

AUG 16 2012

QUADGUARD ELITE SYSTEM (Permanent)
S544-0044

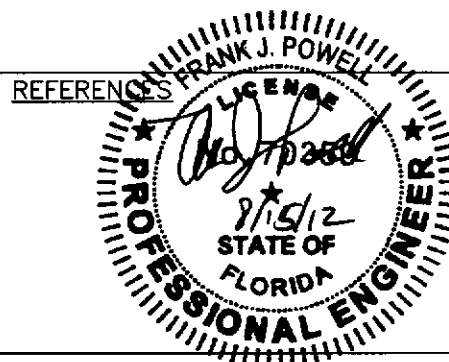
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1. The energy absorbing system represented on these Qualified Products List (QPL) drawings is a proprietary design by Energy Absorption Systems, of Trinity Industries, Inc., and marketed under the name QUADGUARD® ELITE System (QGE). Any infringement on the rights of the designer shall be the sole responsibility of the users.
2. The QGE is a non-gating, redirective crash cushion which is well suited for use shielding hazards subject to high speed traffic. The QGE is used for permanent installations. The beginning length of need shall be at the point of intersection between the face of the crash cushion and the transverse centerline of the first diaphragm.
3. The QGE has been fully tested to NCHRP-350 as a redirective, non-gating system. The model numbers listed in the table are accepted for speeds \leq the listed design speed. See table on Sheets 2 and 3.
4. The QUADGUARD® Elite tension strut backup is the primary backup to be used on Florida Department of Transportation projects. Use of concrete backups will be permitted, but will require call out and detailing in the plans for site specific construction; concrete backups must meet manufacturer's specifications, installation guidelines and transition hardware requirements.
5. The QGE shall be assembled and installed in accordance with the manufacturer's detailed drawings, procedures, specifications and installation guide.
6. The QGE is available in 24", and 30", 36", 69" and 90" nominal widths. The system width will be as called out in the plans, permit or other contract document for each location.
7. Only the QGE Type 1, Type 2 and QEN energy absorbing cylinders shall be used as shown on the drawings.
8. All metallic compounds shall meet the galvanizing requirements for guardrail, Section 967 of the FDOT Specifications.
9. A yellow Type 1 Object Marker shall be centered 3' in front of the nose of the QG. Mounting hardware shall be in conformance with index no. 11860. The cost of the Object Marker shall be included in the cost of the QG.

As an option, the contractor may install reflective sheeting on the nose of the crash cushion. The sheeting to be used must be solid yellow, Type III or better and must be a product listed on the Department's Qualified Products List (QPL). The sheeting to be applied to the nose of the crash cushion shall be a minimum of 360 square inches with a minimum height of 15".

Frank J. Powell, PE 3617 Cincinnati Ave.
 Florida #70359 Rocklin, CA 95765

Revisions	Date	Rev.	By	Ckd.	App.



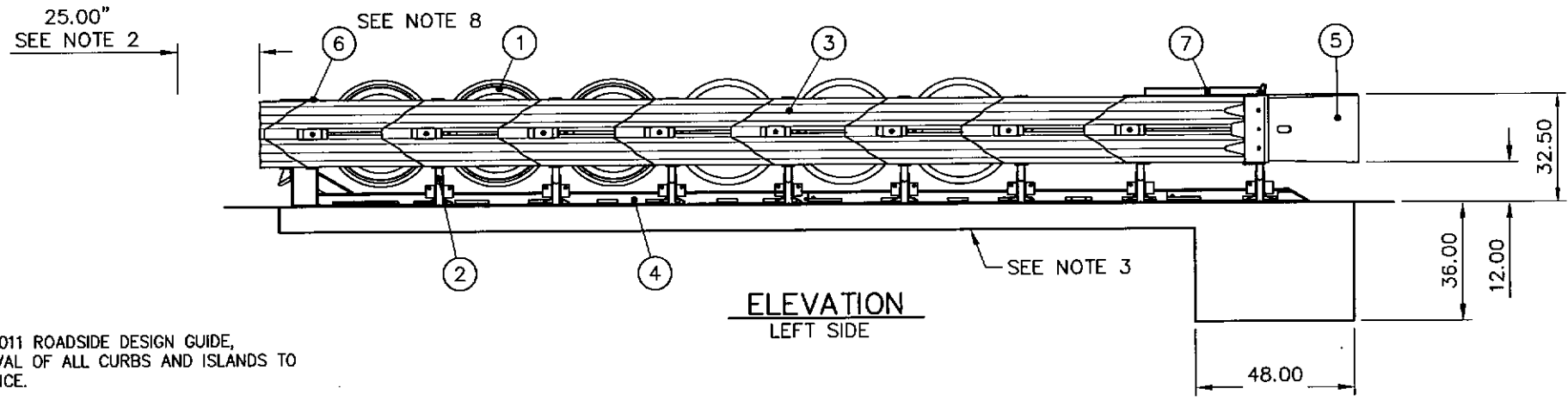
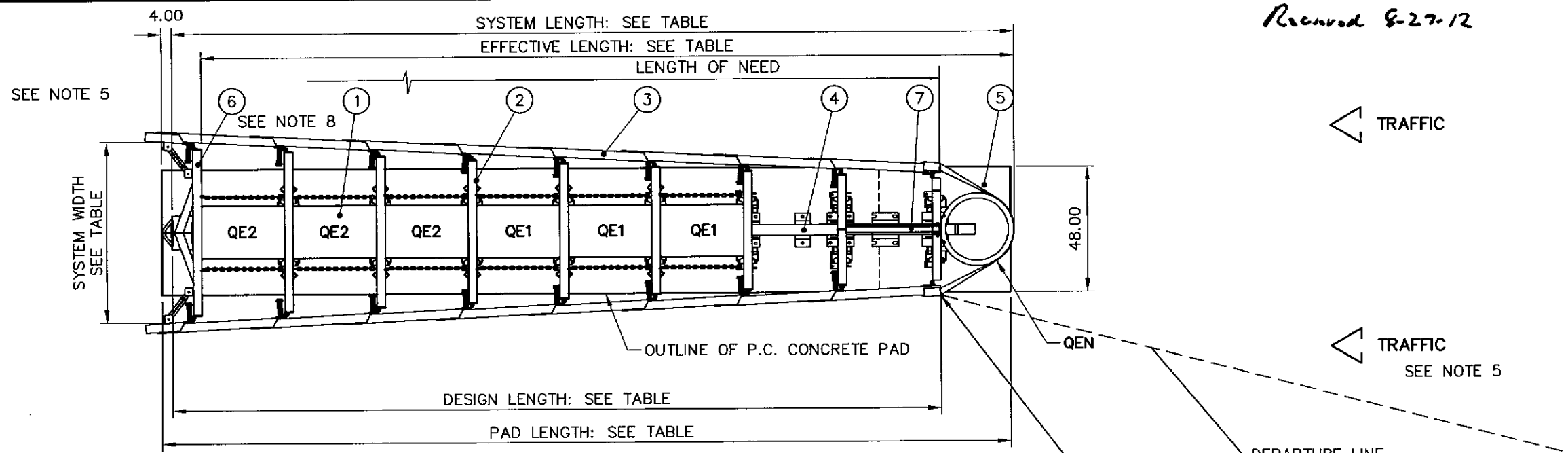
DRAWN: K. LOONEY	DATE: 5/14/2012
DESIGNED:	DATE:
CHECKED: R. Brougner	DATE: 7/25/12
APPROVED: Frank J. Powell	DATE: 7/26/12
CAD FILE: 60-36-72 Cover.dwg	
NEXT ASSEMBLY:	

 **ENERGY ABSORPTION SYSTEMS**
 ENGINEERING AND RESEARCH DEPARTMENT

QUADGUARD® ELITE™ PERMANENT
DRAWING SET
FOR QPL S544-0044

SCALE	DWG.	SHEET	REV
	60-36-72	1 of 25	

Revised 8-27-12



- NOTES:
- IN COMPLIANCE WITH THE AASHTO 2011 ROADSIDE DESIGN GUIDE, MANUFACTURER RECOMMENDS REMOVAL OF ALL CURBS AND ISLANDS TO ENSURE PROPER IMPACT PERFORMANCE.
 - PROVISION SHALL BE MADE FOR REAR FENDER PANELS TO SLIDE REARWARD UPON IMPACT 25.00" MIN.
 - 6.00" MIN. REINFORCED 4000 PSI P.C. CONCRETE PAD OR 8.00" MIN. NON-REINFORCED 4000 PSI P.C. CONCRETE ROADWAY, MEASURING AT LEAST 12'-0" WIDE BY 50'-0" LONG OR 7.00" MIN. 4000 PSI P.C. CONCRETE DECK STRUCTURE.
 - SEE THE "QUADGUARD ELITE SYSTEM PRODUCT MANUAL", FOR A DESCRIPTION OF ITS IMPACT PERFORMANCE CHARACTERISTICS AND DESIGN LIMITATIONS BEFORE PLACING A SYSTEM AT A GIVEN SITE. INFORMATION AND COPIES OF ABOVE MANUAL ARE AVAILABLE ON QPL.
 - FOR BIDIRECTIONAL OR OTHER NECESSARY APPLICATIONS, SUPPLY AN ADEQUATE TRANSITION FROM THE QUADGUARD ELITE SYSTEM TO THE OBJECT BEING SHIELDED.

- FOR PROPER IMPACT PERFORMANCE, THE UNIT MUST BE RESTORED TO ITS ORIGINAL LENGTH AFTER EACH IMPACT.
- UNITS OF MEASUREMENT ARE INCHES UNLESS OTHERWISE NOTED.
- BACKUP ASSEMBLY NOT INCLUDED IN MODEL NUMBER. ORDER SEPARATELY.
- 5 BAY QUADGUARD ELITE SYSTEMS USE ONLY QE1 AND QEN CYLINDERS.
- THE QUADGUARD ELITE SYSTEM HAS BEEN TESTED TO NCHRP 350 TL-2 AND TL-3 AS A REDIRECTIVE, NON-GATING SYSTEM. THE MODEL NUMBERS LISTED IN THE TABLE ARE ACCEPTED FOR DESIGN SPEEDS EQUAL TO OR LESS THAN THE LISTED DESIGN SPEED.
- △ FHWA ACKNOWLEDGES THAT HIGHWAY SAFETY HARDWARE TESTED TO NCHRP 350 TL-3 AT 62.1 mph IS ELIGIBLE FOR FHWA MATCHING FUNDS WHEN INSTALLED ON HIGHWAYS WITH POSTED SPEEDS GREATER THAN 62.1 mph.

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BAYS	69" WIDTH MODEL#	90" WIDTH MODEL#	SYSTEM LENGTH	EFFECTIVE LENGTH	PAD LENGTH	DESIGN LENGTH	DESIGN SPEED	TESTED TO	# OF CYLINDERS TYPE I	# OF CYLINDERS TYPE II
5	QS6905E	QS9005E	17'-11"	17'-7"	18'-0"	15'-3"	45 mph*	TL-2	3	0
8	QS6908E	QS9008E	26'-7"	25'-11"	27'-0"	24'-0"	60 mph*Δ	TL-3	3	3

*FOR FACILITIES WITH A DESIGN SPEED OF ≥ 50 mph USE A 8 BAY SYSTEM. FOR FACILITIES WITH A DESIGN SPEED OF < 45 mph USE A 5 BAY. SEE NOTE 10 & 11.

UNIDIRECTIONAL (SEE NOTE 5)
MODEL NO. SEE TABLE

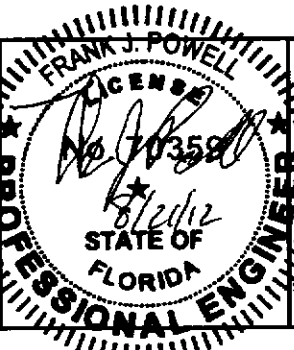
- KEY
- ① QUADGUARD ELITE CYLINDER
 - ② DIAPHRAGM
 - ③ FENDER PANEL
 - ④ MONORAIL
 - ⑤ NOSE ASSEMBLY
 - ⑥ BACKUP
 - ⑦ HIT INDICATOR

Revisions	Date	Rev.	By	Ckd.	App.

REFERENCES

SERIAL#	_____	DIAPHRAGM ASSY.	SHEET 5
SALES ORDER#	_____	NOSE ASSY.	SHEET 7
EH PROJECT#	_____	FENDER PANEL ASSY.	SHEET 9
DESIGN SPEED	_____	BACKUP ASSY.	SHEET 13
NOSE COLOR	_____	MONORAIL ASSY.	SHEET 11
NUMBER OF UNITS	_____	CONCRETE PAD	SHEET 10
TRANSITION ASSY.	SHEETS 21 - 25	BAY ASSY.	SHEETS 16 & 17
WHEEL DEFLECTOR ASSY.	N/A	CHAIN ASSY.	SHEET 18
		HIT INDICATOR ASSY.	SHEET 20

DRAWN: K. LOONEY DATE: 05/02/12
DESIGNED: _____ DATE: _____
CHECKED: R. Brougner DATE: 7/25/11
APPROVED: Frank J. Powell DATE: 7/26/11
CAD FILE: 60-36-72 SH 3.dwg



ENERGY ABSORPTION SYSTEMS
ENGINEERING AND RESEARCH DEPARTMENT

QUADGUARD® ELITE SYSTEM (PERMANENT)
TENSION STRUT BACKUP (PERMANENT) FOR FLORIDA
QPL S544-0044

SCALE: 1=50 DWG: 60-36-72 SHEET: 3 of 25 REV: _____

PARTS LIST			
ITEM	STOCK NO.	DESCRIPTION	QTY.
1	SEE TABLE	DIAPHRAGM,QB,36,G,QGE	1
2	611368G	MONORAIL GUIDE,QG,G	2
3	003704G	3/4" HVY HEX NUT A563 DH	4
4	113555G	BOLT,HX,3/4X2,G8,G	4
5	118089G	WASHER,LOCK,3/4,G	4

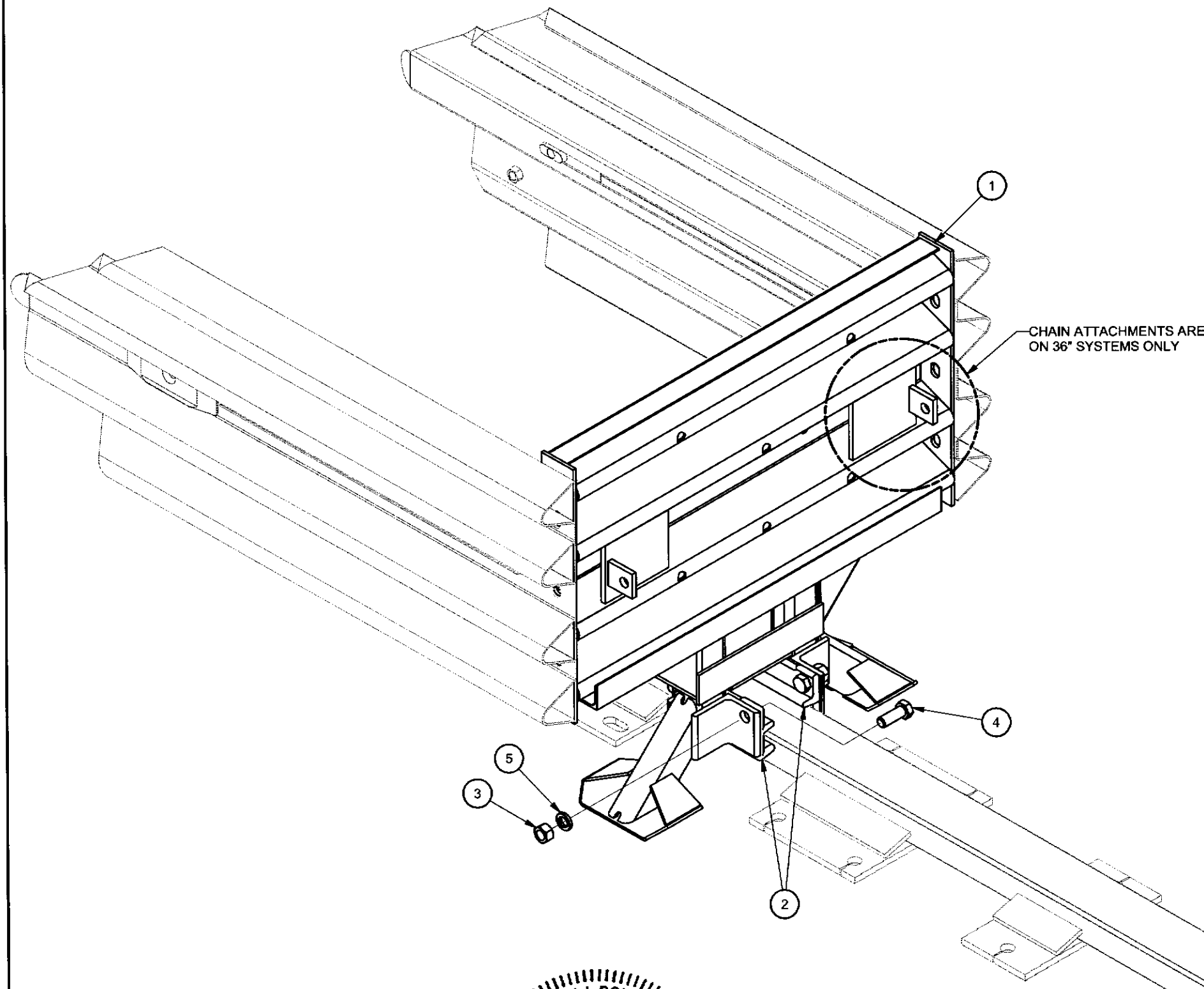
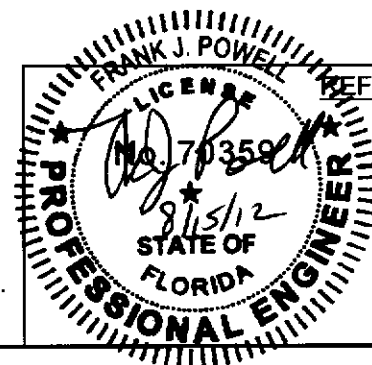


Table		
WIDTH	ASSEMBLY NO.	ITEM 1 PART NO.
24"	607187B	607820B
30"	607189B	607826B
36"	607190B	607832B

ASSEMBLY NO. (SEE TABLE)

Frank J. Powell, PE 3617 Cincinnati Ave.
Florida #70359 Rocklin, CA 95765



REFERENCES

DRAWN: S. Trageser	DATE: 3/15/2012
DESIGNED:	DATE:
CHECKED: R. Brougher	DATE: 7/25/12
APPROVED: Frank J. Powell	DATE: 7/26/12
FILE: 60-36-72 SH04	

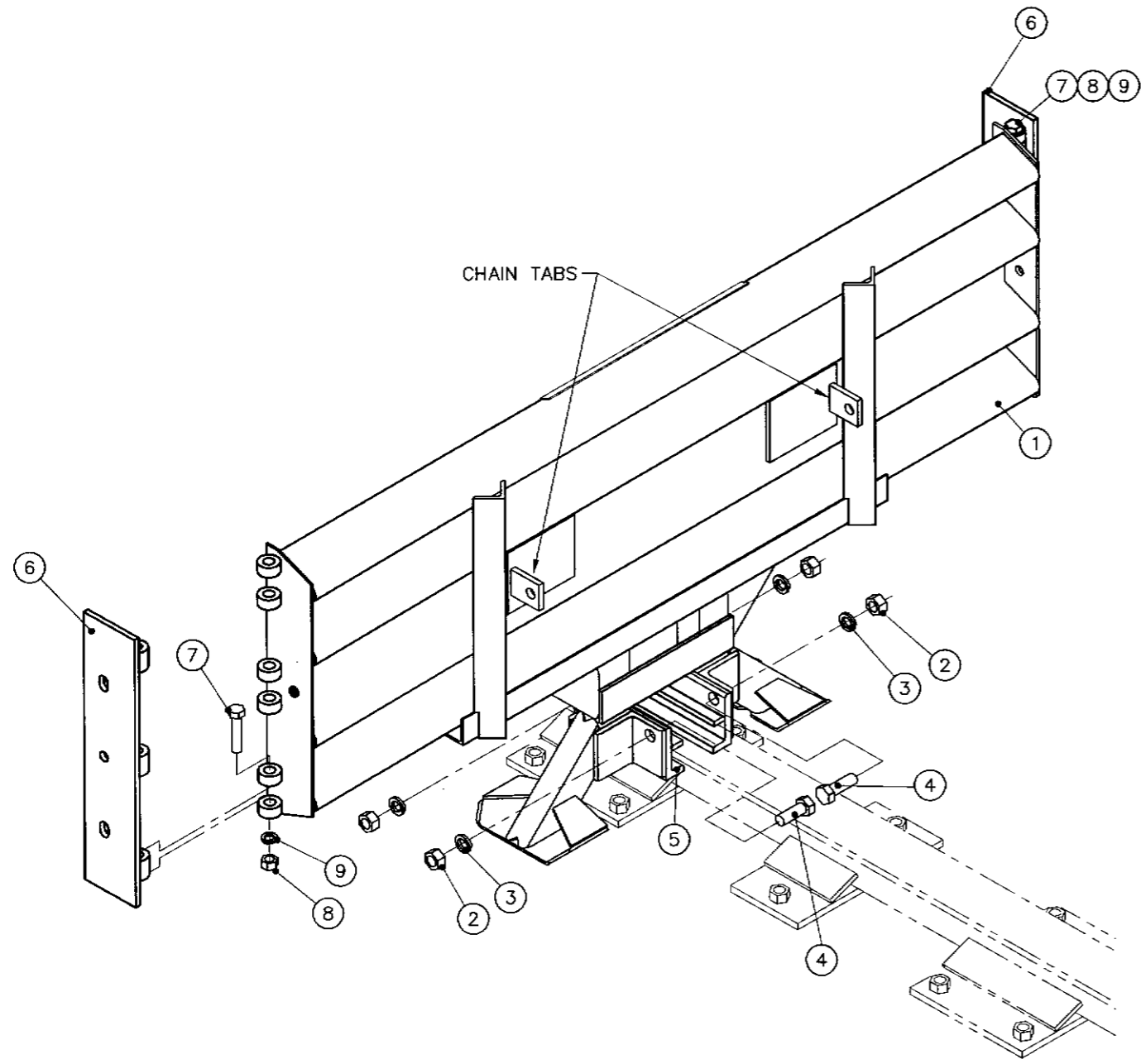


QUADGUARD® ELITE™ SYSTEM
DIAPHRAGM ASSY,QGE,24,30,36

SCALE: Do Not Scale	DRAWING: 60-36-72	SHEET: 4 of 25	REV
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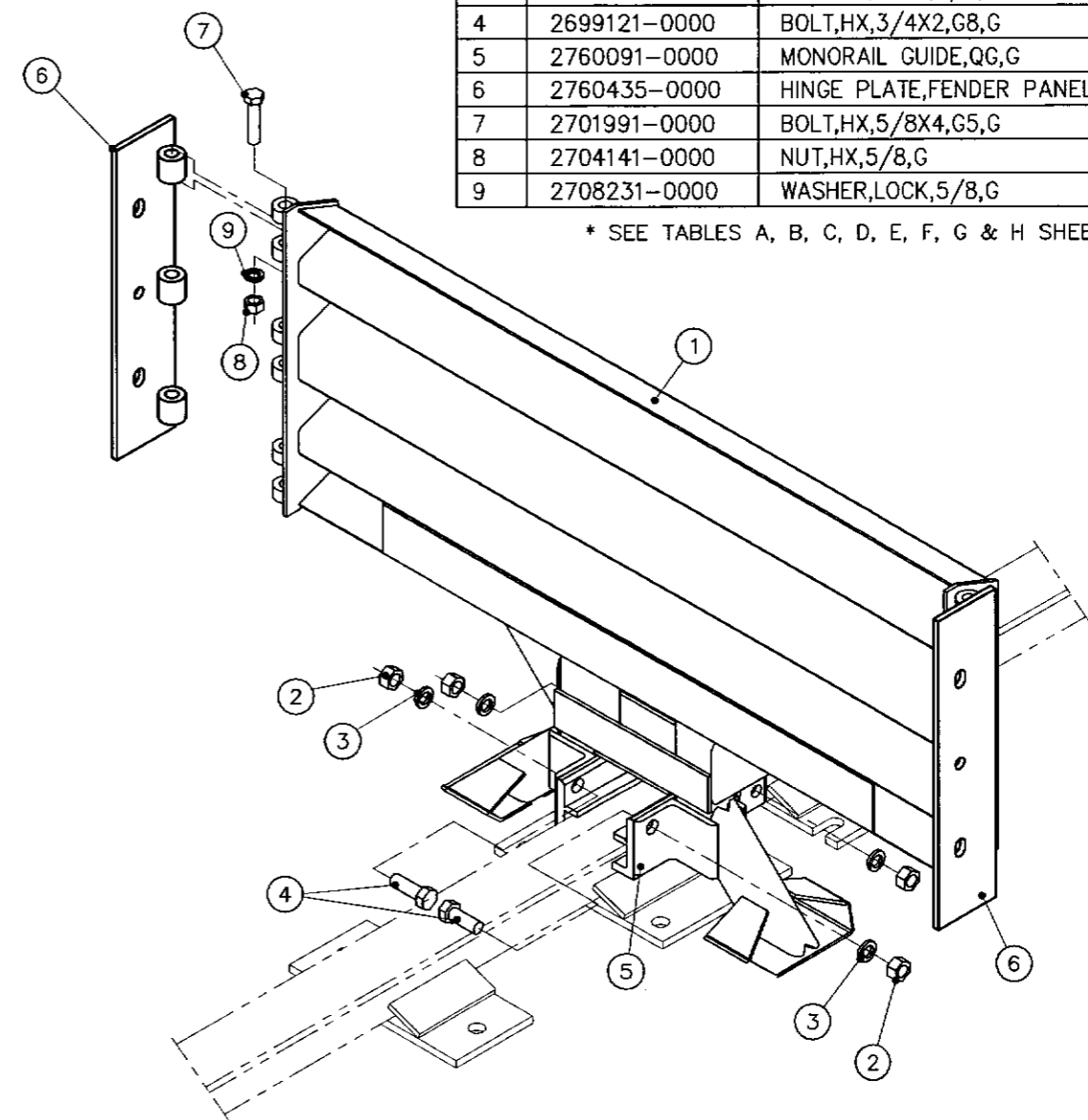
PARTS LIST			
ITEM	STOCK NO.	DESCRIPTION	REQ'D
1	*	DIAPHRAGM,QB,QG,G	1.00
2	2704341-0000	NUT,HX,3/4,G,GR DH	4.00
3	2708201-0000	WASHER,LOCK,3/4,G	4.00
4	2699121-0000	BOLT,HX,3/4X2,G8,G	4.00
5	2760091-0000	MONORAIL GUIDE,QG,G	2.00
6	2760435-0000	HINGE PLATE,FENDER PANEL,QG,G	2.00
7	2701991-0000	BOLT,HX,5/8X4,G5,G	6.00
8	2704141-0000	NUT,HX,5/8,G	6.00
9	2708231-0000	WASHER,LOCK,5/8,G	6.00

* SEE TABLES A, B, C, D, E, F, G & H SHEETS 2, 3 & 4



VIEW FRONT SIDE

DIAPHRAGM #4-1
DIAPHRAGM #3 ONLY HAS CHAIN TABS ON THE BACK SIDE



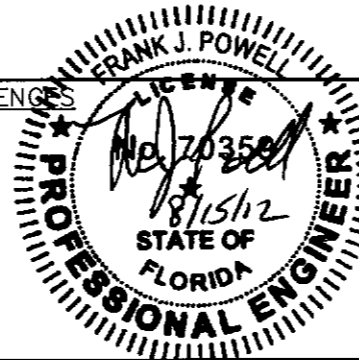
VIEW BACK SIDE

DIAPHRAGM #1 AND #2

(SEE TABLES A, B, C, ETC.)

ASSEMBLY NO. 3540 - - - -

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REFERENCES

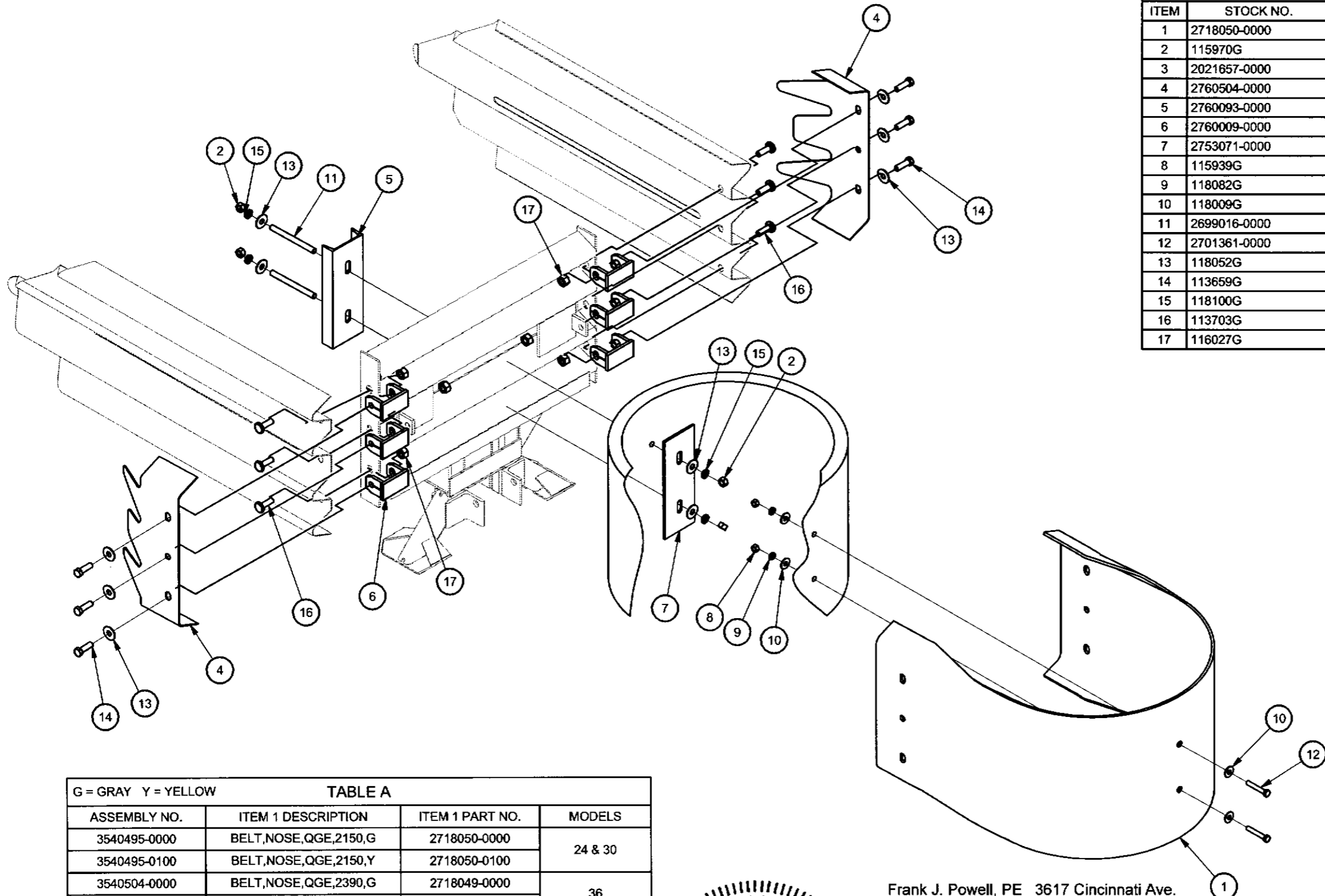
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DESIGNED:	R. Blaski	DATE:	1/6/99
CHECKED:	R. Brouger	DATE:	7/25/12
APPROVED:	Frank J. Powell	DATE:	7/26/12
CAD FILE:	60-36-72 SH 5.dwg		
NEXT ASSEMBLY:			

ENERGY ABSORPTION SYSTEMS
ENGINEERING AND RESEARCH DEPARTMENT

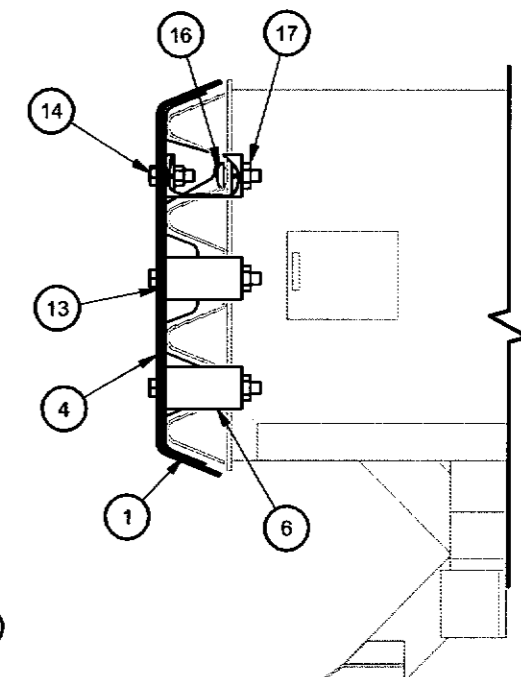
QUADGUARD® ELITE™ SYSTEMS
DIAPHRAGM ASSY,
QGE,69/90

Revisions	Date	Rev.	By	Ckd.	App.

SCALE	1:12	DWG	60-36-72	SHEET	5 of 25	REV	-
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PARTS LIST			
ITEM	STOCK NO.	DESCRIPTION	QTY.
1	2718050-0000	BELT,NOSE,84 5/8,QGE,24&30,G	1
2	115970G	NUT,HX,5/8,G	4
3	2021657-0000	CYLINDER,NOSE,HDPE,28X20	1
4	2760504-0000	CLAMP,NOSE BELT,QG,G	2
5	2760093-0000	BRACKET,CHAIN MOUNT,VERT TAB,G	1
6	2760009-0000	STOP,TAB,WRAP,WELDMENT	6
7	2753071-0000	PLATE,NOSE CYLINDER,G	1
8	115939G	NUT,HX,1/2,G	2
9	118082G	WASHER,LOCK,1/2,G	2
10	118009G	WASHER,FLAT,1/2X1 3/8,G	4
11	2699016-0000	ROD,THREADED,5/8X7,G5,G	2
12	2701361-0000	BOLT,HX,1/2X3,G2,G	2
13	118052G	WASHER,FLAT,5/8 X 1 3/4, G	10
14	113659G	BOLT,HX,5/8X2,G2,G	6
15	118100G	WASHER,LOCK,5/8,G	4
16	113703G	BOLT,SPLICE,M16X50,8.8,G	6
17	116027G	NUT,HX,SPLICE,M16,G	6



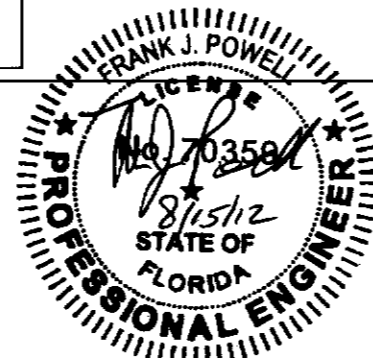
SECTION A-A
SCALE 1 / 10

G = GRAY Y = YELLOW

TABLE A			
ASSEMBLY NO.	ITEM 1 DESCRIPTION	ITEM 1 PART NO.	MODELS
3540495-0000	BELT,NOSE,QGE,2150,G	2718050-0000	24 & 30
3540495-0100	BELT,NOSE,QGE,2150,Y	2718050-0100	
3540504-0000	BELT,NOSE,QGE,2390,G	2718049-0000	36
3540504-0100	BELT,NOSE,QGE,2390,Y	2718049-0100	

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ASSEMBLY NO. (SEE TABLE)

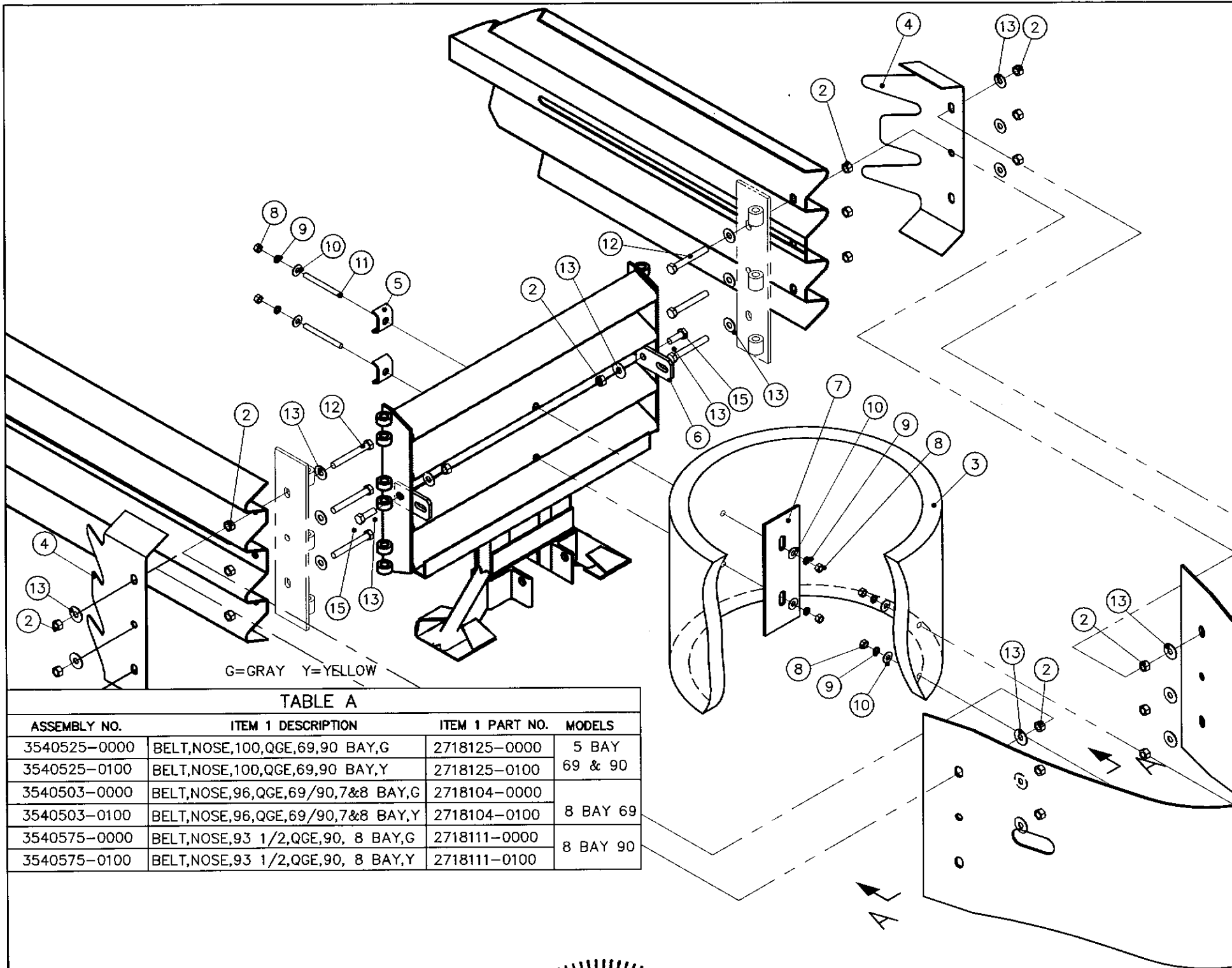


DRAWN: S. Trageser	DATE: 3/15/2012
DESIGNED:	DATE:
CHECKED: R. Brouger	DATE: 7/25/2012
APPROVED: Frank J. Powell	DATE: 7/26/2012
FILE: 60-36-72 SH06	



QUADGUARD® ELITE™ SYSTEM
NOSE ASSY,QGE,24,30 & 36,G OR Y

SCALE: Do Not Scale	DRAWING: 60-36-72	SHEET: 6 of 25	REV:
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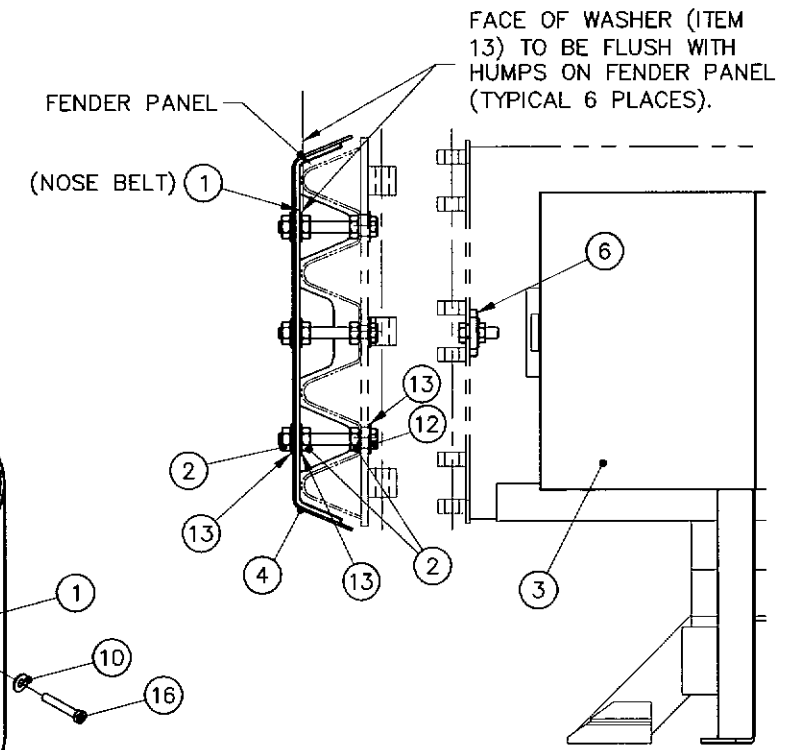


PARTS LIST			
ITEM	STOCK NO.	DESCRIPTION	REQ'D
1	SEE TABLE	BELT,NOSE,QGE	1.00
2	2704141-0000	NUT,HX,5/8,G	20.0
3	2021657-0000	CYLINDER,NOSE,HDPE,28X20X2	1.00
4	2760504-0000	CLAMP,BELT,LMC	2.00
5	2760507-0000	SHIM,NOSE CLAMP, G	2.00
6	2760251-0000	BRACKET,PULL OUT,QG	2.00
7	2753071-0000	PLATE,NOSE CYLINDER	1.00
8	2704011-0000	NUT,HX,1/2,G	6.00
9	2708181-0000	WASHER,LOCK,1/2,G	6.00
10	2708011-0000	WASHER,FLAT,1/2X1 3/8,G	8.00
11	2699171-0000	ROD,THREADED,1/2X5 3/4,G5,G	2.00
12	2701994-0000	BOLT,HX,5/8X5,G5,G,ALL THREAD	6.00
13	2708291-0000	WASHER,FLAT,5/8X1 3/4,G	20.0
15	2698241-0000	BOLT,HX,5/8X2 1/4,G8,G	2.00
16	2701361-0000	BOLT,HX,1/2x3,G2,G	2.00

G=GRAY Y=YELLOW

TABLE A

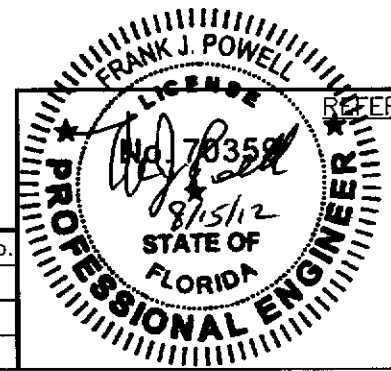
ASSEMBLY NO.	ITEM 1 DESCRIPTION	ITEM 1 PART NO.	MODELS
3540525-0000	BELT,NOSE,100,QGE,69,90 BAY,G	2718125-0000	5 BAY
3540525-0100	BELT,NOSE,100,QGE,69,90 BAY,Y	2718125-0100	69 & 90
3540503-0000	BELT,NOSE,96,QGE,69/90,7&8 BAY,G	2718104-0000	8 BAY 69
3540503-0100	BELT,NOSE,96,QGE,69/90,7&8 BAY,Y	2718104-0100	8 BAY 90
3540575-0000	BELT,NOSE,93 1/2,QGE,90, 8 BAY,G	2718111-0000	8 BAY 90
3540575-0100	BELT,NOSE,93 1/2,QGE,90, 8 BAY,Y	2718111-0100	



VIEW A-A
SCALE - 1:10

ASSEMBLY NO. SEE TABLE

Frank J. Powell, PE 3617 Cincinnati Ave.
Florida #70359 Rocklin, CA 95765



REFERENCES

DRAWN: K. LOONEY	DATE: 5/4/12
DESIGNED:	DATE:
CHECKED: R. Brouger	DATE: 7/25/12
APPROVED: Frank J. Powell	DATE: 7/26/12
CAD FILE: 60-36-72 SH 7.dwg	
NEXT ASSEMBLY:	

ENERGY ABSORPTION SYSTEMS
ENGINEERING AND RESEARCH DEPARTMENT

QUADGUARD® ELITE™ SYSTEM
NOSE ASSY,QGE,G OR Y,69/90

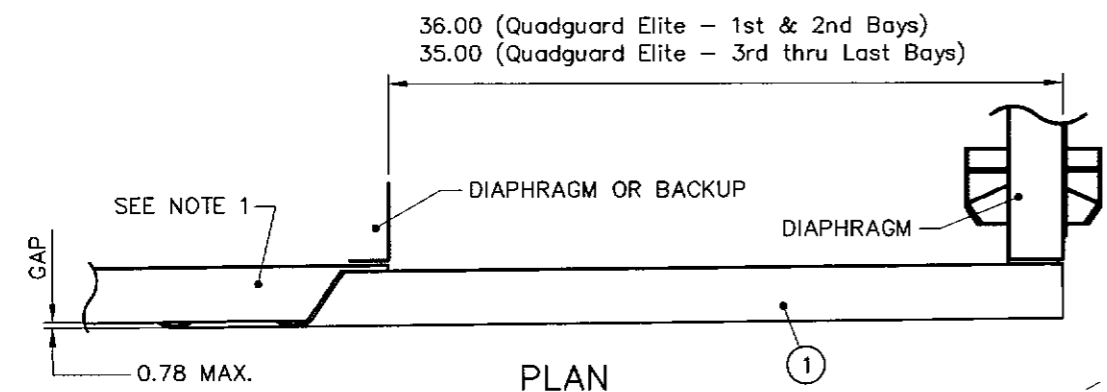
SCALE 1:15	DWG. 60-36-72	SHEET 7 of 25	REV -
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Revisions	Date	Rev.	By	Ckd.	App.

PARTS LIST			
ITEM	STOCK NO.	DESCRIPTION	REQ'D
1	611832G	PANEL,FENDER,QQ,G	1.00
2	113703G	BOLT,SPLICE,M16X50,8.8,G	2.00
3	116027G	NUT,HX,SPLICE,M16,G	2.00
4	617045G	WASHER,MUSHROOM,FORGED,QQ,G	1.00
5	116878G	SCREW,FL,5/8X5,G8,G,SOCKET	1.00
6	115970G	NUT,HX,5/8,G	1.00
7	118052G	WASHER,FLAT,5/8X1 3/4,G	1.00
8	117459G	SPRING,DIE,1 1/4 OD X5/8X1 1/2	1.00

TWO FENDER PANEL ASSEMBLIES REQUIRED PER BAY.

THE SPRING (ITEM 8) SHOULD BE COMPRESSED 1/16" TO 1/8" TO COMPLETE THE ASSEMBLY.



PLAN

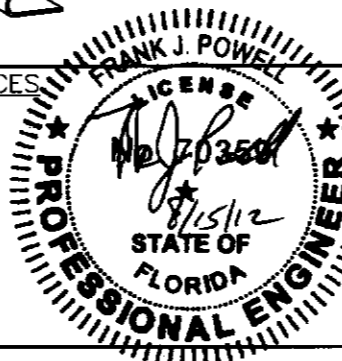
SEE NOTE 1

- NOTES:
1. UNDERLYING PANEL IS EITHER ANOTHER FENDER PANEL OR, IN THE CASE OF THE LAST FENDER PANEL IT COULD BE A BACKUP SIDE PANEL, EXTENSION PANEL OR TRANSITION PANEL.
 2. UNITS OF MEASUREMENT ARE INCHES UNLESS OTHERWISE NOTED.

Frank J. Powell, PE 3617 Cincinnati Ave.
Florida #70359 Rocklin, CA 95765

ASSEMBLY NO. 608235B

REFERENCES:



DRAWN:	K. Looney	DATE:	5/4/12
DESIGNED:	RBB	DATE:	12/8/98
CHECKED:	R. Brouger	DATE:	7/25/12
APPROVED:	Frank J. Powell	DATE:	7/26/12
CAD FILE:	60-36-72 sh 8		
NEXT ASSEMBLY:			

ENERGY ABSORPTION SYSTEMS
ENGINEERING AND RESEARCH DEPARTMENT

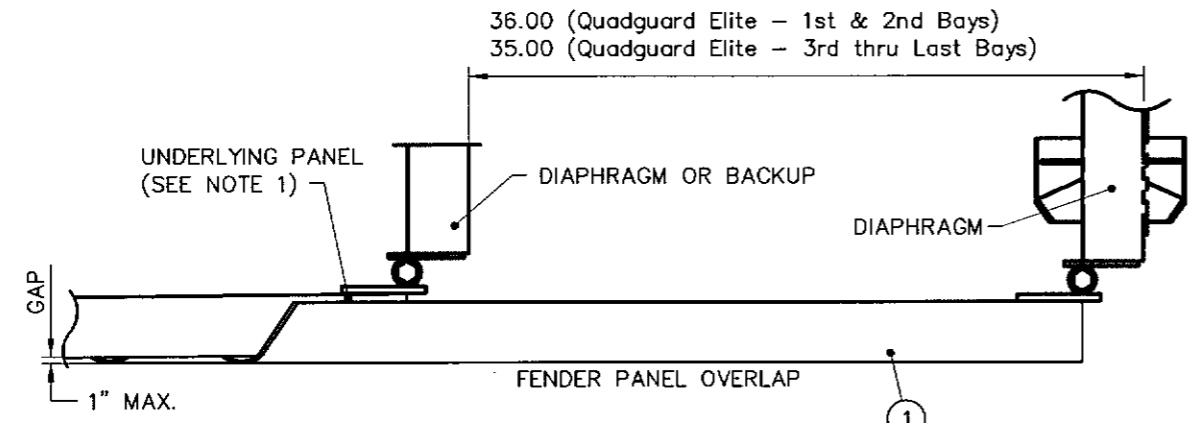
QUADGUARD ELITE™ SYSTEM
FENDER PANEL ASSY,
24, 30, & 36

SCALE: DWG: 60-36-72 SHEET: 8 of 25 REV: -

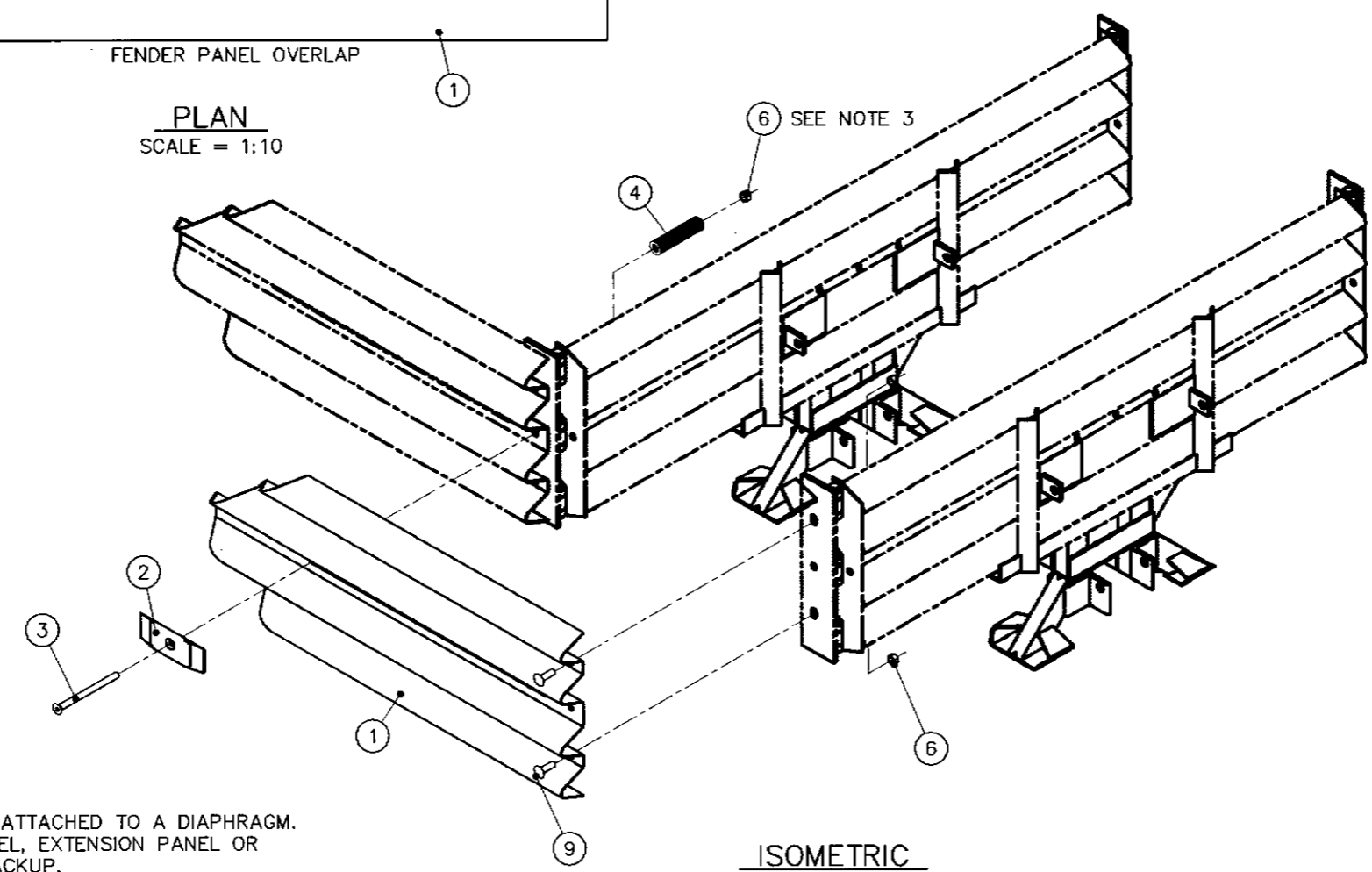
Revisions	Date	Rev.	By	Ckd.	App.

PARTS LIST			
ITEM	STOCK NO.	DESCRIPTION	REQ'D
1	611832G	PANEL,FENDER,QG,G	1.00
2	617045G	WASHER,MUSHROOM,QG,G	1.00
3	116879G	SCREW,FL,5/8X8 1/2,G8,G,SOCKET	1.00
4	117458G	SPRING,DIE,1 1/2 ODX3/4X6	1.00
6	003340G	NUT,HX,5/8,G,RAIL	3.00
9	003400G	BOLT,RAIL,5/8X2,G	2.00

TWO FENDER PANEL ASSEMBLIES REQUIRED PER BAY.



PLAN
SCALE = 1:10



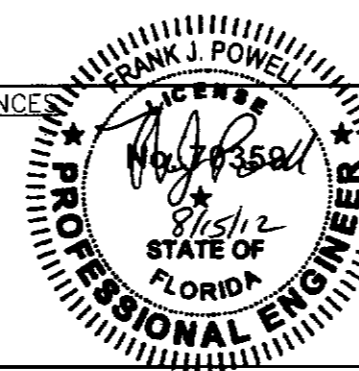
ISOMETRIC
SCALE = 1:20

- NOTES:
1. UNDERLYING PANEL IS A FENDER PANEL IF ATTACHED TO A DIAPHRAGM. UNDERLYING PANEL IS A BACKUP SIDE PANEL, EXTENSION PANEL OR TRANSITION PANEL IF ATTACHED TO THE BACKUP.
 2. UNITS OF MEASUREMENT ARE INCHES UNLESS OTHERWISE NOTED.
 3. TIGHTEN NUT UNTIL IT REACHES END OF THREADS.

Frank J. Powell, PE 3617 Cincinnati Ave.
Florida #70359 Rocklin, CA 95765

ASSY NO. 608240B

REFERENCES



DRAWN:	K. LOONEY	DATE:	05/4/12
DESIGNED:	J. Machado	DATE:	4/10/97
CHECKED:	R. Brougher	DATE:	7/25/12
APPROVED:	Frank J. Powell	DATE:	7/26/12
CAD FILE:	60-36-72. SH 9		
NEXT ASSEMBLY:			

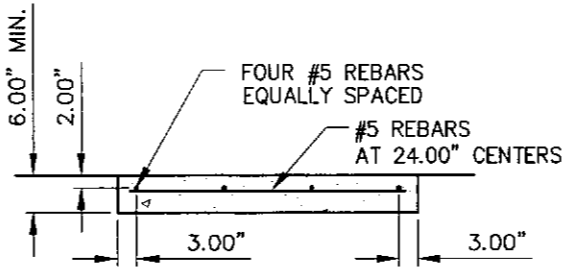
ENERGY ABSORPTION SYSTEMS
ENGINEERING AND RESEARCH DEPARTMENT

QuadGuard® ELITE™ SYSTEM,
FENDER PANEL ASSY,
QGE 69/90

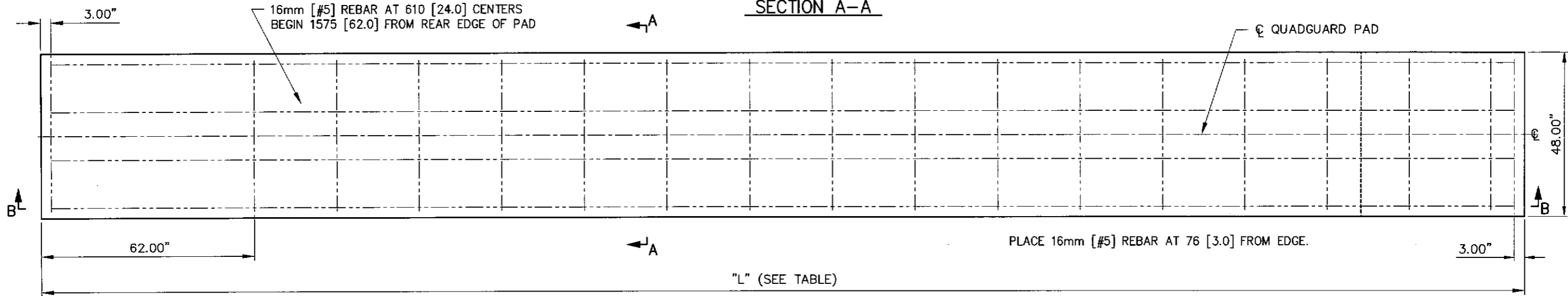
SCALE	DWG	SHEET	REV
AS NOTED	60-36-72	9 of 25	-

Revisions	Date	Rev.	By	Ckd.	App.

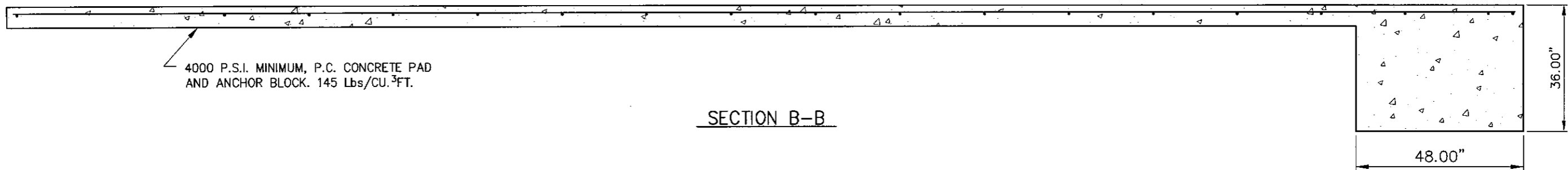
TABLE			
UNIT SIZE	"L"	REBAR REQUIRED	CONCRETE VOLUME
	ft-in	ft-in	YARDS ³
5 BAY	18' -0"	101' -6"	2.8
8 BAY	27' -0"	157' -9"	3.6



SECTION A-A



PLAN VIEW

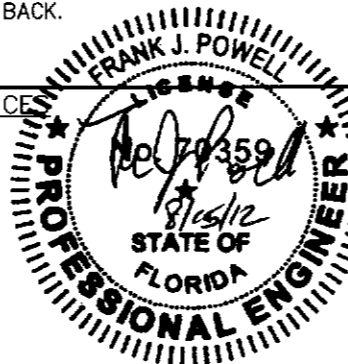


SECTION B-B

NOTES:

- CROSS SLOPE OF PAD SHALL NOT EXCEED 1:10 AND NOT VARY MORE THAN 2% FROM FRONT TO BACK.
- UNITS OF MEASUREMENT ARE INCHES UNLESS OTHERWISE NOTED.

Frank J. Powell, PE 3617 Cincinnati Ave.
Florida #70359 Rocklin, CA 95765



DRAWN:	K. LOONEY	DATE:	05/14/12
DESIGNED:		DATE:	
CHECKED:	R. Brougner	DATE:	7/25/12
APPROVED:	Frank J. Powell	DATE:	7/26/12
CAD FILE:	60-36-72 SH10.dwg		
NEXT ASSEMBLY:			



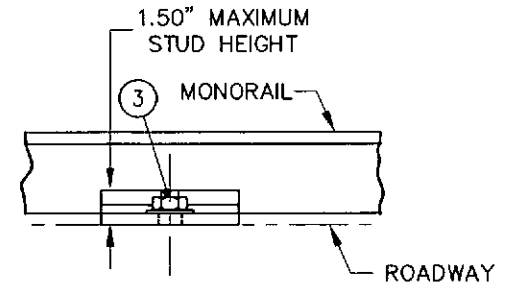
ENERGY ABSORPTION SYSTEMS
ENGINEERING AND RESEARCH DEPARTMENT

QUADGUARD® ELITE™ SYSTEM
CONCRETE PAD, QG ELITE

Revisions	Date	Rev.	By	Ckd.	App.

SCALE	1:30	DWG.	60-36-72	SHEET	10 of 25	REV	-
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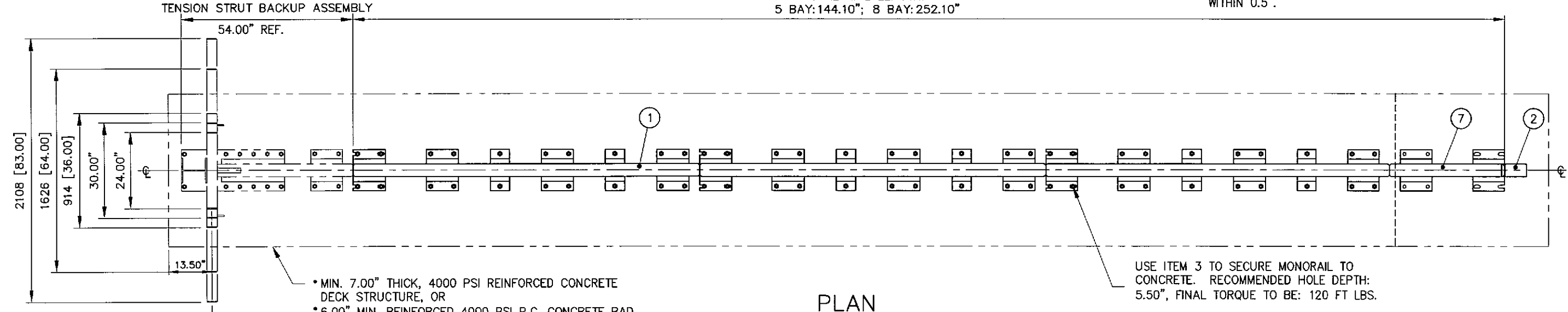
PARTS LIST			5 BAY 8 BAY	
ITEM	STOCK NO.	DESCRIPTION	REQ'D	REQ'D
1	2760071-0000	MONORAIL, THREE BAYS, QG, G	1.00	2.00
2	2760041-0000	END CAP, MONORAIL, QG, G	1.00	1.00
3	3525300-0000	ANCHOR, MP-3, PT-KIT, 3/4X7, VT	4.00	8.00
4	2699571-0000	BOLT, HX, 5/8X3 1/2, G5, G	1.00	1.00
5	2704141-0000	NUT, HX, 5/8, G	1.00	1.00
6	2708231-0000	WASHER, LOCK, 5/8, G	1.00	1.00
7	2760051-0000	MONORAIL, ONE BAY, QG, G	1.00	1.00



DETAIL A

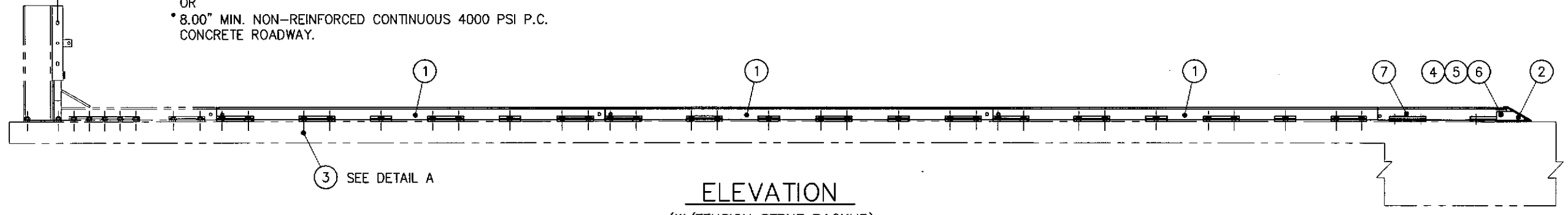
TOTAL RAIL LENGTH:
5 BAY: 144.10"; 8 BAY: 252.10"

NOTE: MONORAIL & BACKUP ASSEMBLY MUST BE STRAIGHT TO WITHIN 0.5".



PLAN

USE ITEM 3 TO SECURE MONORAIL TO CONCRETE. RECOMMENDED HOLE DEPTH: 5.50", FINAL TORQUE TO BE: 120 FT LBS.

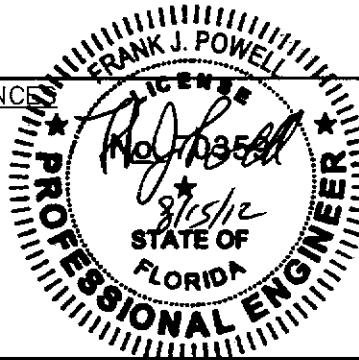


ELEVATION
(W/TENSION STRUT BACKUP)

- NOTES:
1. USE MONORAILS (ITEMS 1 & 7) AS TEMPLATES TO LOCATE MP-3 ANCHOR BOLTS (ITEM 3).
 2. CROSS SLOPE OF PAD SHALL NOT EXCEED 1:10 NOR VARY MORE THAN 2% FROM FRONT TO BACK.
 3. UNITS OF MEASUREMENT ARE INCHES UNLESS OTHERWISE NOTED.
 4. EVERY STUD MUST BE EMBEDDED TO A DEPTH OF 5.5". IF REBAR IS ENCOUNTERED IN A P.C. CONCRETE PAD, DRILL THROUGH IT. IF REBAR IS ENCOUNTERED ON A DECK STRUCTURE, DO NOT DRILL THROUGH REBAR WITHOUT FIRST GETTING PERMISSION FROM A PROJECT ENGINEER.

Frank J. Powell, PE 3617 Cincinnati Ave.
Florida #70359 Rocklin, CA 95765

5 BAY ASSEMBLY NO. 3540482-0500
8 BAY ASSEMBLY NO. 3540482-0800



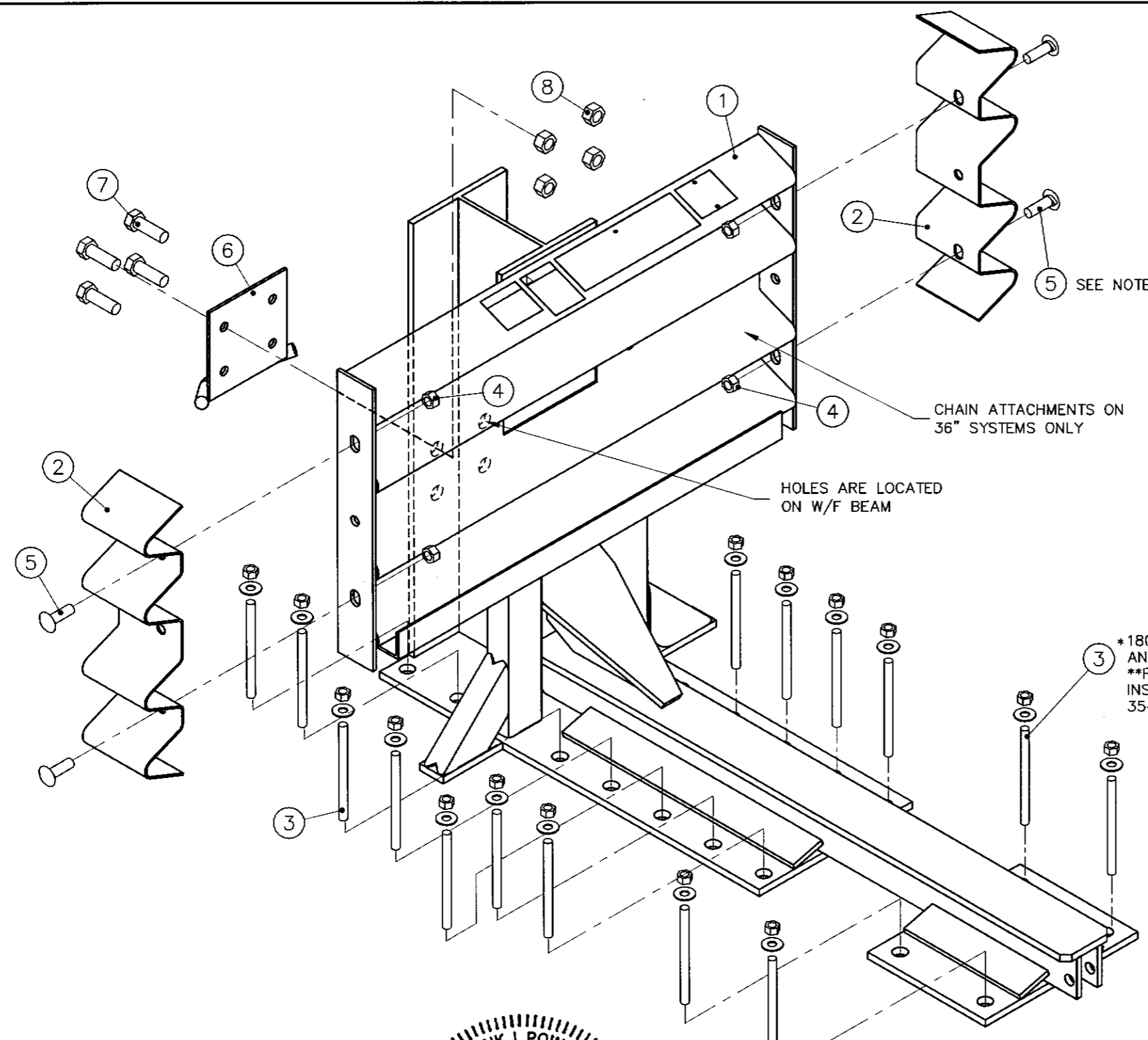
DRAWN:	K. Looney	DATE:	5/4/2012
DESIGNED:		DATE:	
CHECKED:	R. Brouger	DATE:	7/25/12
APPROVED:	Frank J. Powell	DATE:	7/26/12
CAD FILE:	60-36-72 SH11.dwg		
NEXT ASSEMBLY:			

ENERGY ABSORPTION SYSTEMS
ENGINEERING AND RESEARCH DEPARTMENT

QUADGUARD® ELITE™ SYSTEM
MONORAIL ASSY, QGE
FOR 5 & 8 BAY SYSTEMS

SCALE: Do Not Scale DWG: 60-36-72 SHEET: 11 of 25 REV:

Revisions	Date	Rev.	By	Ckd.	App.



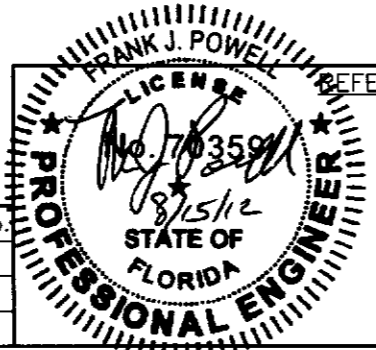
PARTS LIST			
ITEM	STOCK NO.	DESCRIPTION	REQ'D
1	SEE TABLE	BACKUP,TS,___,QG ELITE,W/DECALS	1.00
2	611898G	PANEL,SIDE,QG,G	2.00
3	603673B	ANCHOR,MP-3,PT-KIT,3/4X7,VT	3.00
4	003340G	NUT,HX,5/8,G,RAIL	4.00
5	003400G	BOLT,RAIL,5/8X2,G	4.00
6	605418G	BRACKET,CABLE SUPPORT,BACKUP	1.00
7	113552G	BOLT,HX,3/4X2,G2,G	4.00
8	115953G	NUT,HX,3/4,G	4.00

TABLE		
ASSEMBLY NO.	PART NUMBER	DESCRIPTION
604603B	604744B	BACKUP,TS,24,QG ELITE,W/DECALS
604604B	604751B	BACKUP,TS,30,QG ELITE,W/DECALS
604605B	604764B	BACKUP,TS,36,QG ELITE,W/DECALS

*180mm [7"] OR 460mm [18"]**
 ANCHORING STUDS.
 **FOR TEMPORARY
 INSTALLATION. SEE DWG.
 35-40-24L

NOTE: WHEN TRANSITIONING QUADGUARD SYSTEM TO EXISTING BARRIER REFER TO THE TRANSITION ASSEMBLY DRAWINGS FOR PROPER USE OF SIDE PANEL PART NO. 2760141-0000.

Frank J. Powell, PE 3617 Cincinnati Ave.
 Florida #70359 Rocklin, CA 95765



Revisions	Date	Rev.	By	Ckd.	App.

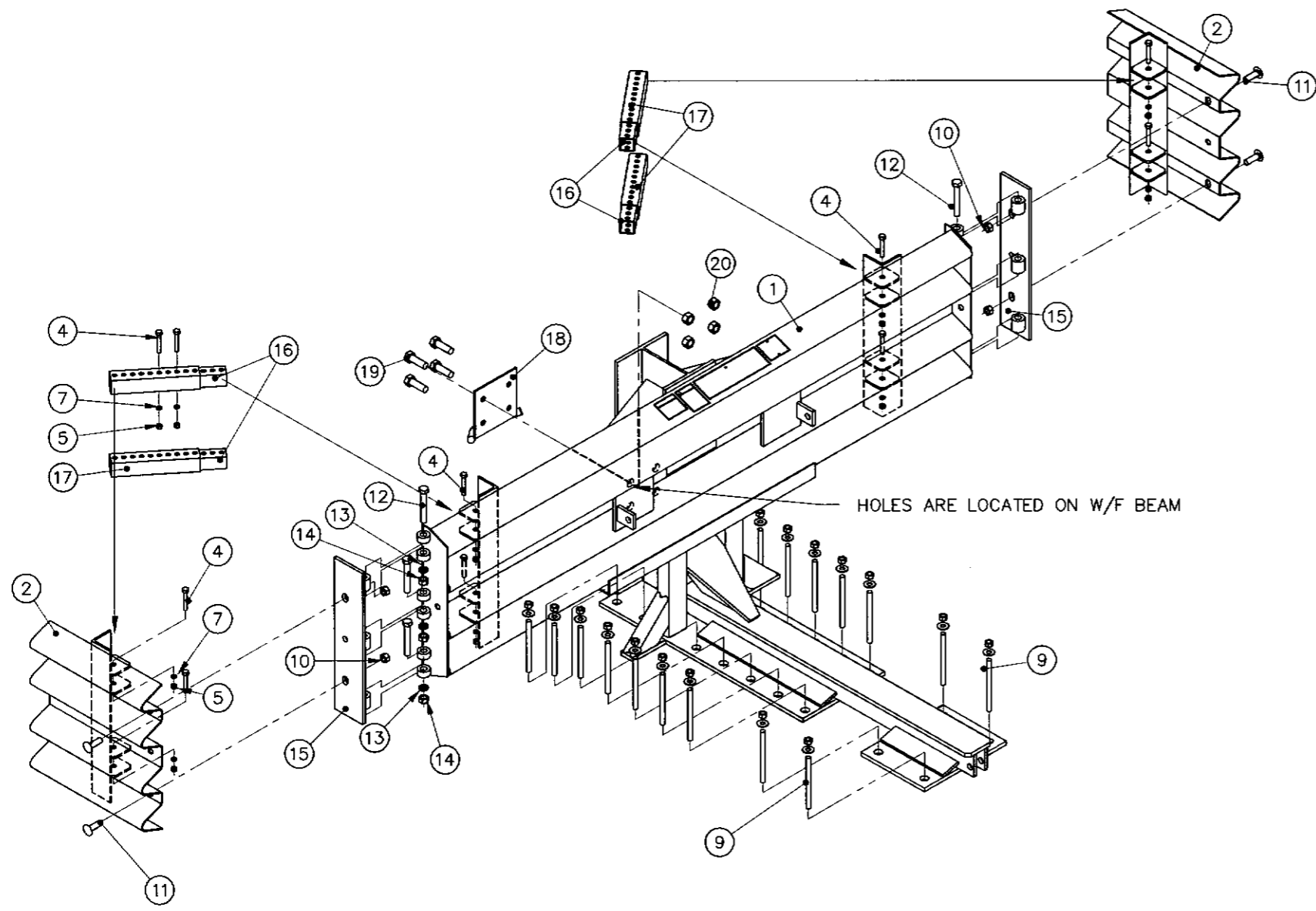
DRAWN: S. Trageser	DATE: 3/15/2012
DESIGNED:	DATE:
CHECKED: K. Mortensen	DATE: 3/20/12
APPROVED: K. Looney	DATE: 3/21/12
CAD FILE: 60-36-72 SH12.dwg	
NEXT ASSEMBLY:	

ASSEMBLY NO. SEE TABLE

ENERGY ABSORPTION SYSTEMS
 ENGINEERING AND RESEARCH DEPARTMENT

QUADGUARD® ELITE™ SYSTEM
 BACKUP ASSY,TS,
 QGE, 24, 30, 36

SCALE Do Not Scale	DWG. 60-36-72	SHEET 12 of 25	REV
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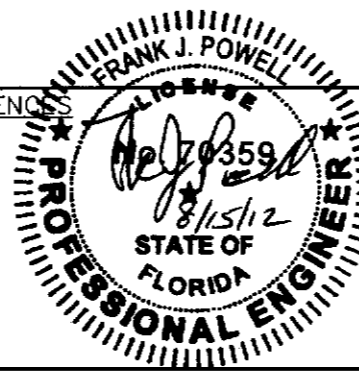
PARTS LIST			
ITEM	STOCK NO.	DESCRIPTION	REQ'D
1	SEE TABLE	BACKUP,TS,___,QG LMC/QGE W/DECALS	1.00
2	611900G	PANEL,SIDE,QG WIDE,G	2.00
4	113612G	BOLT,HX,3/8X3 1/2,G2,G,ALL THREAD	16.0
5	115960G	NUT,HX,3/8,G	16.0
7	118092G	WASHER,LOCK,3/8,G	16.0
9	603673B	ANCHOR,MP-3,PT-KIT,3/4X7,VT	3.00
10	003340G	NUT,HX,5/8,G,RAIL	4.00
11	003400G	BOLT,RAIL,5/8X2,G	4.00
12	113666G	BOLT,HX,5/8X4,G5,G	6.00
13	118100G	WASHER,LOCK,5/8,G	6.00
14	115970G	NUT,HX,5/8,G	6.00
15	610172G	HINGE PLATE,FENDER PANEL,QG LMC 69/90	2.00
16	615756B	TEL ST 1 3/4X1 3/4X12GA,H4S,G,10" LG	4.00
17	615765B	TEL ST 2X2X12GA,H2S,G,10" LONG	4.00
18	605418G	BRACKET,CABLE SUPPORT,BACKUP	1.00
19	113552G	BOLT,HX,3/4X2,G2,G	4.00
20	115953G	NUT,HX,3/4,G	4.00

TABLE			
ASSY. NO.	STOCK NO.	DESCRIPTION	WIDTH
604607B	604783B	BACKUP,TS,64,QG LMC/QGE W/DECALS	1620 [64"]
604608B	604791B	BACKUP,TS,83,QG LMC/QGE W/DECALS	2100 [83"]

NOTES:
 1. WHEN TRANSITIONING QUADGUARD SYSTEM TO EXISTING BARRIER REFER TO THE TRANSITION ASSEMBLY DRAWINGS FOR PROPER USE OF SIDE
 2. PANEL PART NO. 611898G.
 DIMENSIONS ARE IN MILLIMETERS [INCHES] UNLESS OTHERWISE NOTED.

Frank J. Powell, PE 3617 Cincinnati Ave.
 Florida #70359 Rocklin, CA 95765

ASSEMBLY NO. SEE TABLE



DRAWN:	S. Cholda	DATE:	12/01/98
DESIGNED:	R. Blaski	DATE:	12/1/98
CHECKED:	KRM	DATE:	3/19/99
APPROVED:	RBB	DATE:	3/23/99
CAD FILE:	60-36-72 SH13.dwg		
NEXT ASSEMBLY:			

ENERGY ABSORPTION SYSTEMS
 ENGINEERING AND RESEARCH DEPARTMENT

QUADGUARD® ELITE™ SYSTEM
 BACKUP ASSY,TS,QGE WIDE

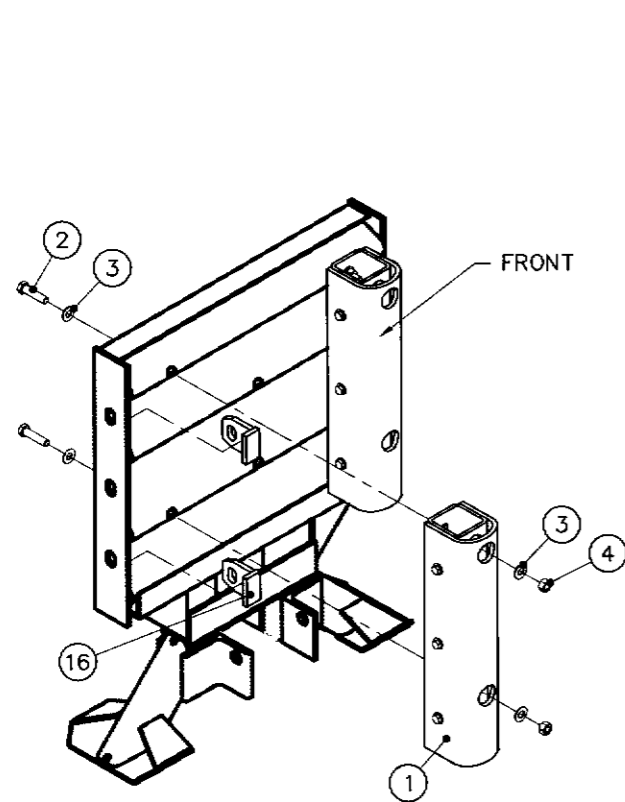
SCALE: 1:20 DWG: 60-36-72 SHEET: 13 of 25 REV: --

Revisions	Date	Rev.	By	Ckd.	App.

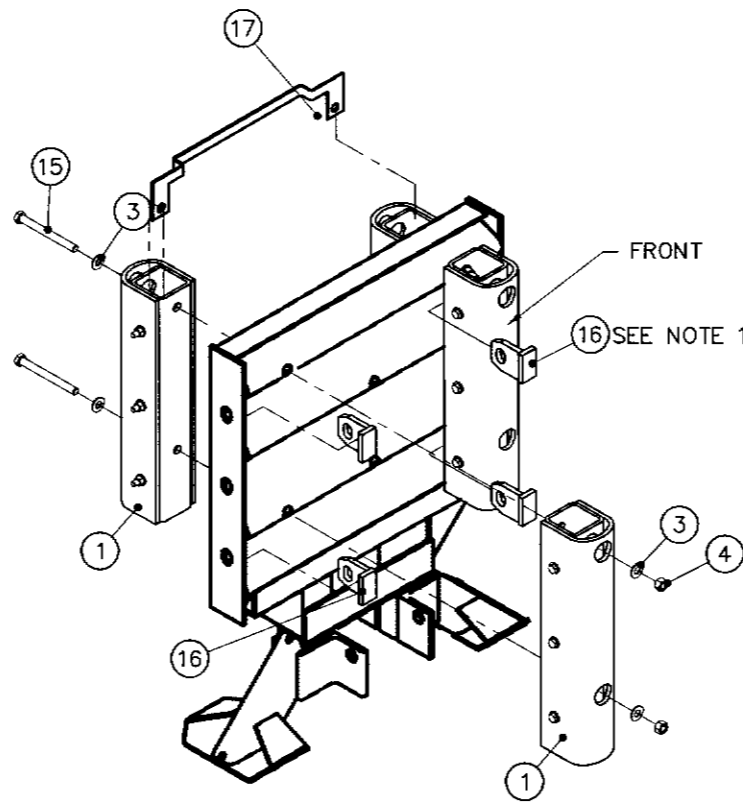
TABLE						
SYSTEM	ASSY NO.	ITEM NUMBER				
		8	9	12	13	14
		QUANTITY				
5 BAY SYSTEM	605040B	3	0	6	4	8
8 BAY SYSTEM	605044B	3	3	12	7	14

PARTS LIST			
ITEM	STOCK NO.	DESCRIPTION	REQ'D
1	605707B	BUMPER ASSEMBLY,ELITE,24,30,36	8.00
2	113472G	BOLT,HX,1/2X2,G2,G	4.00
3	118009G	WASHER,FLAT,1/2X1 3/8,G	24.0
4	115939G	NUT,HX,1/2,G	12.0
8	606646B	CYLINDER ASSY,ELITE,QE1	*
9	606647B	CYLINDER ASSY,ELITE,QE2	*
12	618547G	TUBE,CABLE JACKET	*
13	113851G	CABLE ASSEMBLY,CYLINDER RETAINER	*
14	114108G	CLAMP,WIRE ROPE,1/2	*
15	113487G	BOLT,HX,1/2X5,G	8.00
16	615612G	TAB,STOP	8.00
17	605463B	BRACKET,HIT INDICATOR	1.00

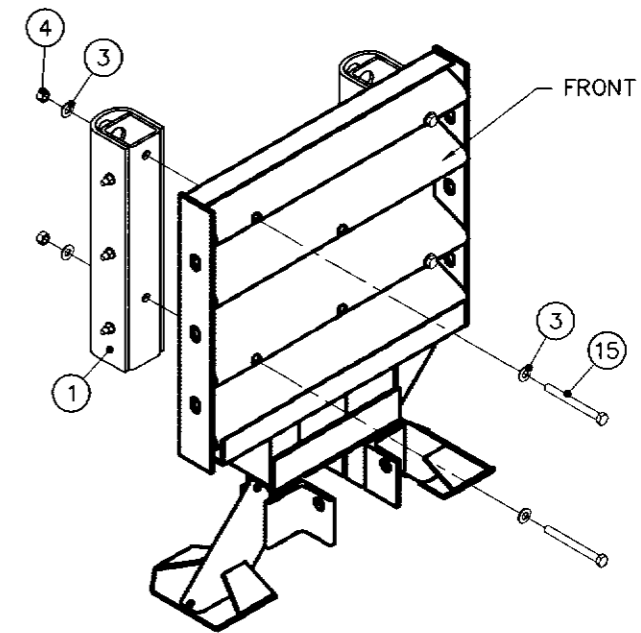
* SEE TABLE



DIAPHRAGM 3



DIAPHRAGM 2



DIAPHRAGM 1

NOTE:
1. PLACE ONLY ON DIAPHRAGMS 2 AND 3.

Revisions	Date	Rev.	By	Ckd.	App.

REFERENCES

FRANK J. POWELL
LICENSE
No. 70359
8/15/12
PROFESSIONAL ENGINEER
STATE OF FLORIDA

Frank J. Powell, PE 3617 Cincinnati Ave.
Florida #70359 Rocklin, CA 95765

DRAWN: K. Looney	DATE: 5/4/2012
DESIGNED:	DATE:
CHECKED: R. Brouger	DATE: 7/25/12
APPROVED: Frank J. Powell	DATE: 7/26/12
CAD FILE: 60-36-72 SH14&16.dwg	
NEXT ASSEMBLY:	

ASSEMBLY NO. (SEE TABLE)

ENERGY ABSORPTION SYSTEMS
ENGINEERING AND RESEARCH DEPARTMENT

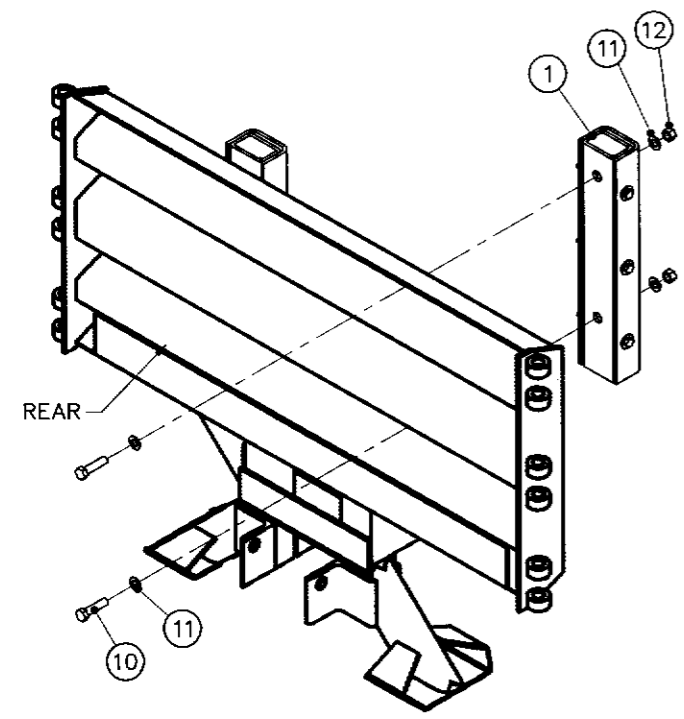
QUADGUARD® ELITE™ SYSTEM
BAY ASSY, QGE, 24,30,36

SCALE Do Not Scale	FWC 60-36-72	SHEET 14 of 25	REV
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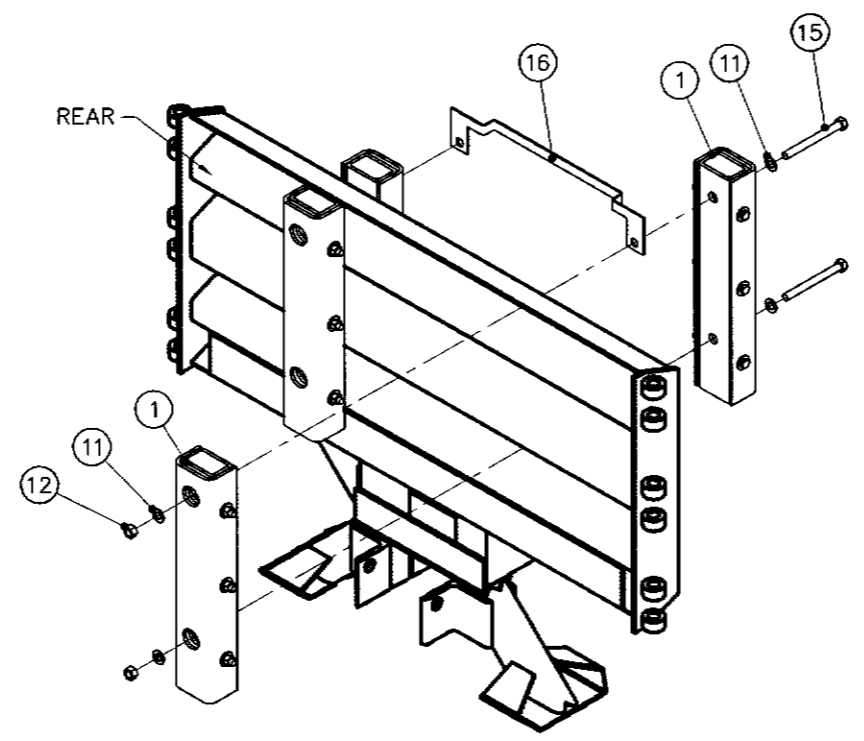
TABLE		ITEM NO.				
SYSTEM	ASSY NO.	5	6	7	8	9
5 BAY SYSTEM	605041B	3	0	6	4	8
8 BAY SYSTEM	605045B	3	3	12	7	14

PARTS LIST			
ITEM	STOCK NO.	DESCRIPTION	
1	605705B	BUMPER ASSY,QG	8.00
5	606646B	CYLINDER ASSY,ELITE,QE1	*
6	606647B	CYLINDER ASSY,ELITE,QE2	*
7	618547G	TUBE,CABLE JACKET	*
8	113851G	CABLE ASSEMBLY,CYLINDER RETAINER	*
9	114108G	CLAMP,WIRE ROPE,1/2	*
10	114108G	BOLT,HX,1/2X2,G2,G	4.00
11	118009G	WASHER,FLAT,1/2X1 3/8,G	24.0
12	115939G	NUT,HX,1/2,G	12.0
15	113487G	BOLT,HX,1/2X5,G2,G	8.00
16	605463B	BRACKET,HIT INDICATOR	1.00

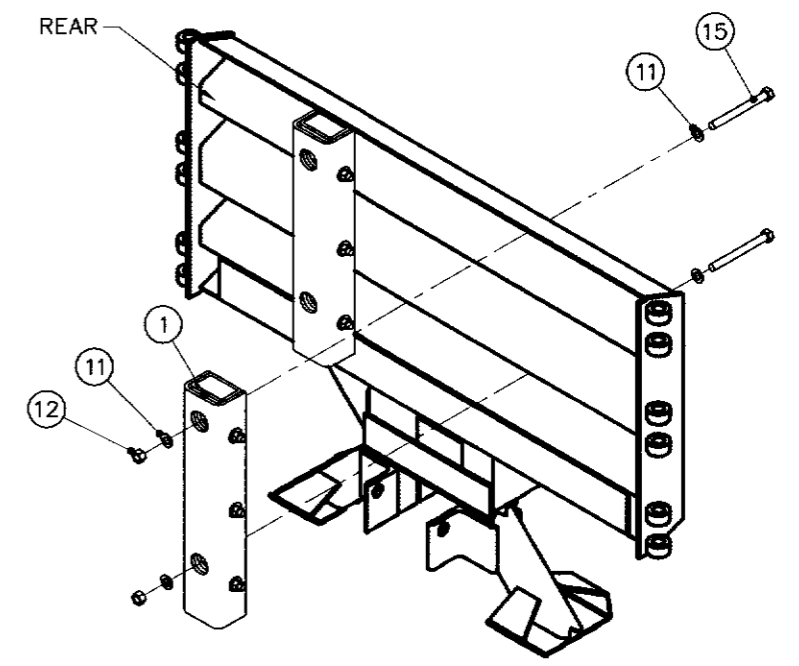
* SEE TABLE



DIAPHRAGM 3



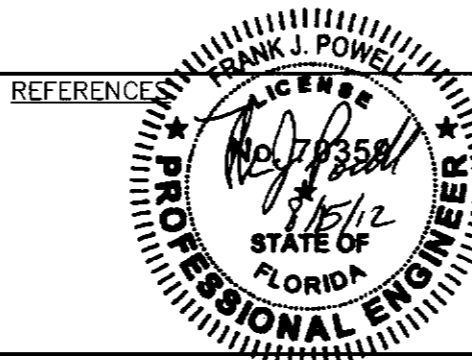
DIAPHRAGM 2



DIAPHRAGM 1

Frank J. Powell, PE 3617 Cincinnati Ave.
Florida #70359 Rocklin, CA 95765

ASSEMBLY NO. (SEE TABLE)



DRAWN:	K. Looney	DATE:	05/04/12
DESIGNED:	RBB	DATE:	11/13/98
CHECKED:	R. Brouger	DATE:	7/25/12
APPROVED:	Frank J. Powell	DATE:	7/26/12
CAD FILE:	60-36-72 SH15&17.dwg		
NEXT ASSEMBLY:			

ENERGY ABSORPTION SYSTEMS
ENGINEERING AND RESEARCH DEPARTMENT

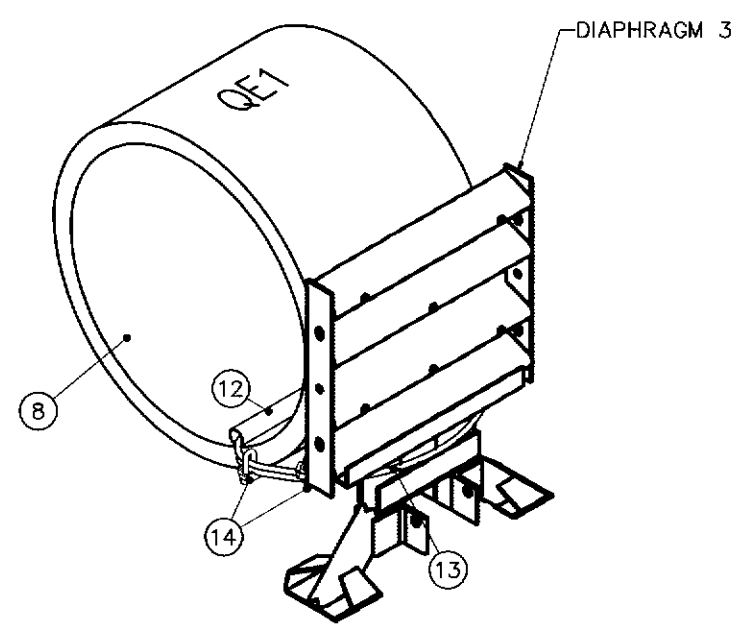
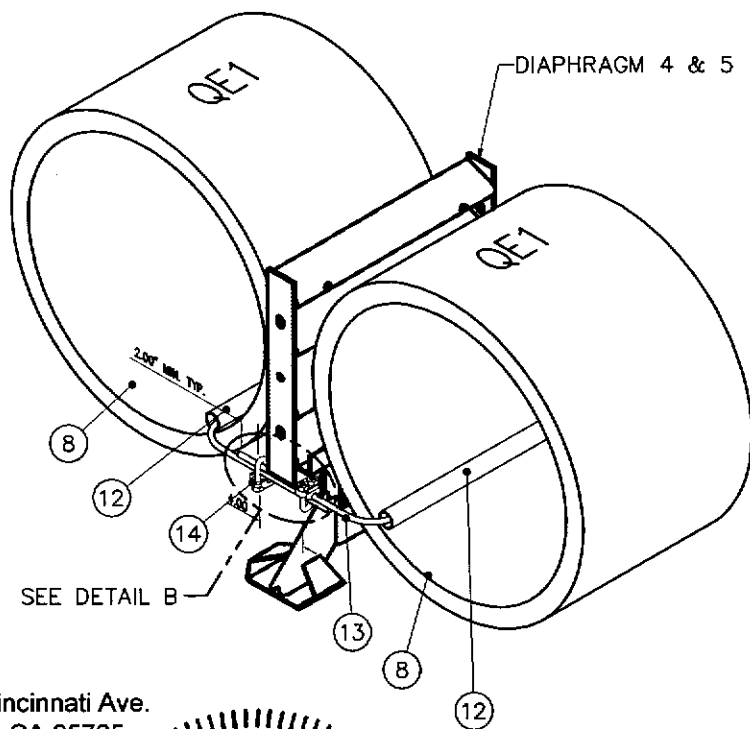
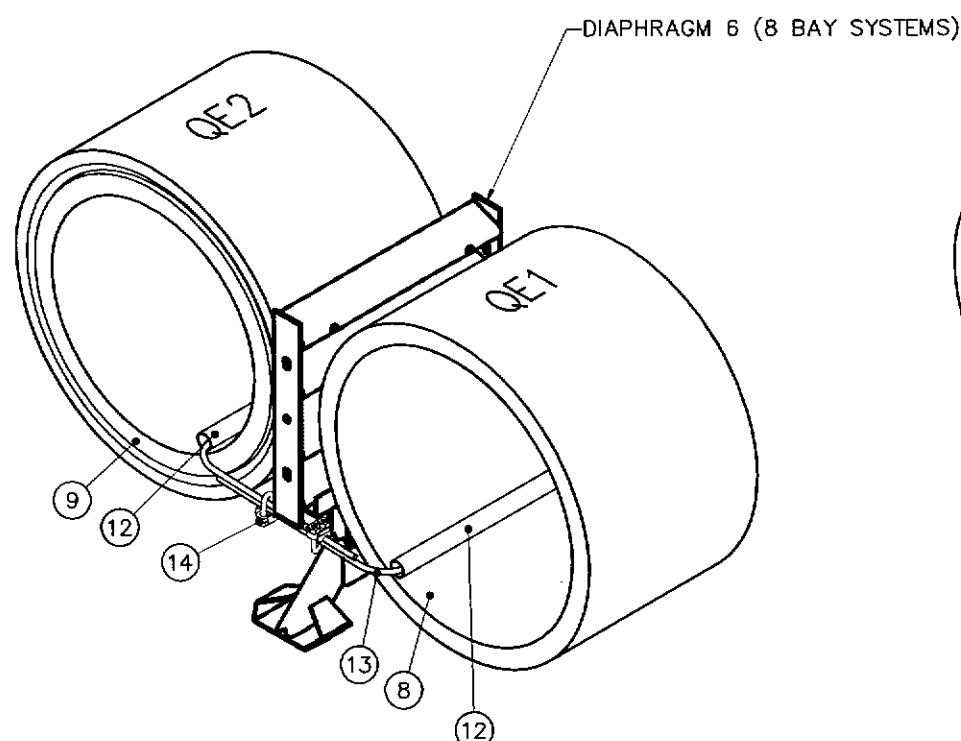
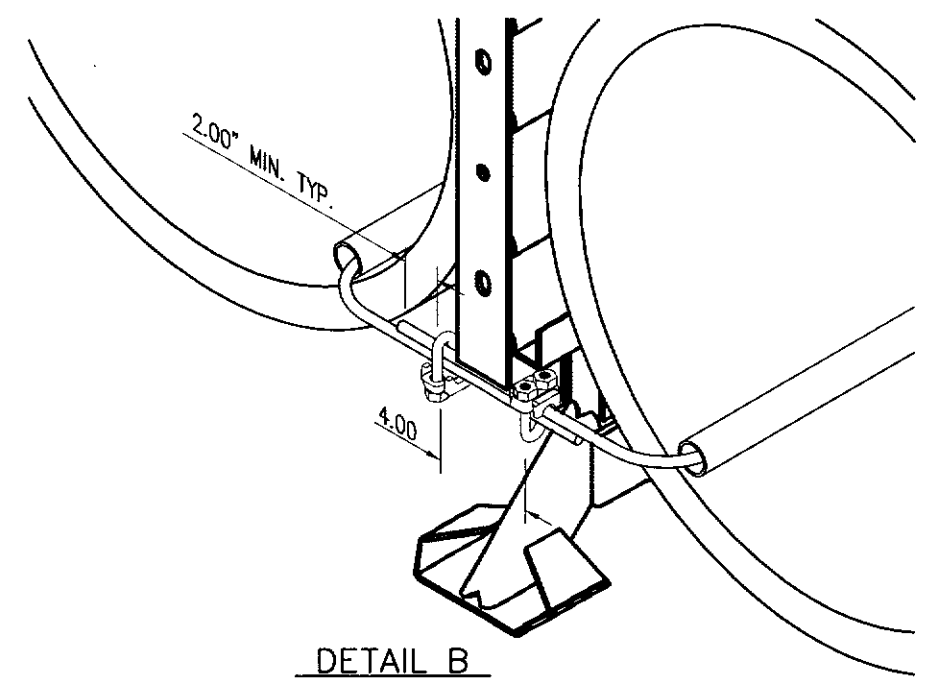
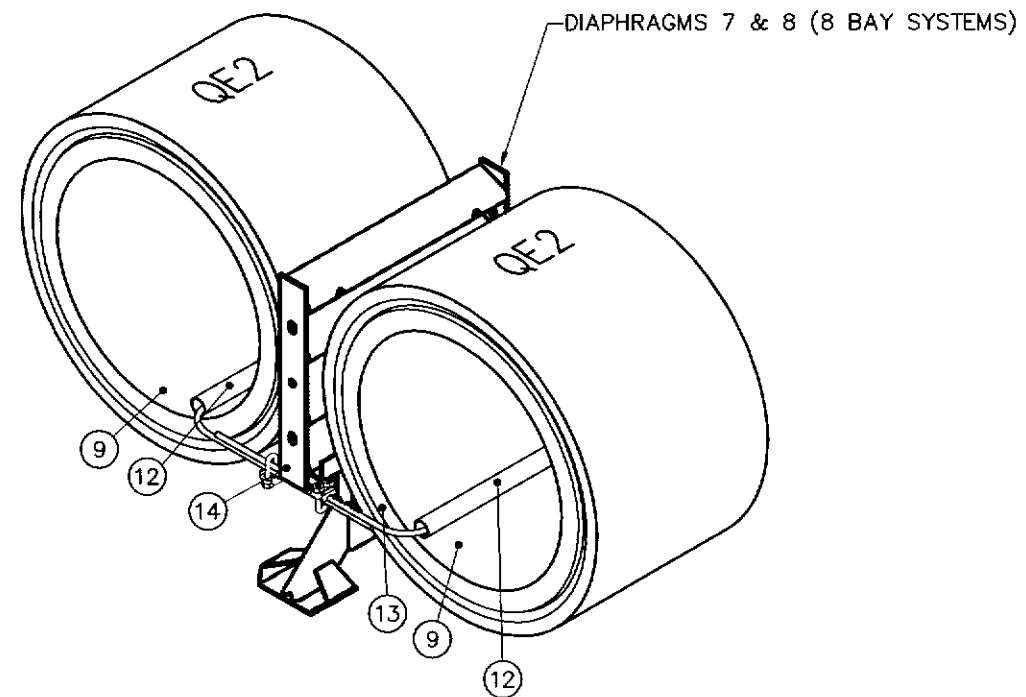
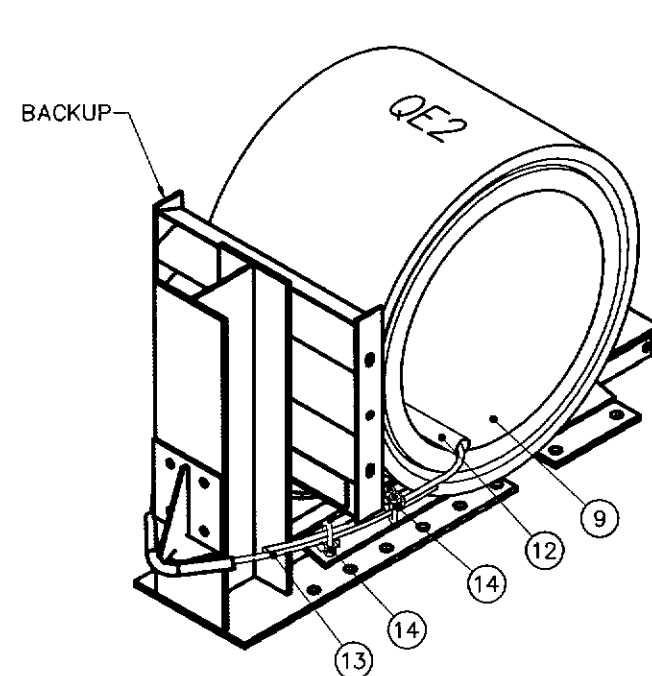
QUADGUARD® ELITE™ SYSTEM

BAY ASSY,QGE,69/90

SCALE: 1/15 DWG: 60-36-72 SHEET: 15 of 25 REV: -

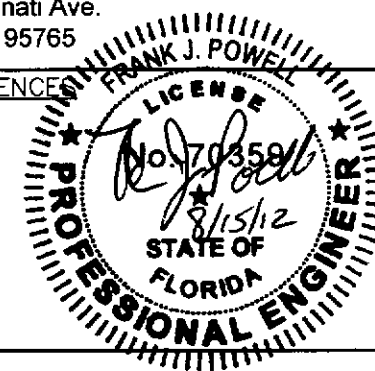
Revisions	Date	Rev.	By	Ckd.	App.

PARTS LIST			
ITEM	STOCK NO.	DESCRIPTION	REQ'D



- NOTES:
1. REMOVE ALL SLACK IN CABLE (ITEM 13) PRIOR TO TIGHTENING THE CABLE CLAMPS (ITEM 14).
 2. TORQUE THE CABLE CLAMPS (ITEM 14) TO 50 FT-LBS. DRAW DOWN BOTH NUTS EVENLY.

Frank J. Powell, PE 3617 Cincinnati Ave.
 Florida #70359 Rocklin, CA 95765



REFERENCES

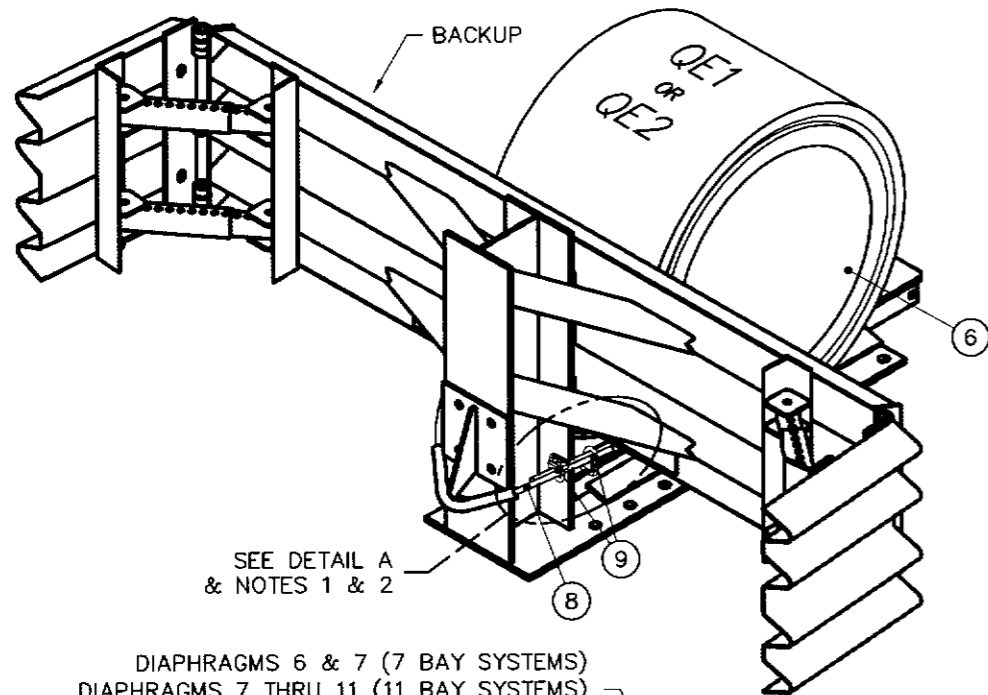
DRAWN: S. Trageser	DATE: 3/15/2011
DESIGNED:	DATE:
CHECKED: K. Mortensen	DATE: 3/20/12
APPROVED: K. Looney	DATE: 3/21/12
CAD FILE: 60-36-72 SH14&16.dwg	
NEXT ASSEMBLY:	

ENERGY ABSORPTION SYSTEMS, INC.
 ENGINEERING AND RESEARCH DEPARTMENT

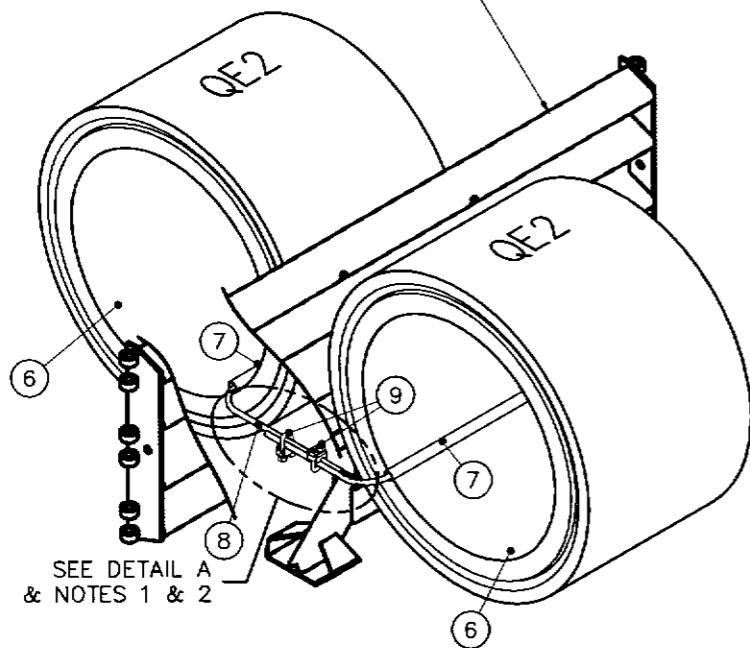
QUADGUARD® ELITE™ SYSTEM
 BAY ASSY, QGE, 24,30,36

SCALE Do Not Scale	DWG. 60-36-72	SHEET 16 of 25	REV
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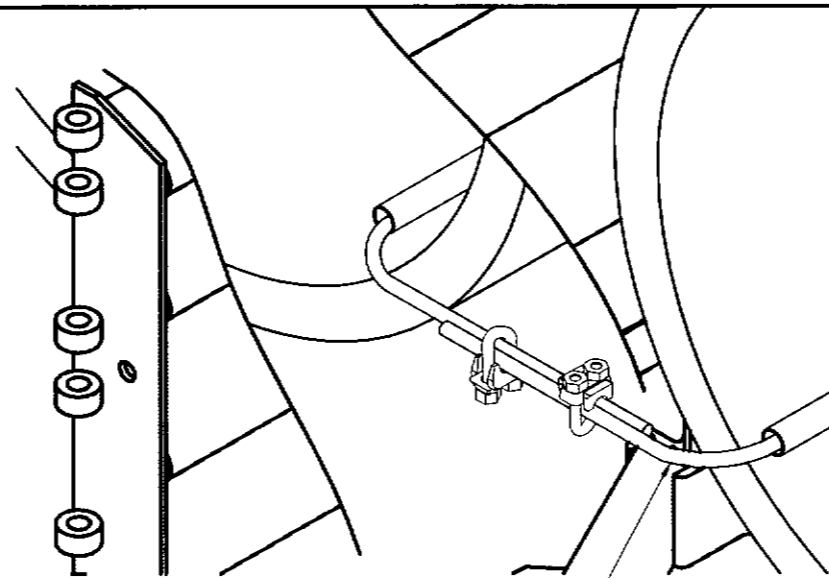
Revisions	Date	Rev.	By	Ckd.	App.



DIAPHRAGMS 6 & 7 (7 BAY SYSTEMS)
 DIAPHRAGMS 7 THRU 11 (11 BAY SYSTEMS)
 DIAPHRAGMS 7 & 8 (8 BAY SYSTEMS)

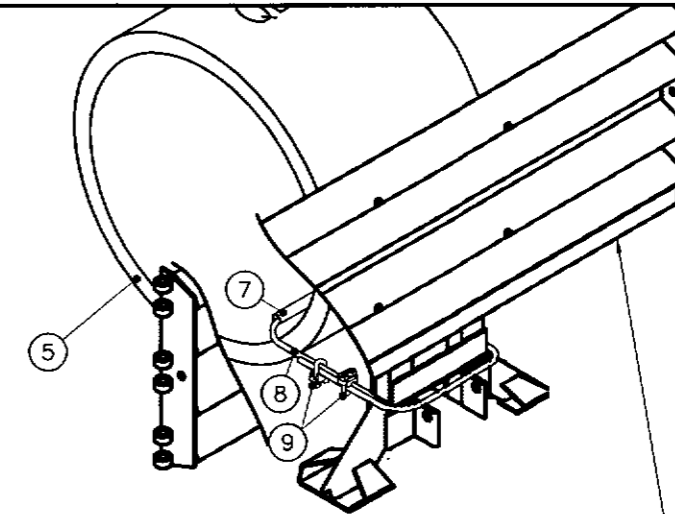


SEE DETAIL A
 & NOTES 1 & 2

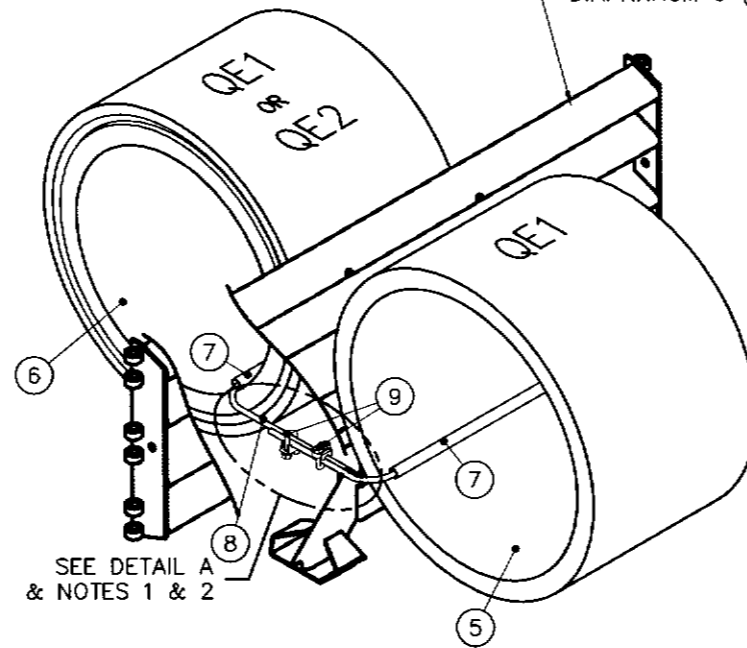


SEE NOTES 1 & 2

DETAIL A

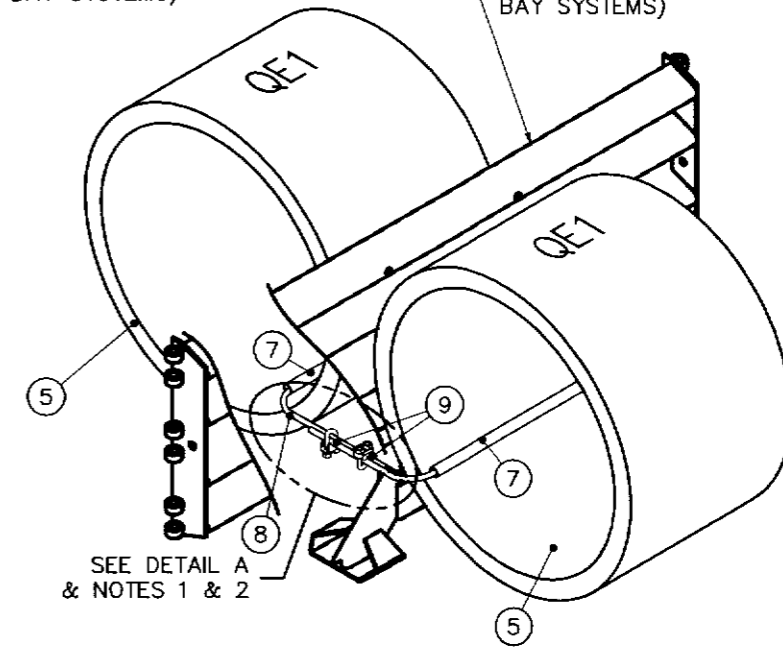


DIAPHRAGM 3 (5, 7, 8 & 11 BAY SYSTEMS)



SEE DETAIL A
 & NOTES 1 & 2

DIAPHRAGM 5 (5 & 7 BAY SYSTEMS)
 DIAPHRAGM 6 (8 & 11 BAY SYSTEMS)



SEE DETAIL A
 & NOTES 1 & 2

DIAPHRAGM 4 (7 BAY SYSTEMS)
 DIAPHRAGM 4 & 5 (5, 8 & 11 BAY SYSTEMS)

NOTES:

1. REMOVE ALL SLACK IN CABLE (ITEM 8) PRIOR TO TIGHTENING THE CABLE CLAMPS (ITEM 9).
2. TORQUE THE CABLE CLAMPS (ITEM 9) TO 50 FT-LBS. DRAW DOWN BOTH NUTS EVENLY.

Frank J. Powell, PE 3617 Cincinnati Ave.
 Florida #70359 Rocklin, CA 95765

REFERENCE



DRAWN:	K. Looney	DATE:	05/04/12
DESIGNED:		DATE:	
CHECKED:	R. Brouger	DATE:	7/25/12
APPROVED:	Frank J. Powell	DATE:	7/26/12
CAD FILE:	60-36-72 SH15&17.dwg		
NEXT ASSEMBLY:			

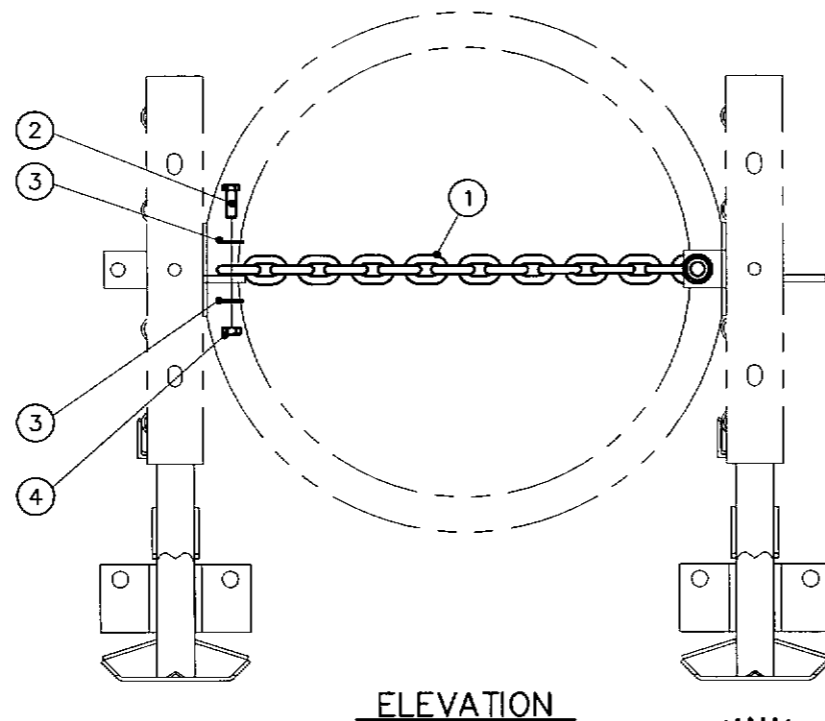
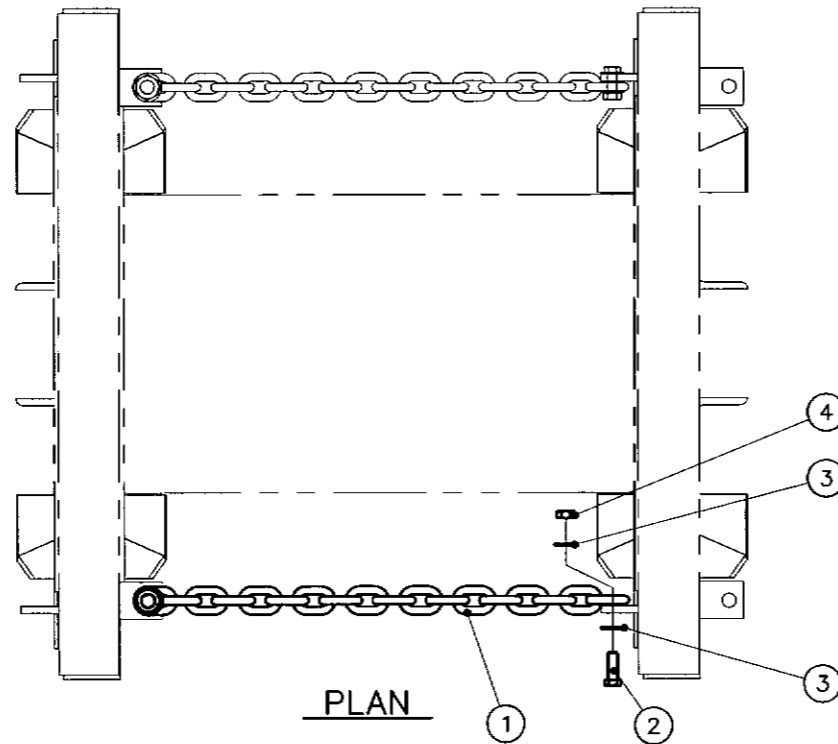
ASSEMBLY NO. (SEE TABLE)

ENERGY ABSORPTION SYSTEMS, INC.
 ENGINEERING AND RESEARCH DEPARTMENT

QUADGUARD® ELITE™ SYSTEM
 BAY ASSY, QGE, 69/90

Revisions	Date	Rev.	By	Ckd.	App.

SCALE	1/15	DWG.	60-36-72	SHEET	17 of 25	REV	-
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PARTS LIST			
ITEM	STOCK NO.	DESCRIPTION	REQ'D
1	2517212-0000	CHAIN, 3/8", GRADE 40, 31, G	1.00
2	2701210-0000	BOLT, HX, 1/2X2, G5, G	2.00
3	2708011-0000	WASHER, FLAT, 1/2X1 3/8, G	4.00
4	2704011-0000	NUT, HX, 1/2, G	2.00

TABLE A	
MODEL NO.	CHAIN ASSEMBLIES REQUIRED
QS2405E	NOT APPLICABLE
QS3005E	NOT APPLICABLE
QS3605E	6
QN4805E	6
QS6905E	6
QS9005E	6
QS2408E	NOT APPLICABLE
QS3008E	NOT APPLICABLE
* QS3608E	12
* QN4808E	12
* QS6908E	12
* QS9008E	12

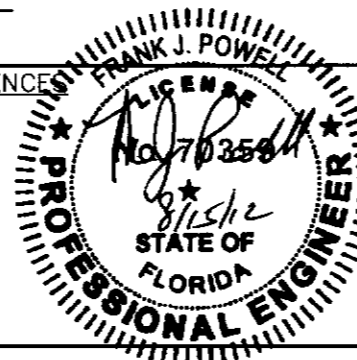
* TWO CHAIN ASSEMBLIES REQUIRED IN ALL BAYS EXCEPT FIRST & SECOND BAYS ON APPLICABLE SYSTEMS (SEE TABLE A).

NOTE:
1. SEE TABLE A FOR QUANTITY OF CHAIN ASSEMBLIES NEEDED.

Frank J. Powell, PE 3617 Cincinnati Ave.
Florida #70359 Rocklin, CA 95765

ASSY NO. 3540491-0000

REFERENCE



DRAWN:	K. Looney	DATE:	05/09/12
DESIGNED:	RBB	DATE:	11/12/98
CHECKED:	R. Brougher	DATE:	7/25/12
APPROVED:	Frank J. Powell	DATE:	7/26/12
CAD FILE:	60-36-72 SH 18.DWG		
NEXT ASSEMBLY:			

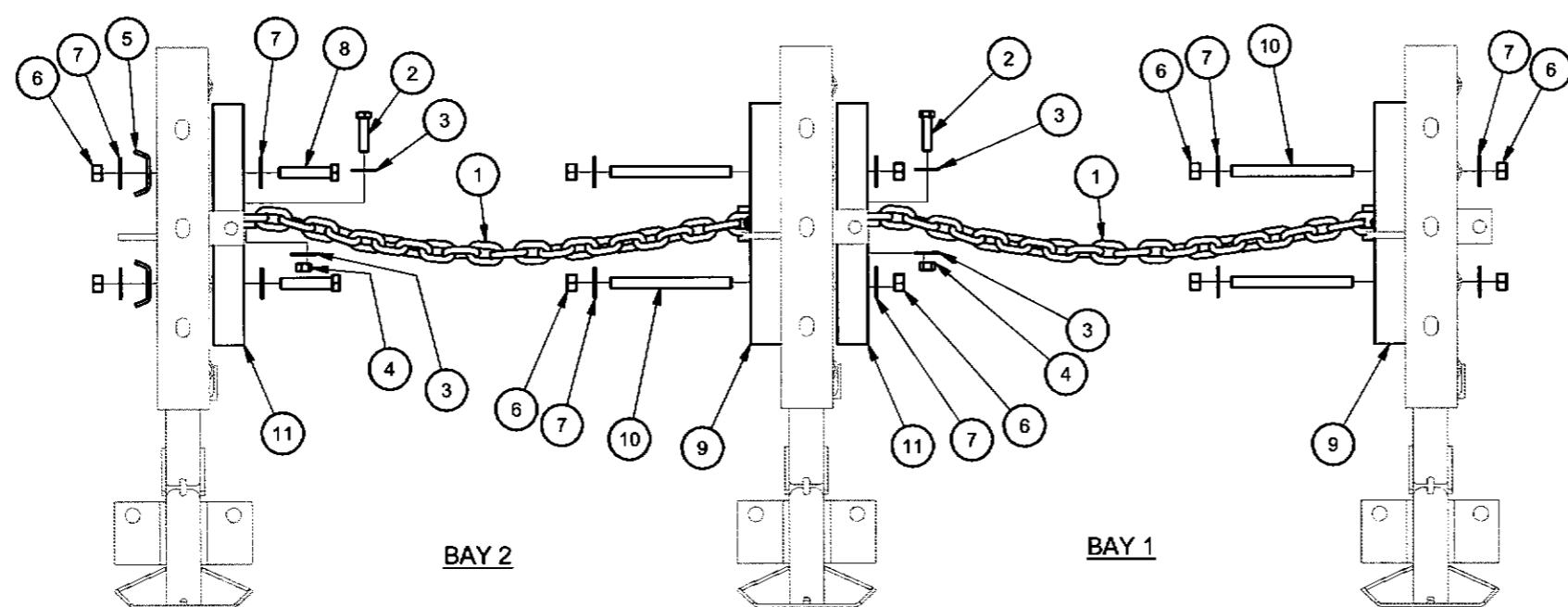
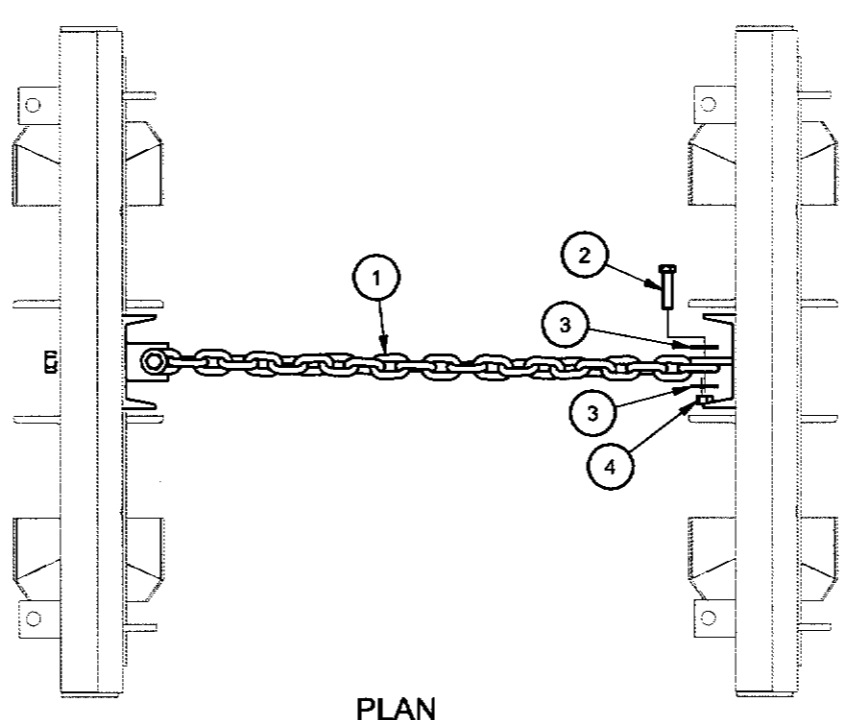
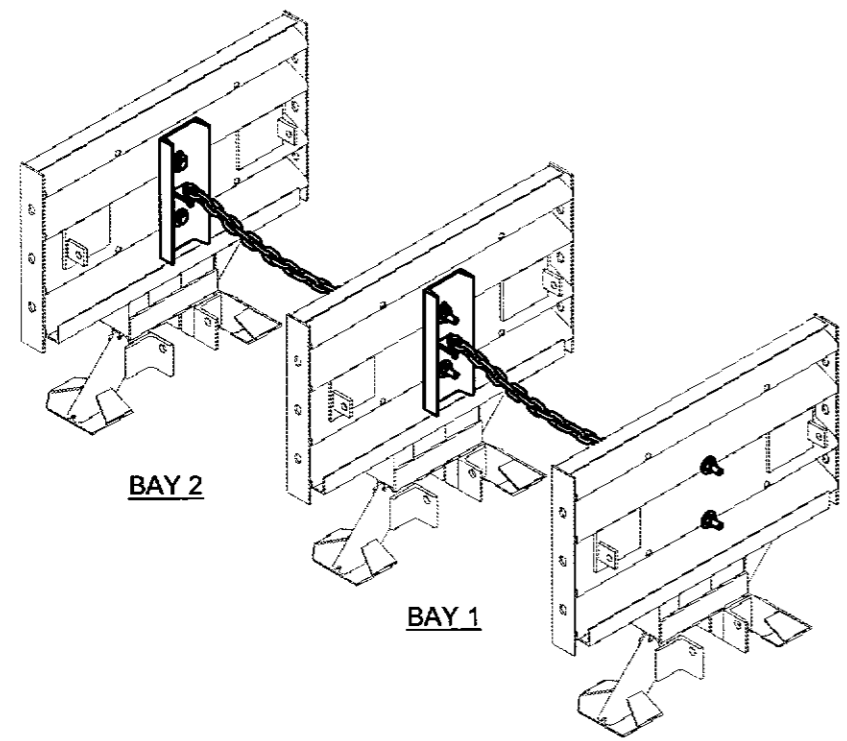


ENERGY ABSORPTION SYSTEMS
ENGINEERING AND RESEARCH DEPARTMENT

QUADGUARD® ELITE™ SYSTEM
CHAIN ASSY, QGE

SCALE	1:10	DWG.	60-36-72	SHEET	18 of 25	REV	-
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Revisions	Date	Rev.	By	Ckd.	App.



PARTS LIST			
ITEM	STOCK NO.	DESCRIPTION	QTY.
1	2517915-0000	CHAIN,3/8,GRADE 40,29.5,G	2
2	2701210-0000	BOLT,HX,1/2X2,G5,G	4
3	2708011-0000	WASHER,FLAT,1/2X1 3/8,G	8
4	2704011-0000	NUT,HX,1/2,G	4
5	2760507-0000	SHIM,NOSE CLAMP,G	2
6	2704141-0000	NUT,HX,5/8,G	10
7	2708291-0000	WASHER,FLAT,5/8 X 1 3/4, G	12
8	2699572-0000	BOLT,HX,5/8X3,G2,G	2
9	2760093-0000	BRACKET,CHAIN MOUNT,VERT TAB,G	2
10	2699016-0000	ROD,THREADED,5/8X7,G5,G	4
11	2760094-0000	BRACKET,CHAIN MOUNT,HORZ TAB,G	2

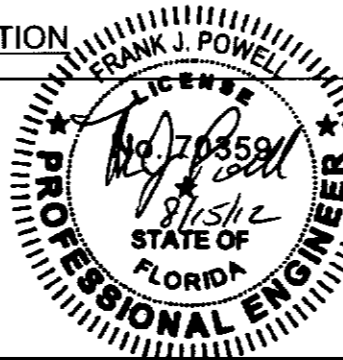
TABLE A	
MODEL NO.	CHAIN ASSEMBLIES REQUIRED
* QS2405E	1
* QS3005E	1
* QS3605E	1
* QS2407E	1
* QS3007E	1
* QS3607E	1
QN4807E	NOT APPLICABLE
QS6907E	NOT APPLICABLE
QS9007E	NOT APPLICABLE
* QS2408E	1
* QS3008E	1
* QS3608E	1
QN4808E	NOT APPLICABLE
QS6908E	NOT APPLICABLE
QS9008E	NOT APPLICABLE
* QS2411E	1
* QS3011E	1
* QS3611E	1
QN4811E	NOT APPLICABLE
QS6911E	NOT APPLICABLE
QS9011E	NOT APPLICABLE
* QS2414E	1
* QS3014E	1
* QS3614E	1
QN4814E	NOT APPLICABLE

* CHAIN ASSEMBLY REQUIRED IN FIRST AND SECOND BAYS ON APPLICABLE SYSTEMS (SEE TABLE A).

ELEVATION

Frank J. Powell, PE 3617 Cincinnati Ave.
Florida #70359 Rocklin, CA 95765

ASSEMBLY NO. 3540075-0000



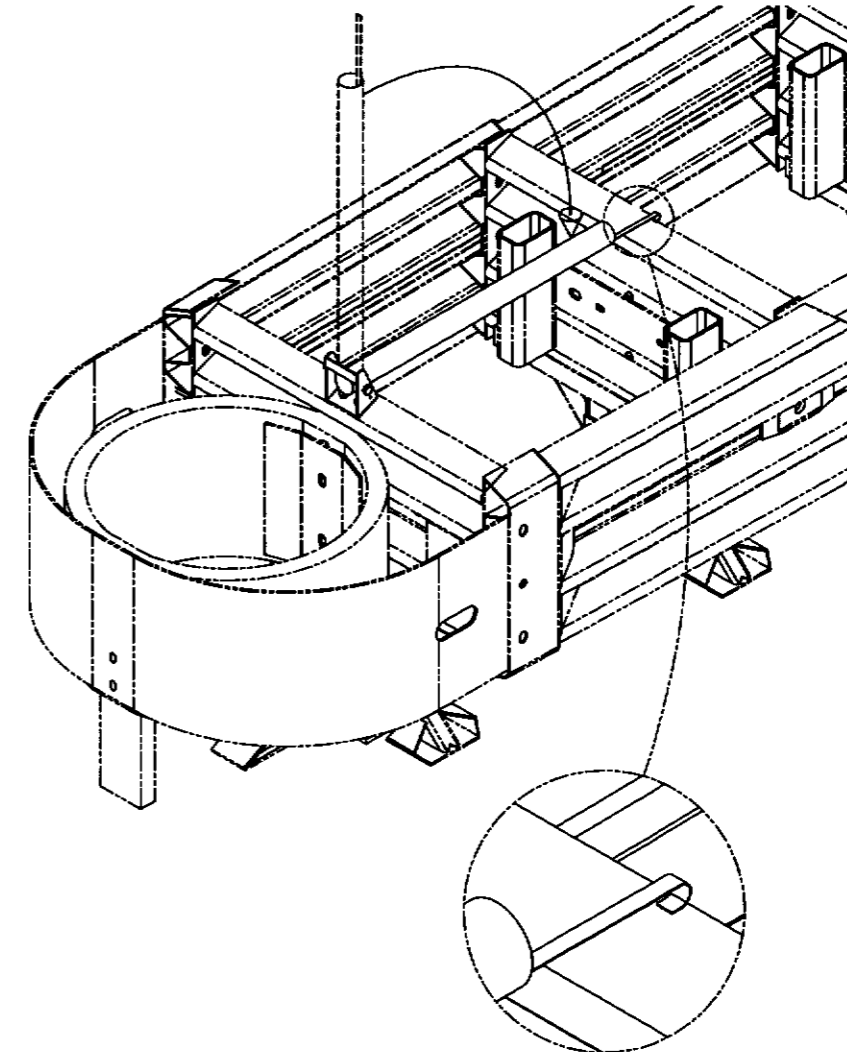
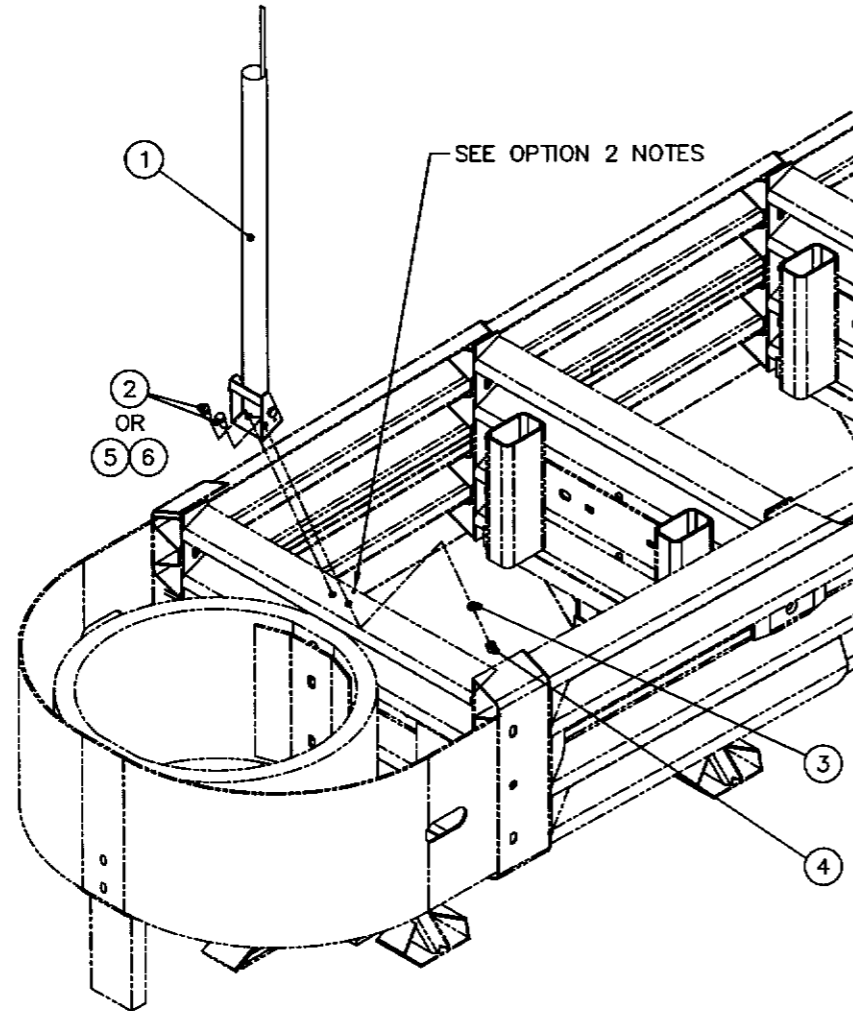
DRAWN: D. Standridge	DATE: 6/17/2008
DESIGNED: Anthony Van Brocklin	DATE: 6/3/2008
CHECKED: JME	DATE: 7/11/2008
APPROVED: AVB	DATE: 7/15/2008
FILE: 60-36-72 SH 19	
NEXT ASSEMBLY:	



QUADGUARD® ELITE™ SYSTEM
CHAIN ASSY,QGE,24,30,36
BAY 1 AND 2

SCALE: 1=10	DRAWING: 60-36-72	SHEET: 19 of 25	REV
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PARTS LIST			
ITEM	STOCK NO.	DESCRIPTION	REQ'D
1	3540462-0000	HIT INDICATOR, LMC/ELITE	1.00
2	2701111-0000	BOLT, HX, 1/2X1, G	2.00
3	2708181-0000	WASHER, LOCK, 1/2, G	2.00
4	2704011-0000	NUT, HX, 1/2, G	2.00
5	2706442-0600	SCREW, HWH, 1/4X1, SELF DRILL/TAP, COATED	2.00
6	2708101-0000	WASHER, FLAT, 1/4 X 1, G	2.00



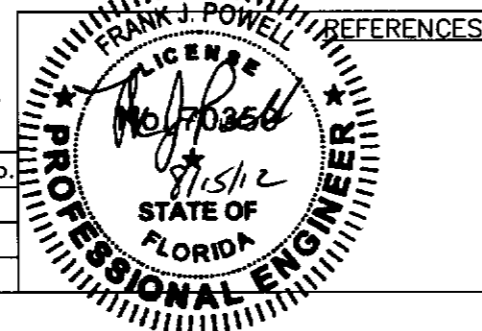
STEP 1: POSITION HIT INDICATOR ON 1ST DIAPHRAGM. DRILL ONE $\phi 1/4$ " HOLE AS NEEDED TO SET BRACKET TAB IN DIAPHRAGM. BRACKET SHOULD BE CENTERED ON TOP SURFACE OF DIAPHRAGM.

STEP 2: ATTACH HIT INDICATOR TO 1ST DIAPHRAGM.
 OPTION 1: MATCH DRILL TWO $\phi 9/16$ " HOLES AS NEEDED IN DIAPHRAGM. USE ITEMS 2, 3 & 4 TO ATTACH BRACKET.
 OPTION 2: USE SELF DRILLING + TAP SCREWS (ITEM 5) ALONG WITH FLAT WASHER (ITEM 6) TO ATTACH BRACKET.

STEP 3: ROTATE HIT INDICATOR TO HORIZONTAL POSITION AND BEND TRIGGER CLIP AROUND TOP OF 2ND DIAPHRAGM

ASSEMBLY NO. 3540463-0000

Frank J. Powell, PE 3617 Cincinnati Ave.
 Florida #70359 Rocklin, CA 95765



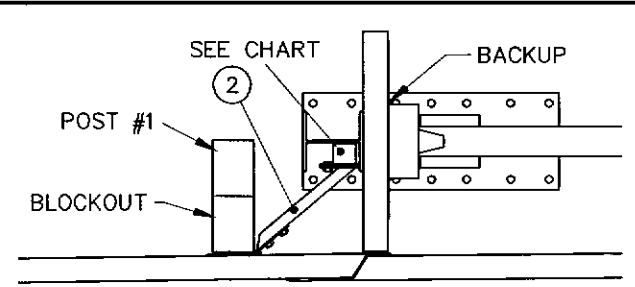
REFERENCES	
DRAWN:	DATE:
S. Trageser	3/16/2012
DESIGNED:	DATE:
CHECKED:	DATE:
K. Mortensen	3/20/12
APPROVED:	DATE:
K. Looney	3/21/12
CAD FILE:	
60-36-72 SH20.dwg	
NEXT ASSEMBLY:	

ENERGY ABSORPTION SYSTEMS, INC.
 ENGINEERING AND RESEARCH DEPARTMENT

QUADGUARD® ELITE™ SYSTEM
 HIT INDICATOR, W/HARDWARE, ELITE
 QPL S544-0044

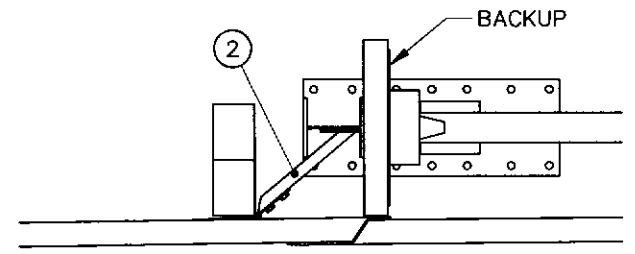
SCALE	DWG.	SHEET	REV.
Do Not Scale	60-36-72	20 of 25	

Revisions	Date	Rev.	By	Ckd.	App.



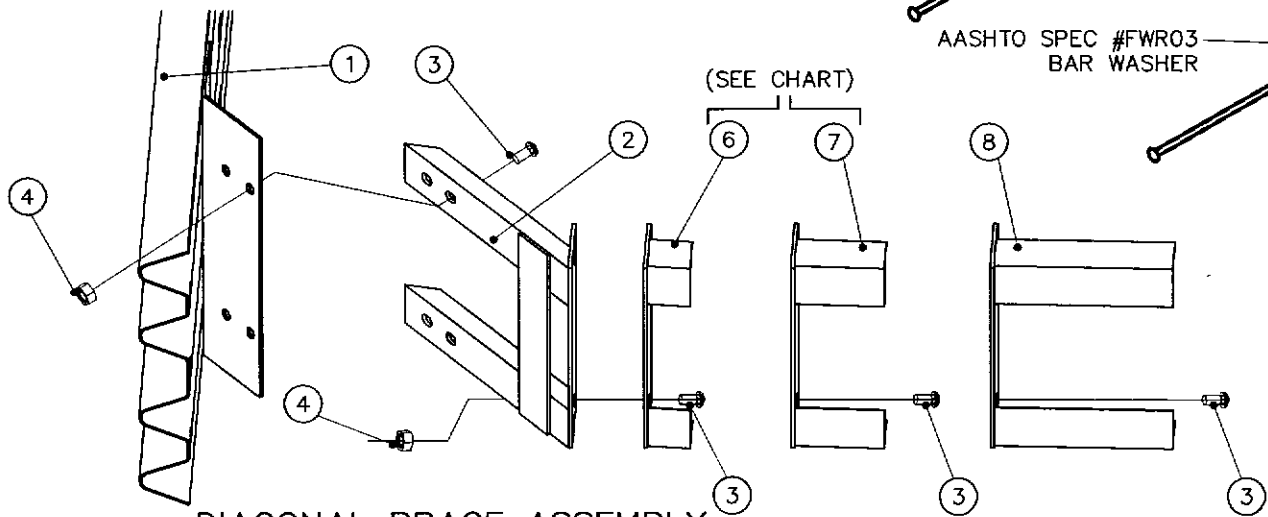
DETAIL A

FINAL CONFIGURATION OF DIAGONAL BRACE FOR MEDIUM OR WIDE 30.00 OR 36.00 SYSTEMS



DETAIL A

FINAL CONFIGURATION OF DIAGONAL BRACE FOR NARROW 24.00 SYSTEMS



DIAGONAL BRACE ASSEMBLY

- NOTES:**
1. PANEL OVERLAP SHOWN IS FOR TRAFFIC DIRECTION SHOWN. ACTUAL OVERLAP SHALL BE DETERMINED BY THE SITE CONDITIONS AND PROJECT ENGINEER PER TRAFFIC DIRECTION. USE STANDARD GUARDRAIL CONNECTION.
 2. RIGHT SIDE OF ROAD APPLICATION SHOWN. ASSEMBLY MAY BE USED ON EITHER OR BOTH SIDES FOR LEFT, RIGHT, MEDIAN OR GORE APPLICATIONS. SEE NOTE 1. THIS ASSEMBLY IS NOT INCLUDED IN THE MODEL NUMBER AND MUST BE ORDERED SEPARATELY.
 3. ENERGY ABSORPTION SYSTEMS, INC. SUPPLIES THE STOCK ITEMS SHOWN IN THE PARTS LIST. ALL OTHER COMPONENTS OF THE DOWNSTREAM GUARDRAIL ARE STANDARD HIGHWAY MATERIALS AND MAY BE OBTAINED FROM YOUR LOCAL HIGHWAY SUPPLY VENDORS.

4. TRANSITION AND GUARDRAIL PANEL CONNECTIONS MAY BE SLOTTED IN ORDER TO ACCOMMODATE THERMAL EXPANSION AND CONTRACTION.

PARTS LIST			REQ'D			
ITEM	STOCK NO.	DESCRIPTION	N	M	W	48
1	2760321-0000	QUADGUARD TO W-BEAM TRANS. PANEL	1	1	1	1
2	2760341-0000	DIAGONAL BRACE	1	1	1	1
3	2699341-0000	BOLT, RAIL, 5/8X2, G	4	6	6	6
4	2704191-0000	NUT, HX, 5/8, G	4	6	6	6
5	2708871-0000	WASHER, BAR, 1/8X1 1/4X2, W/HOLE	2	2	2	2
6	2760342-0000	DIAGONAL BRACE BLOCKOUT, 3"	0	1	0	0
7	2760343-0000	DIAGONAL BRACE BLOCKOUT, 6"	0	0	1	0
8	2760344-0000	DIAGONAL BRACE BLOCKOUT, 12"	0	0	0	1

SYSTEM WIDTH		ASSEMBLY #	BLOCKOUT
24.00	N	354021N-0000	NOT REQ'D
30.00	M	354021M-0000	ITEM #6*
36.00	W	354021W-0000	ITEM #7*
48.00	48	354021W-0048	ITEM #8*

*SEE PARTS LIST ABOVE FOR QTY REQ'D

AASHTO SPEC #FBB04 GUARDRAIL BOLT AND RECESSED NUT

AASHTO SPEC #FWC16b 5/8" FLAT WASHER

AASHTO SPEC #FWR03 BAR WASHER

SEE NOTE 1

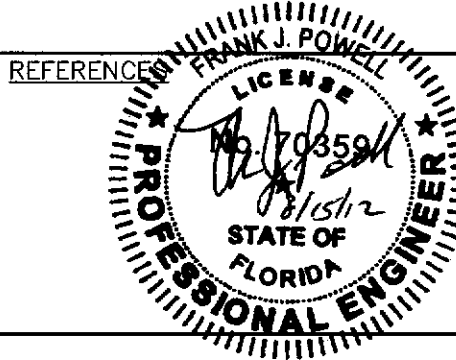
ALL OTHERS TO BE STANDARD AASHTO SEE NOTE 3

SEE DIAGONAL BRACE ASSEMBLY AND DETAIL A

POST #1 IS NOT BOLTED DIRECTLY TO TRANSITION PANEL COUNTERSINK HOLES AS NEEDED.

REPLACE SIDE PANEL P.N. 2760141-0000 WITH TRANSITION PANEL (ITEM 1)

Frank J. Powell, PE 3617 Cincinnati Ave.
Florida #70359 Rocklin, CA 95765



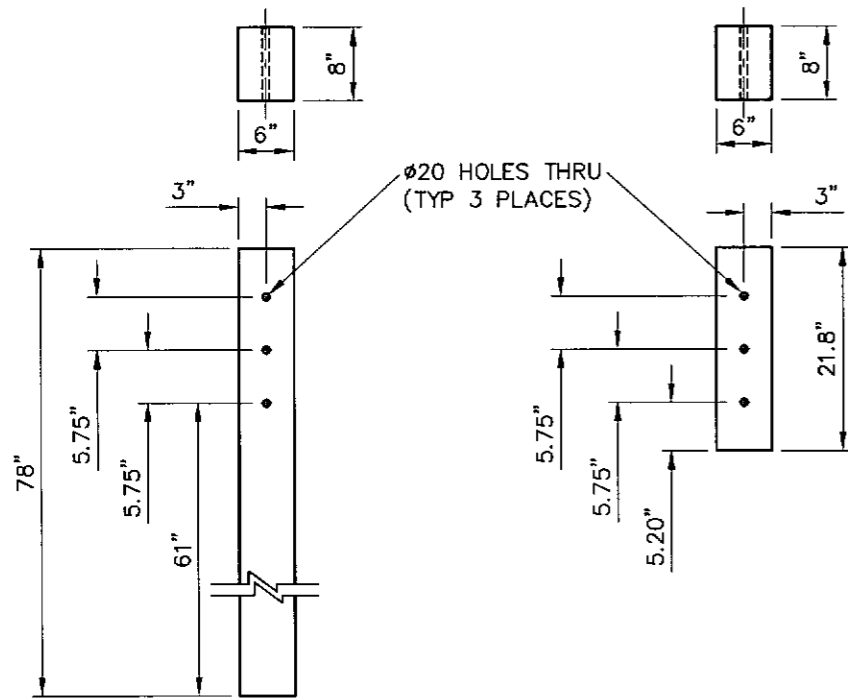
DRAWN:	K. Looney	DATE:	4/26/12
DESIGNED:	JVM	DATE:	8/21/96
CHECKED:	R. Brougner	DATE:	7/25/12
APPROVED:	Frank J. Powell	DATE:	7/26/12
CAD FILE:	60-36-72 SH 21.dwg		
NEXT ASSEMBLY:			

ENERGY ABSORPTION SYSTEMS
ENGINEERING AND RESEARCH DEPARTMENT

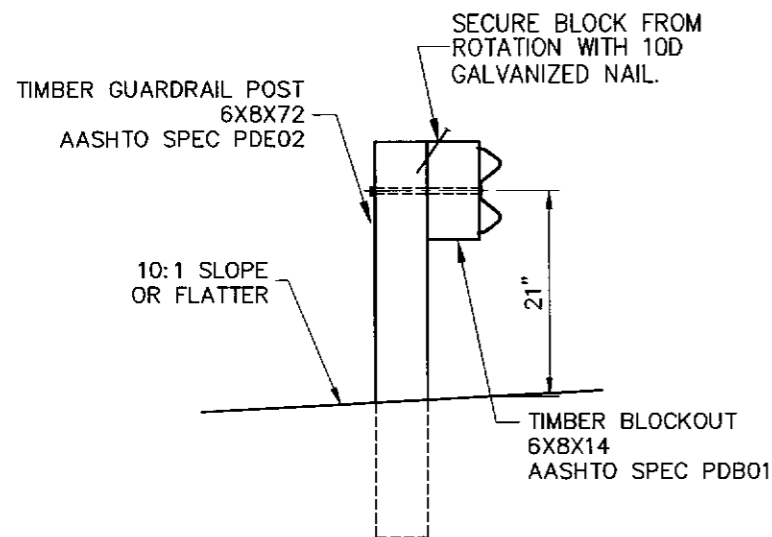
**TRANSITION ASSEMBLY,
QUAD-BEAM TO W-BEAM
QUADGUARD® ELITE™ SYSTEM**

SCALE	N.T.S.	DWG	60-36-72	SHEET	21 of 25	REV	-
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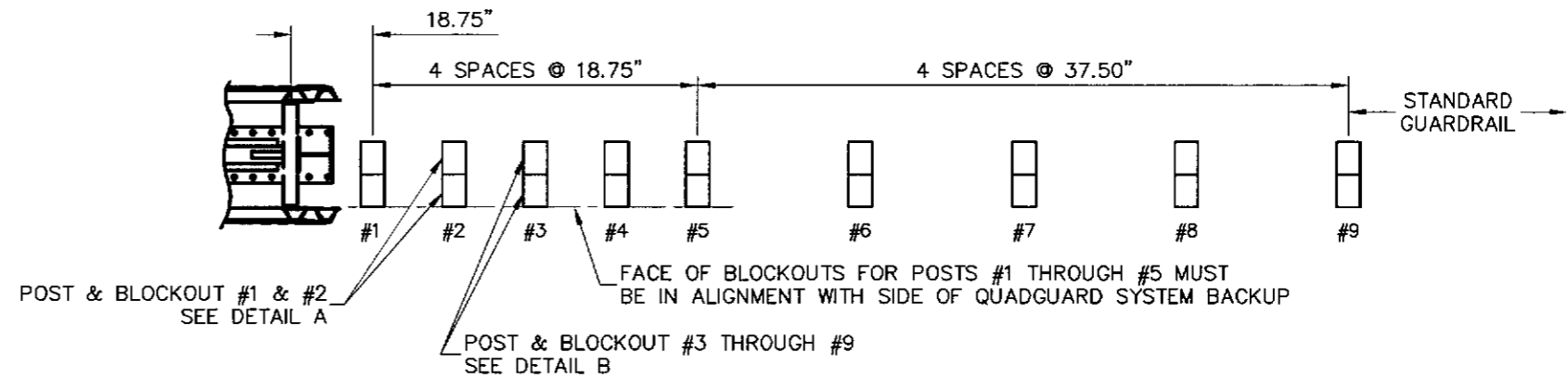
Revisions	Date	Rev.	By	Ckd.	App.



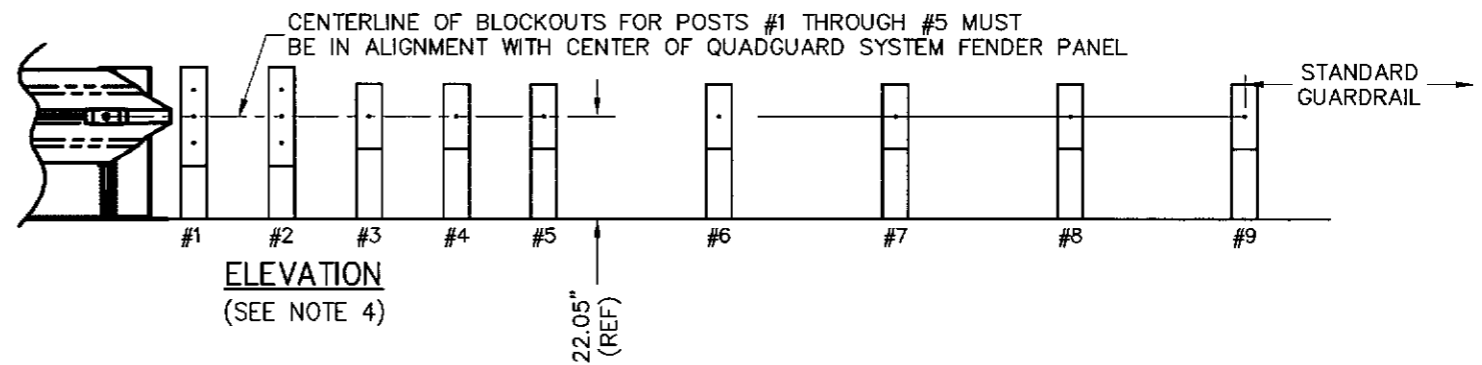
DETAIL A
POSTS & BLOCKOUTS #1 & #2 (NON-STANDARD)
(SEE NOTES 2 & 3)



DETAIL B
POSTS & BLOCKOUTS #3 THRU #9
SEE NOTE 3



PLAN
(SEE NOTE 4)



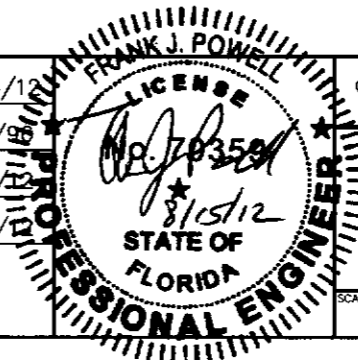
ELEVATION
(SEE NOTE 4)

NOTES:

- DIMENSIONS ARE IN INCHES, UNLESS OTHERWISE NOTED.
- POSTS & BLOCKOUTS SHALL BE MADE OF TIMBER WITH A STRESS GRADE OF AT LEAST 1100 psi. STRESS GRADING SHALL BE IN ACCORDANCE WITH THE RULES OF THE WEST COAST LUMBER INSPECTION BUREAU, SOUTHERN PINE INSPECTION BUREAU OR OTHER APPROPRIATE TIMBER ASSOCIATION. TIMBER FOR POSTS SHALL BE EITHER ROUGH SAWN (UNPLANED) OR S4S (SURFACED FOUR SIDES) WITH NOMINAL DIMENSIONS INDICATED. THE SIZE TOLERANCE OF POSTS IN THE DIRECTION PARALLEL TO THE AXIS OF THE BOLT HOLES SHALL NOT BE MORE THAN $\pm \frac{1}{4}$ ". ALL TIMBER SHALL RECEIVE A PRESERVATION TREATMENT IN ACCORDANCE WITH AASHTO M133 AFTER ALL END CUTS ARE MADE AND ALL HOLES ARE DRILLED.
- TRANSITION SECTION SHOWN ON SHEET 1 WAS TESTED AND IS IN COMPLIANCE WITH NCHRP 350.
- GUARDRAIL & TRANSITION PANEL NOT SHOWN FOR CLARITY.

REFERENCES

DRAWN: K. Looney	DATE: 04/24/12
DESIGNED: JVM	DATE: 8/21/91
CHECKED: R. Brouger	DATE: 7/25/12
APPROVED: Frank J. Powell	DATE: 7/26/12
CAD FILE: 60-36-72 SH22.dwg	
NEXT ASSEMBLY:	



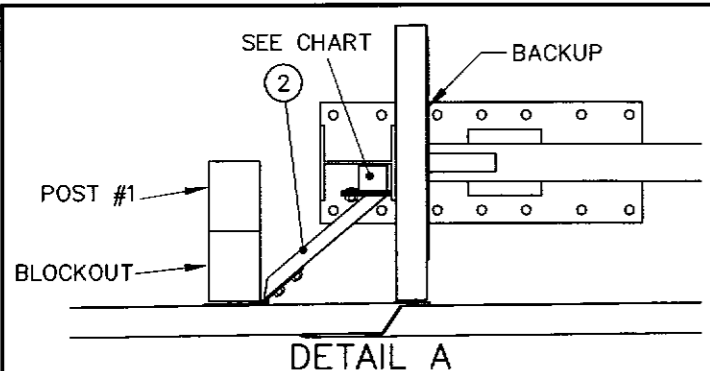
Frank J. Powell, PE 3617 Cincinnati Ave.
Florida #70359 Rocklin, CA 95765

ENERGY ABSORPTION SYSTEMS
ENGINEERING AND RESEARCH DEPARTMENT

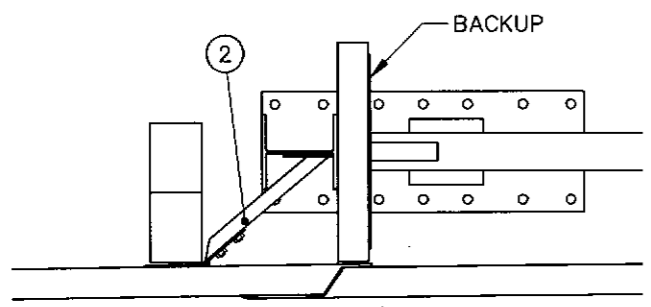
**TRANSITION ASSEMBLY,
QUAD-BEAM TO W-BEAM
QUADGUARD® ELITE™ SYSTEM**

Revisions	Date	Rev.	By	Ckd.	App.

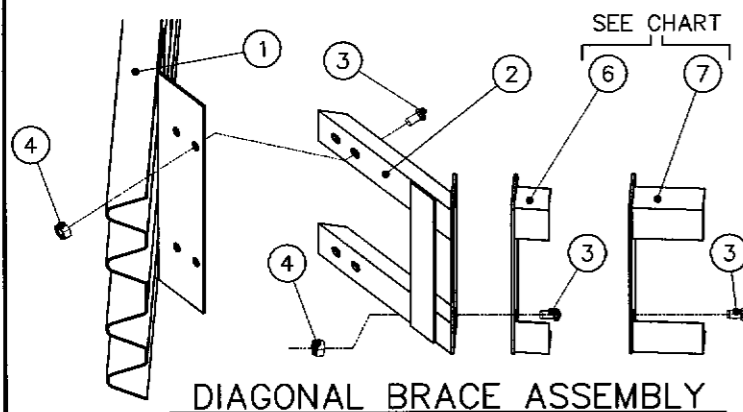
SCALE N.T.S.	DWG 60-36-72	SHEET 22 of 25	REV -
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DETAIL A
FINAL CONFIGURATION OF DIAGONAL BRACE
FOR MEDIUM & WIDE (30.00 OR 36.00) SYSTEMS

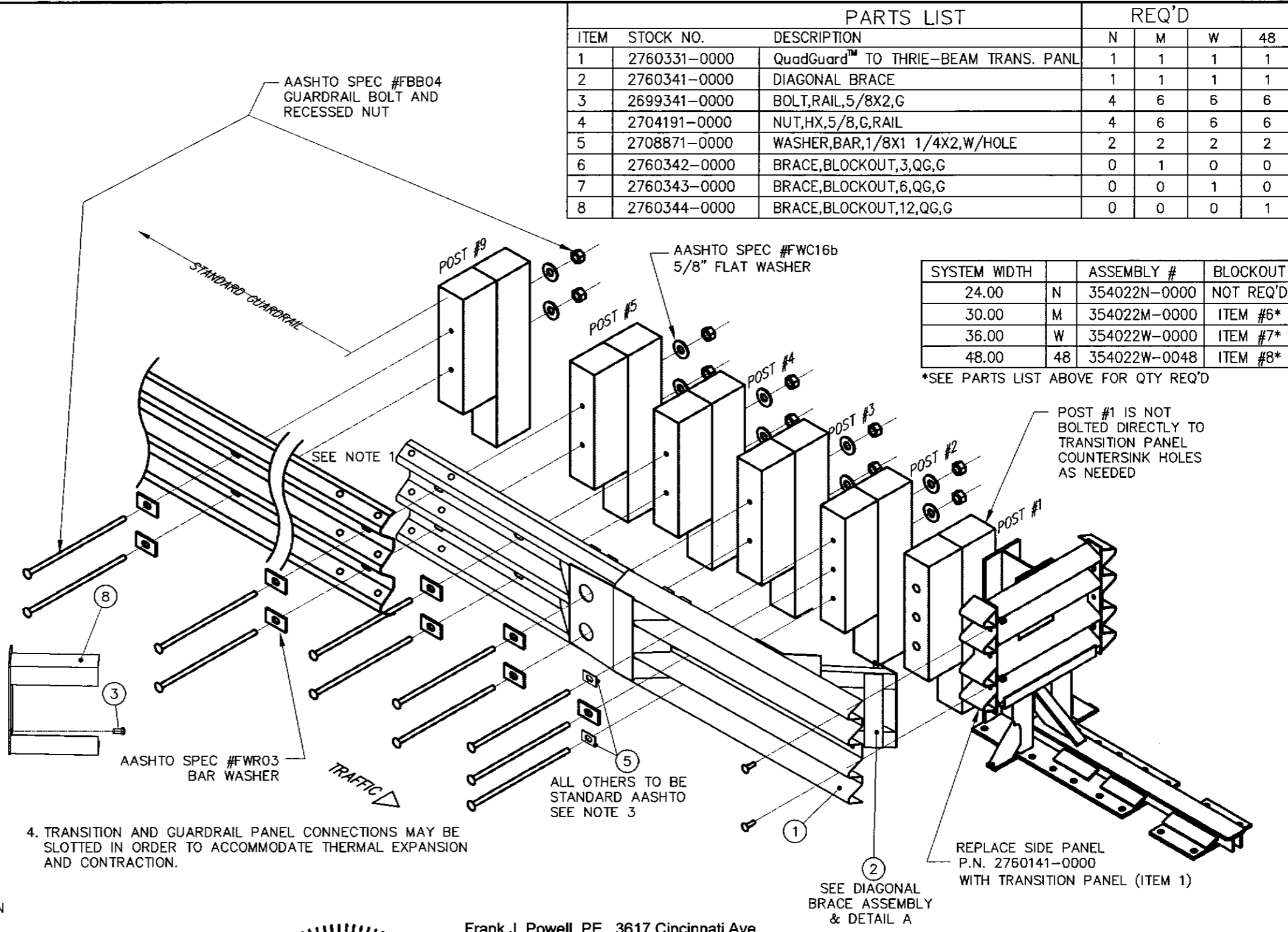


DETAIL A
FINAL CONFIGURATION OF DIAGONAL BRACE
FOR NARROW (24.00) SYSTEMS



NOTES:
 1. PANEL OVERLAP SHOWN IS FOR TRAFFIC DIRECTION SHOWN. ACTUAL OVERLAP SHALL BE DETERMINED BY THE SITE CONDITIONS AND PROJECT ENGINEER PER TRAFFIC DIRECTION. USE STANDARD GUARDRAIL CONNECTION.
 2. RIGHT SIDE OF ROAD APPLICATION SHOWN. ASSEMBLY MAY BE USED ON EITHER OR BOTH SIDES FOR LEFT, RIGHT, MEDIAN OR GORE APPLICATIONS. SEE NOTE 1. THIS ASSEMBLY IS NOT INCLUDED IN THE MODEL NUMBER AND MUST BE ORDERED SEPARATELY.
 3. ENERGY ABSORPTION SYSTEMS, INC. SUPPLIES THE STOCK ITEMS SHOWN IN THE PARTS LIST. ALL OTHER COMPONENTS OF THE DOWNSTREAM GUARDRAIL ARE STANDARD HIGHWAY MATERIALS AND MAY BE OBTAINED FROM YOUR LOCAL HIGHWAY SUPPLY VENDORS.

Revisions	Date	Rev.	By	Ckd.	App.



PARTS LIST			REQ'D			
ITEM	STOCK NO.	DESCRIPTION	N	M	W	48
1	2760331-0000	QuadGuard™ TO THRIE-BEAM TRANS. PANL	1	1	1	1
2	2760341-0000	DIAGONAL BRACE	1	1	1	1
3	2699341-0000	BOLT,RAIL,5/8X2,G	4	6	6	6
4	2704191-0000	NUT,HX,5/8,G,RAIL	4	6	6	6
5	2708871-0000	WASHER,BAR,1/8X1 1/4X2,W/HOLE	2	2	2	2
6	2760342-0000	BRACE,BLOCKOUT,3,QG,G	0	1	0	0
7	2760343-0000	BRACE,BLOCKOUT,6,QG,G	0	0	1	0
8	2760344-0000	BRACE,BLOCKOUT,12,QG,G	0	0	0	1

SYSTEM WIDTH		ASSEMBLY #	BLOCKOUT
24.00	N	354022N-0000	NOT REQ'D
30.00	M	354022M-0000	ITEM #6*
36.00	W	354022W-0000	ITEM #7*
48.00	48	354022W-0048	ITEM #8*

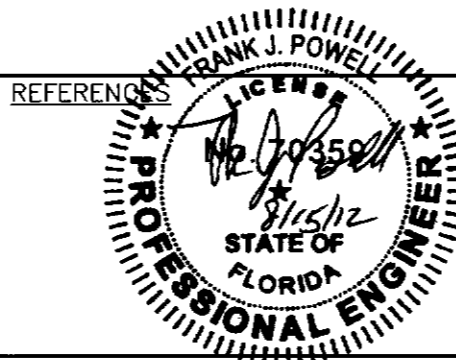
*SEE PARTS LIST ABOVE FOR QTY REQ'D

POST #1 IS NOT BOLTED DIRECTLY TO TRANSITION PANEL COUNTERSINK HOLES AS NEEDED

ALL OTHERS TO BE STANDARD AASHTO SEE NOTE 3

SEE DIAGONAL BRACE ASSEMBLY & DETAIL A

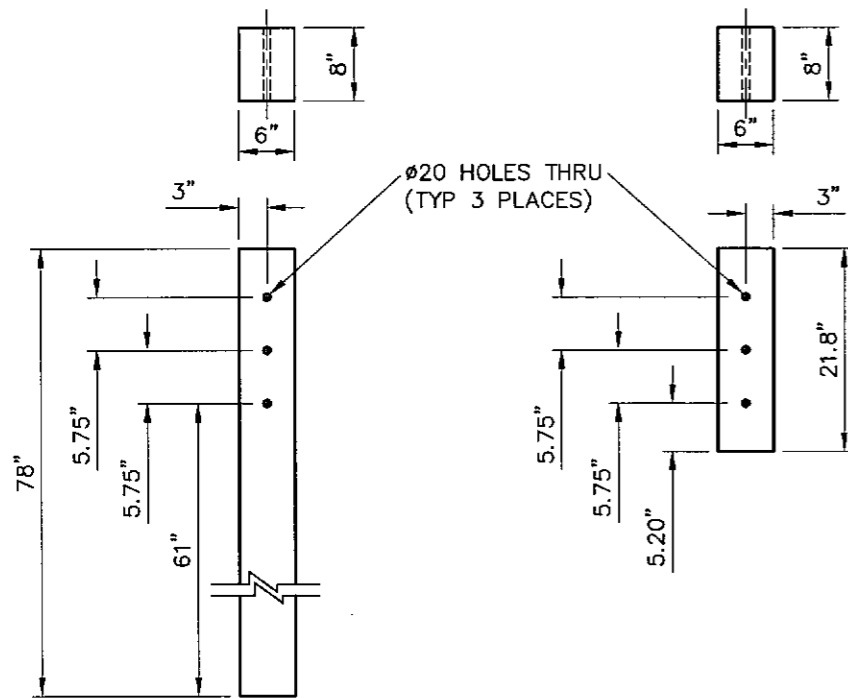
REPLACE SIDE PANEL P.N. 2760141-0000 WITH TRANSITION PANEL (ITEM 1)



Frank J. Powell, PE 3617 Cincinnati Ave.
 Florida #70359 Rocklin, CA 95765

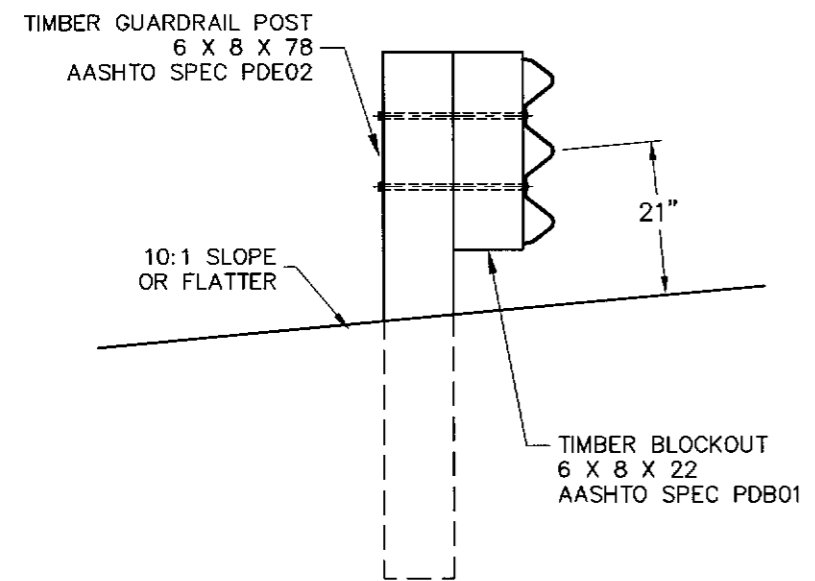
DRAWN: K. Looney	DATE: 4/26/12
DESIGNED: JVM	DATE: 08/21/96
CHECKED: R. Brouger	DATE: 7/25/12
APPROVED: Frank J. Powell	DATE: 7/26/12
CAD FILE: 60-36-72 sh23.dwg	
NEXT ASSEMBLY:	

ENERGY ABSORPTION SYSTEMS ENGINEERING AND RESEARCH DEPARTMENT			
TRANSITION ASSEMBLY QUAD-BEAM TO THRIE-BEAM QUADGUARD® ELITE™ SYSTEM			
SCALE N.T.S.	DWG. 60-36-72	SHEET 23 of 25	REV -



DETAIL A

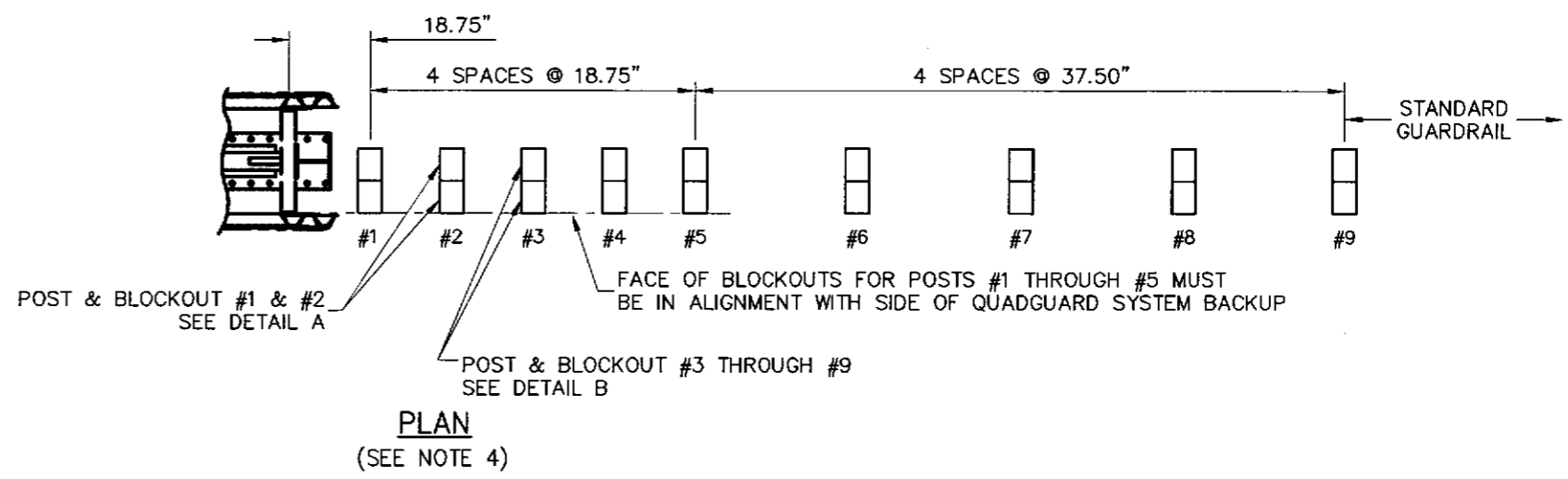
POSTS & BLOCKOUTS #1 & #2 (NON-STANDARD)
(SEE NOTES 2 & 3)



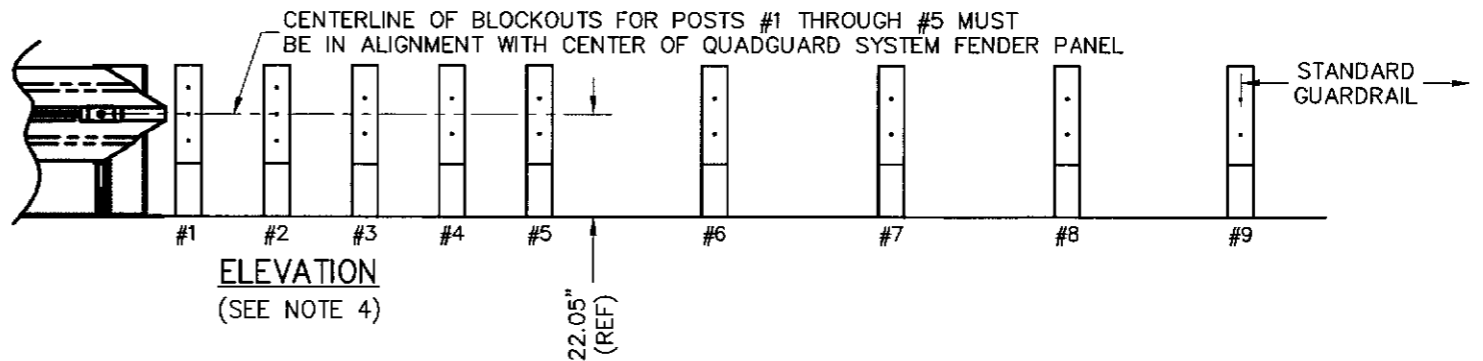
DETAIL B

POSTS & BLOCKOUTS #3 THRU #9
SEE NOTE 3

Revisions	Date	Rev.	By	Ckd.	App.



PLAN
(SEE NOTE 4)



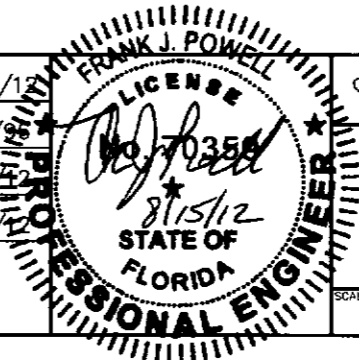
ELEVATION
(SEE NOTE 4)

NOTES:

1. DIMENSIONS ARE IN INCHES, UNLESS OTHERWISE NOTED.
2. POSTS & BLOCKOUTS SHALL BE MADE OF TIMBER WITH A STRESS GRADE OF AT LEAST 1100 psi. STRESS GRADING SHALL BE IN ACCORDANCE WITH THE RULES OF THE WEST COAST LUMBER INSPECTION BUREAU, SOUTHERN PINE INSPECTION BUREAU OR OTHER APPROPRIATE TIMBER ASSOCIATION. TIMBER FOR POSTS SHALL BE EITHER ROUGH SAWN (UNPLANED) OR S4S (SURFACED FOUR SIDES) WITH NOMINAL DIMENSIONS INDICATED. THE SIZE TOLERANCE OF POSTS IN THE DIRECTION PARALLEL TO THE AXIS OF THE BOLT HOLES SHALL NOT BE MORE THAN $\pm \frac{1}{4}$ ". ALL TIMBER SHALL RECEIVE A PRESERVATION TREATMENT IN ACCORDANCE WITH AASHTO M133 AFTER ALL END CUTS ARE MADE AND ALL HOLES ARE DRILLED.
3. TRANSITION SECTION SHOWN ON SHEET 1 WAS TESTED AND IS IN COMPLIANCE WITH NCHRP 350.
4. GUARDRAIL & TRANSITION PANEL NOT SHOWN FOR CLARITY.

REFERENCES

DRAWN:	K. Looney	DATE:	04/24/11
DESIGNED:	JVM	DATE:	8/21/10
CHECKED:	R. Brouger	DATE:	7/25/11
APPROVED:	Frank J. Powell	DATE:	7/26/11
CAD FILE:	60-36-74 sh 24.dwg		
NEXT ASSEMBLY:			

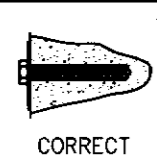


Frank J. Powell, PE 3617 Cincinnati Ave.
Florida #70359 Rocklin, CA 95765

ENERGY ABSORPTION SYSTEMS
ENGINEERING AND RESEARCH DEPARTMENT

**TRANSITION ASSEMBLY,
QUAD-BEAM TO THRIE-BEAM
QUADGUARD® ELITE™ SYSTEM**

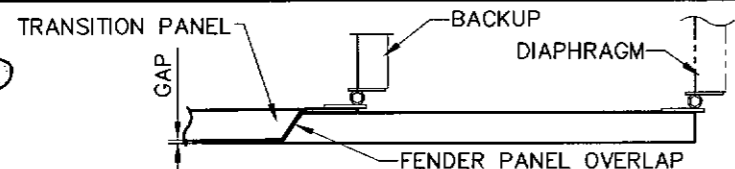
SCALE	N.T.S.	DWG	60-36-74	SHEET	24 of 25	REV	-
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CORRECT



INCORRECT

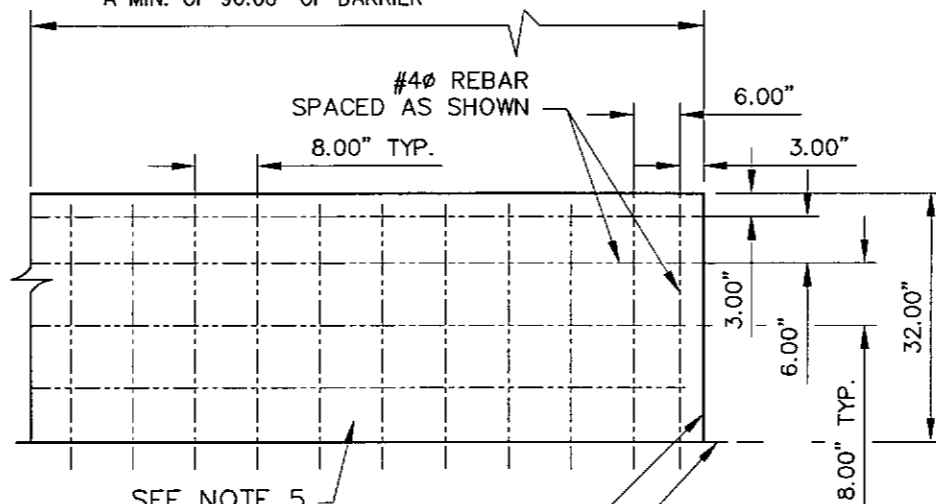


CAUTION
0.78" MAX.
FOR PROPER IMPACT
PERFORMANCE

DETAIL C

SCALE: 1=20

MANUFACTURER RECOMMENDS TO REINFORCE
A MIN. OF 96.00" OF BARRIER

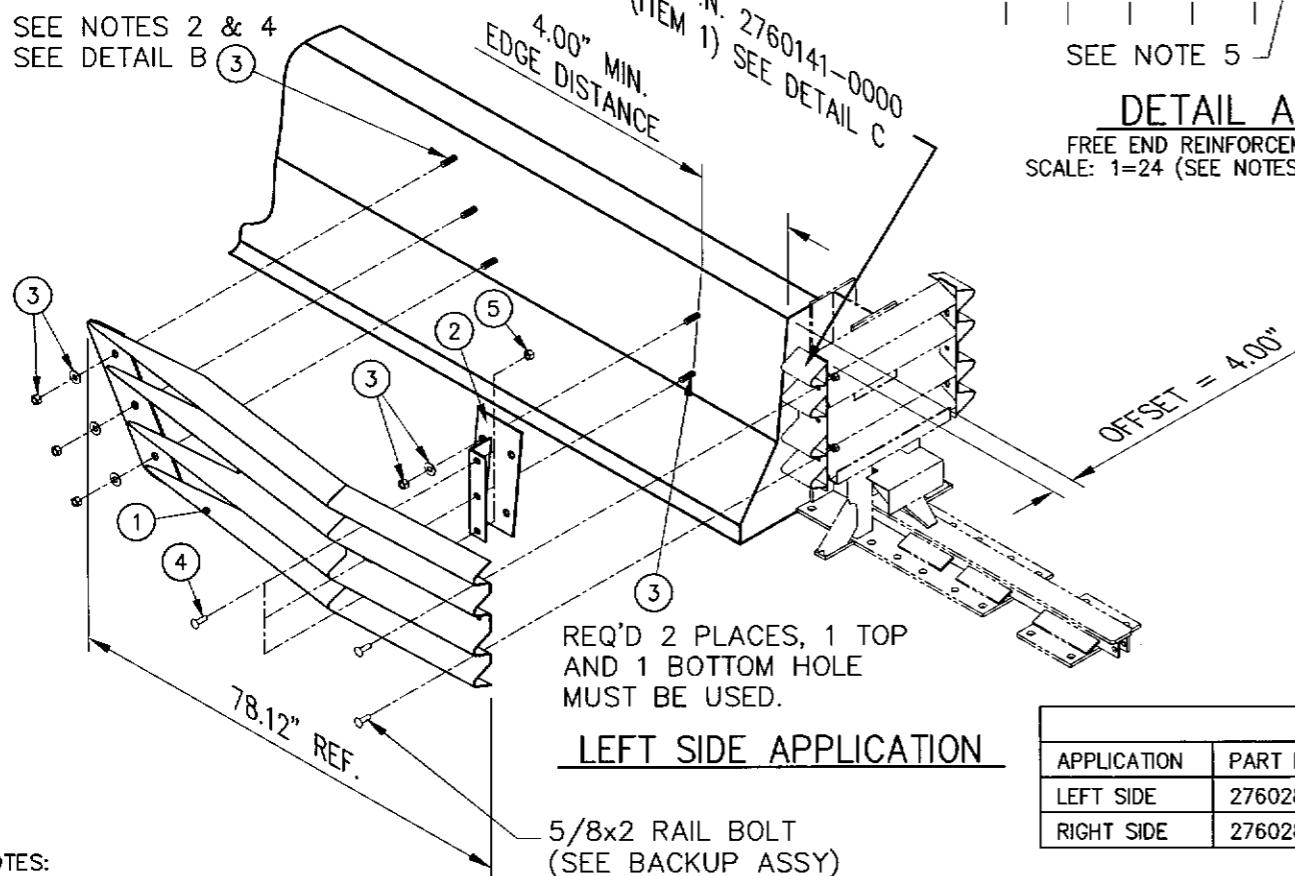


SEE NOTE 5
DETAIL A
FREE END REINFORCEMENT
SCALE: 1=24 (SEE NOTES 1 & 3)

PARTS LIST			
ITEM	STOCK NO.	DESCRIPTION	REQ'D
1	SEE TABLE	PANEL, TRANSITION, 4 OFFSET, QG	1.00
2	2760301-0000	BRACKET, SUPPORT, 4 TRANS TO CMB	1.00
3	3525130-0000	ANCHOR, MP-3, PT KIT, 3/4X6 1/2 HOR	1.00
4	2699341-0000	BOLT, RAIL, 5/8X2, G	3.00
5	2704191-0000	NUT, HX, 5/8, G, RAIL	3.00

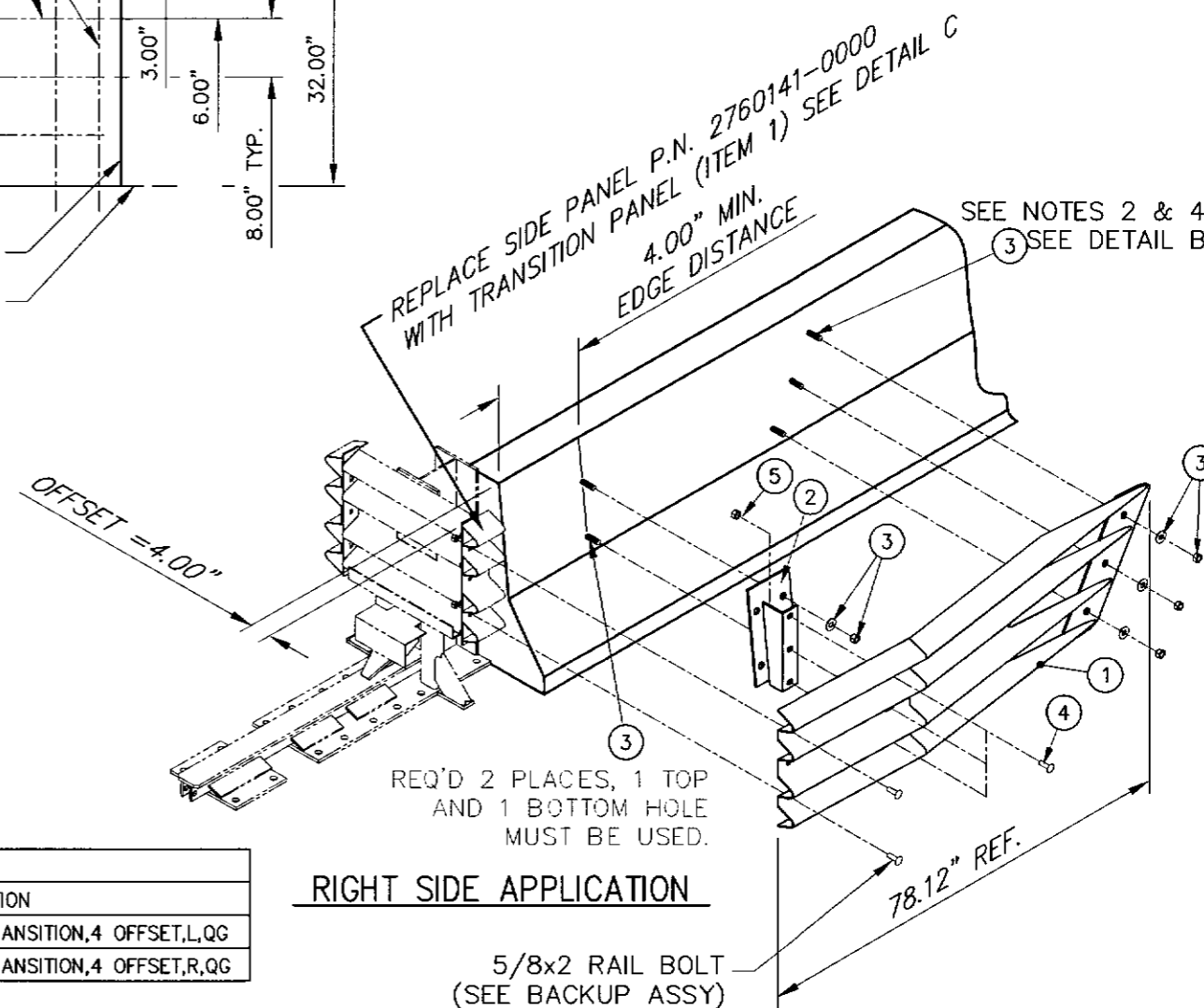
DETAIL B
NOT TO SCALE

SEE NOTES 2 & 4
SEE DETAIL B



LEFT SIDE APPLICATION

5/8x2 RAIL BOLT
(SEE BACKUP ASSY)



RIGHT SIDE APPLICATION

5/8x2 RAIL BOLT
(SEE BACKUP ASSY)

TABLE - ITEM 1		
APPLICATION	PART NO.	DESCRIPTION
LEFT SIDE	2760281-0000	PANEL, TRANSITION, 4 OFFSET, L, QG
RIGHT SIDE	2760282-0000	PANEL, TRANSITION, 4 OFFSET, R, QG

NOTES:

1. THE CONCRETE BARRIER REINFORCEMENT SHOWN IN DETAIL "A" IS RECOMMENDED TO ENSURE ADEQUATE BARRIER INTEGRITY FOR PROPER IMPACT PERFORMANCE. IT IS APPROPRIATE FOR A STANDARD SAFETY SHAPED BARRIER WITH A 24.00" BASE AND A 6.00" TOP. VARIATIONS MAY BE REVIEWED AND DETERMINATIONS MADE AS TO REASONABLE EQUIVALENCE BY PROJECT ENGINEER.

3. IMPACT FORCES COULD BE TRANSFERRED INTO TERMINAL END OF THE BARRIER. ADEQUATE ANCHORAGE IS REQUIRED FOR PROPER IMPACT PERFORMANCE.

5. MIN. 4000 PSI P.C. CONCRETE MEDIAN BARRIER.

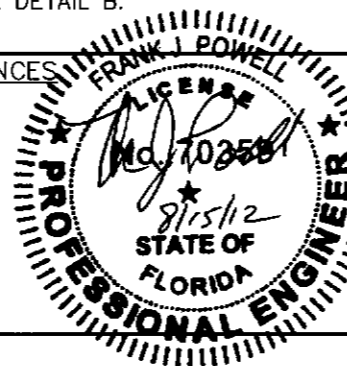
4. ANCHOR STUD END SHOULD BE FLUSH WITH OUTSIDE SURFACE OF ANCHOR NUT, SEE DETAIL B.

2. USE TRANSITION PANEL AS TEMPLATE FOR DRILLING. RECOMMENDED HOLE DEPTH 5.00. FINAL TORQUE TO BE 120 FT-LBS (TYP).

Frank J. Powell, PE 3617 Cincinnati Ave.
Florida #70359 Rocklin, CA 95765

LEFT ASSEMBLY NO. 354018L-0000
RIGHT ASSEMBLY NO. 354018R-0000

REFERENCES



DRAWN:	K. Looney	DATE:	04/24/12
DESIGNED:	J. WELCH	DATE:	8/21/96
CHECKED:	R. Brougner	DATE:	7/25/12
APPROVED:	Frank J. Powell	DATE:	7/26/12
CAD FILE:	60-36-74 sh 25.dwg		
NEXT ASSEMBLY:			

ENERGY ABSORPTION SYSTEMS
ENGINEERING AND RESEARCH DEPARTMENT

QUADGUARD® ELITE™ SYSTEM
TRANSITION ASSY, 4 OFFSET, QG

Revisions	Date	Rev.	By	Ckd.	App.

SCALE	N.T.S.	DWG.	60-36-74	SHEET	25 of 25	REV.	-
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