID: AA	PN: 3300G
					
5/8" x 7.5" Hex Bolt		Guardrail 12'-6"		5/8" Round Washer	



ID: BB	PN: 3340G	ID: CC	PN: 3497G	ID: DD	PN: 9921G
					
5/8" GR Hex Nut		5/8" X 9.5" Hex Bolt		CAT® 6" Sleeve (Knockout Block) 6" x 8"	


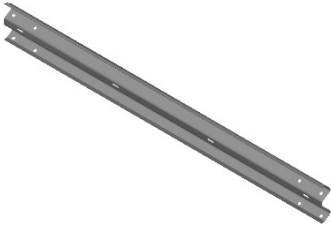
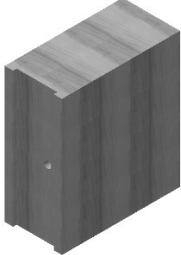
ID: EE	PN: 19259G	ID: FF	PN: 19261G	ID: GG	PN: 19271G
					
CAT® 3/16" x 2" x 10" Plate Washer		CAT® 1/2" x 3" x 7" Post Plate		CAT® 1" x 2.5" Pipe Sleeve	



ID: HH	PN: 4252G	ID: JJ	PN: 4258G	ID: KK	PN: 3275G
					
3/8" Hex Nut		3/8" Lock Washer		3/8" x 24.5" Restraint Rod	



ID: LL	PN: 3320G	ID: MM	PN: 3395G	ID: NN	PN:
					
3/16" x 1.75" x 3" Rectangular Washer		CAT® 5/8" x 1.75" Hex Bolt		5/8" x 24 Hex Bolt	

ID: OO	PN: 9916A	ID: PP	PN: 4640G	ID: QQ	PN: 533G
					
CAT® Bent Plate Sleeve Post 1		CAT® Tail Anchor Guardrail 12'-6"		6'-0" Steel Post	

ID: RR	PN: 3000G	ID: SS	PN: 4076B	ID: TT	PN: 3500G
					
CAT® Cable Anchor 3/4" x 6'-6"		8" Wood Offset Block		5/8" x 10" GR Bolt A307	

ID: UU	PN: 9915A	ID: VV	PN: 10967G	ID: WW	PN: 4660B
					
CAT® Spacer Channel		CAT® Tail Guardrail, 9'-4 1/2"		12" Wood Offset Block	

ID: XX	PN: 3540G	ID: YY	PN: 3520G
			
5/8" x 14" GR Bolt A307		5/8" x 12" GR Bolt A307	

ID: ZZ	PN: 3177B	ID: A1	PN: 6665B
			
18" x 18" Delineation Striped Yellow/Black		16" x 16" Delineation Striped Yellow/Black	

NOTE: For Delineators ZZ or A1, rotate for Roadside Application.

Assembly Steps



To ensure an accurate assembly of the CAT® Terminal, it is recommended that steps 1A through 10C be completed in order. Steps 11 through 16 may be assembled in any order after Step 10C has been completed. **ALL STEPS MUST BE COMPLETED.**



Below ground portions in some assembly steps are not shown for clarity.



There are no torque requirements for any of the fasteners.

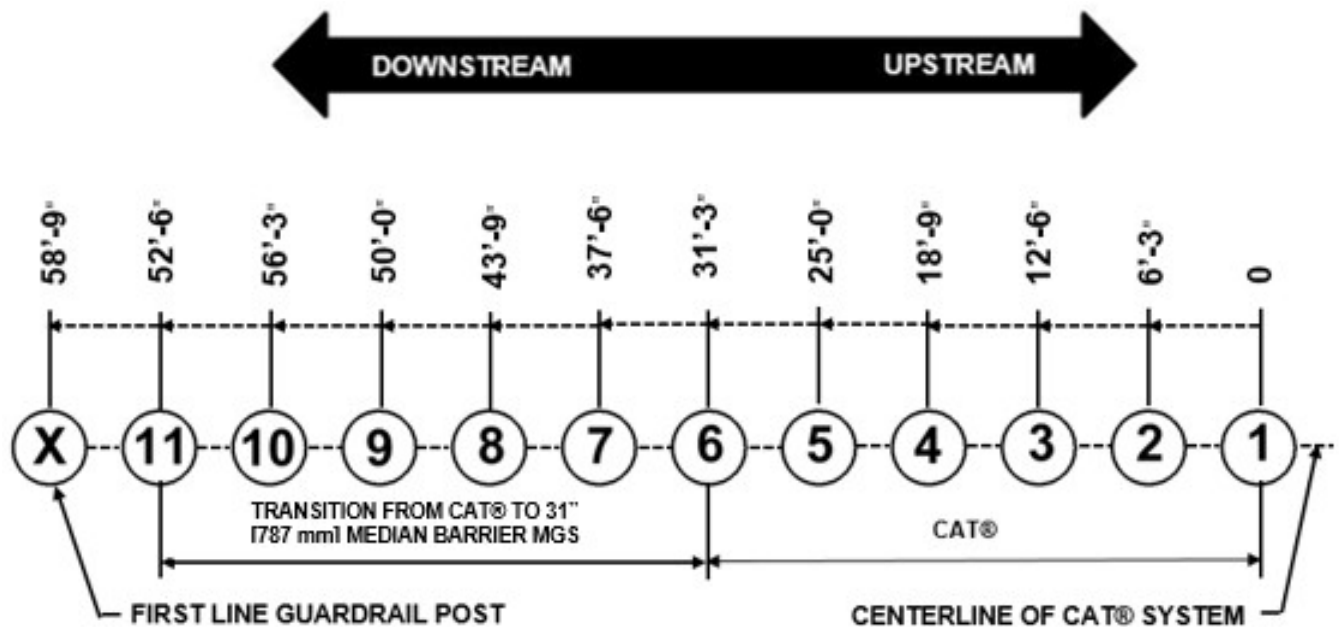
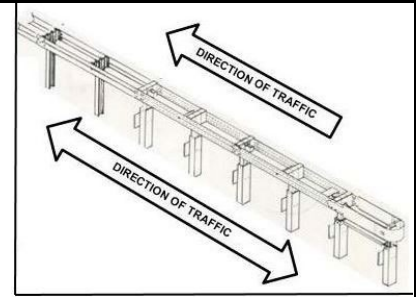
Use the Steps below for assembling the CAT® and CAT® Tail when connecting to a 27 3/4" [705 mm] high downstream guardrail system; 31" [787 mm] high MGS, 8" [200 mm] offset block systems; or 31" [787 mm] high MGS, 12" [300 mm] offset block systems.

<u>Steps for 27 3/4"</u>	<u>Steps for 31" using 8" Offset Blocks</u>	<u>Steps for 31" using 12" Offset Blocks</u>
1A	1B	1B
2A	2B	2B
3	3	3
4A	4A	4A
4B	4B	4B
4C	4C	4C
5A	7A	7B
5B	8	8
5C		
6		

Steps 9A through Steps 16 will be the same for the 27 3/4" high downstream guardrail system, or the 31" high MGS, 8" or 12" offset block downstream guardrail systems.

STEP 1A

CAT® and CAT® Tail - Post Layout 1-8 Connecting to 27 3/4" [705 mm] High Downstream Single/Double Sided Guardrail



PARTS

Use only Valtir parts that are specified herein for the CAT® for assembling, maintaining, or repairing the CAT®. Do not utilize or otherwise commingle parts from other systems even if those systems are Valtir systems.

INSTRUCTIONS

Reference: Drawing SS220 and SS224

1. Layout the post locations as shown above.
2. Layout and placement of the posts are critical to the assembly of the CAT®.

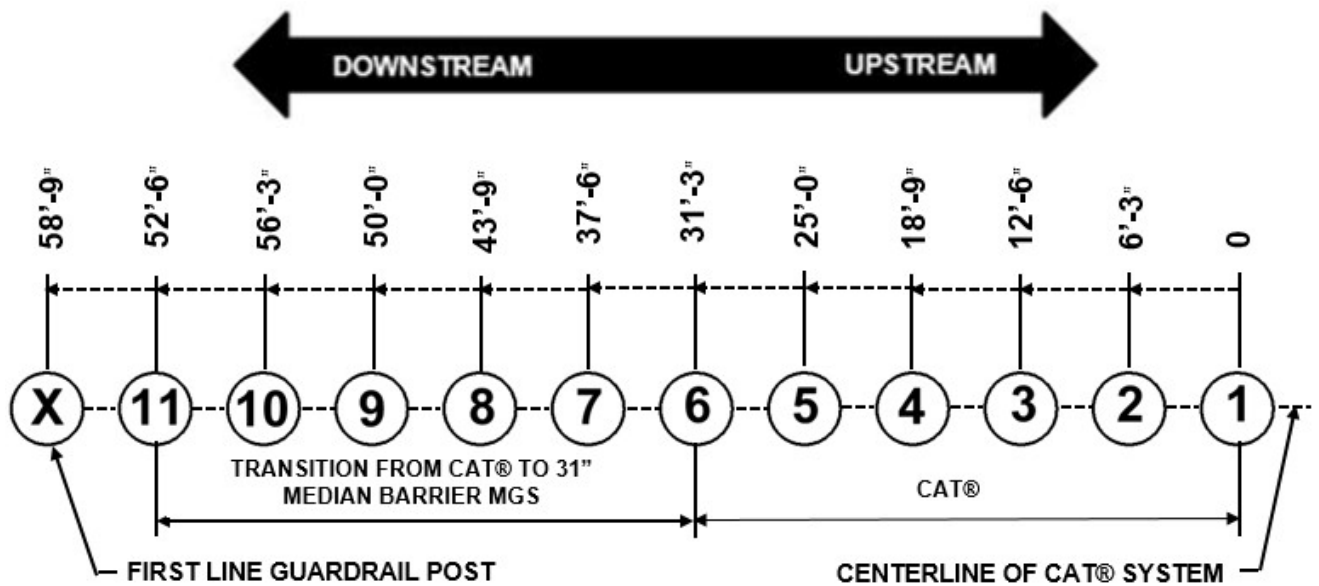
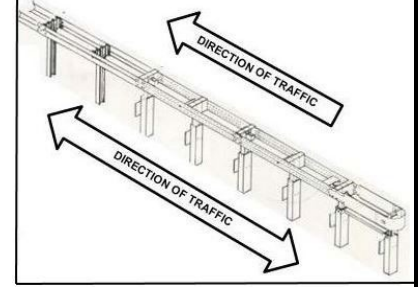
WARNINGS




Ensure proper site grading in accordance with the state/specifying agency guidelines or the AASHTO Roadside Design Guide, whichever is more stringent. Failure to follow this warning could result in serious injury or death in the event of a vehicle impact with the system.

STEP 1B

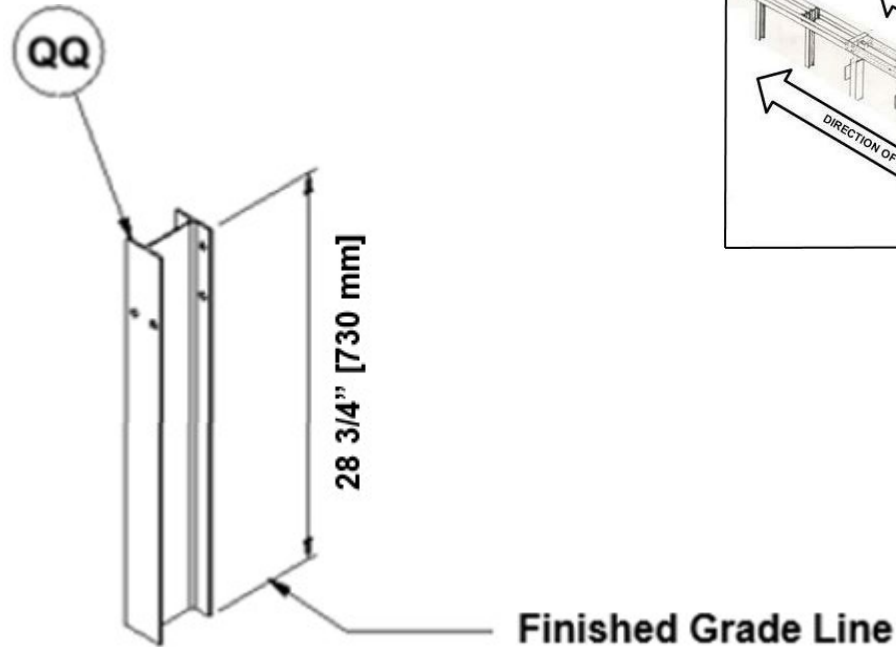
CAT® and CAT® Transition – Post Layout 1-11 Connecting To 31" [787 mm] High Downstream Guardrail




PARTS			INSTRUCTIONS	
			Reference: Drawing SS695 and SS696	
			1. Layout the post locations as shown above.	
			2. Layout and placement of the posts are critical to the assembly of the CAT®.	
Use only Valtir parts that are specified herein for the CAT® for assembling, maintaining, or repairing the CAT®. <u>Do not utilize or otherwise commingle parts from other systems even if those systems are Valtir systems.</u>			WARNINGS	
			 <p>Ensure proper site grading in accordance with the state/specifying agency guidelines or the AASHTO Roadside Design Guide, whichever is more stringent. Failure to follow this warning could result in serious injury or death in the event of a vehicle impact with the system.</p>	

STEP 2A

CAT® Tail – Post Assembly 7 & 8 Connecting To 27 3/4" [705 mm] High Downstream Single/Double Sided Guardrail



NOTE: An alternate to the Steel Post (Part QQ) is 6" x 8" [150 mm x 200 mm] X 6'-0" [1.83 m] long, wood guardrail post.

PARTS			INSTRUCTIONS
QQ	533G	2 EA	1. Assemble the 6'-0" [1.83 m] Post (Part QQ) as shown above for Posts 7 & 8 at locations established in Step 1A.
Use only Valtir parts that are specified herein for the CAT® for assembling, maintaining, or repairing the CAT®. Do not utilize or otherwise commingle parts from other systems even if those systems are Valtir systems.			WARNINGS
			 <p>Ensure the Post spacing is as established in Step 1A. Failure to follow this warning could result in serious injury or death in the event of a vehicle impact with the system.</p>

STEP 2B

CAT® Tail - Post Assembly 7 -11 Connecting To 31" [787 mm] High Downstream MGS Guardrail

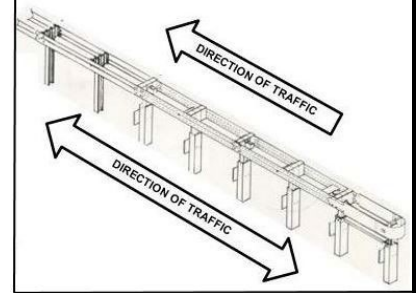
QQ

POST HEIGHT

Finished Grade Line

POST HEIGHT TABLE

POST #	POST HEIGHT
7	28 5/8" [727 mm]
8	29" [737 mm]
9	29 7/8" [759 mm]
10	30 5/8" [778 mm]
11	31 1/2" [800 mm]



PARTS

QQ	533G	5 EA

Use only Valtir parts that are specified herein for the CAT® for assembling, maintaining, or repairing the CAT®. Do not utilize or otherwise commingle parts from other systems even if those systems are Valtir systems.

INSTRUCTIONS

Reference: Drawing SS695 and SS696

1. Assemble the 6'-0" [1.83 m] Post (Part QQ) as shown above for Posts 7-11 at locations established in Step 1B.
2. Ensure the Post Heights are installed per the Post Height Table.

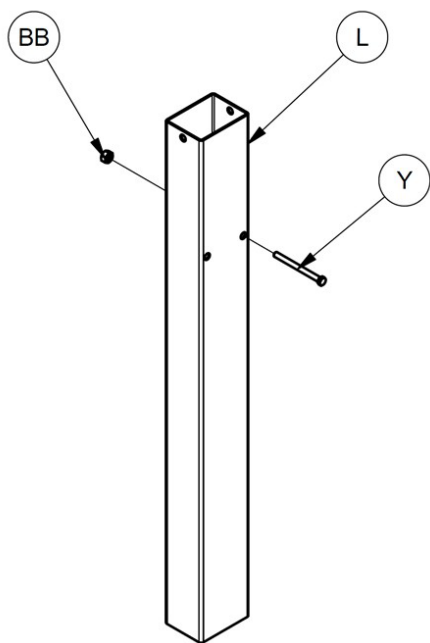
WARNINGS



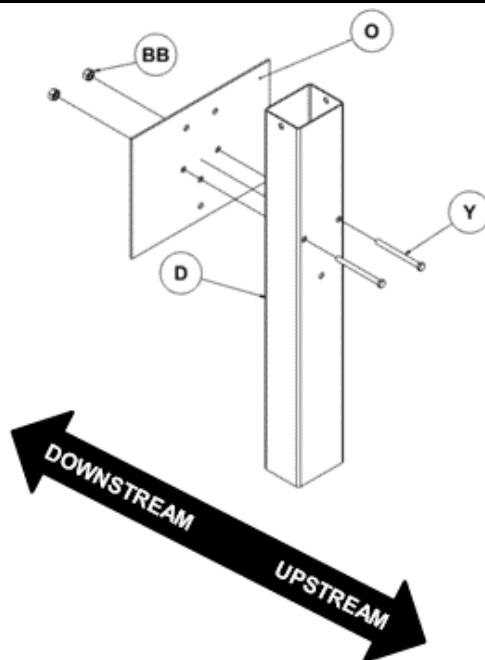
Ensure the Post Heights are installed per the Post Height Table. Failure to follow this warning could result in serious injury or death in the event of a vehicle impact with the system.

STEP 3

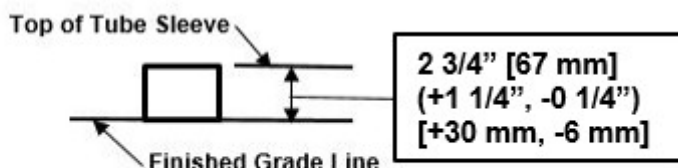
CAT® Tube Assembly Short Tube 4'-6" [1.37 m] with Soil Plate Long Tube 6'-0" [1.83 m]




LONG TUBE



SHORT TUBE WITH SOIL PLATE

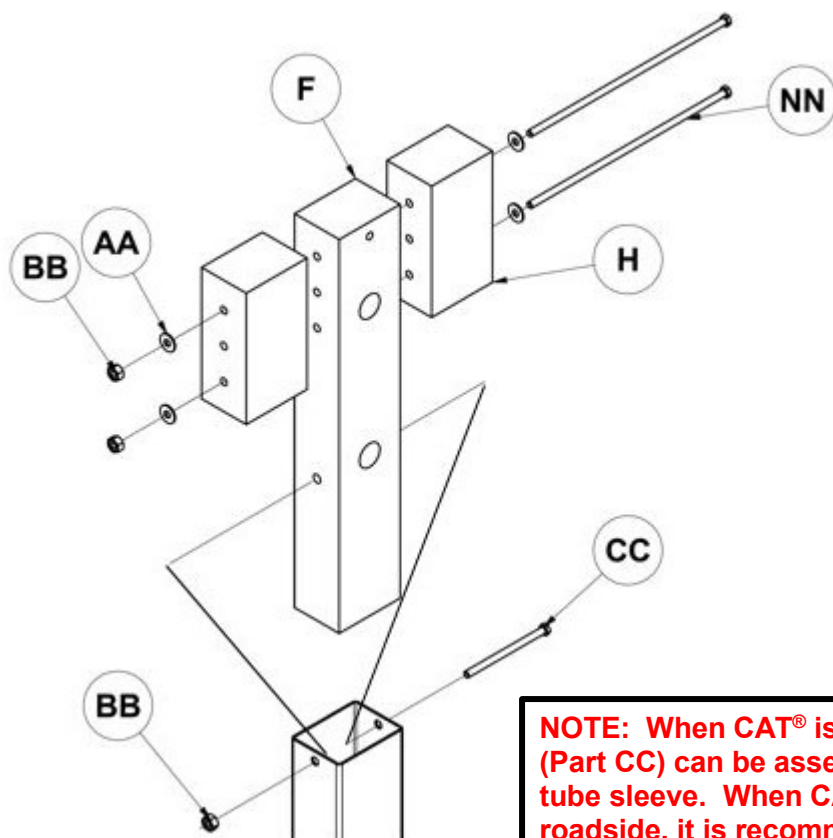


Tube Sleeve Assembly at Correct Height


PARTS			INSTRUCTIONS
D	740G	6 EA	<ol style="list-style-type: none">1. Assemble all parts in the configuration and orientation as shown above.2. Assemble the soil plates (Part O) to the Tube Sleeve (Part D). Tighten all threaded hardware to a snug position with a minimum of two (2) bolt threads protruding beyond the nut. Do not over tighten the bolt and deform the tubes.3. Ensure the soil plates are assembled on the downstream side of the tube sleeve when embedding them into the soil.4. Ensure the tube sleeve height does not exceed 4" [100 mm] above finished grade.
O	769G	6 EA	
L	749G	6 EA	
Y	3478G	12 EA	
BB	3340G	12 EA	
<p>Use only Valtir parts that are specified herein for the CAT® System for assembling, maintaining, or repairing the CAT® System. Do not utilize or <u>otherwise commingle parts from other systems even if those systems are Valtir systems.</u></p>			WARNINGS
			<div></div> <p>Ensure the Soil Plates are assembled on the downstream side of the Tube Sleeve and the tube sleeve height does not exceed 4" [100 mm] above finished grade. Failure to follow this warning could result in serious injury or death in the event of a vehicle impact with the system.</p>

STEP 4A

CAT® Post and Offset Block Assembly (Posts 3, 5, & 6)

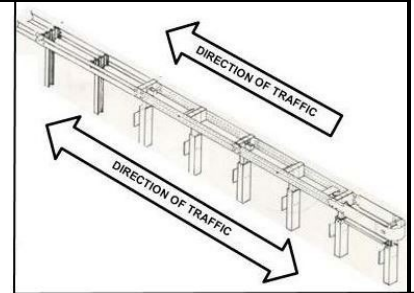
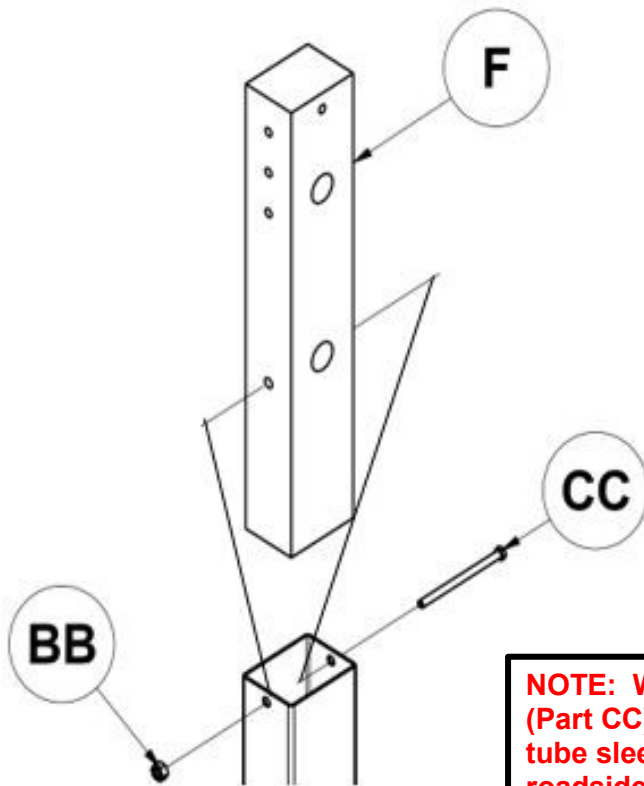


NOTE: When CAT® is assembled in a median, bolt (Part CC) can be assembled from either side of the tube sleeve. When CAT® is assembled on the roadside, it is recommended the bolt be assembled from the embankment side.


PARTS			INSTRUCTIONS
F	3074B	3 EA	<ol style="list-style-type: none"> 1. Assemble all parts in the configuration and orientation as shown above. 2. Ensure washers (Part AA) are placed between the bolt head (Part NN) and CAT® offset block (Part H) and the nut (Part BB) and the offset block. 3. Ensure the tube sleeve height does not exceed 4" [100 mm] above finished grade. 4. Tighten all threaded hardware to a snug position with a minimum of two (2) bolt threads protruding beyond the nut. <p>Note: Post (Part F) and Block (Part H) assembly could be completed in advance to reduce time on jobsite.</p>
H	3101B	6 EA	
AA	3300G	12 EA	
BB	3340G	9 EA	
CC	3497G	3 EA	
NN	4640G	6 EA	
<p>Use only Valtir parts that are specified herein for the CAT® for assembling, maintaining, or repairing the CAT®. <u>Do not utilize or otherwise commingle parts from other systems even if those systems are Valtir systems.</u></p>			WARNINGS
 <p>Ensure that the post is installed per the above drawing with the three (3) holes at the top of the post.</p>			

STEP 4B

CAT® Post Assembly (Post 4)

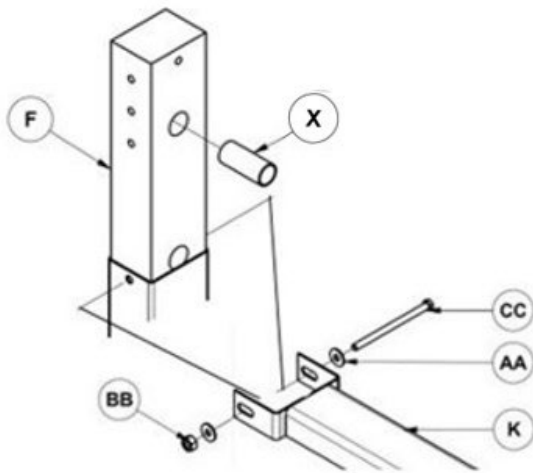


NOTE: When CAT® is assembled in a median, bolt (Part CC) can be assembled from either side of the tube sleeve. When CAT® is assembled on the roadside, it is recommended the bolt be assembled from the embankment side.

PARTS			INSTRUCTIONS
F	3074B	1 EA	<ol style="list-style-type: none"> 1. Assemble all parts in the configuration and orientation as shown above. 2. Ensure the tube sleeve height does not exceed 4" [100 mm] above finished grade. 3. Tighten threaded hardware to a snug position with a minimum of two (2) bolt threads protruding beyond the nut. Do not over tighten the bolt and deform the tubes.
BB	3340G	1 EA	
CC	3497G	1 EA	
<p>Use only Valtir parts that are specified herein for the CAT® for assembling, maintaining, or repairing the CAT®. Do not utilize or otherwise commingle parts from other systems even if those systems are Valtir systems.</p>			WARNINGS
 <p>Ensure that the post is installed per the above drawing with the three (3) holes at the top of the post.</p>			

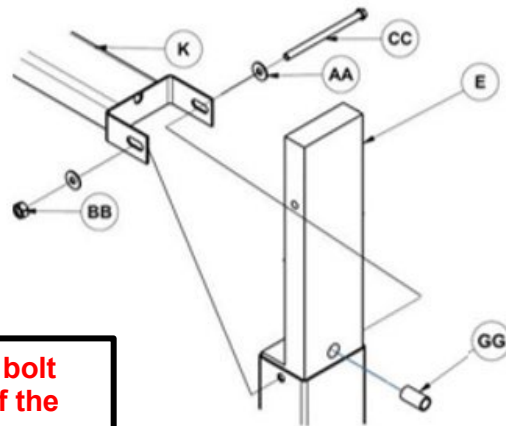
STEP 4C

CAT® Post and Strut Assembly (Posts 1 & 2)

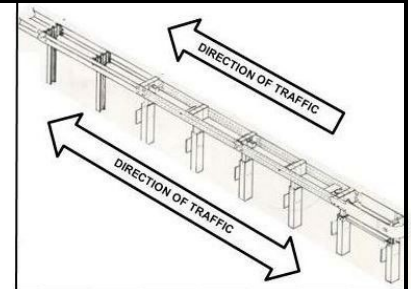



Post 2

NOTE: When CAT® is assembled in a median, bolt (Part CC) can be assembled from either side of the tube sleeve. When CAT® is assembled on the roadside, it is recommended the bolt be assembled from the embankment side.



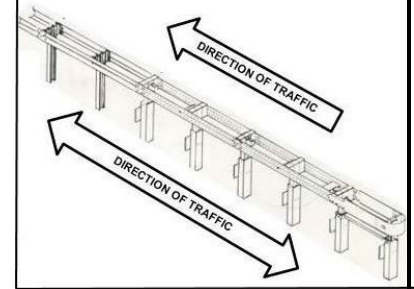
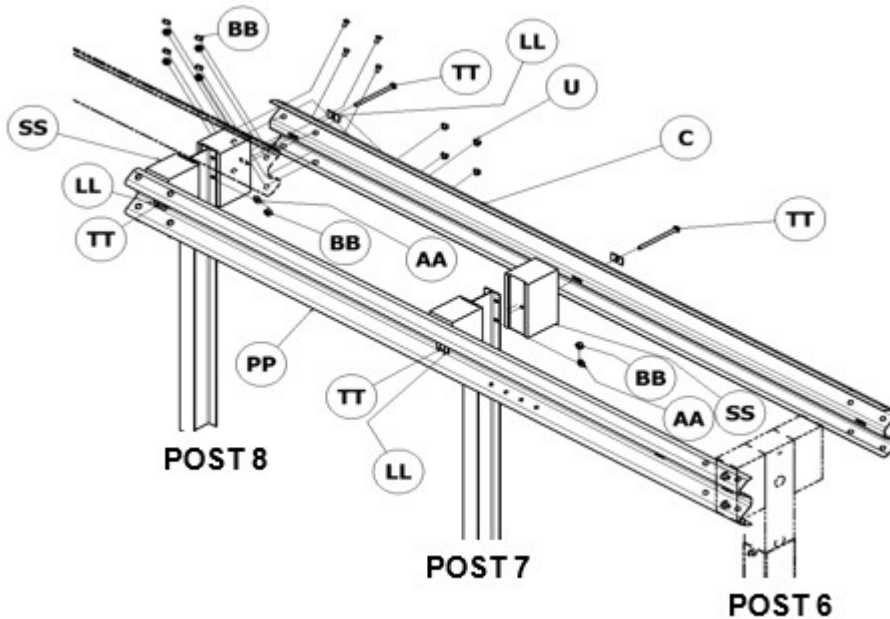
Post 1



PARTS			INSTRUCTIONS
E	3075B	1 EA	<ol style="list-style-type: none">1. Assemble all parts in the configuration and orientation as shown above.2. Ensure the notched side of post 1 (Part E) is facing post 2 (Part F).3. Assemble CAT® 1" Pipe Sleeve (Part GG) in Post 1 and CAT® 2" Pipe Sleeve (Part X) in Post 2.4. Ensure washers (Part AA) are placed between the bolt head (Part CC) and the yoke of the strut (Part K) and the nut (Part BB) and the strut yoke.5. Ensure the tube sleeve height does not exceed 4" [100 mm] above finished grade.6. Tighten all threaded hardware to a snug position with a minimum of two (2) bolt threads protruding beyond the nut. Do not over tighten the bolt and deform the tubes.
F	3074B	1 EA	
K	9852A	1 EA	
X	705G	1 EA	
AA	3300G	4 EA	
BB	3340G	2 EA	
CC	3497G	2 EA	
GG	19271G	1 EA	
<p>Use only Valtir parts that are specified herein for the CAT® for assembling, maintaining, or repairing the CAT®. <u>Do not utilize or otherwise commingle parts from other systems even if those systems are Valtir systems.</u></p>			<div><div></div><div><p>Ensure the notched side of post 1 (Part E) is facing post 2 (Part F).</p><p>Ensure that the strut opening is facing down.</p></div></div>
WARNINGS			

STEP 5A

CAT® Tail - Guardrail Assembly Connecting to 27 3/4" [705 mm] High Downstream Single Sided Guardrail Assembly



PARTS

C	9G	1 EA
U	3360G	8 EA
AA	3300G	4 EA
BB	3340G	8 EA
LL	3320G	4 EA
PP	21G	1 EA
SS	4076B	4 EA
TT	3500G	4 EA

INSTRUCTIONS

Reference: Drawing SS220

1. Assemble all parts in the configuration and orientation as shown above.
2. Ensure the cable anchor holes of the CAT® Tail Anchor Guardrail (Part PP) are between posts 6 and 7.
3. Ensure the CAT® Tails Guardrail (Part C) is lapped in the direction of the adjacent traffic.
4. Ensure a Rectangular Washer (Part LL) is placed between the bolt head (Part TT) and CAT® Tail Guardrail (Parts C and PP) at Posts 7 and 8.
5. Ensure a Rectangular Washer (Part LL) is placed between the bolt head (Part TT) and CAT® Tail Guardrails (Parts C and PP) at Posts 7 and 8.
6. Ensure the CAT® Tail Guardrails are not attached to Post 6.
7. Tighten all threaded hardware to a snug position with a minimum of two (2) bolt threads protruding beyond the nut.

WARNINGS



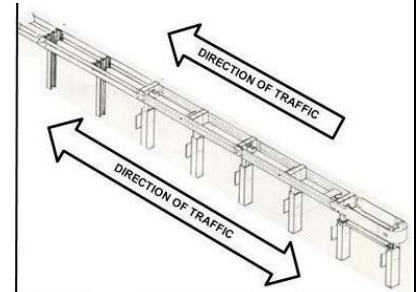
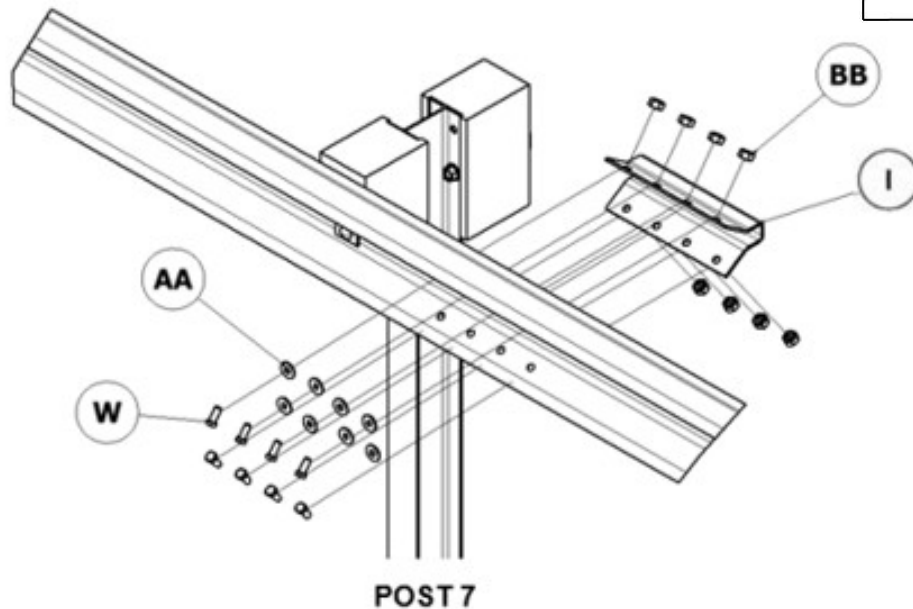
Use only Valtir parts that are specified herein for the CAT® for assembling, maintaining, or repairing the CAT®. Do not utilize or otherwise commingle parts from other systems even if those systems are Valtir systems.


Ensure the Single Sided CAT® Tail is **not** used in a median application where the opposing traffic can impact the blunt end of the CAT® Tail Guardrail, if it is inside the Clear Zone as defined by Roadside Design Guide (latest edition). Ensure the cable anchor holes are between Posts 6 and 7 and a Rectangular Washer is placed between the bolt head and CAT® Tail Guardrails at Posts 7 and 8. Ensure the CAT® Tail Guardrails are not attached to Post 6. Ensure the CAT® Tail Guard is lapped in the direction of the adjacent traffic. Ensure the Failure to follow these warnings could result in serious injury or death in the event of a vehicle impact with the system.

STEP 5B

CAT® Tail - Anchor Bracket Assembly Connecting to 27 3/4" [705 mm] High Downstream Single Sided Guardrail

NOTE: The CAT® Tail Guardrail 12'-6" [3.81 m] is not shown for clarity.

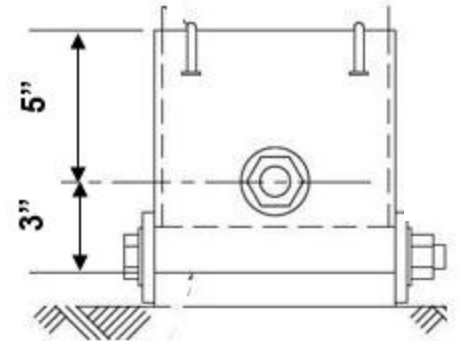
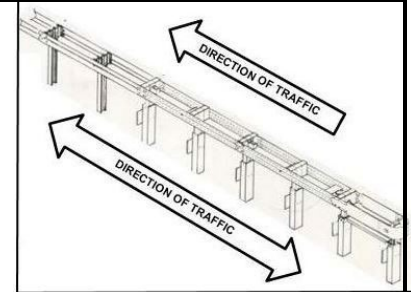
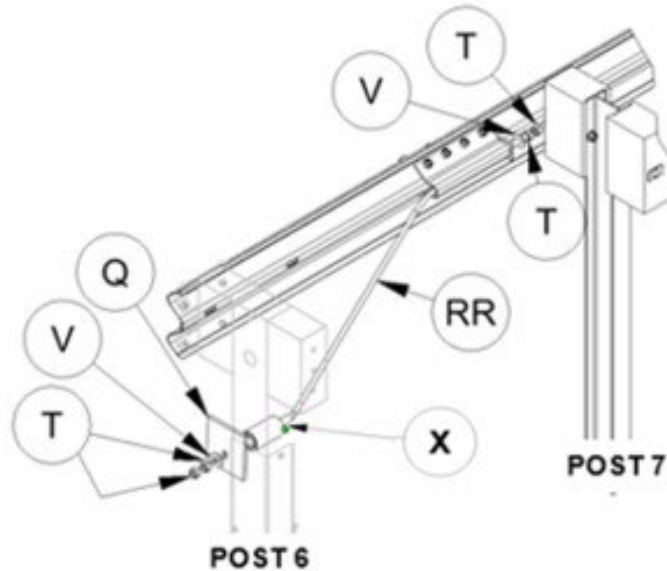


PARTS			INSTRUCTIONS
I	701A	1 EA	<ol style="list-style-type: none"> 1. Assemble the Cable Anchor Bracket (Part I) as shown above, with bracket on back side of the CAT® Tail Anchor Guardrail and welded plate towards Post 7. 2. Ensure that flat washers (Part AA) are placed between the bolt head (Part W) and front side of the CAT® Tail Anchor Guardrail. 3. Tighten all threaded hardware to a snug position with a minimum of two (2) bolt threads protruding beyond the nut.
W	3380G	8 EA	
AA	3300G	8 EA	
BB	3340G	8 EA	
<p>Use only Valtir parts that are specified herein for the CAT® for assembling, maintaining, or repairing the CAT®. Do not utilize or otherwise commingle parts from other systems even if those systems are Valtir systems.</p>			WARNINGS
 <p>Ensure the Cable Anchor Bracket is assembled between Posts 6 and 7 and the welded plate is towards Post 7. Failure to follow this warning could result in serious injury or death in the event of a vehicle impact with the system.</p>			

STEP 5C

CAT® Tail - Anchor Assembly Connecting To 27 3/4" [705 mm] High Downstream Single Sided Guardrail

NOTE: The CAT® Tail Guardrail 12'-6" [3.81 m] is not shown for clarity.



Bearing Plate Detail

PARTS			INSTRUCTIONS
Q	782G	1 EA	<ol style="list-style-type: none"> 1. Assemble the Anchor Cable (Part RR) as shown above. 2. Ensure the CAT® 2" [50 mm] Pipe Sleeve (Part X) is assembled in Post 6 as shown above. 3. Ensure the Bearing Plate (Part Q) is assembled at Post 6 with the hole oriented as shown in Bearing Plate Detail. 4. Assemble on each end of the Cable Assembly a 1" Round Washer (Part V) and two (2) 1" Hex Nuts (Part T). 5. While tightening nut with a wrench, restrain the end fitting with locking pliers at the end being tightened to avoid twisting the cable. 6. Tighten the cable until it is taut. The cable is considered taut when it does not deflect more than 1 inch [25 mm] when pressure is applied by hand in an up or down direction. 7. Ensure two (2) nails are assembled as shown in the Bearing Plate Detail to prevent the plate from rotating. Nails are not included in the quantities.
T	3910G	4 EA	
V	3900G	2 EA	
X	705G	1 EA	
RR	3000G	1 EA	

Use only Valtir parts that are specified herein for the CAT® for assembling, maintaining, or repairing the CAT®. Do not utilize or otherwise commingle parts from other systems even if those systems are Valtir systems.

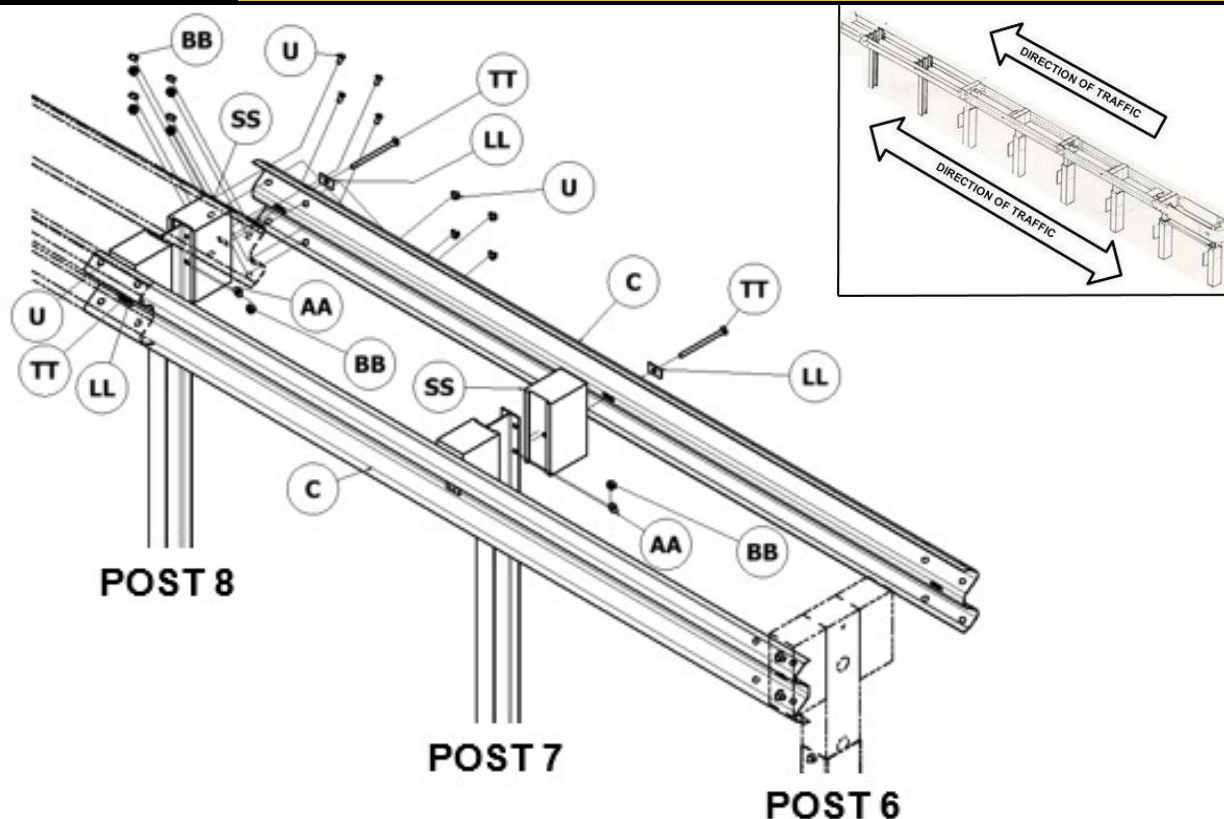
WARNINGS




Ensure the Bearing Plate is placed on the Cable Assembly with the hole 3" [75 mm] from the bottom of the Bearing Plate. Failure to follow this warning could result in serious injury or death in the event of a vehicle impact with the system

STEP 6

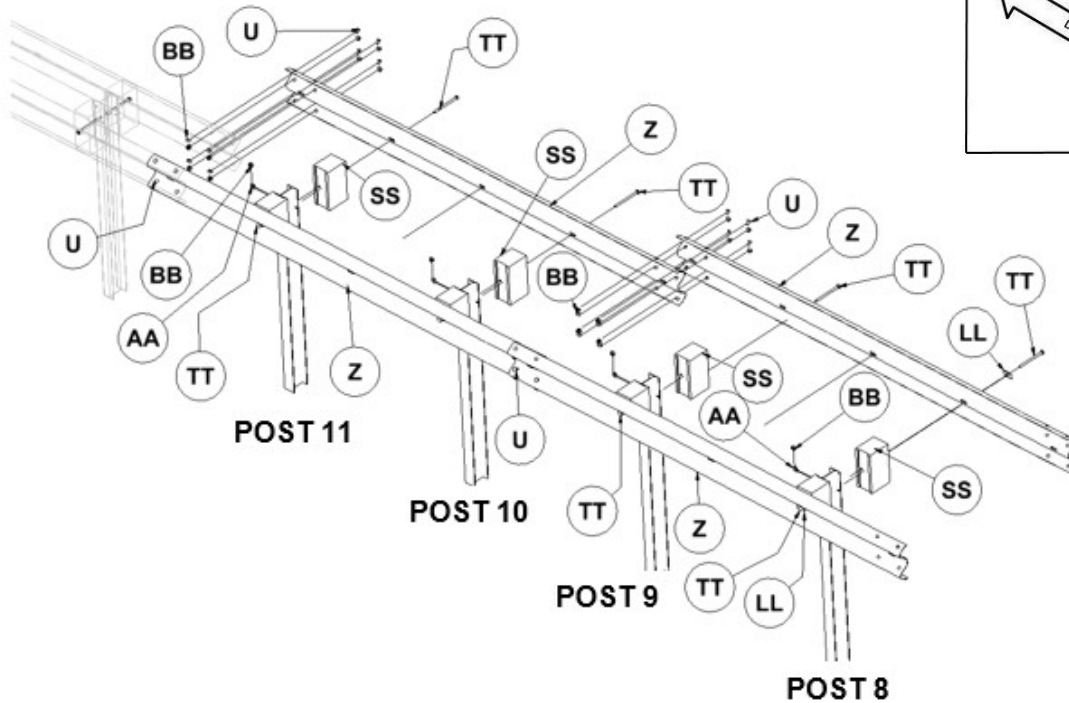
CAT® Tail - Guardrail Assembly Connecting To 27 3/4" [705 mm] High Downstream Double Sided Guardrail




PARTS			INSTRUCTIONS
C	9G	2 EA	Reference: Drawing SS224 1. Assemble all parts in the configuration and orientation as shown above. 2. Ensure the CAT® Guardrails (Part C) are lapped in the direction of the adjacent traffic. 3. Ensure a Rectangular Washer (Part LL) is placed between the guardrail bolt head (Part TT) and CAT® Tail Guardrails at Posts 7 and 8. 4. Ensure the CAT® Tail Guardrails are not bolted to Post 6. 5. Tighten all threaded hardware to a snug position with a minimum of two (2) bolt threads protruding beyond the nut.
U	3360G	16 EA	
AA	3300G	4 EA	
BB	3340G	20 EA	
LL	3320G	4 EA	
SS	4076B	4 EA	WARNINGS  Ensure Rectangular Washers are assembled between Guardrail Bolt head and the CAT® Tail Guardrail at Posts 7 and 8. Ensure the CAT® Tail Guardrails are lapped in the direction of the adjacent traffic. Failure to follow this warning could result in serious injury or death in the event of a vehicle impact with the system
TT	3500G	4 EA	
Use only Valtir parts that are specified herein for the CAT® for assembling, maintaining, or repairing the CAT®. Do not utilize or otherwise commingle parts from other systems even if those systems are Valtir systems.			

STEP 7A

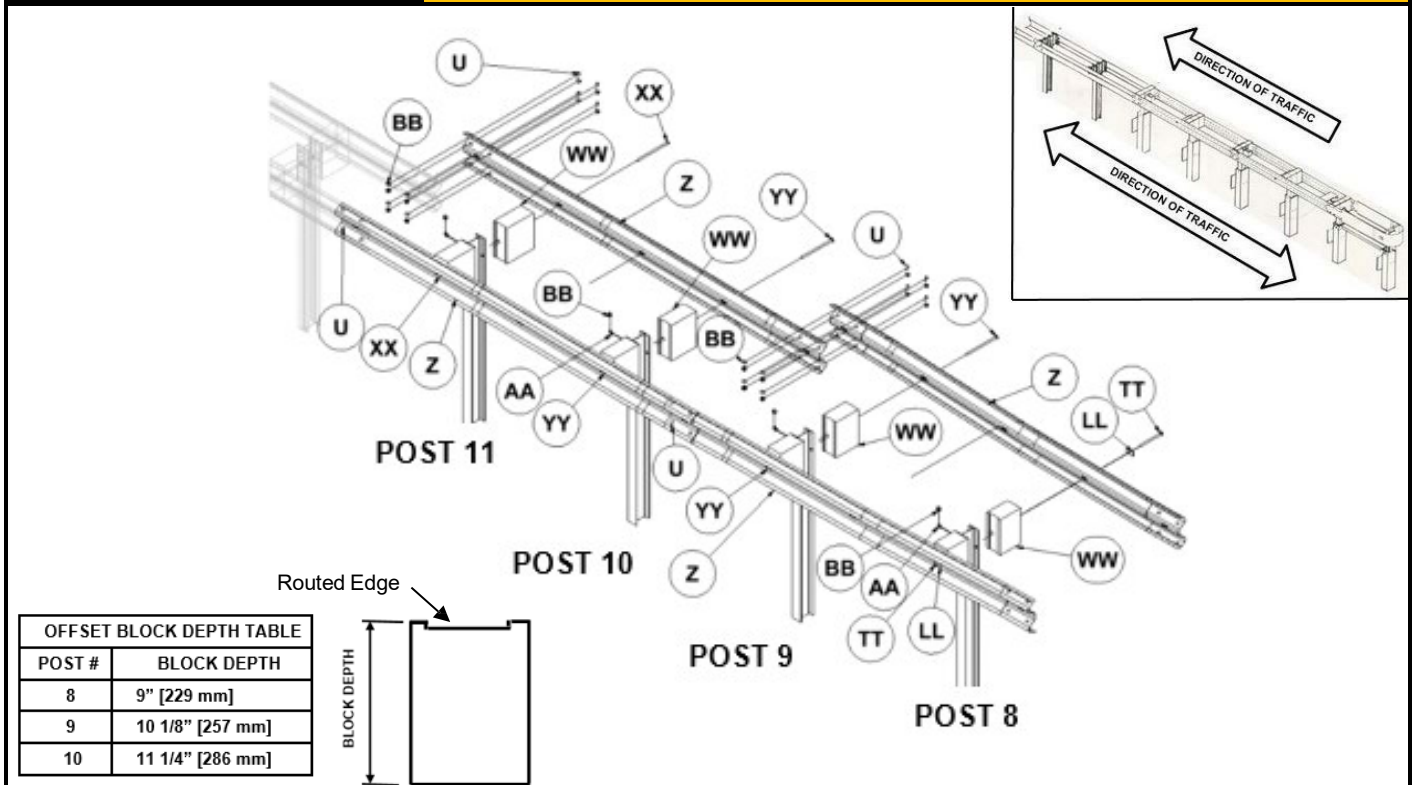
CAT® Tail - Guardrail Assembly Connecting To 31" [787 mm] High, 8" [200 mm] Offset Blocks, MGS Downstream Guardrail




PARTS			INSTRUCTIONS
U	3360G	48 EA	Reference: Drawing SS696 <ol style="list-style-type: none">1. Assemble all parts in the configuration and orientation as shown above.2. Ensure the CAT® Tail Guardrails (Part Z) are lapped in the direction of the adjacent traffic.3. Ensure a Rectangular Washer (Part LL) is placed between the guardrail bolt head (Part TT) and CAT® Tail Guardrails at Post 8.4. Tighten all threaded hardware to a snug position with a minimum of two (2) bolt threads protruding beyond the nut.
Z	11G	4 EA	
AA	3300G	10 EA	
BB	3340G	58 EA	
LL	3320G	4 EA	
SS	4076B	8 EA	
TT	3500G	4 EA	
Use only Valtir parts that are specified herein for the CAT® for assembling, maintaining, or repairing the CAT®. <u>Do not utilize or otherwise commingle parts from other systems even if those systems are Valtir systems.</u>			WARNINGS
			<div></div> <div>Ensure Rectangular Washers are assembled between Guardrail Bolt head and the CAT® Tail Guardrail at Post 8. Ensure the CAT® Tail Guardrails are lapped in the direction of the adjacent traffic. Failure to follow this warning could result in serious injury or death in the event of a vehicle impact with the system</div>

STEP 7B

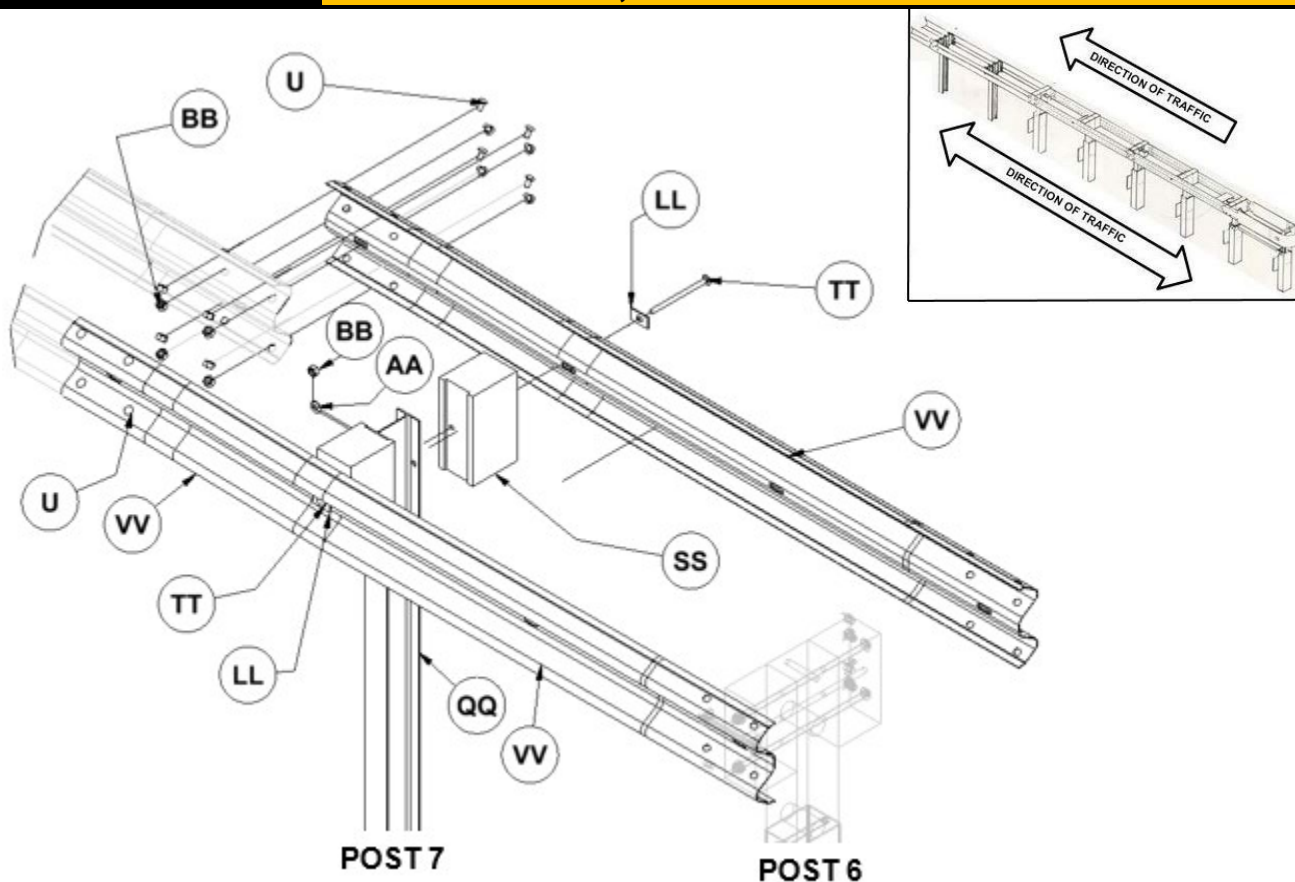
CAT® Tail - Guardrail Assembly Connecting To 31" [787 mm] High, 12" [300 mm] Offset Blocks, MGS Downstream Guardrail



PARTS			INSTRUCTIONS
U	3360G	48 EA	Reference: Drawing SS695 1. Assemble all parts in the configuration and orientation as shown above. 2. Field cut the opposite side of the routed edge of the Offset Blocks (Part WW) to the size shown in the Offset Block Depth Table. 3. Ensure the CAT® Tail Guardrails (Part Z) are lapped in the direction of the adjacent traffic. 4. Ensure a Rectangular Washer (Part LL) is placed between the guardrail bolt head (Part TT) and CAT® Tail Guardrails (Parts Z) at Post 8. 5. Tighten all threaded hardware to a snug position with a minimum of two (2) bolt threads protruding beyond the nut. 6. Tighten all threaded hardware to a snug position with a minimum of two (2) bolt threads protruding beyond the nut.
Z	11G	4 EA	
AA	3300G	10 EA	
BB	3340G	58 EA	
LL	3320G	4 EA	
TT	3500G	4 EA	
WW	4660B	8 EA	
XX	3540G	2 EA	
YY	3520G	4 EA	
Use only Valtir parts that are specified herein for the CAT® for assembling, maintaining, or repairing the CAT®. Do not utilize or otherwise commingle parts from other systems even if those systems are Valtir systems.			WARNINGS
 Ensure Rectangular Washers are assembled between Guardrail Bolt head and the CAT® Tail Guardrail at Post 8. Ensure the CAT® Tail Guardrails are lapped in the direction of the adjacent traffic. Failure to follow this warning could result in serious injury or death in the event of a vehicle impact with the system			

STEP 8

CAT® Tail - Guardrail Assembly With 9'-4 1/2" [2.60 m] Guardrail Connecting to 31" [787 mm] High, 8" [200 mm] Offset Blocks, Downstream MGS Guardrail



PARTS

U	3360G	16 EA
BB	3340G	18 EA
LL	3320G	2 EA
SS	4076B	2 EA
TT	3500G	2 EA
VV	10967G	2 EA

INSTRUCTIONS

Reference: Drawing SS695 and SS696

1. Assemble all parts in the configuration and orientation as shown above.
2. Ensure a Rectangular Washer (Part LL) is placed between the guardrail bolt head (Part TT) and CAT® Tail Guardrails (Parts V V) at Posts 7.
3. Ensure the CAT® Tail Guardrails (Part Z) are lapped in the direction of the adjacent traffic.
4. Ensure the CAT® Tail Guardrails are not bolted to Post 6.
5. Tighten all threaded hardware to a snug position with a minimum of two (2) bolt threads protruding beyond the nut.

WARNINGS

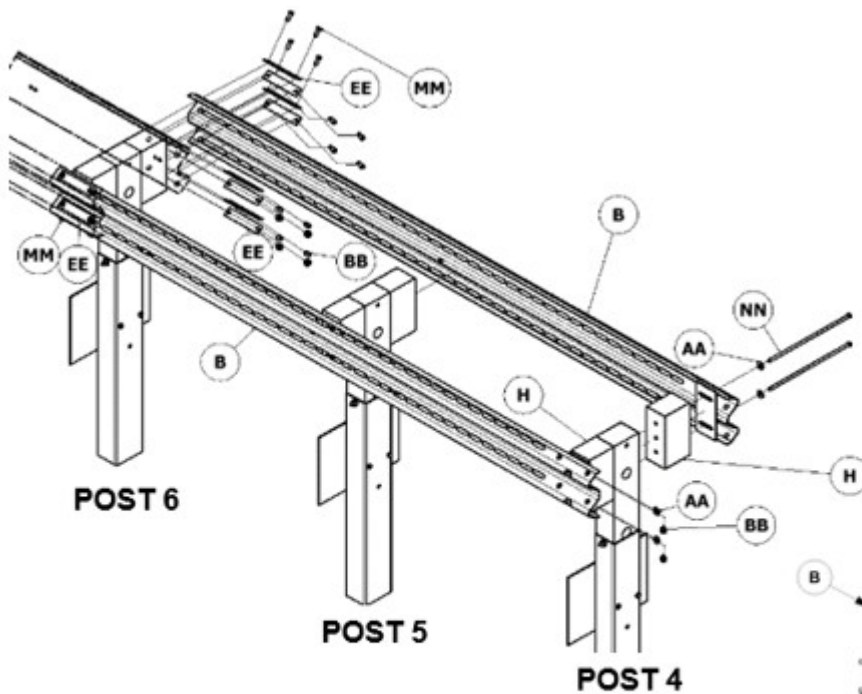
Use only Valtir parts that are specified herein for the CAT® for assembling, maintaining, or repairing the CAT®. Do not utilize or otherwise commingle parts from other systems even if those systems are Valtir systems.



Ensure Rectangular Washers are assembled between Guardrail Bolt head and the CAT® Tail Guardrail at Posts 7. Ensure the CAT® Tail Guardrails are lapped in the direction of the adjacent traffic. Failure to follow this warning could result in serious injury or death in the event of a vehicle impact with the system

STEP 9A

CAT® 10 Gauge, Slotted/Welded Guardrail-2 Assembly



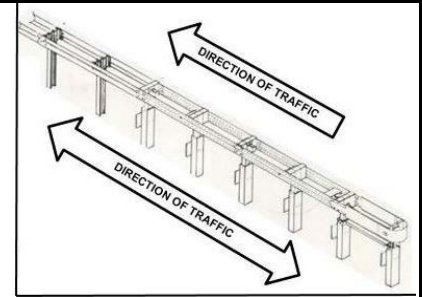
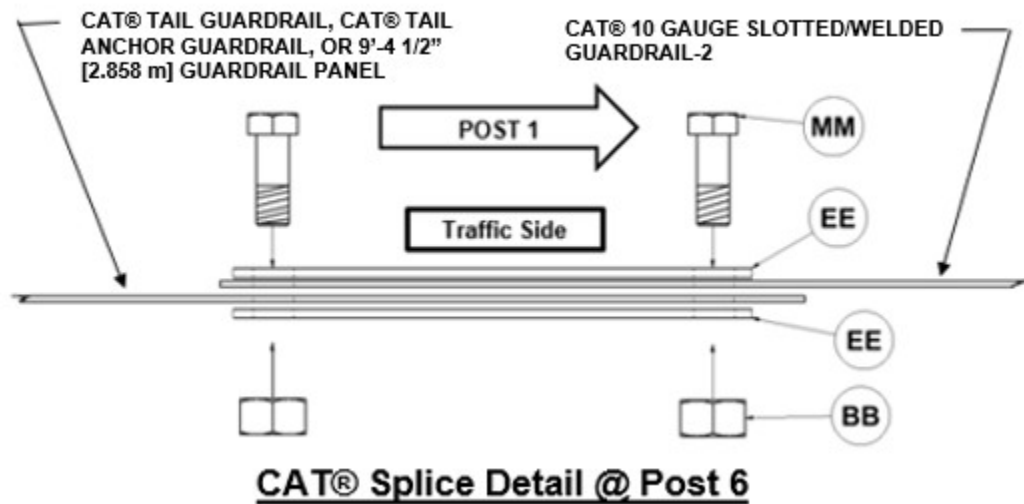
**NOTE: See Step 9B for Post 4
CAT® Guardrail Splice**

**CAT® 10 Gauge, Slotted/Welded Guardrail-2
Assembly at Post 4**


PARTS			INSTRUCTIONS
B	130A	2 EA	<ol style="list-style-type: none"> 1. Assemble the (Part B) as shown above. Lap at Post 6 both CAT® 10 gauge, slotted/Welded Guardrail-2 to the outside of the CAT® Tail Guardrail. 2. Assemble the splice at Post 6 per Step 9B. Ensure CAT® Hex Bolts (Part MM) with the CAT® marking and CAT® Plate Washers (Part EE) are used. 3. Assemble the CAT® 10 gauge, slotted/Welded Guardrail-2 at Post 4 as shown in the CAT® 2 Guardrail Assembly at Post 4 detail above. 4. Do not attach the CAT® 10 gauge, slotted/Welded Guardrail-2 to Posts 6 or 5. 5. Tighten all threaded hardware to a snug position with a minimum of two (2) bolt threads protruding beyond the nut.
H	3101B	2 EA	
AA	3300G	4 EA	
BB	3340G	18 EA	
EE	19259G	16 EA	
MM	3395G	16 EA	
NN	4640G	2 EA	
<p>Use only Valtir parts that are specified herein for the CAT® for assembling, maintaining, or repairing the CAT®. <u>Do not utilize or otherwise commingle parts from other systems even if those systems are Valtir systems.</u></p>			WARNINGS
			<p>Ensure that CAT® Hex Bolts and CAT® Plate Washers are used for the splice at Post 6. Ensure the CAT® 10 gauge, slotted/Welded Guardrail-2 are lapped to the outside of the CAT® Tail Guardrail. Failure to follow this warning could result in serious injury or death in the event of a vehicle impact with the system</p>

STEP 9B

CAT® Splice Assembly (At Post 6)



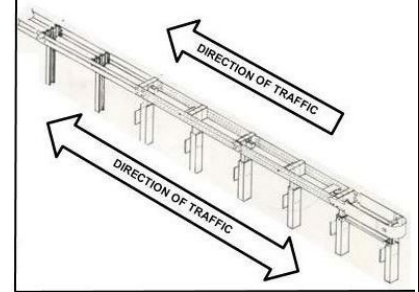
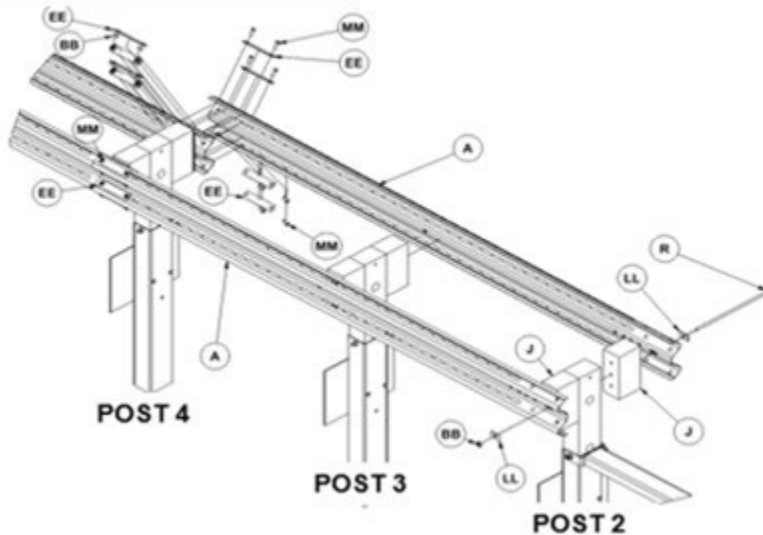
CAT® HEX BOLT HEAD DETAIL


PARTS			INSTRUCTIONS
BB	3340G	32 EA	<ol style="list-style-type: none"> Assemble all parts in the configuration and orientation as shown above. Ensure CAT® Hex Bolts (Part MM) with the CAT® marking (See CAT® Hex Bolt Head Detail) and Plate Washers (Part EE) are used for splices at Posts 6. Tighten threaded hardware to a snug position with a minimum of two (2) bolt threads protruding beyond the nut.
EE	3497G	32 EA	
MM	3395G	32 EA	
<p>Use only Valtir parts that are specified herein for the CAT® for assembling, maintaining, or repairing the CAT®. <u>Do not utilize or otherwise commingle parts from other systems even if those systems are Valtir systems.</u></p>			WARNINGS
 <p>Ensure CAT® Hex Bolts with the CAT® marking and Plate Washers are used for assembling the splices at Post 6. Failure to follow these warnings could result in serious injury or death in the event of a vehicle impact with the system</p>			

STEP 10A

CAT® 12 Gauge, Slotted Guardrail-1 Assembly

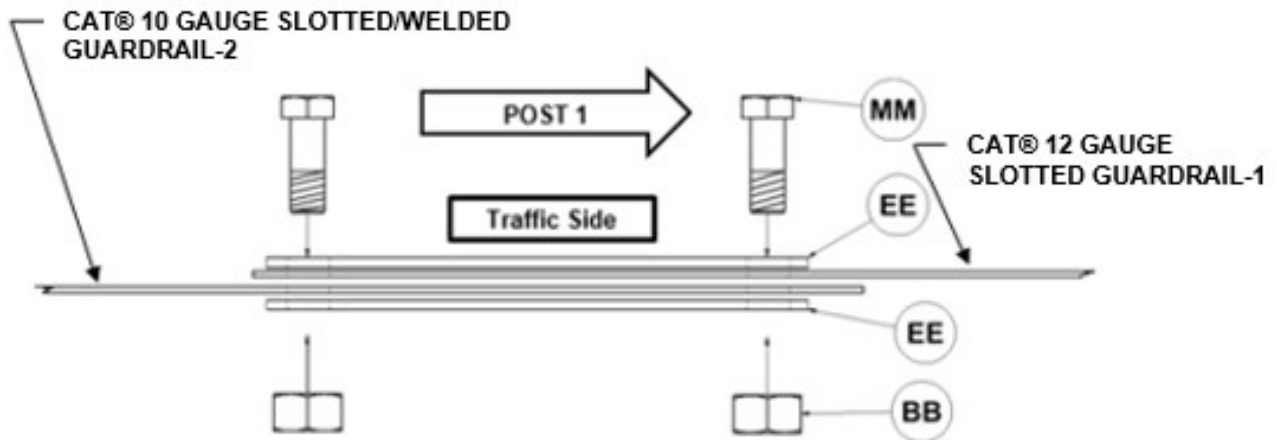
**Note: See Step 10B for Post 4
CAT® Guardrail Splice**



PARTS			INSTRUCTIONS
A	31A	2 EA	<ol style="list-style-type: none"> 1. Assemble the CAT® 12 gauge, slotted Guardrail-1 (Part A) as shown above. 2. Assemble the Wood Offset Block (Part J) and CAT® 12 gauge, slotted Guardrail-1 to Post 2. Lap both CAT® 12 gauge, slotted Guardrail-1 to the outside of the CAT® 10 gauge, slotted/Welded Guardrail-2. 3. Assemble the splice at Post 4 per Step 10B. Ensure CAT® Hex Bolts (Part MM) with the CAT® marking and Plate Washers (Part EE) are used. 4. Tighten all threaded hardware to a snug position with a minimum of two (2) bolt threads protruding beyond the nut.
J	3100B	2 EA	
R	3650G	1 EA	
BB	3340G	17 EA	
EE	19259G	16 EA	
LL	3320G	2 EA	
MM	3395G	16 EA	
Use only Valtir parts that are specified herein for the CAT® for assembling, maintaining, or repairing the CAT®. <u>Do not utilize or otherwise commingle parts from other systems even if those systems are Valtir systems.</u>			WARNINGS
 Ensure that CAT® Hex Bolts and Plate Washers are used for the splice. Ensure both of the CAT® 12 gauge, slotted Guardrail-1 are lapped to the outside of the CAT® 10 gauge, slotted/Welded Guardrail-2. Failure to follow this warning could result in serious injury or death in the event of a vehicle impact with the system.			

STEP 10B


CAT® Splice Assembly (At Post 4)



CAT® Splice Detail @ Post 4

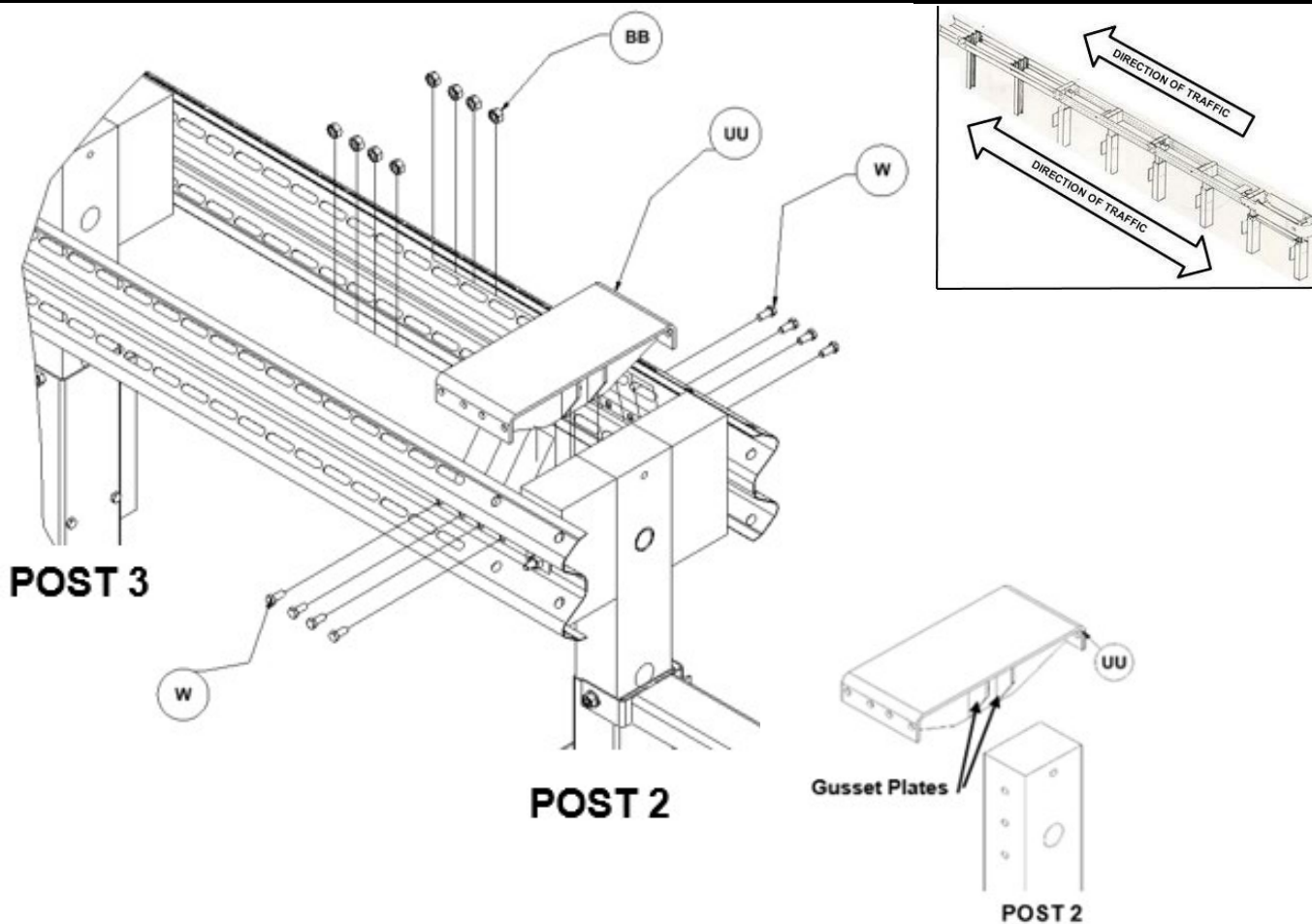


CAT® HEX BOLT HEAD DETAIL


PARTS			INSTRUCTIONS
BB	3340G	32 EA	<ol style="list-style-type: none"> 1. Assemble all parts in the configuration and orientation as shown above. 2. Ensure CAT® Hex Bolts (Part MM) with the CAT® marking (See CAT® Hex Bolt Head Detail) and Plate Washers (Part EE) are used for splices at Post 4. 3. Tighten threaded hardware to a snug position with a minimum of two (2) bolt threads protruding beyond the nut.
EE	3497G	32 EA	
MM	3395G	32 EA	
WARNINGS			
Use only Valtir parts that are specified herein for the CAT® for assembling, maintaining, or repairing the CAT®. <u>Do not utilize or otherwise commingle parts from other systems even if those systems are Valtir systems.</u>			 Ensure CAT® Hex Bolts with the CAT® marking and Plate Washers are used for assembling the splices at Post 4. Failure to follow these warnings could result in serious injury or death in the event of a vehicle impact with the system

STEP 10C

CAT® Spacer Assembly

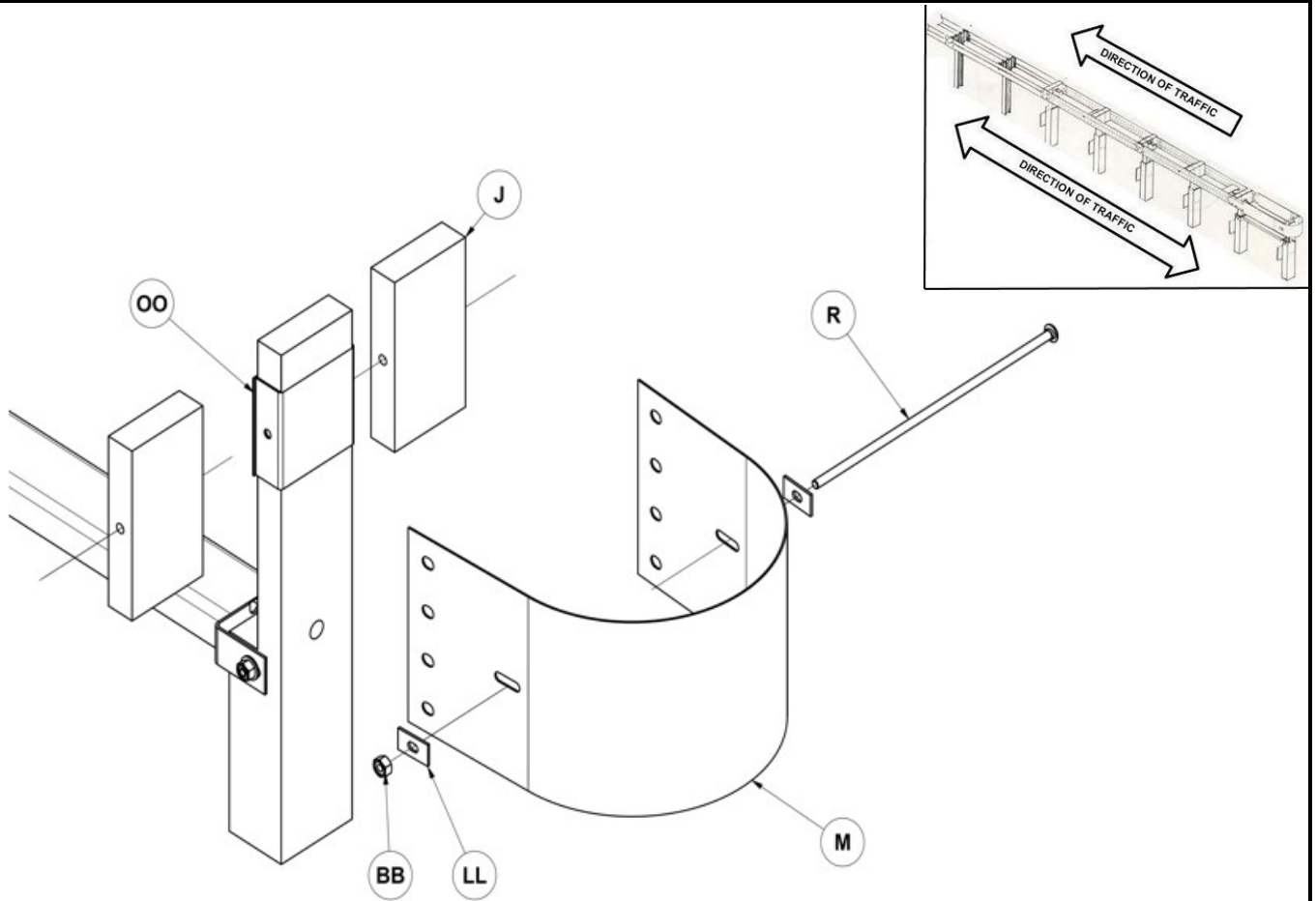



CAT® Spacer Channel Orientation Detail

PARTS			INSTRUCTIONS
W	3380G	8 EA	<ol style="list-style-type: none"> 1. Assemble the CAT® Spacer Channel (Part UU) between the CAT® 12 Gauge, Slotted Guardrail-1 as shown above. 2. Ensure the gusset plates on shown in the CAT® Spacer Channel Orientation Detail above are facing Post 2. 3. Tighten all threaded hardware to a snug position with a minimum of two (2) bolt threads protruding beyond the nut.
UU	9915A	1 EA	
BB	3340G	8 EA	
<p>Use only Valtir parts that are specified herein for the CAT® for assembling, maintaining, or repairing the CAT®. <u>Do not utilize or otherwise commingle parts from other systems even if those systems are Valtir systems.</u></p>			WARNINGS
			<p>Ensure the Spacer Channel CAT® is assembled per the Spacer Channel CAT® Orientation Detail. Failure to follow this warning could result in serious injury or death in the event of a vehicle impact with the system</p>

STEP 11

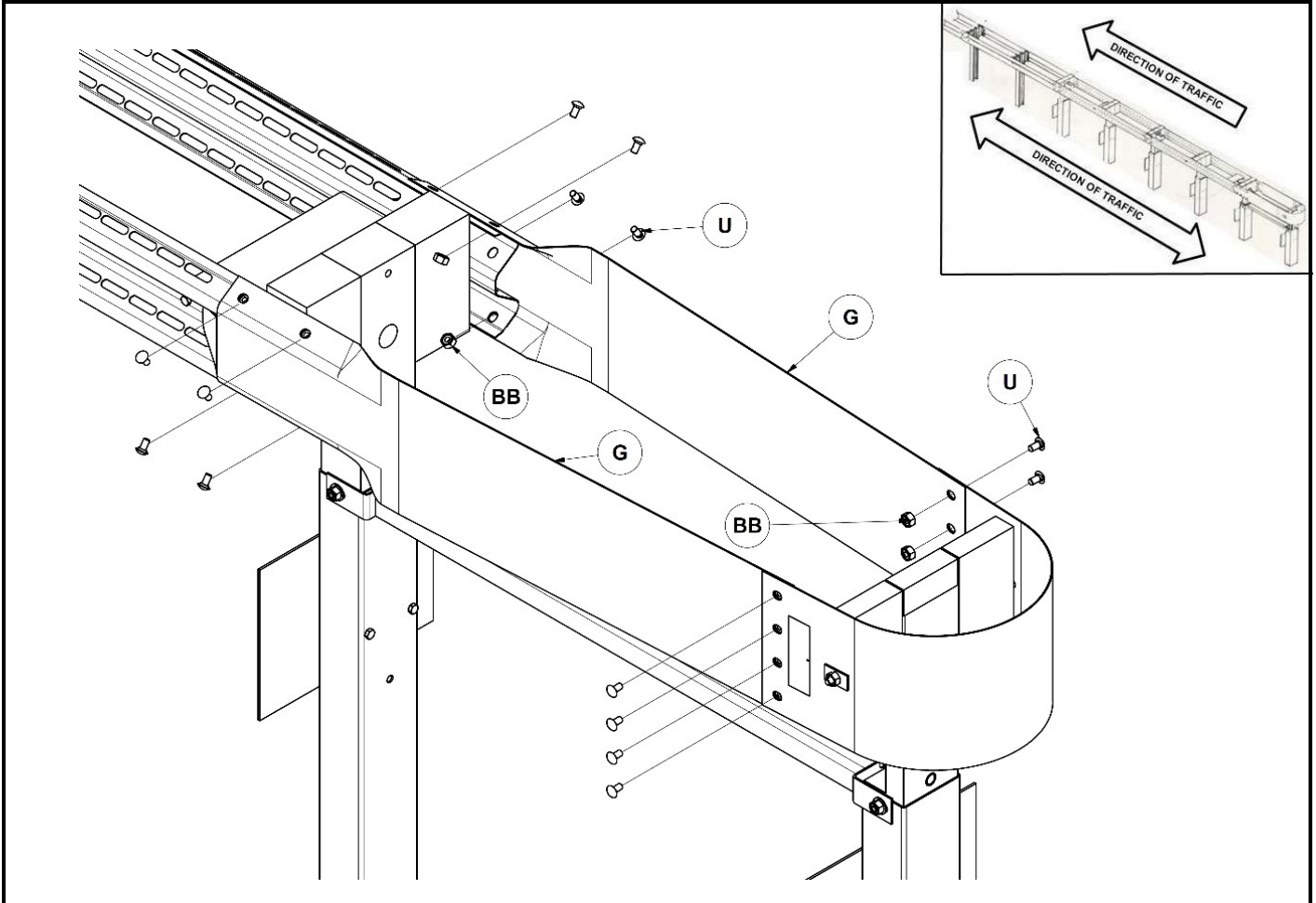
CAT® 10 Gauge Nose Plate Assembly




PARTS			INSTRUCTIONS
J	3100B	2 EA	<ol style="list-style-type: none"> 1. Assemble the CAT® 10 Gauge Nose Section as shown above. 2. Assemble the CAT® 10 Gauge Nose Plate (Part M), Wood Offset Blocks Post 1 (Part J), and Bent Plate Sleeve Post 1 (Part OO) to Post 1 as shown above. 3. Ensure Rectangular Washers (Part LL) are placed between the Bolt Head (Part R) and CAT® 10 Gauge Nose Plate and the Nut (Part BB) and the CAT® 10 Gauge Nose Plate. 4. Tighten all threaded hardware to a snug position with a minimum of two (2) bolt threads protruding beyond the nut. 5. Cut off excess Bolt Threads (Part R) and peen excess threads.
M	983G	1 EA	
R	3350G	1 EA	
BB	3340G	1 EA	
LL	3320G	2 EA	
OO	9916A	1 EA	
Use only Valtir parts that are specified herein for the CAT® System for assembling, maintaining, or repairing the CAT® System. Do not utilize or otherwise commingle parts from other systems even if those systems are Valtir systems.			WARNINGS
			 <p>Ensure CAT® Bent Plate Sleeve is placed on Post 1. Failure to follow this warning could result in serious injury or death in the event of a vehicle impact with the system</p>

STEP 12

CAT® 10 Gauge Side Plate Assembly

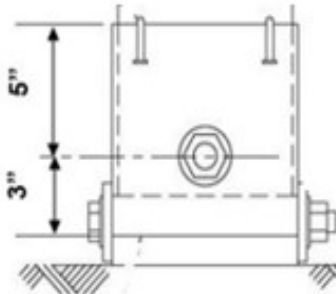


PARTS			INSTRUCTIONS
G	984G	2 EA	<ol style="list-style-type: none"> 1. Assemble the CAT® 10 Gauge Side Plates (Part G) as shown above. 2. Ensure the CAT® 10 Gauge Side Plates are assembled on the inside of the CAT® 10 Gauge Nose Plate and the outside of the CAT® 12 Gauge, Slotted Guardrail-1. 3. Tighten all threaded hardware to a snug position with a minimum of two (2) bolt threads protruding beyond the nut.
U	3360G	16 EA	
BB	3340G	16 EA	
<p>Use only Valtir parts that are specified herein for the CAT® for assembling, maintaining, or repairing the CAT®. <u>Do not utilize or otherwise commingle parts from other systems even if those systems are Valtir systems.</u></p>			WARNINGS
			 <p>Ensure the CAT® 10 Gauge Side Plates are assembled on the inside of the CAT® 10 Gauge Nose Plate and the outside of the CAT® 12 Gauge, Slotted Guardrail-1. Failure to follow this warning could result in serious injury or death in the event of a vehicle impact with the system</p>

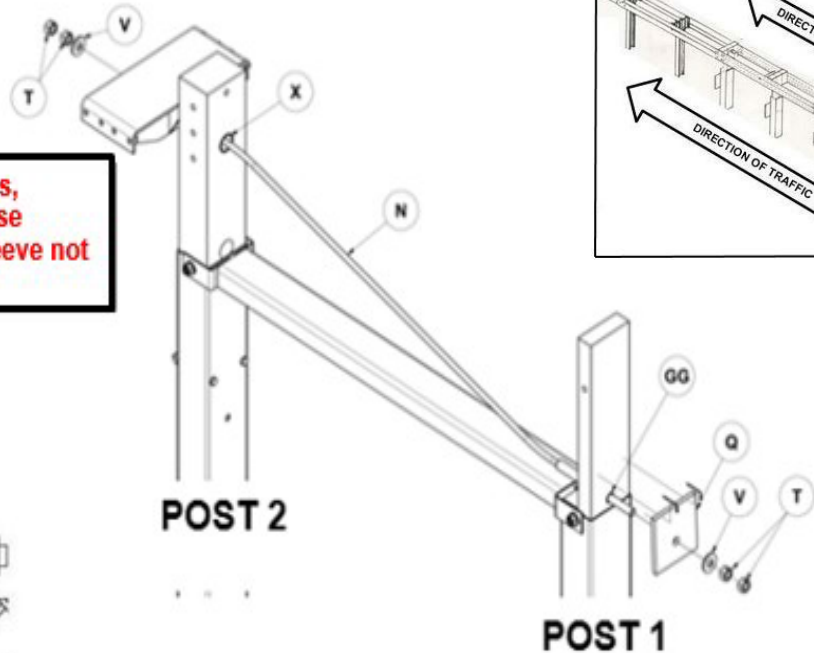
STEP 13


CAT® Anchor Cable Assembly

NOTE: CAT® Side Plates, Wood Offset Blocks, Nose Plate, and Bent Plate Sleeve not shown for clarity.



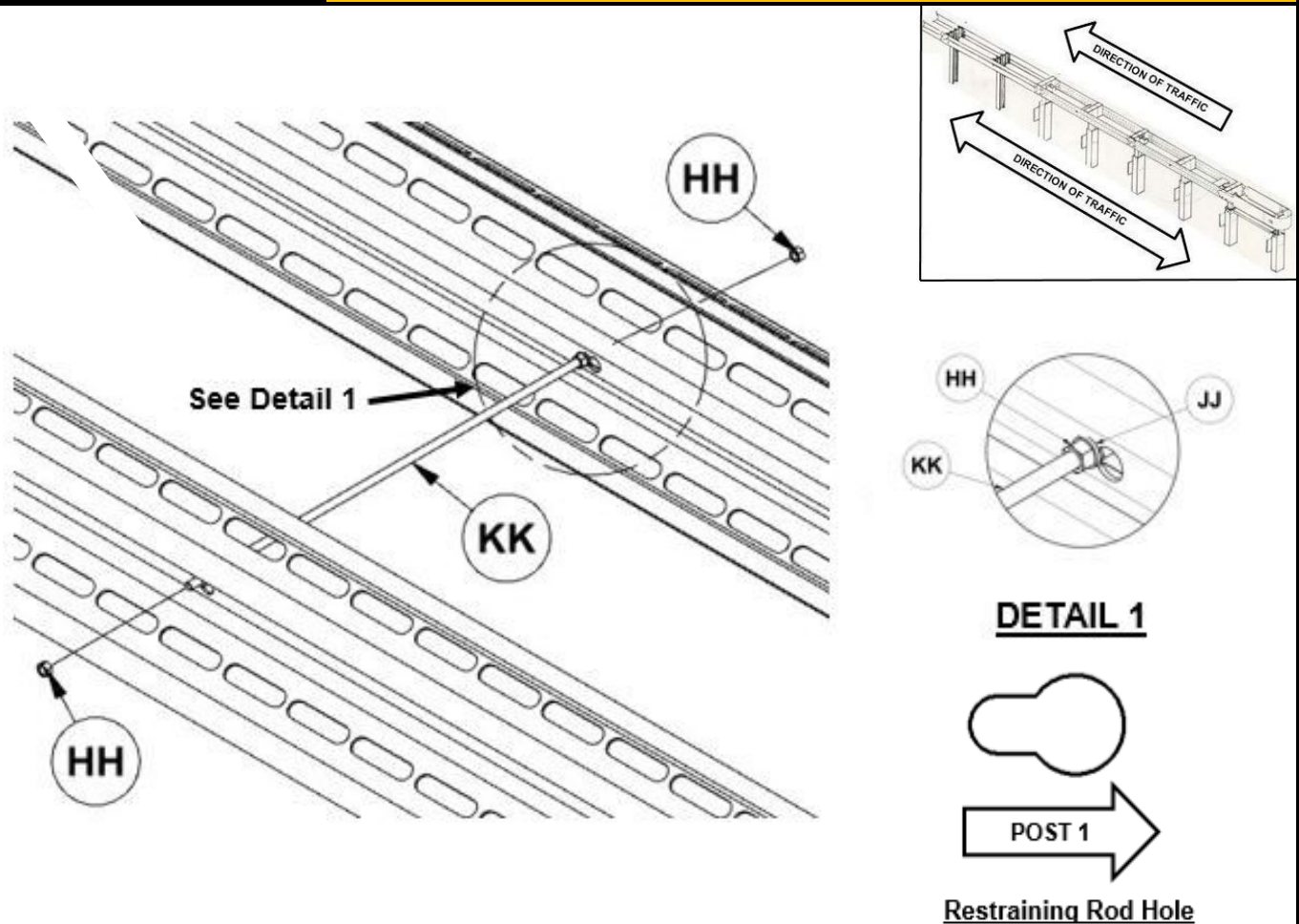
Bearing Plate Detail




PARTS			INSTRUCTIONS
N	3012G	1 EA	<ol style="list-style-type: none"> 1. Assemble CAT® Cable Assembly (Part N) as shown above. 2. Assemble 1" [25 mm] Pipe Sleeve CAT™ (Part GG) in Post 1 and 2" [50 mm] Pipe Sleeve (Part X) in Post 2 if not assembled in Step 4C. 3. Assemble the ends of the Cable Assembly through the two pipe sleeves and hole in the Spacer. 4. Ensure the Bearing Plate (Part Q) is assembled at Post 1 with the hole oriented as shown in Bearing Plate Detail. 5. Assemble on each end of the Cable Assembly a 1" Round Washer (Part V) and two (2) 1" Hex Nuts (Part T). 6. While tightening nut with a wrench, restrain the cable end fitting with locking pliers at the end being tightened to avoid twisting the cable. 7. Tighten the cable until it is taut. The cable is considered taut when it does not deflect more than 1" [25 mm] when pressure is applied by hand in an up or down direction. 8. Ensure two (2) nails are assembled as shown in Bearing Plate Detail to prevent the plate from rotating. Nails are not included in the quantities.
Q	3360G	1 EA	
T	3910G	4 EA	
V	3900G	2 EA	
X	705G	1 EA	
GG	19271G	1 EA	
<p>Use only Valtir parts that are specified herein for the CAT® for assembling, maintaining, or repairing the CAT®. Do not utilize or otherwise commingle parts from other systems even if those systems are Valtir systems.</p>			WARNINGS
			 <p>Ensure the Bearing Plate is placed on the Cable Assembly with the hole 3" [75 mm] from the bottom of the Bearing Plate. Ensure Bearing Plate is toe nailed and the cable is taut. Failure to follow this warning could result in serious injury or death in the event of a vehicle impact with the system.</p>

STEP 14

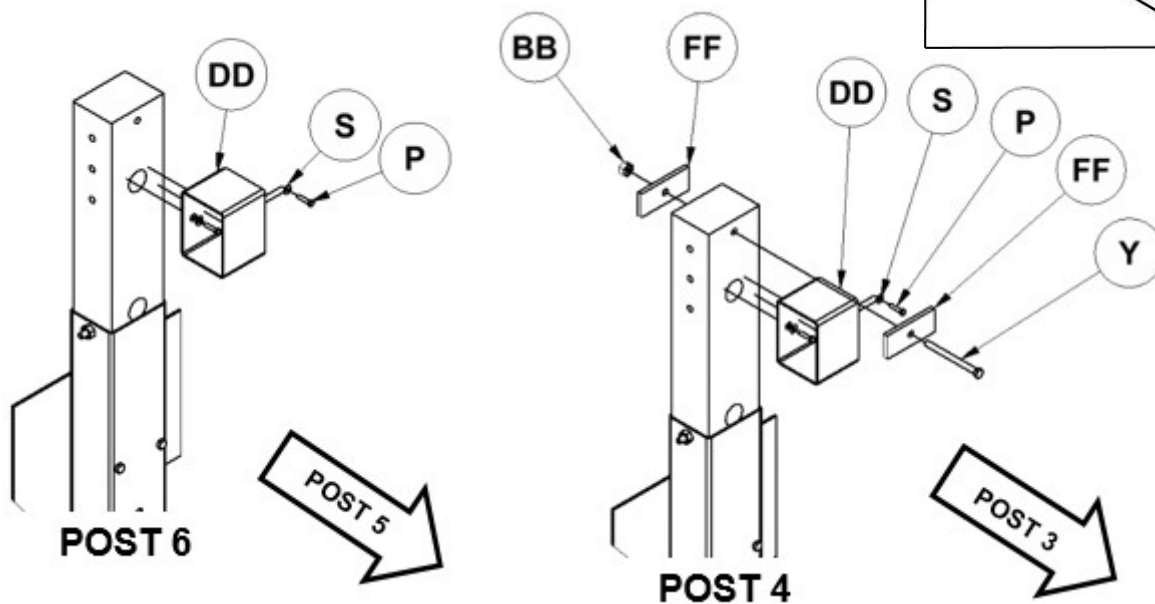
CAT® Restraining Rod Assembly (Posts 3 & 5)




PARTS			INSTRUCTIONS
HH	4252G	8 EA	<ol style="list-style-type: none"> 1. Assemble the CAT® Restraining Rods (Part KK) as shown above. Posts 3 and 5 not shown for clarity. 2. Ensure the rod is assembled in the narrow portion of the key hole. 3. Tighten the nuts to a snug position, ensuring a minimum of two threads are showing.
JJ	3360G	4 EA	
KK	3275G	2 EA	
<p>Use only Valtir parts that are specified herein for the CAT® for assembling, maintaining, or repairing the CAT®. Do not utilize or otherwise commingle parts from other systems even if those systems are Valtir systems.</p>			WARNINGS
			 <p>Ensure no washers are placed between the nut and the outside face of the CAT® 12 gauge, Slotted Guardrail-1 or the CAT® 10 Gauge, Slotted/Welded Guardrail-2. Ensure nuts are placed on inside and outside of rail panels with lock washers as shown in detail 1. Failure to follow this warning could result in serious injury or death in the event of a vehicle impact with the system</p>

STEP 15

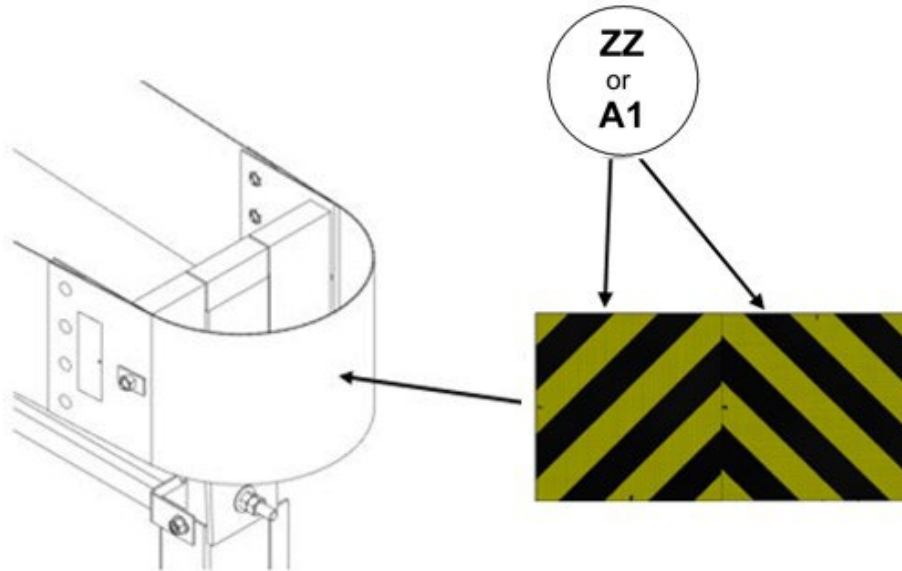
CAT® Knock Out Tube and Post Plate Assembly (Posts 4 & 6)




PARTS			INSTRUCTIONS
P	3263G	4 EA	<ol style="list-style-type: none"> 1. Assemble CAT® Knock Out Tubes (Part DD) with openings horizontal and Post Plates (Part FF) as shown above. 2. Drill two (2) 3/16" [5 mm] pilot holes into the Post and secure the Knock Out Tube to the Post with two (2) lag screws. Do Not pound lag screws into the wood. 3. Tighten threaded hardware to a snug position with a minimum of two (2) bolt threads protruding beyond the nut.
S	3255G	4 EA	
Y	3478G	1 EA	
BB	3340G	1 EA	
DD	9921G	2 EA	
FF	19261G	2 EA	
<p>Use only Valtir parts that are specified herein for the CAT® for assembling, maintaining, or repairing the CAT®. Do not utilize or otherwise commingle parts from other systems even if those systems are Valtir systems.</p>			WARNINGS
			<p>Ensure the CAT® Knock Out Tubes are assembled horizontally on the upstream side of Posts 4 and 6. Failure to follow this warning could result in serious injury or death in the event of a vehicle impact with the system</p>

STEP 16

CAT® Delineation



PARTS			INSTRUCTIONS
ZZ	3177B	2 EA	<ol style="list-style-type: none"> 1. Attach the 18" x 18" [450 mm x 450 mm] Delineation Sheeting (Part ZZ) or 16" x 16" [400 mm x 400mm] Delineation Sheeting (Part A1) as shown above for median/gore application. 2. For roadside/shoulder applications, rotate the sheeting. <p>Note: Manufacturer suggests that user provide delineation (reflective sheeting) as required by the state/specifying agency for terminals.</p> <p>Valtir offers two (2) specific reflective sheeting options for an additional charge. Valtir makes no guarantees they meet the minimum specifications, comply with MUTCD requirements or comply with state/specifying agency requirements.</p>
A1	6665B	2 EA	
<p>Use only Valtir parts that are specified herein for the CAT® for assembling, maintaining, or repairing the CAT®. <u>Do not utilize or otherwise commingle parts from other systems even if those systems are Valtir systems.</u></p>			WARNINGS
			<p>Ensure delineation (reflective sheeting) used on the CAT® meets state/specifying agency's MUTCD for proper delineation. Use of steel delineator posts must be a minimum of 3'-0" [1 m] in front (upstream) of the CAT®. Failure to follow this warning could result in serious injury or death in the event of a vehicle impact with the system.</p>

CAT® System Assembly Checklist

(File with Project Records)

Performed by: _____

Date: _____

Location: _____

- ☐ 1. Ensure only Valtir CAT® parts are used for the assembly of the CAT® System and that all parts are free of damage. (pp 5 & 6)
- ☐ 2. Ensure required traffic control is in place to conduct CAT® assembly. (p 5)
- ☐ 3. Ensure the appropriate CAT® Tail has been used. (pp 6 & 14)
- ☐ 4. Ensure proper site grading complies with state/specifying agency guidelines or AASHTO Roadside Design Guide, whichever is more stringent. (pp 14 & 16)
- ☐ 5. Ensure the top of the Tube Sleeves do not protrude more than 4" [100 mm] above the finished grade. (pp 17- 20).
- ☐ 6. Ensure that washers are assembled between the bolt head and strut and nut and strut at posts 1 & 2. (p 18)
- ☐ 7. Ensure that 1 3/4" x 3" [42 mm x 75 mm] Rectangular Washers are assembled at Post Locations 8, 7, 2, & 1. (pp 22, 25, 28 & 30)
- ☐ 8. Ensure the CAT® 12 Gauge, Slotted Guardrail-1 or CAT® 10 Gauge, Slotted/Welded, Guardrail-2 are oriented correctly and lapped in the appropriate direction allowing them to telescope when impacted on the nose. (pp 27 & 28)
- ☐ 9. Ensure that the CAT® 12 Gauge, Slotted Guardrail-1 or CAT® 10 Gauge, Slotted/Welded, Guardrail-2 are not bolted to post 3, 5, and 6. (pp 19 & 27)
- ☐ 10. Ensure that **only** the plate welded to the CAT® 10 Gauge, Slotted/Welded, Guardrail-2 is bolted to the post at post 4. (p 34)
- ☐ 11. Ensure the CAT® 3/16" x 2" x 10" [5 mm x 50 mm x 250 mm] plate washers at posts 4 and 6 are located on the inside and outside of the CAT® 12 Gauge, Slotted Guardrail-1 or CAT® 10 Gauge, Slotted/Welded, Guardrail-2. (pp 35 and 37)
- ☐ 12. Ensure that only CAT® hex bolts with the CAT® symbol are used to assemble the splices at posts 4 and 6. (pp 26-28)
- ☐ 13. Ensure that the gusset plates in the CAT® spacer block are facing Post 2. (p 29)
- ☐ 14. Ensure CAT® pipe sleeves are inserted at both Post 1 and Post 2. If a single sided CAT® Tail is used, ensure a pipe sleeve is used at Post 6. (pp 24 & 32)
- ☐ 15. Ensure the CAT® Bearing Plate is toe nailed and oriented with the hole 3" from the bottom edge of the CAT® Bearing Plate. (pp 24 & 32)
- ☐ 16. Ensure the CAT® Anchor Cable and CAT® Tail Anchor Cable when used, is double nutted on each end and are tightened against each other with a minimum of two (2) threads showing past the outside nut. (pp 24 & 32)
- ☐ 17. Ensure the CAT® Anchor Cable and CAT® Tail Anchor Cable when used is taut. (pp 24 & 32)
- ☐ 18. Ensure that the CAT® restraining rods are assembled down stream of posts 3 and 5 in the narrow portion of the key holes of the CAT® 1 & 2 Guardrails and there are lock washers and nuts on the inside of the panel and a nut on the outside of the panel with two threads showing past the nut. Ensure there are no washers between the nut and traffic face of the panel. (p 33)
- ☐ 19. Ensure the CAT® knockout tubes are assembled correctly and on the downstream side of Posts 4 and 6, using two (2) lag screws. Ensure the CAT® Post Plates are assembled correctly on Post 4. (p 34)
- ☐ 20. Ensure that all fasteners of the CAT® are tightened to a snug position with a minimum of two (2) bolt threads protruding beyond the nut. **There are no torque requirements.** (Various pp)
- ☐ 21. Ensure delineation is placed on the CAT® Nose Section per MUTCD and/ or state/specifying agency. (p 35)
- ☐ 22. Ensure any steel delineator posts are a minimum of 3'-0 [1 m] upstream from the CAT® 10 Gauge Nose Section. (p 35)

CAT® System Repair Checklist

(File with Maintenance Records)

Performed by: _____

Date: _____

Location: _____

- ☐ 1. Ensure only Valtir CAT® parts are used for the assembly of the CAT® System and that all parts are free of damage. (pp 5 & 6)
- ☐ 2. Ensure required traffic control is in place to conduct CAT® assembly. (p 5)
- ☐ 3. Ensure the appropriate CAT® Tail has been used. (pp 6 & 14)
- ☐ 4. Ensure proper site grading complies with state/specifying agency guidelines or AASHTO Roadside Design Guide, whichever is more stringent. (pp 14 & 16)
- ☐ 5. Ensure the top of the Tube Sleeves do not protrude more than 4" [100 mm] above the finished grade. (pp 17- 20).
- ☐ 6. Ensure that washers are assembled between the bolt head and strut and nut and strut at posts 1 & 2. (p 18)
- ☐ 7. Ensure that 1 3/4" x 3" [42 mm x 75 mm] Rectangular Washers are assembled at Post Locations 8, 7, 2, & 1. (pp 22, 25, 28 & 30)
- ☐ 8. Ensure the CAT® 12 Gauge, Slotted Guardrail-1 or CAT® 10 Gauge, Slotted/Welded, Guardrail-2 are oriented correctly and lapped in the appropriate direction allowing them to telescope when impacted on the nose. (pp 27 & 28)
- ☐ 9. Ensure that the CAT® 12 Gauge, Slotted Guardrail-1 or CAT® 10 Gauge, Slotted/Welded, Guardrail-2 are not bolted to post 3, 5, and 6. (pp 19 & 27)
- ☐ 10. Ensure that **only** the plate welded to the CAT® 10 Gauge, Slotted/Welded, Guardrail-2 is bolted to the post at post 4. (p 34)
- ☐ 11. Ensure the CAT® 3/16" x 2" x 10" [5 mm x 50 mm x 250 mm] plate washers at posts 4 and 6 are located on the inside and outside of the CAT® 12 Gauge, Slotted Guardrail-1 or CAT® 10 Gauge, Slotted/Welded, Guardrail-2. (pp 35 and 37)
- ☐ 12. Ensure that only CAT® hex bolts with the CAT® symbol are used to assemble the splices at posts 4 and 6. (pp 26-28)
- ☐ 13. Ensure that the gusset plates in the CAT® spacer block are facing Post 2. (p 29)
- ☐ 14. Ensure CAT® pipe sleeves are inserted at both Post 1 and Post 2. If a single sided CAT® Tail is used, ensure a pipe sleeve is used at Post 6. (pp 24 & 32)
- ☐ 15. Ensure the CAT® Bearing Plate is toe nailed and oriented with the hole 3" from the bottom edge of the CAT® Bearing Plate. (pp 24 & 32)
- ☐ 16. Ensure the CAT® Anchor Cable and CAT® Tail Anchor Cable when used, is double nutted on each end and are tightened against each other with a minimum of two (2) threads showing past the outside nut. (pp 24 & 32)
- ☐ 17. Ensure the CAT® Anchor Cable and CAT® Tail Anchor Cable when used is taut. (pp 24 & 32)
- ☐ 18. Ensure that the CAT® restraining rods are assembled down stream of posts 3 and 5 in the narrow portion of the key holes of the CAT® 1 & 2 Guardrails and there are lock washers and nuts on the inside of the panel and a nut on the outside of the panel with two threads showing past the nut. Ensure there are no washers between the nut and traffic face of the panel. (p 33)
- ☐ 19. Ensure the CAT® knockout tubes are assembled correctly and on the downstream side of Posts 4 and 6, using two (2) lag screws. Ensure the CAT® Post Plates are assembled correctly on Post 4. (p 34)
- ☐ 20. Ensure that all fasteners of the CAT® are tightened to a snug position with a minimum of two (2) bolt threads protruding beyond the nut. **There are no torque requirements.** (Various pp)
- ☐ 21. Ensure delineation is placed on the CAT® Nose Section per MUTCD and/ or state/specifying agency. (p 35)
- ☐ 22. Ensure any steel delineator posts are a minimum of 3'-0 [1 m] upstream from the CAT® 10 Gauge Nose Section. (p 35)

CAT® Routine Inspection Checklist

(File with Maintenance Records)

Performed by: _____

Date: _____

Location: _____

Valtir recommends the state/specifying agency develop and administer their own end terminal inspection program, based on location of unit, volume of traffic and impact history.



Important: The CAT® and all of its components shall be inspected for damage after every impact. Repair using only Valtir parts that are specified for use within this CAT® Product Description Assembly Manual.

If no end terminal inspection program exists, Valtir recommends visual drive-by inspections at least once every month and walk-up inspections every six (6) months. These inspections shall, at a minimum, consist of:

Visual Drive-By Inspections (Recommended Frequency: Monthly)

- ☐ Check for damage caused by vehicle impacts.
- ☐ Check for damage caused by impacts from snowplow, mowing or roadway operations.
- ☐ Check for misalignment.
- ☐ Check for missing system components.
- ☐ Check for vandalism.
- ☐ Check for damage caused by adverse weather conditions (i.e. erosion, weight of snow, UV).

Walk-Up Inspections (Recommended Frequency: Every Six (6) Months)

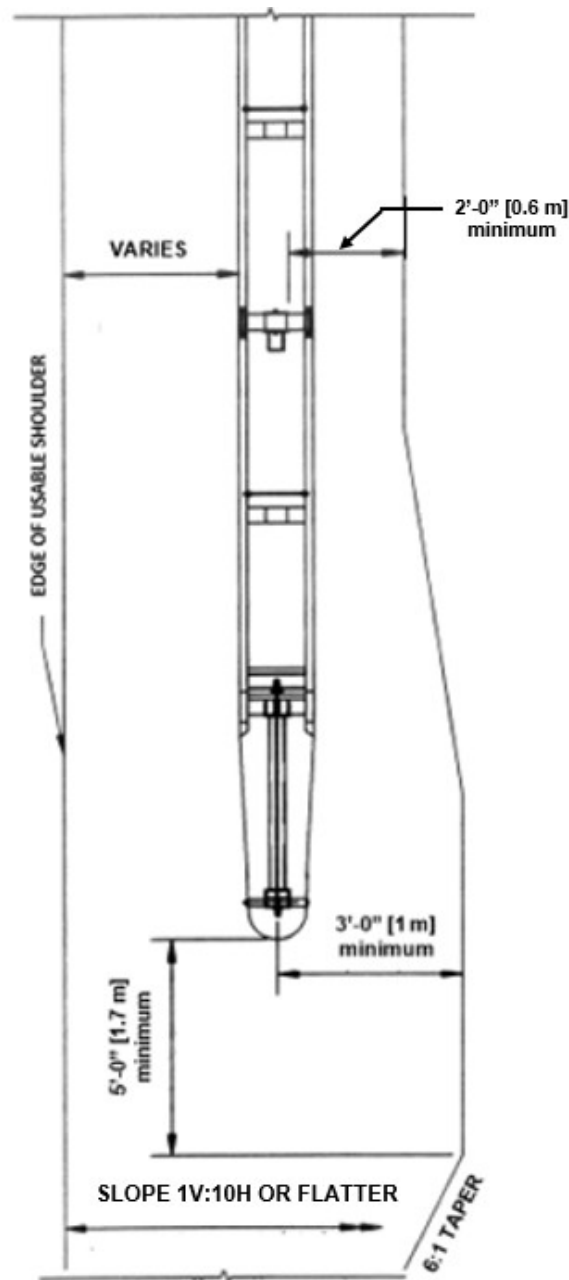
Walk-Up Inspections include ALL Visual Drive-By Inspection items (listed above) as well as the items listed below.

- ☐ Ensure required traffic control is in place to conduct walk-up inspection.
- ☐ Clear and dispose of any debris or trash found on the CAT® site, which may interfere with the performance of the CAT®.
- ☐ Check that fasteners are fully tight and a minimum of two (2) bolt threads are protruding beyond the nut.
- ☐ Check for erosion to the site grading around the system.
- ☐ Ensure that the Anchor Cable(s) is/are taut and the Bearing Plate(s) is/are properly positioned and toe nailed. Ensure the CAT® Restraining Rods are correctly assembled.
- ☐ Ensure the CAT® Panels are lapped correctly to allow them to telescope.

If any of the above items are identified during the inspection process, swift action shall be taken to correct and repair the CAT® to working condition as outlined in the CAT® Product Description Assembly Manual, latest edition.

Appendix A

AASHTO Roadside Design Guide Roadside (Shoulder) Grading Detail



CAT® Roadside (Shoulder) Grading Detail

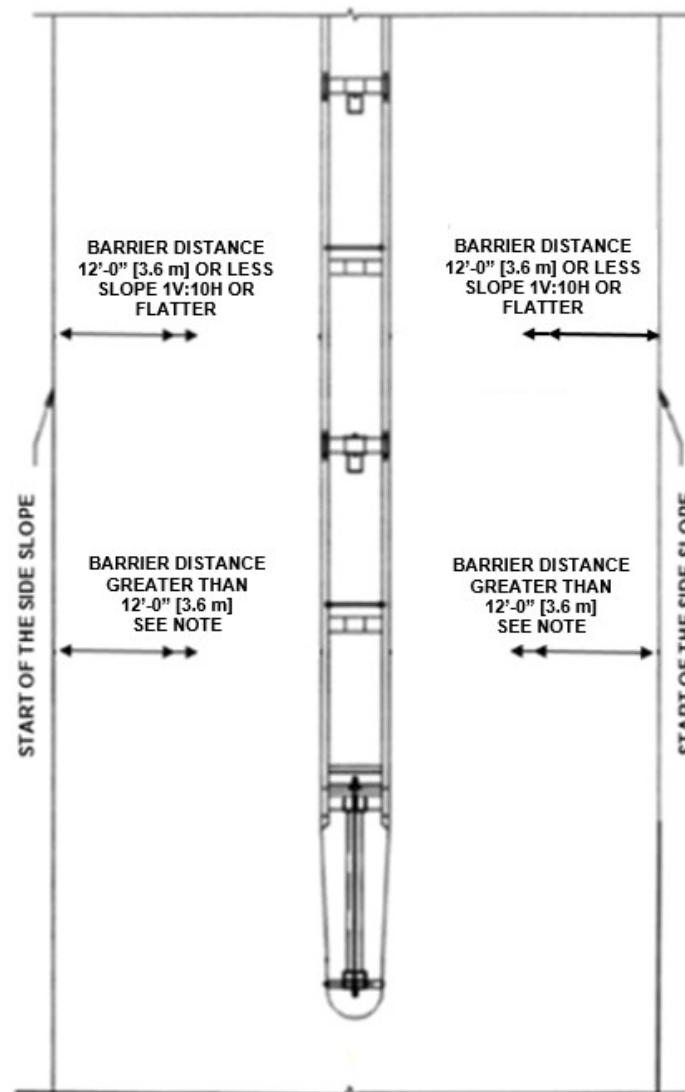
Detail derived from information contained in the AASHTO Roadside Design Guide, 4th Edition 2011



Important: Trinity Highway does not direct grading. Proper site grading must be accomplished before assembly of the CAT® System in accordance with state/specifying agency guidelines OR the AASHTO Roadside Design Guide whichever is more stringent. Failure to follow this warning could result in serious injury or death in the event of a vehicle impact with the system.

Appendix B

AASHTO Roadside Design Guide Median Grading Detail



NOTE: Refer to AASHTO Roadside Design Guide, 4th Edition 2011, Section 5.6.2.2 Slopes, pp 5-46 through 5-48 for slope criteria.

CAT[®] MEDIAN Grading Detail

Detail derived from information contained in the AASHTO Roadside Design Guide, 4th Edition 2011



Important: Trinity Highway does not direct grading. Proper site grading must be accomplished before assembly of the CAT[®] System in accordance with state/specifying agency guidelines OR the AASHTO Roadside Design Guide whichever is more stringent. Failure to follow this warning could result in serious injury or death in the event of a vehicle impact with the system.

Appendix C

CAT® SS245 Repair Kit1 and CAT® Hardware Bags

ID	CAT® SS245 Repair Kit1, (Above Ground Only)	PN	50245L
A	CAT® 12 gauge, Slotted Guardrail-1, 12'-6" [3.810 m]	31G	1
B	CAT® 10 gauge, Slotted/Welded Guardrail-2, 12'-6" [3.810 m]	130A	2
G	CAT® Side Plate	984G	2
K	CAT® Channel Strut	9852A	1
M	CAT® Nose Plate	983G	1
N	CAT® Cable Assembly 3/4" x 8'-0" [19 mm x 2.44 m]	3012G	1
UU	Spacer Channel CAT®	9915A	1
	CAT® Bundled Wood	6298B	1
	CAT® Hardware Can	43660G	1

ID	CAT® HARDWARE BAGS	PN	33811G Post 1	33812G Post 2	33813G Post 3	33814G Post 4	338115G Post 5	33816G Post 6
P	3/8" x 2" [10 mm x 50 mm] Lag Screw at Posts 4 & 6	3263G				2		2
S	3/8" Round Washer at Posts 4 & 6	3255G				2		2
T	1" Hex Nut (At Cable Ends)	3910G	2	2				
U	5/8" x 1.25" GR Bolt	3360G	8	8				
V	1" Round Washer (At Cable Ends)	3900G	1	1				
W	5/8" x 1.5" Hex Bolt	3380G		8				
Y	5/8" x 7.5" Hex Bolt	3478G	2	2	2	3	2	2
AA	5/8" Round Washer	3300G	2	2	4	4	4	4
BB	5/8" GR Hex Nut	3340G	12	2	5	22	5	21
CC	5/8" x 9.5" Hex Bolt	3497G	1	1	1	1	1	1
HH	3/8" Hex Nut	4252G			4		4	
JJ	3/8" Lock Washer	4258G			2		2	
LL	3/16" x 1.75" x 3" [5 mm x 44 mm x 75 mm] Rectangular Washer	3320G	2	2				
MM	CAT® 5/8" x 1.75" Hex Bolt	3395G				16		16

Additional CAT® Related Materials	PN
CAT® Bundled Wood Products for Posts 1-6	6298B
CAT® Can Hardware Kit	43660G

NOTES:



For more complete information on Valtir products and services, visit us on the web at www.valtir.com. Materials and specifications are subject to change without notice. Please contact Valtir to confirm that you are referring to the most current instructions.

WWW.VALTIR.COM
1.888.356.2363