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\*FOR 24-36" SYSTEMS WITH SAFETY BARRIER, PARALLEL TO C OF SYSTEM, AND FOR 69-90" SYSTEMS WITH SAFETY BARRIER PARALLEL TO SIDES OF SYSTEMS.

\*\* FOR 69-90" SYSTEMS WITH SAFETY BARRIER PARALLEL TO C OF SYSTEM.

**QUADGUARD® II SYSTEM (Permanent)  
S544-043**

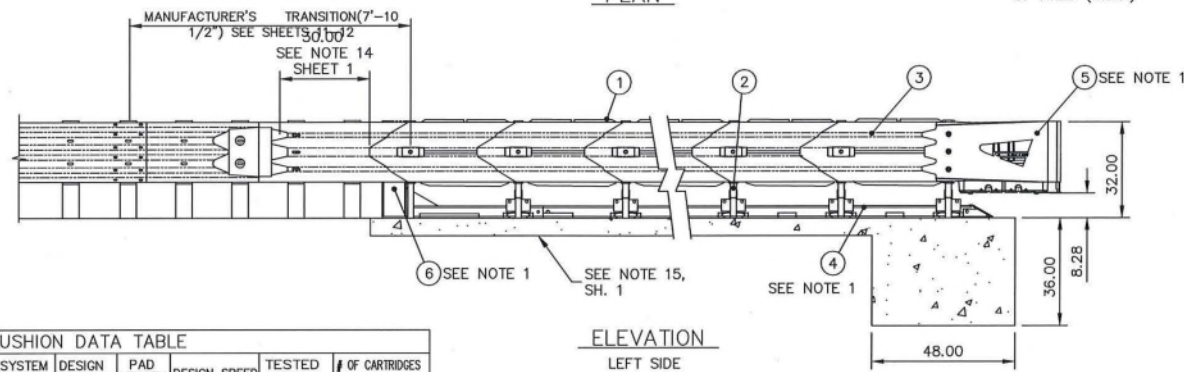
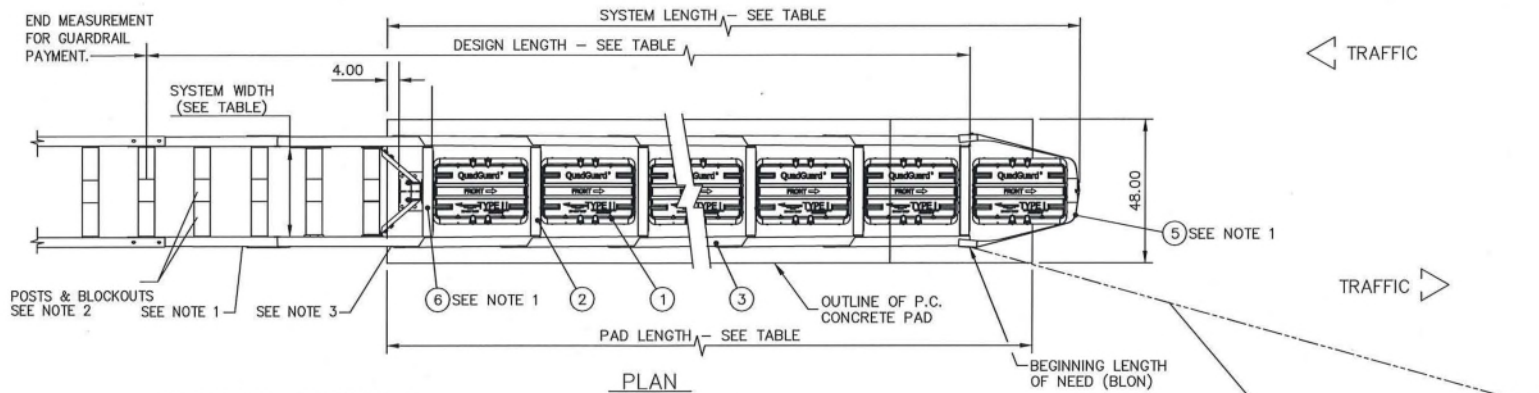
- The energy absorbing system represented on these Approved Products List (APL) drawings is a proprietary design by Trinity Highway, and marketed under the name QUADGUARD® II System (QGII).
- The QGII is a redirective, non-gating crash cushion which is well suited for use shielding hazards. The QGII 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 departure line.
- The QGII has been evaluated to NCHRP-350 crash test criteria and is suitable for Test Level 2 and Test Level 3 crash cushion applications.
- The QGII shall be assembled and installed in accordance with the manufacturer's detailed drawings, procedures and specifications, product manual or installation guide. Information and copies of the above manual are available on the Approved Product List (APL).
- The QGII is available in 24", 30", 36", 48", 69" and 90" nominal widths. The system width will be as called out in the plans, permit or other contract document for each location.
- Only the QGII Type I and Type II energy absorbing cartridges shall be used as shown on the drawings.
- All metallic compounds shall meet the galvanizing requirements for guardrail, Section 967 of the FDOT specifications.
- A yellow Type 1 Object Marker shall be centered 3' in front of the nose of the QGII. Mounting hardware shall be in conformance with Section 993 of the FDOT Specification. The cost of the Object Marker shall be included in the cost of the QGII.

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 Approved Products List (APL). 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".

- Quantity for payment is based on each independent location as called for in the plans or as directed by the Engineer. The cost of foundations, subgrade preparation and other appurtenant construction will be included in the cost for the QGII.
- In compliance with the AASHTO 2011 Roadside Design Guide, remove all curbs and islands to ensure proper impact performance.
- Supply adequate transition from the QGII to the object being shielded.
- Units of measurements are in English units.
- The QGII 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.
- Provision shall be made on QGII systems for all rear fender panels to slide rearward 30" upon impact.
- QGII shall be placed on a 6" min. reinforced 4000 PSI Portland concrete pad or 8" min. non-reinforced, 4000 psi Portland concrete roadway measuring at least 12'-0" wide by 50'-0" long.  
  
As an option, the contractor may extend an existing 5-bay QuadGuard® II concrete pad by one additional bay for use with 6-bay MASH QuadGuard® M10 system. Refer to sheet 24.
- See the QuadGuard® II 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 current manual are available on APL.
- For proper impact performance, the QGII system must be restored to its original length after each impact.



DRAWN: K. LOONEY CHECKED: B. ECKERT <small>UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN INCHES DIMENSIONS ACCORDING TO ASME Y 14.5A-1994 AND TYP-92-000 UNLESS OTHERWISE SPECIFIED.</small>	DATE: 04/24/2012	MODEL NO: N/A	QUADGUARD® II SYSTEM (PERMANENT)  DRAWING SET APL 544-000-043  FLORIDA 60-36-62	
	DATE: 12/07/2012	FILE: 60-36-62.dwg		
	DO NOT SCALE DRAWING			
	Revision	ECO Date Rev By Chk.		
UPDATED NOTE NUMBERS, M10548	/ 08/19/16 B JMS BRE			
ADDED 2ND PARAGRAPH TO NOTE 15, UPDATED BORDER AND TITLE BLOCK, ADDED SHEET 24	6303 02/18/19 C JMS BRE			
UPDATED TITLE BLOCK AND TABLE OF CONTENTS	7147 06/26/20 D JMS RCB			



BAYS	24" WIDTH MODEL#	30" WIDTH MODEL#	36" WIDTH MODEL#	48" WIDTH MODEL#	SYSTEM LENGTH	DESIGN LENGTH	PAD LENGTH	DESIGN SPEED	TESTED TO	# OF CARTRIDGES	
										TYPE I	TYPE II
1	QG24024	QG24030	QG24036	QG24048	7'-0"	11'-0"	9'-0"	25 mph	Interpolated*	2	0
2	QG27024	QG27030	QG27036	QG27048	10'-0"	14'-0"	9'-0"	45 mph	TL-2	2	1
3	QG28024	QG28030	QG28036	QG28048	13'-0"	17'-0"	12'-0"	50 mph	Interpolated*	2	2
4	QG29024	QG29030	QG29036	QG29048	16'-0"	20'-0"	15'-0"	55 mph	Interpolated*	3	2
5	QG210024	QG210030	QG210036	QG210048	19'-0"	23'-0"	18'-0"	60 mph	TL-3 Δ	3	3

\* 25, 50 & 55 mph MODELS ARE NOT TESTED BUT ARE INTERPOLATIONS BETWEEN TL2 AND TL-3.

NOTE: FOR LOW SPEED FACILITIES WITH A DESIGN SPEED OF ≤ 45 mph USE A TL-2 SYSTEM.  
FOR HIGH SPEED FACILITIES WITH A DESIGN SPEED OF ≥ 50 mph USE A TL-3 SYSTEM.

NOTES:

- BACKUP TRANSITION, MONORAIL AND NOSE ASSEMBLIES NOT INCLUDED IN MODEL NUMBER. ORDER SEPARATELY. TRANSITION PANELS AND RELATED FASTENERS ARE ACCESSORY ITEMS.
- POSTS, BLOCKOUTS AND HARDWARE ARE STANDARD HIGHWAY ISSUE AND ARE NOT SUPPLIED BY ENERGY ABSORPTION SYSTEMS.
- TRANSITION PANEL SHALL BE ANGLED SUCH THAT MAXIMUM GAP FROM FENDER PANEL OVERLAP DOES NOT EXCEED 3/4".



KEY	
① CARTRIDGE	④ MONORAIL
② DIAPHRAGM	⑤ NOSE ASSEMBLY
③ FENDER PANEL	⑥ BACKUP

DRAWN: S. TRAGESER	DATE: 07/25/2012	MODEL NO: SEE TABLE			
ORDERED: F. J. POWELL	DATE: 07/25/2012	FILE: 60-36-62.dwg			
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN INCHES DIMENSIONS ACCORDING TO ASME Y14.5M-1994 AND TYP-66-003 UNLESS OTHERWISE SPECIFIED.					
Revision	ECO	Date	Rev	By	Chk.
SEE SHEET 1	/	08/19/16	B	JMS	BRE
UPDATED BORDER AND TITLE BLOCK, ADDED SHEET 24	6303	02/18/19	C	JMS	BRE
UPDATED TITLE BLOCK	7147	06/26/20	D	JMS	RCB

BIDIRECTIONAL

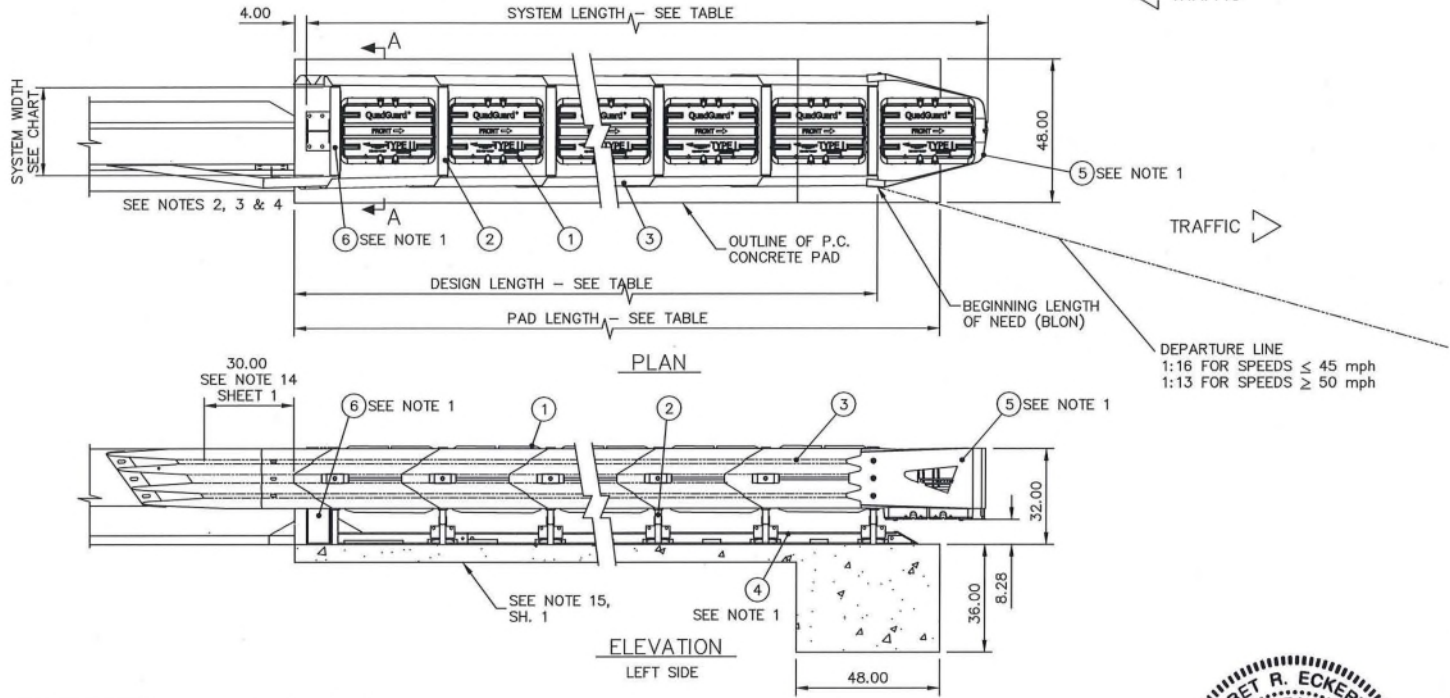
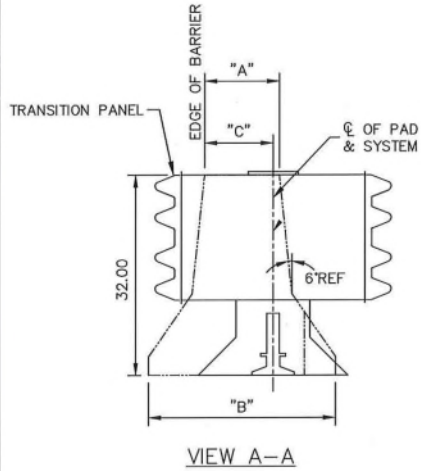
QUADGUARD® II SYSTEM (PERMANENT)  
W/ TENSION STRUT BUJ ATTACHED TO  
THREE BEAM GUARDRAIL  
APL 544-000-043



FLORIDA	REV: D	SHEET: 2 of 26
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SYSTEM WIDTH	TYPICAL BARRIER APPLICATION		
	"A" TOP OF BARRIER	"B" BARRIER WIDTH	"C" OFFSET
24.00	6.00-16.00	24.00-34.00	8.00
30.00	12.00-22.00	30.00-40.00	11.00
36.00	18.00-28.00	36.00-46.00	14.00
48.00	24.00-40.00	48.00-58.00	17.00



BAYS	24" WIDTH MODEL#	30" WIDTH MODEL#	36" WIDTH MODEL#	48" WIDTH MODEL#	SYSTEM LENGTH	DESIGN LENGTH	PAD LENGTH	DESIGN SPEED	TESTED TO	# OF CARTRIDGES	
										TYPE I	TYPE II
1	QG24024	QG24030	QG24036	QG24048	7'-0"	4'-3"	9'-0"	25 mph	Interpolated	2	0
2	QG27024	QG27030	QG27036	QG27048	10'-0"	7'-3"	9'-0"	45 mph	TL-2	2	1
3	QG28024	QG28030	QG28036	QG28048	13'-0"	10'-3"	12'-0"	50 mph	Interpolated *	2	2
4	QG29024	QG29030	QG29036	QG29048	16'-0"	13'-3"	15'-0"	55 mph	Interpolated *	3	2
5	QG210024	QG210030	QG210036	QG210048	19'-0"	16'-3"	18'-0"	60 mph	TL-3 Δ	3	3

\* 25, 50 & 55 mph MODELS ARE NOT TESTED BUT ARE INTERPOLATIONS BETWEEN TL2 AND TL-3.

NOTE: FOR LOW SPEED FACILITIES WITH A DESIGN SPEED OF ≤ 45 mph USE A TL-2 SYSTEM.  
FOR HIGH SPEED FACILITIES WITH A DESIGN SPEED OF ≥ 50 mph USE A TL-3 SYSTEM.

NOTES:

- BACKUP, NOSE AND TRANSITION ASSEMBLIES NOT INCLUDED IN MODEL NUMBER. ORDER SEPARATELY. TRANSITION ASSEMBLIES ARE ACCESSORY ITEMS
- TRANSITION PANEL SHALL BE ANGLED SUCH THAT MAXIMUM GAP FROM FENDER PANEL OVERLAP DOES NOT EXCEED 3/4".
- CAUTION: C OF QUADGUARD II SYSTEM SHALL BE PARALLEL TO C OF BARRIER ±1".
- CAUTION: MAX. 7" CLEARANCE BETWEEN BACKUP AND BARRIER WALL.
- LOCATE EDGE OF BARRIER @ 32.00" ABOVE GRADE AND USE DIMENSIONS PROVIDED IN TABLE "A" TO LOCATE QUADGUARD II SYSTEM AND PAD WITH RESPECT TO SAFETY BARRIER.



KEY	
① CARTRIDGE	④ MONORAIL
② DIAPHRAGM	⑤ NOSE ASSEMBLY
③ FENDER PANEL	⑥ BACKUP

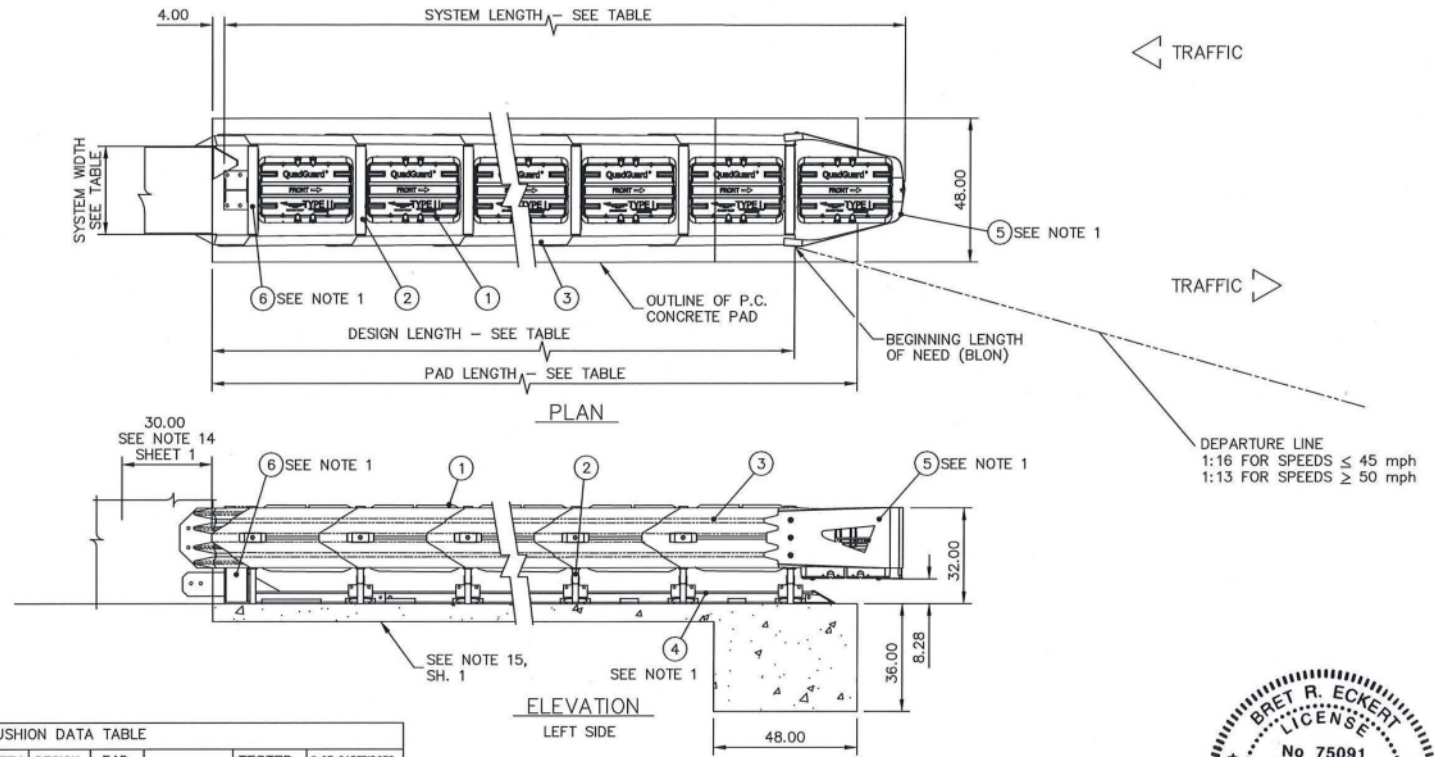
DRAWN: S. TRAGESER	DATE: 07/25/2012	MODEL NO: SEE TABLE			
DESIGNED: F. J. POWELL	DATE: 07/25/2012	FILE: 60-36-62.dwg			
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN INCHES. DIMENSIONS ACCORDING TO ASME Y14.5M-1994 AND TYP-92-003 UNLESS OTHERWISE SPECIFIED.					
Revision	ECO	Date	Rev	By	Chk.
SEE SHEET 1	/	08/19/16	B	JMS	BRE
UPDATED BORDER AND TITLE BLOCK, ADDED SHEET 24	6303	02/18/19	C	JMS	BRE
UPDATED TITLE BLOCK	7147	06/26/20	D	JMS	RCB

BIDIRECTIONAL  
QUADGUARD® II SYSTEM (PERMANENT)  
W/ TENSION STRUT BACKUP ATTACHED TO SAFETY BARRIER  
APL 544-000-043

FLORIDA	REV: D	DATE: 06-26-20	SHEET: 3 of 26
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BAYS	24" WIDTH MODEL#	30" WIDTH MODEL#	36" WIDTH MODEL#	48" WIDTH MODEL#	SYSTEM LENGTH	DESIGN LENGTH	PAD LENGTH	DESIGN SPEED	TESTED TO	# OF CARTRIDGES	TYPE I	TYPE II
1	QG24024	QG24030	QG24036	QG24048	7'-0"	4'-3"	9'-0"	25 mph	Interpolated*	2	0	
2	QG27024	QG27030	QG27036	QG27048	10'-0"	7'-3"	9'-0"	45 mph	TL-2	2	1	
3	QG28024	QG28030	QG28036	QG28048	13'-0"	10'-3"	12'-0"	50 mph	Interpolated*	2	2	
4	QG29024	QG29030	QG29036	QG29048	16'-0"	13'-3"	15'-0"	55 mph	Interpolated*	3	2	
5	QG210024	QG210030	QG210036	QG210048	19'-0"	16'-3"	18'-0"	60 mph	TL-3	3	3	

\* 25, 50 & 55 mph MODELS NOT TESTED BUT ARE INTERPOLATIONS BELOW OR BETWEEN TL-2 AND TL-3.

NOTE: FOR LOW SPEED FACILITIES WITH A DESIGN SPEED OF  $\leq 45$  mph USE A TL-2 SYSTEM.  
FOR HIGH SPEED FACILITIES WITH A DESIGN SPEED OF  $\geq 50$  mph USE A TL-3 SYSTEM.

NOTES:

1. BACKUP, END SHOE, MONORAIL AND NOSE ASSEMBLIES NOT INCLUDED IN MODEL NUMBER. ORDER SEPARATELY. END SHOE ASSEMBLIES AND RELATED FASTENERS ARE ACCESSORY ITEMS.
2. END SHOES AND WHEEL DEFLECTORS MAY BE USED ON EITHER SIDE, FOR UNIDIRECTIONAL OR BIDIRECTIONAL APPLICATIONS DEPENDING ON NEED. TO BE DECIDED BY PROJECT ENGINEER.
3. CAUTION: MAX. 7.00 CLEARANCE BETWEEN BACKUP AND WALL TO PROVIDE SUPPORT FOR END SHOE ANCHORS.



KEY	
① CARTRIDGE	④ MONORAIL
② DIAPHRAGM	⑤ NOSE ASSEMBLY
③ FENDER PANEL	⑥ BACKUP

DESIGN: S. TRAGESER	DATE: 07/25/2012	MODEL NO: SEE TABLE			
CHECKED: F. J. POWELL	DATE: 07/25/2012	FILE: 60-36-62.dwg			
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN INCHES DIMENSIONS ACCORDING TO ASME Y14.5M-1994 AND TSP-92-003 UNLESS OTHERWISE SPECIFIED.					
Revision	ECO	Date	Rev	By	Chk.
SEE SHEET 1	/	08/19/16	B	JMS	BRE
UPDATED BORDER AND TITLE BLOCK, ADDED SHEET 24	6303	02/18/19	C	JMS	BRE
UPDATED TITLE BLOCK	7147	06/26/20	D	JMS	RCB

BIDIRECTIONAL

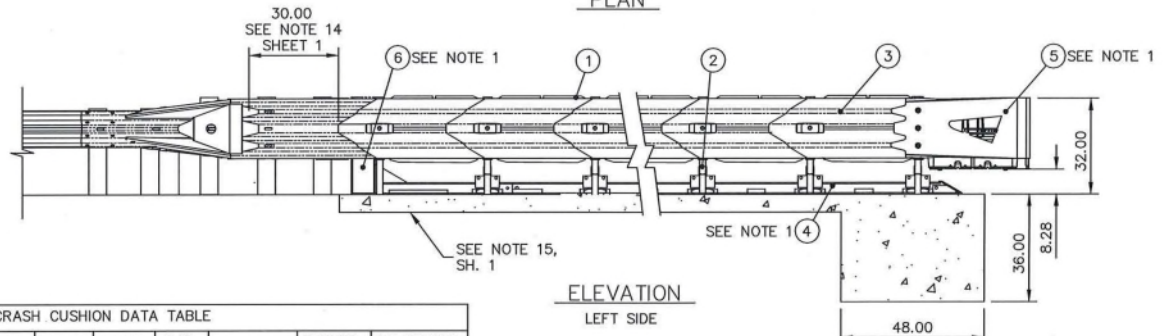
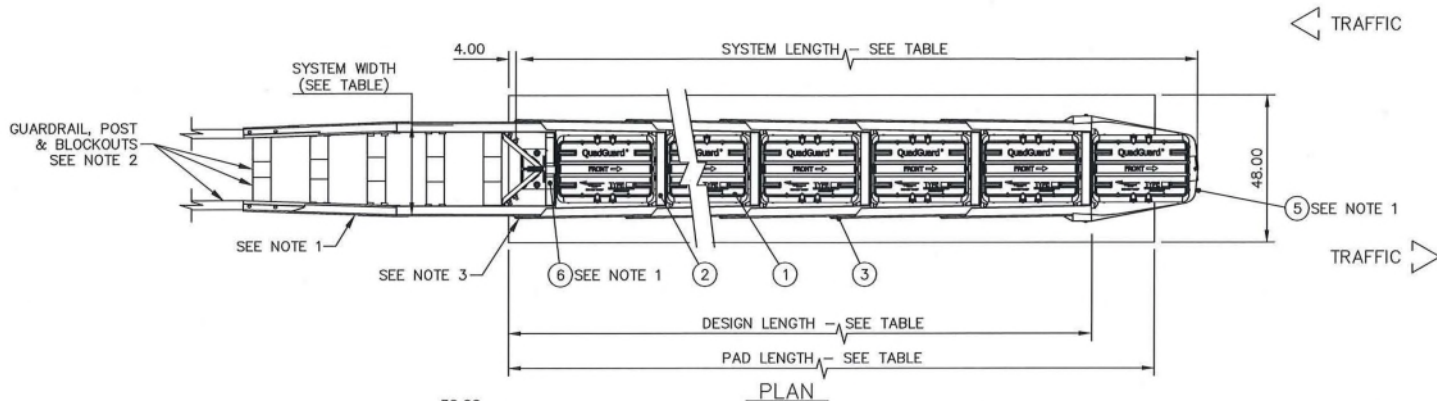
QUADGUARD® II SYSTEM (PERMANENT)  
W/ TENSION STRUT BACKUP & END SHOES

APL 544-000-043



FLORIDA	REV: D	SHEET: 4 of 26
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BAYS	24" WIDTH MODEL#	30" WIDTH MODEL#	36" WIDTH MODEL#	48" WIDTH MODEL#	SYSTEM LENGTH	DESIGN LENGTH	PAD LENGTH	DESIGN SPEED	TESTED TO	# OF CARTRIDGES
										TYPE I   TYPE II
1	QG24024	QG24030	QG24036	QG24048	7'-0"	4'-3"	9'-0"	25 mph	Interpolated*	2   0
2	QG27024	QG27030	QG27036	QG27048	10'-0"	7'-3"	9'-0"	45 mph	TL-2	2   1
3	QG28024	QG28030	QG28036	QG28048	13'-0"	10'-3"	12'-0"	50 mph	Interpolated *	2   2
4	QG29024	QG29030	QG29036	QG29048	16'-0"	13'-3"	15'-0"	55 mph	Interpolated *	3   2
5	QG210024	QG210030	QG210036	QG210048	19'-0"	16'-3"	18'-0"	60 mph	TL-3	3   3

\* 25, 50 & 55 mph MODELS NOT TESTED BUT ARE INTERPOLATIONS BELOW OR BETWEEN TL-2 AND TL-3.

NOTE: FOR LOW SPEED FACILITIES WITH A DESIGN SPEED OF ≤ 45 mph USE A TL-2 SYSTEM.  
FOR HIGH SPEED FACILITIES WITH A DESIGN SPEED OF ≥ 50 mph USE A TL-3 SYSTEM.

- NOTES:
- BACKUP, TRANSITION, MONORAIL AND NOSE ASSEMBLIES NOT INCLUDED IN MODEL NUMBER. ORDER SEPARATELY. TRANSITION ASSEMBLIES AND RELATED FASTENERS ARE ACCESSORY ITEMS.
  - POSTS, BLOCKOUTS AND HARDWARE ARE STANDARD HIGHWAY ISSUE AND ARE NOT SUPPLIED BY ENERGY ABSORPTION SYSTEMS.
  - TRANSITION PANEL SHALL BE ANGLED SUCH THAT MAXIMUM GAP FROM FENDER PANEL OVERLAP DOES NOT EXCEED 3/4".



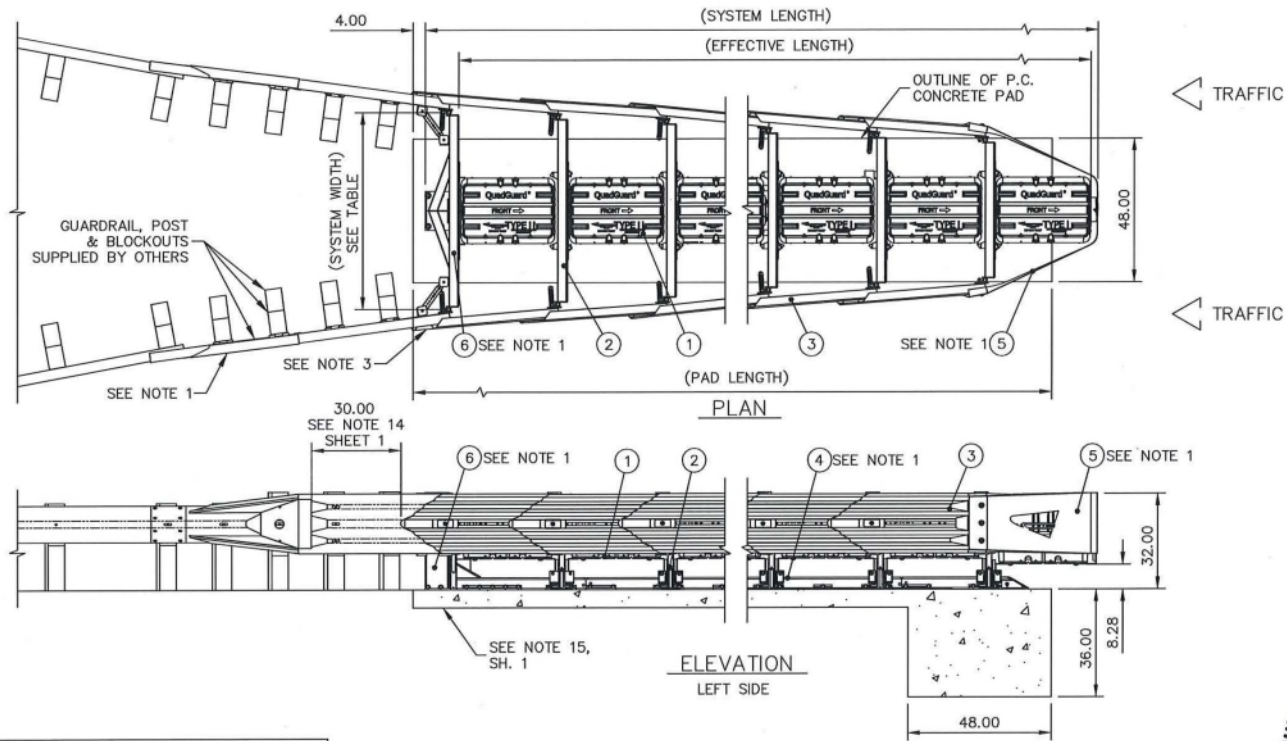
① CARTRIDGE	④ MONORAIL
② DIAPHRAGM	⑤ NOSE ASSEMBLY
③ FENDER PANEL	⑥ BACKUP

DESIGNED BY: W. LEDDINGTON	DATE: 02/04/2010	MODEL NO: SEE TABLE					
CHECKED BY: F. J. POWELL	DATE: 07/23/2010	FILE: 60-36-62.dwg					
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.							
Revision	ECO	Date	Rev	By	Chk.		
SEE SHEET 1	/	08/19/16	B	JMS	BRE		
DIMENSIONS WERE MILLIMETERS (INCHES) UPDATED BORDER AND TITLE BLOCK, ADDED SHEET 24			6303	02/18/19	C	JMS	BRE
UPDATED TITLE BLOCK			7147	06/26/20	D	JMS	RCB

BIDIRECTIONAL	
QUADGUARD® II SYSTEM (PERMANENT) W/ TENSION STRUT BACKUP & QUAD TO W-BEAM TRANS	
APL 544-000-043	
FLORIDA	REV: D
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TRINITY HIGHWAY ENERGY ABSORPTION SYSTEM

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BAYS	69" WIDTH MODEL#	90" WIDTH MODEL#	SYSTEM LENGTH	EFFECTIVE LENGTH	PAD LENGTH	DESIGN SPEED	TESTED TO	# OF CARTRIDGES	
								TYPE I	TYPE II
3	QG27069	QG27090	13'-0"	17'-3"	12'-0"	45 mph	TL-2	2	2
4	QG28069	QG28090	16'-0"	20'-3"	15'-0"	50 mph	Interpolated *	3	2
5	QG210069	QG210090	19'-0"	23'-3"	18'-0"	60 mph	TL-3	3	3

\* 50 mph MODELS NOT TESTED BUT ARE INTERPOLATIONS BELOW OR BETWEEN TL-2 AND TL-3.

NOTE: FOR LOW SPEED FACILITIES WITH A DESIGN SPEED OF  $\leq 45$  mph USE A TL-2 SYSTEM.  
FOR HIGH SPEED FACILITIES WITH A DESIGN SPEED OF  $\geq 50$  mph USE A TL-3 SYSTEM.

NOTES:

- BACKUP, TRANSITION, MONORAIL AND NOSE ASSEMBLIES NOT INCLUDED IN MODEL NUMBER. ORDER SEPARATELY. TRANSITION PANELS AND RELATED FASTENERS ARE ACCESSORY ITEMS.
- POSTS, BLOCKOUTS AND HARDWARE ARE STANDARD HIGHWAY ISSUE AND ARE NOT SUPPLIED BY ENERGY ABSORPTION SYSTEMS.
- TRANSITION PANEL SHALL BE ANGLED SUCH THAT MAXIMUM GAP FROM FENDER PANEL OVERLAP DOES NOT EXCEED 3/4".



UNIDIRECTIONAL

QUADGUARD® II SYSTEM (PERMANENT)  
69" 90" SYSTEM W/ TS BU & QUAD TO W-BEAM (L/R)

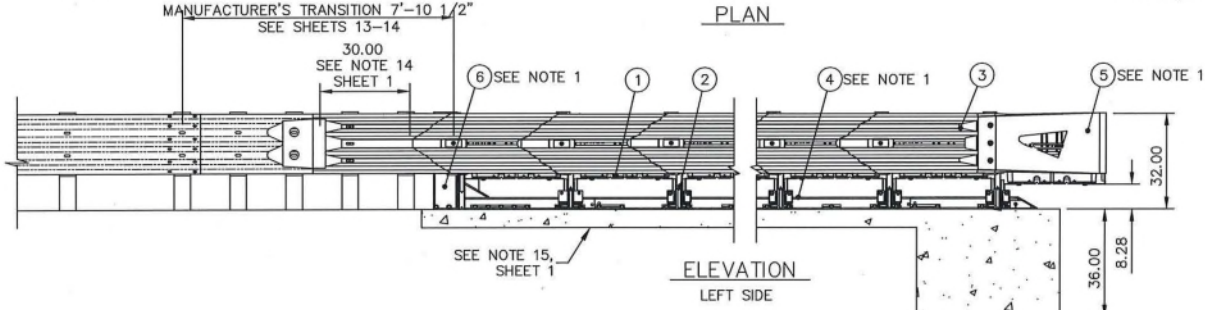
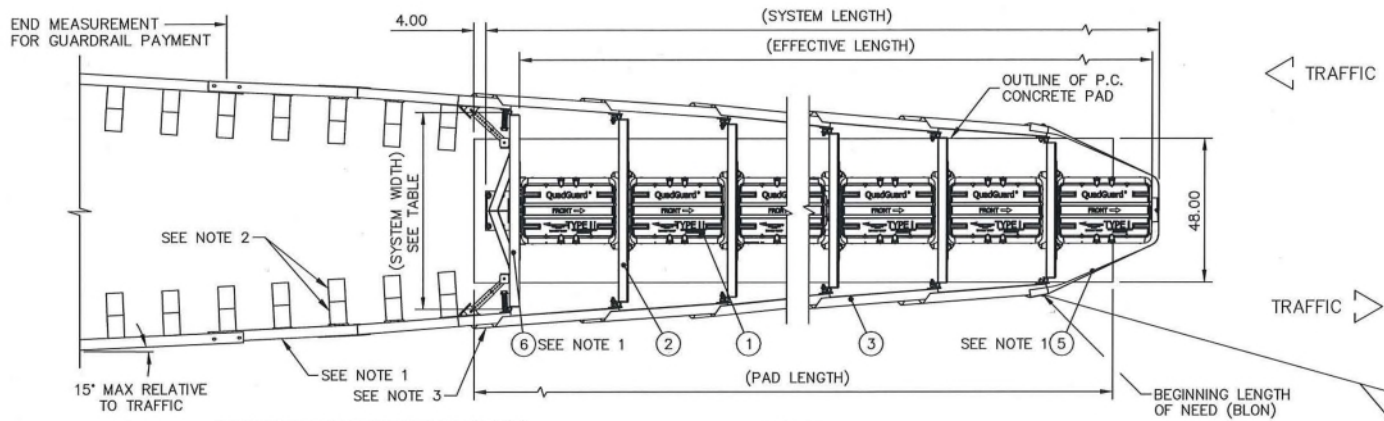
APL 544-000-043



KEY	
① CARTRIDGE	④ MONORAIL
② DIAPHRAGM	⑤ NOSE ASSEMBLY
③ FENDER PANEL	⑥ BACKUP

DESIGNED BY R. VENZON	DATE 11/09/2010	MODEL NO. SEE TABLE			
DRAWN BY F. J. POWELL	DATE 11/10/2010	FILE 60-36-62.dwg			
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN INCHES. DIMENSIONS ACCORDING TO ASME Y14.5M-1994 AND TYP-92-003 UNLESS OTHERWISE SPECIFIED.					
Revision	ECO	Date	Rev	By	Chk.
SEE SHEET 1	/	08/19/16	B	JMS	BRE
DIMENSIONS WERE MILLIMETERS (INCHES) UPDATED BORDER AND TITLE BLOCK, ADDED SHEET 24		6303	02/18/19	C	JMS BRE
UPDATED TITLE BLOCK		7147	06/26/20	D	JMS RCB

FLORIDA	REV	D	60-36-62	6 of 26
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DEPARTURE LINE  
 1:16 FOR SPEEDS ≤ 45 mph  
 1:13 FOR SPEEDS ≥ 50 mph



BAYS	69" WIDTH MODEL#	90" WIDTH MODEL#	SYSTEM LENGTH	DESIGN LENGTH	PAD LENGTH	DESIGN SPEED	TESTED TO	# OF CARTRIDGES	
								TYPE I	TYPE II
3	QG27069	QG27090	13'-0"	10'-3"	12'-0"	45 mph	TL-2	2	2
4	QG28069	QG28090	16'-0"	13'-3"	15'-0"	50 mph	Interpolated *	3	2
5	QG210069	QG210090	19'-0"	16'-3"	18'-0"	60 mph	TL-3	3	3

\* 50 mph MODELS NOT TESTED BUT ARE INTERPOLATIONS BELOW OR BETWEEN TL-2 AND TL-3.

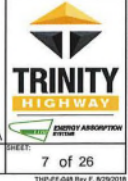
NOTE: FOR LOW SPEED FACILITIES WITH A DESIGN SPEED OF ≤ 45 mph USE A TL-2 SYSTEM.  
 FOR HIGH SPEED FACILITIES WITH A DESIGN SPEED OF ≥ 50 mph USE A TL-3 SYSTEM.

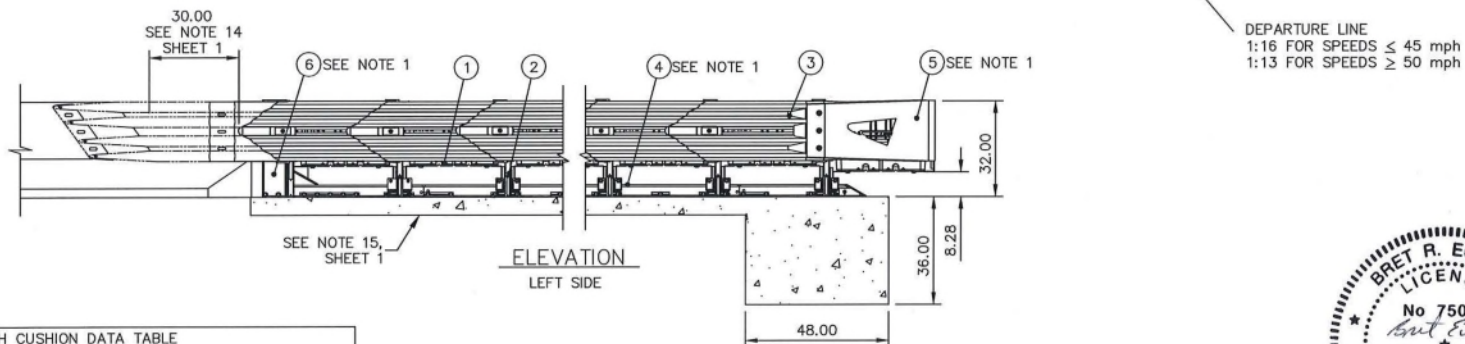
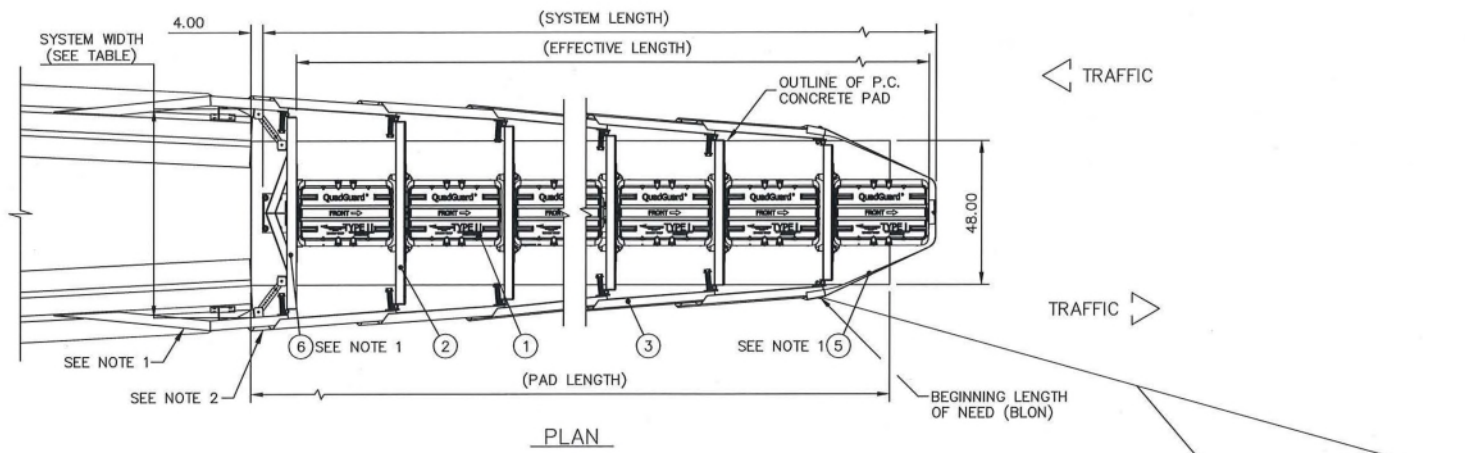
- NOTES:
1. BACKUP, TRANSITION, MONORAIL AND NOSE ASSEMBLIES NOT INCLUDED IN MODEL NUMBER. ORDER SEPARATELY. TRANSITION PANELS AND RELATED FASTENERS ARE ACCESSORY ITEMS.
  2. POSTS, BLOCKOUTS AND RELATED FASTENERS NOT SUPPLIED BY ENERGY ABSORPTION SYSTEMS.
  3. TRANSITION PANELS SHALL BE ANGLED SUCH THAT MAXIMUM GAP FROM FENDER PANEL OVERLAP DOES NOT EXCEED 1".

KEY	
① CARTRIDGE	④ MONORAIL
② DIAPHRAGM	⑤ NOSE ASSEMBLY
③ FENDER PANEL	⑥ BACKUP

DESIGNED BY S. TRAGESER	DATE 09/19/2012	MODEL NO. SEE TABLE
CHECKED BY B. ECKERT	DATE 12/19/2012	FILE 60-36-62.dwg
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN INCHES DIMENSIONS ACCORDING TO ADMS V14.00-1804 AND TRIP-9E-003 UNLESS OTHERWISE SPECIFIED.		
DO NOT SCALE DRAWING		
Revision	ECO	Date
SEE SHEET 1	/	08/19/16
UPDATED BORDER AND TITLE BLOCK, ADDED SHEET 24	6303	02/18/19
UPDATED TITLE BLOCK	7147	06/26/20

BIDIRECTIONAL	
QUADGUARD® II SYSTEM (PERMANENT) 69" 90" SYSTEM W/ TS B/U & QUAD-THREE TRANSITIONS	
APL 544-000-043	
FLORIDA	SHEET: 7 of 26
60-36-62	D





PERMANENT CRASH CUSHION DATA TABLE

BAYS	69" WIDTH MODEL#	90" WIDTH MODEL#	SYSTEM LENGTH	DESIGN LENGTH	PAD LENGTH	DESIGN SPEED	TESTED TO	# OF CARTRIDGES	
								TYPE I	TYPE II
3	QG27069	QG27090	13'-0"	10'-3"	12'-0"	45 mph	TL-2	2	2
4	QG28069	QG28090	16'-0"	13'-3"	15'-0"	50 mph	Interpolated *	3	2
5	QG210069	QG210090	19'-0"	16'-3"	18'-0"	60 mph	TL-3	3	3

\* 50 mph MODELS NOT TESTED BUT ARE INTERPOLATIONS BELOW OR BETWEEN TL-2 AND TL-3.

NOTE: FOR LOW SPEED FACILITIES WITH A DESIGN SPEED OF ≤ 45 mph USE A TL-2 SYSTEM.  
FOR HIGH SPEED FACILITIES WITH A DESIGN SPEED OF ≥ 50 mph USE A TL-3 SYSTEM.

NOTES:

1. BACKUP, TRANSITION, MONORAIL AND NOSE ASSEMBLIES NOT INCLUDED IN MODEL NUMBER. ORDER SEPARATELY. TRANSITION PANELS AND RELATED FASTENERS ARE ACCESSORY ITEMS.
2. TRANSITION PANELS SHALL BE ANGLED SUCH THAT MAXIMUM GAP FROM FENDER PANEL OVERLAP DOES NOT EXCEED 1".



KEY	
① CARTRIDGE	④ MONORAIL
② DIAPHRAGM	⑤ NOSE ASSEMBLY
③ FENDER PANEL	⑥ BACKUP

DESIGN: S. TRAGESER	DATE: 09/19/2012	MODEL NO: SEE TABLE
CHECKED: B. ECKERT	DATE: 12/07/2012	FILE: 60-36-62.dwg
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN INCHES DIMENSIONS ACCORDING TO ASME Y14.5M-1994 AND TYP-92-003 UNLESS OTHERWISE SPECIFIED.		
DO NOT SCALE DRAWING		
Revision	ECO	Date Rev By Chk.
SEE SHEET 1	/	08/19/16 B JMS BRE
UPDATED BORDER AND TITLE BLOCK, ADDED SHEET 24	6303	02/18/19 C JMS BRE
UPDATED TITLE BLOCK	7147	06/26/20 D JMS RCB

BIDIRECTIONAL

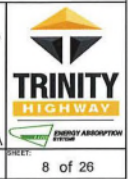
QUADGUARD® II SYSTEM (PERMANENT)  
69" 90" SYSTEM W/ TRANSITION TO SAFETY BARRIER, FLARED

APL 544-000-043

FLORIDA

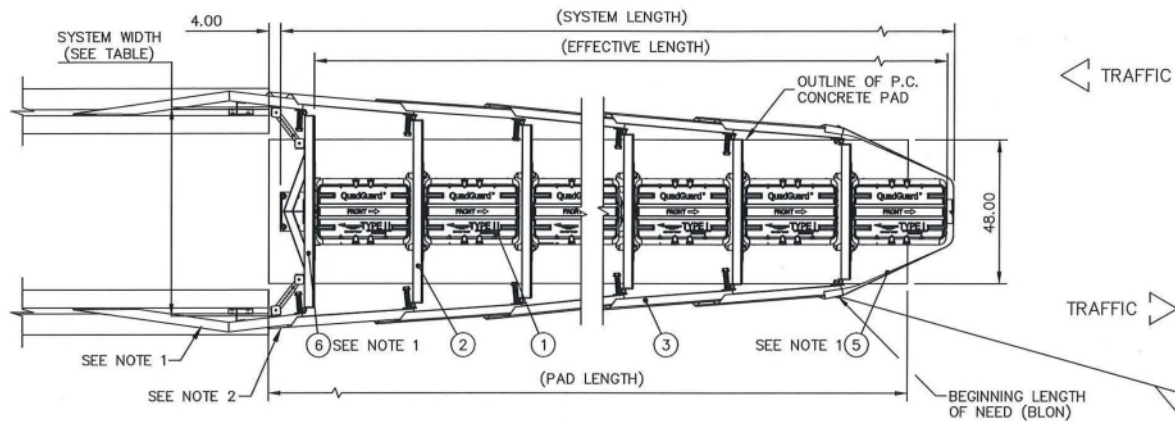
60-36-62

D

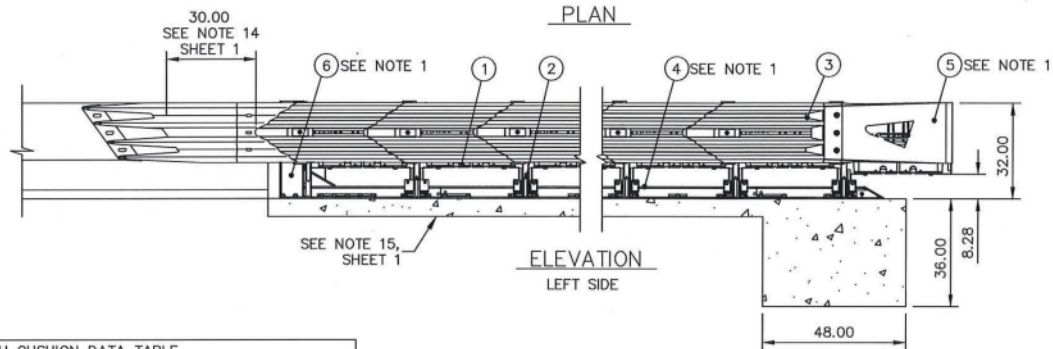


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PLAN



ELEVATION  
LEFT SIDE

DEPARTURE LINE  
1:16 FOR SPEEDS ≤ 45 mph  
1:13 FOR SPEEDS ≥ 50 mph



BAYS	69" WIDTH MODEL#	90" WIDTH MODEL#	SYSTEM LENGTH	DESIGN LENGTH	PAD LENGTH	DESIGN SPEED	TESTED TO	# OF CARTRIDGES
								TYPE I TYPE II
3	QG27069	QG27090	13'-0"	10'-3"	12'-0"	45 mph	TL-2	2 2
4	QG28069	QG28090	16'-0"	13'-3"	15'-0"	50 mph	Interpolated *	3 2
5	QG210069	QG210090	19'-0"	16'-3"	18'-0"	60 mph	TL-3	3 3

\* 50 mph MODELS NOT TESTED BUT ARE INTERPOLATIONS BELOW OR BETWEEN TL-2 AND TL-3.

NOTE: FOR LOW SPEED FACILITIES WITH A DESIGN SPEED OF ≤ 45 mph USE A TL-2 SYSTEM.  
FOR HIGH SPEED FACILITIES WITH A DESIGN SPEED OF ≥ 50 mph USE A TL-3 SYSTEM.

NOTES:

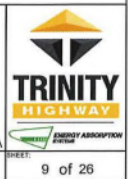
1. BACKUP, TRANSITION, MONORAIL AND NOSE ASSEMBLIES NOT INCLUDED IN MODEL NUMBER. ORDER SEPARATELY. TRANSITION PANELS AND RELATED FASTENERS ARE ACCESSORY ITEMS.
2. TRANSITION PANELS SHALL BE ANGLED SUCH THAT MAXIMUM GAP FROM FENDER PANEL OVERLAP DOES NOT EXCEED 1".

BIDIRECTIONAL

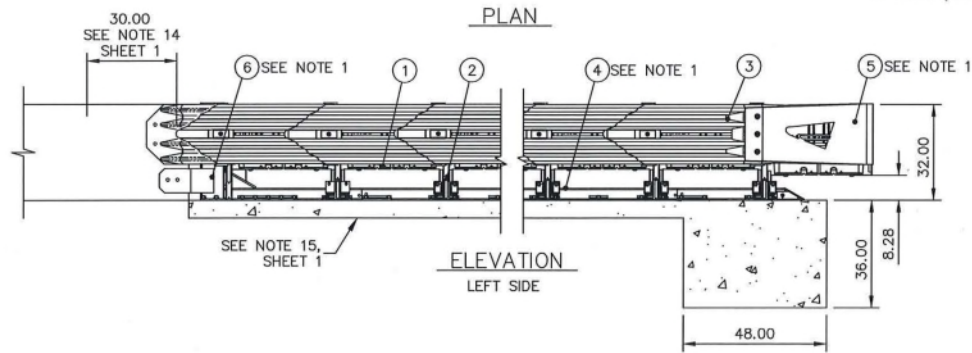
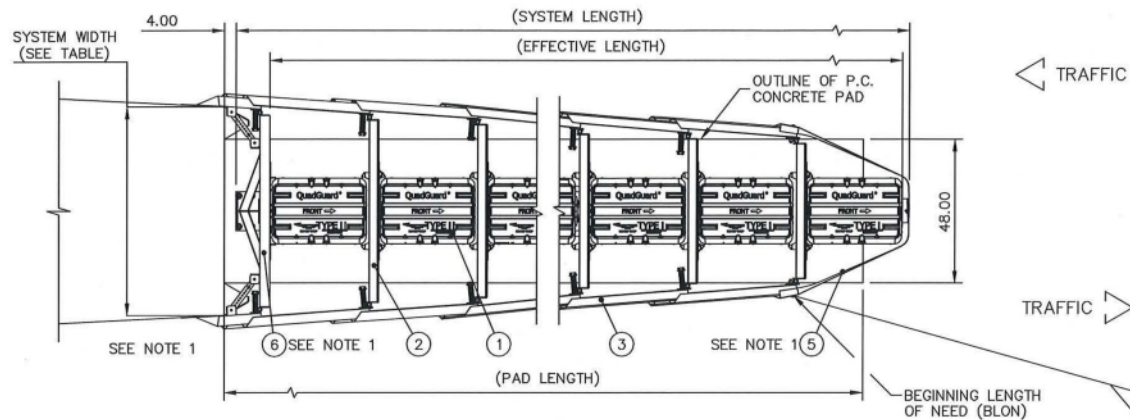
① CARTRIDGE	④ MONORAIL
② DIAPHRAGM	⑤ NOSE ASSEMBLY
③ FENDER PANEL	⑥ BACKUP

DESIGN: S. TRAGESER	DATE: 09/19/2012	MODEL NO: SEE TABLE
CHECKED: B. ECKERT	DATE: 12/07/2012	FILE: 60-36-62.dwg
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN INCHES DIMENSIONS ACCORDING TO ASME Y14.5M-1994 AND TYP-92-003 UNLESS OTHERWISE SPECIFIED.		
DO NOT SCALE DRAWING		
Revision	ECO	Date Rev By Chk.
SEE SHEET 1	/	08/19/16 B JMS BRE
UPDATED BORDER AND TITLE BLOCK, ADDED SHEET 24	6303	02/18/19 C JMS BRE
UPDATED TITLE BLOCK	7147	06/26/20 D JMS RCB

QUADGUARD® II SYSTEM (PERMANENT)  
69" 90" SYSTEM W/ TRANSITION TO  
SAFETY BARRIER, STRAIGHT  
APL 544-000-043



FLORIDA	REV: D	SHEET: 9 of 26
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DEPARTURE LINE  
 1:16 FOR SPEEDS ≤ 45 mph  
 1:13 FOR SPEEDS ≥ 50 mph



BAYS	69" WIDTH MODEL #	90" WIDTH MODEL #	SYSTEM LENGTH	DESIGN LENGTH	PAD LENGTH	DESIGN SPEED	TESTED TO	# OF CARTRIDGES	
								TYPE I	TYPE II
3	QG27069	QG27090	13'-0"	10'-3"	12'-0"	45 mph	TL-2	2	2
4	QG28069	QG28090	16'-0"	13'-3"	15'-0"	50 mph	Interpolated *	3	2
5	QG210069	QG210090	19'-0"	16'-3"	18'-0"	60 mph	TL-3	3	3

\* 50 mph MODELS NOT TESTED BUT ARE INTERPOLATIONS BELOW OR BETWEEN TL-2 AND TL-3.

NOTE: FOR LOW SPEED FACILITIES WITH A DESIGN SPEED OF ≤ 45 mph USE A TL-2 SYSTEM.  
 FOR HIGH SPEED FACILITIES WITH A DESIGN SPEED OF ≥ 50 mph USE A TL-3 SYSTEM.

NOTES:

- BACKUP, END SHOE, MONORAIL AND NOSE ASSEMBLIES NOT INCLUDED IN MODEL NUMBER. ORDER SEPARATELY. END SHOE ASSEMBLIES ARE ACCESSORY ITEMS.

① CARTRIDGE	④ MONORAIL
② DIAPHRAGM	⑤ NOSE ASSEMBLY
③ FENDER PANEL	⑥ BACKUP

DESIGNED BY S. TRAGESER	DATE 09/19/2012	MODEL NO. SEE TABLE			
CHECKED BY B. ECKERT	DATE 12/07/2012	FILE 60-36-62.dwg			
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN INCHES DIMENSIONS ACCORDING TO ASME Y14.5M-1994 AND TYP-5E-003 UNLESS OTHERWISE SPECIFIED.					
Revision	ECO	Date	Rev	By	Chk.
SEE SHEET 1	/	08/19/16	B	JMS	BRE
UPDATED BORDER AND TITLE BLOCK, ADDED SHEET 24	6303	02/18/19	C	JMS	BRE
UPDATED TITLE BLOCK	7147	06/26/20	D	JMS	RCB

BIDIRECTIONAL

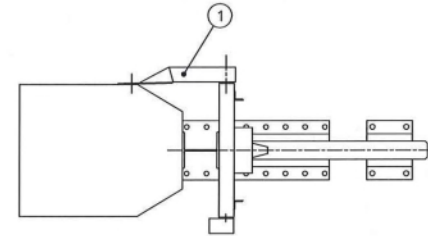
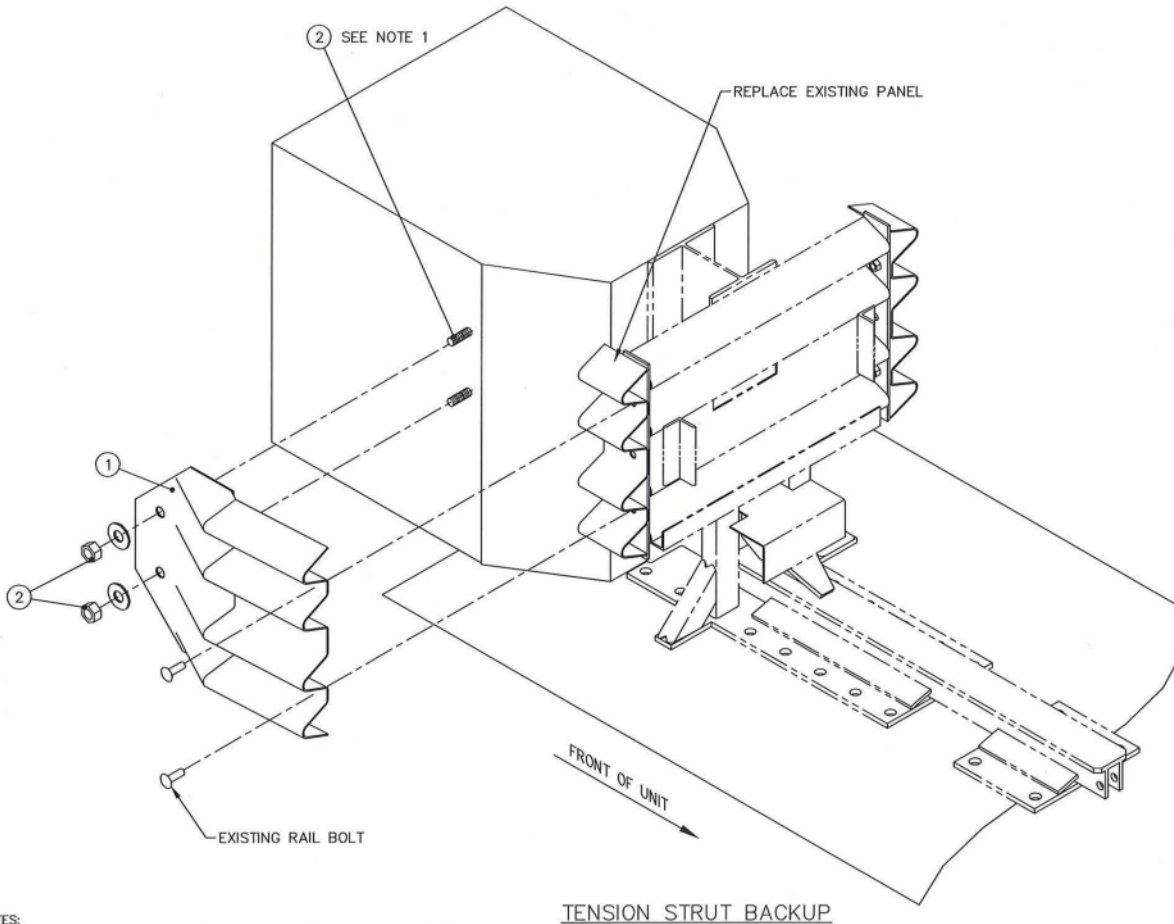
QUADGUARD® II SYSTEM (PERMANENT)  
 69" 90" SYSTEM W/ TS B/U & END SHOES

APL 544-000-043

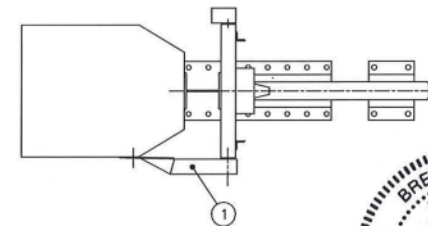


FLORIDA	PROJECT: 60-36-62	REV: D	SHEET: 10 of 26
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PARTS LIST	
ITEM	DESCRIPTION
1	SIDE PANEL, END SHOE, QG, G
2	ANCHOR KIT, HILTI, 330ML, 3/4X6 1/2(4)



RIGHT SIDE APPLICATION



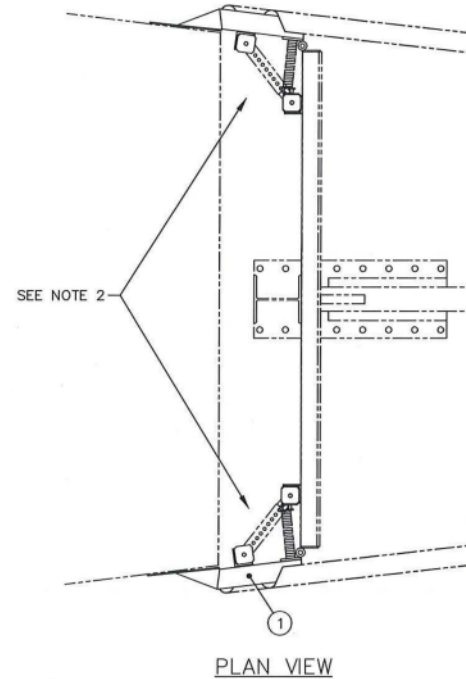
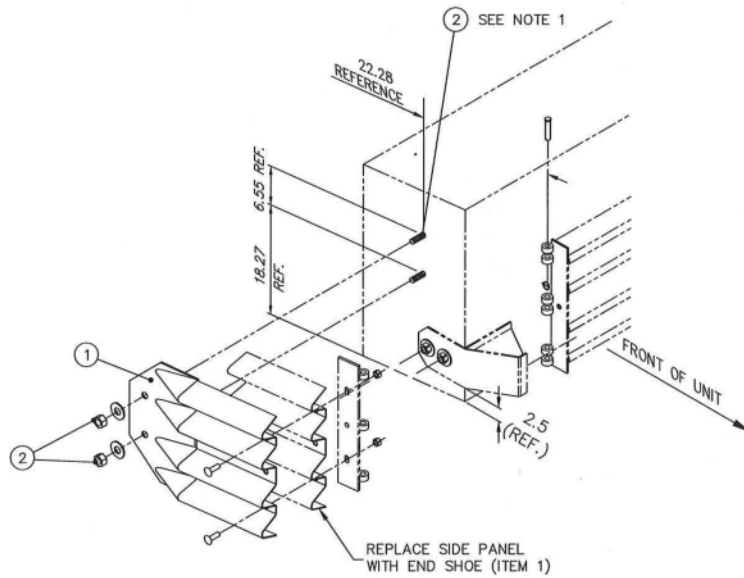
LEFT SIDE APPLICATION



NOTES:  
 1. USE END SHOE AS TEMPLATE FOR DRILLING, RECOMMENDED HOLE DEPTH 5.00". FINAL TORQUE TO BE 100 FT-LBS (TYP). ANCHOR STUD END SHOULD BE FLUSH WITH OUTSIDE SURFACE OF ANCHOR NUT.


DRAWN: K. LOONEY	DATE: 04/26/2012	MODEL NO.:	SEE TABLE	QUADGUARD® II SYSTEM (PERMANENT)	
	CHECKED: B. ECKERT	DATE: 12/07/2012	FILE:		
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN INCHES DIMENSIONS ACCORDING TO ASME Y14.5M-1994 AND TYP-92-003 UNLESS OTHERWISE SPECIFIED.			DO NOT SCALE DRAWING		END SHOE ASSY, QG APL 544-000-043
Revision	ECO	Date	Rev	By	
SEE SHEET 1	/	08/19/16	B	JMS	BRE
UPDATED PARTS LIST, UPDATED BORDER AND TITLE BLOCK, ADDED SHEET 24	6303	02/18/19	C	JMS	BRE
UPDATED TITLE BLOCK, REMOVED STOCK NO. AND REQ'D FROM PARTS LIST	7147	06/26/20	D	JMS	RCB
			DESIGNED:	60-36-62	REV: D
			FLORIDA		SHEET: 11 of 26

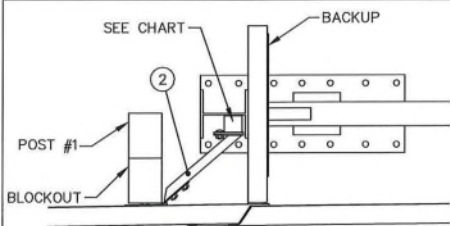
PARTS LIST	
ITEM	DESCRIPTION
1	SIDE PANEL, END SHOE, QG, G
2	ANCHOR KIT, HILTI, 330ML, 3/4X6 1/2(4)



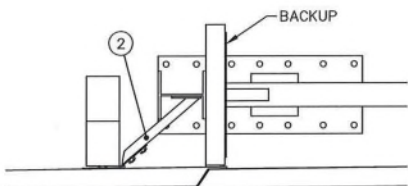
NOTES:

- USE END SHOE AS TEMPLATE FOR DRILLING, RECOMMENDED HOLE DEPTH 5.00". FINAL TORQUE TO BE 100 FT-LBS (TYP). ANCHOR STUD END SHOULD BE FLUSH WITH OUTSIDE SURFACE OF ANCHOR NUT.

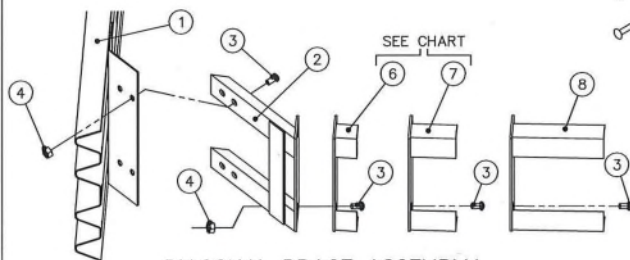
DRAWN S. TRAGESER DATE 09/11/2012	CHECKED B. ECKERT DATE 12/07/2012	MODEL NO. SEE TABLE	QUADGUARD® II SYSTEM (PERMANENT)		 <b>TRINITY HIGHWAY</b> ENERGY ABRASION SYSTEM
		FILE 60-36-62.dwg	END SHOE ASSY, QG WIDE APL 544-000-043		
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN INCHES DIMENSIONS ACCORDING TO ASSM Y143M-1994 AND 11P-5E-003 UNLESS OTHERWISE SPECIFIED.			DO NOT SCALE DRAWING		
Revision	ECO	Date	Rev	By	Chk.
SEE SHEET 1	/	08/19/16	B	JMS	BRE
UPDATED PARTS LIST, UPDATED BORDER AND TITLE BLOCK, ADDED SHEET #4	6303	02/18/19	C	JMS	BRE
UPDATED TITLE BLOCK, REMOVED STOCK NO. AND REQ'D FROM PARTS LIST	7147	06/26/20	D	JMS	RCB
DRAWING			60-36-62	REV	D
SHEET			12	of 26	



DETAIL A  
FINAL CONFIGURATION OF DIAGONAL BRACE  
FOR 30", 36" OR 48" SYSTEMS



DETAIL A  
FINAL CONFIGURATION OF DIAGONAL BRACE  
FOR 24" SYSTEMS



DIAGONAL BRACE ASSEMBLY

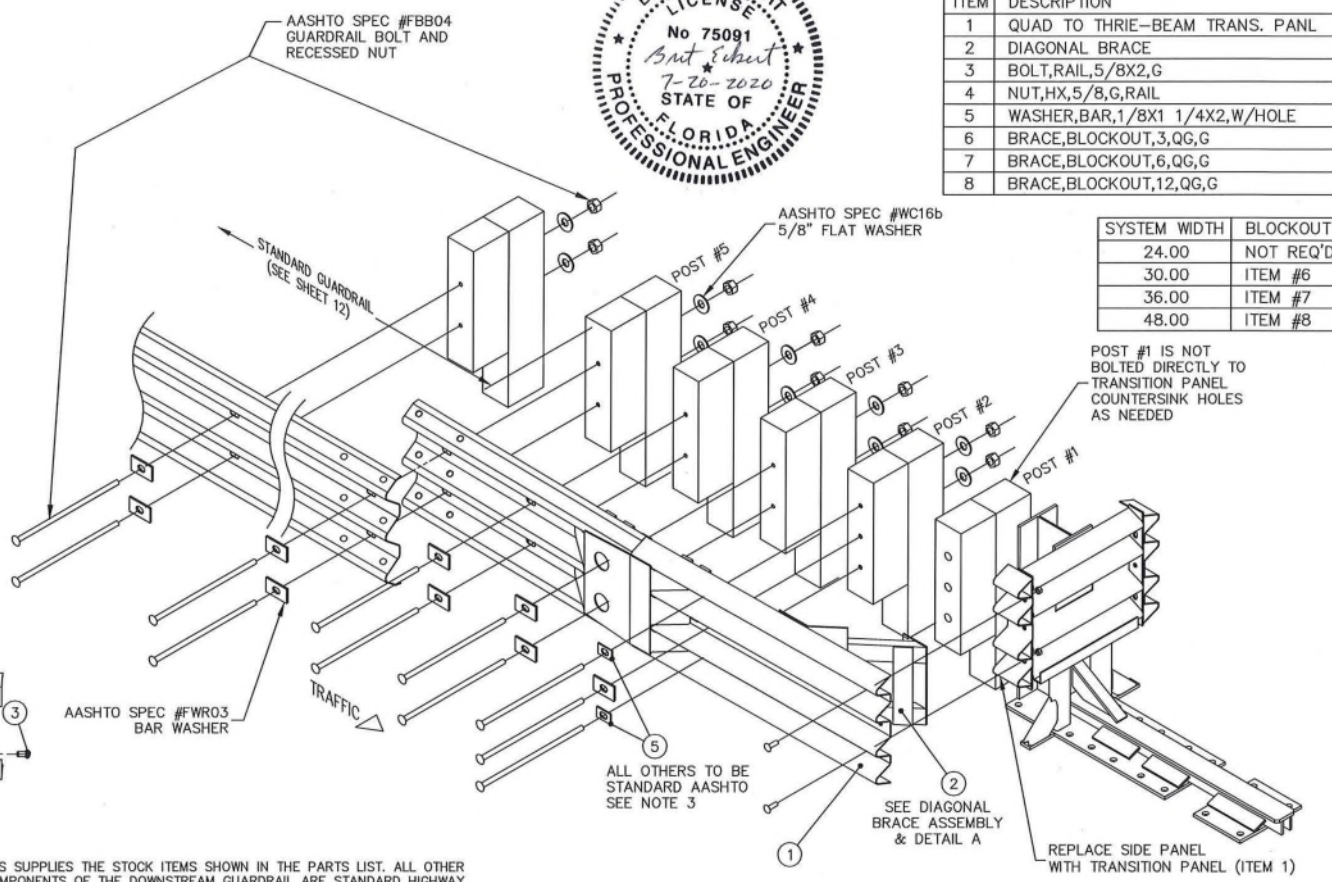
NOTES:

- 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.
- 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.
- EAS SUPPLIES THE STOCK ITEMS SHOWN IN THE PARTS LIST. ALL OTHER COMPONENTS OF THE DOWNSTREAM GUARDRAIL ARE STANDARD HIGHWAY MATERIALS AND NOT INCLUDED IN TRANSITION ASSEMBLY.
- TRANSITION AND GUARDRAIL PANEL CONNECTIONS MAY BE SLOTTED IN ORDER TO ACCOMMODATE THERMAL EXPANSION AND CONTRACTION.



PARTS LIST	
ITEM	DESCRIPTION
1	QUAD TO THRIE-BEAM TRANS. PANL
2	DIAGONAL BRACE
3	BOLT,RAIL,5/8X2,G
4	NUT,HX,5/8,G,RAIL
5	WASHER,BAR,1/8X1 1/4X2,W/HOLE
6	BRACE,BLOCKOUT,3,QG,G
7	BRACE,BLOCKOUT,6,QG,G
8	BRACE,BLOCKOUT,12,QG,G

SYSTEM WIDTH	BLOCKOUT
24.00	NOT REQ'D
30.00	ITEM #6
36.00	ITEM #7
48.00	ITEM #8



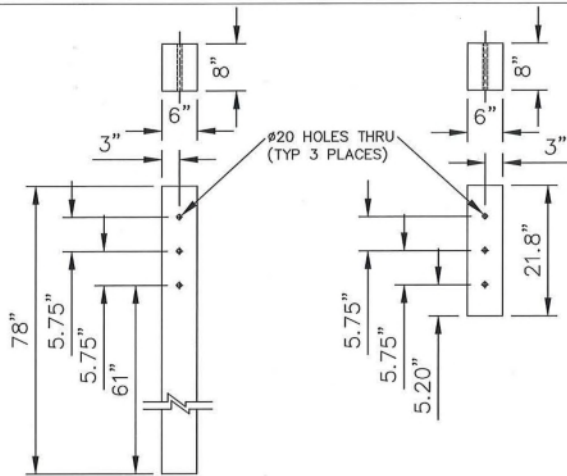
DESIGNER: K. LOONEY	DATE: 04/26/2012	MODEL NO.:	SEE TABLE
CHECKED: F. J. POWELL	DATE: 07/25/2012	FILE:	60-36-62.dwg
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN INCHES DIMENSIONS ACCORDING TO ASME Y14.5M-1994 AND Y14.5-003 UNLESS OTHERWISE SPECIFIED.			
DO NOT SCALE DRAWING			
Revision	ECO	Date	Rev By Chk.
SEE SHEET 1		7 08/19/16	B JMS BRE
UPDATED BORDER AND TITLE BLOCK, ADDED SHEET 24	6303	02/18/19	C JMS BRE
UPDATED TITLE BLOCK, REMOVED DESCRIPTION AND REQ'D FROM PARTS LIST, REMOVED ASSY # FROM CHART	7147	06/26/20	D JMS RCB

QUADGUARD® II SYSTEM (PERMANENT)

QUAD-THRIE TRANSITION ASSEMBLY  
FOR 24, 30, 36, & 48" SYSTEMS  
APL 544-000-043

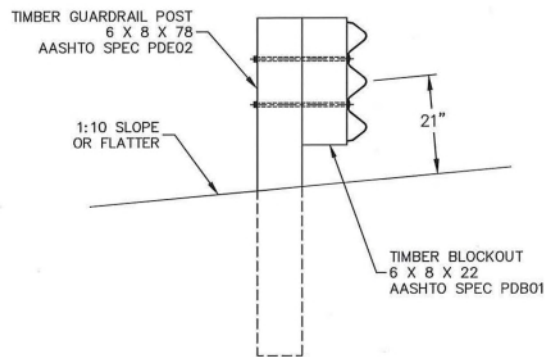
FLORIDA  
SHEET: 13 of 26

60-36-62



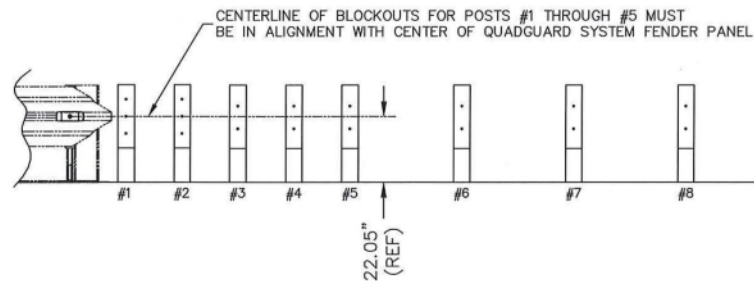
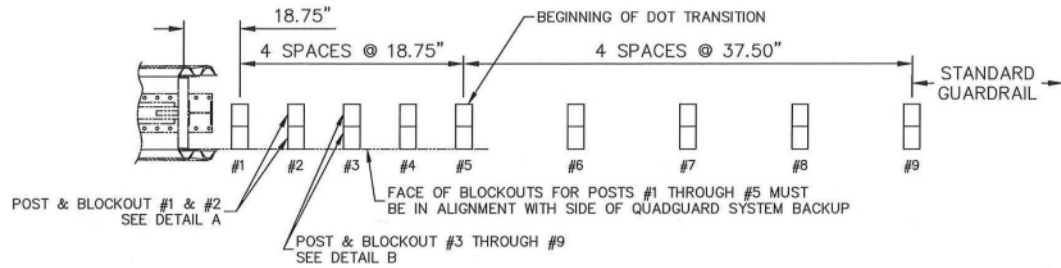
DETAIL A

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



DETAIL B

POSTS & BLOCKOUTS #3 THRU #9  
SEE NOTE 2



NOTES:

- 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 NORMAL DIMENSIONS INDICATED. THE SIZE TOLERANCE OF POSTS IN THE DIRECTION PARALLEL TO THE AXIS OF THE BOLT HOLES SHALL NOT BE MORE THAN  $\pm \frac{1}{8}$ ". 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 11 WAS TESTED AND IS IN COMPLIANCE WITH NCHRP 350.
- GUARDRAIL & TRANSITION PANEL NOT SHOWN FOR CLARITY.

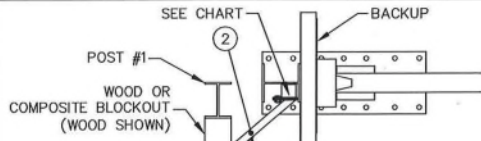


DESIGNER: K. LOONEY	DATE: 04/24/2012	MODEL NO.:	SEE TABLE
CHECKED: K. LOONEY	DATE: 07/24/2012	FILE:	60-36-62.dwg
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN INCHES DIMENSIONS ACCORDING TO ADMS Y14.5M-1994 AND TYP-56-003 UNLESS OTHERWISE SPECIFIED.			
DO NOT SCALE DRAWING			
Revision	ECO	Date	Rev By Chk.
SEE SHEET 1	/	08/19/16	B JMS BRE
UPDATED BORDER AND TITLE BLOCK, ADDED SHEET 24	6303	02/18/19	C JMS BRE
UPDATED TITLE BLOCK	7147	06/26/20	D JMS RCB

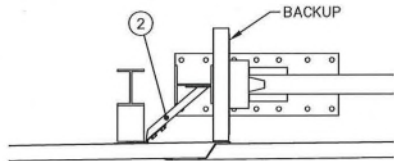
QUADGUARD® II SYSTEM (PERMANENT)  
  
QUAD-THREE TRANSITION ASSEMBLY  
FOR 24, 30, 36, & 48" SYSTEMS  
APL 544-000-043



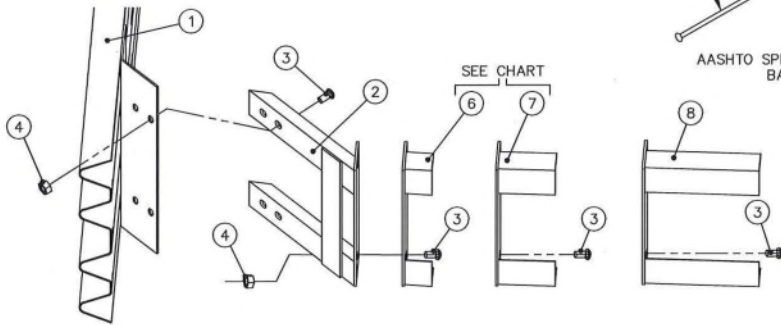
DRAWING:	60-36-62	REV:	D
SHEET:	14	OF:	26



DETAIL A  
FINAL CONFIGURATION OF DIAGONAL BRACE  
FOR 30", 36" OR 48" SYSTEMS



DETAIL A  
FINAL CONFIGURATION OF DIAGONAL BRACE  
FOR 24" SYSTEMS



DIAGONAL BRACE ASSEMBLY

NOTES:

- 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.
- 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.

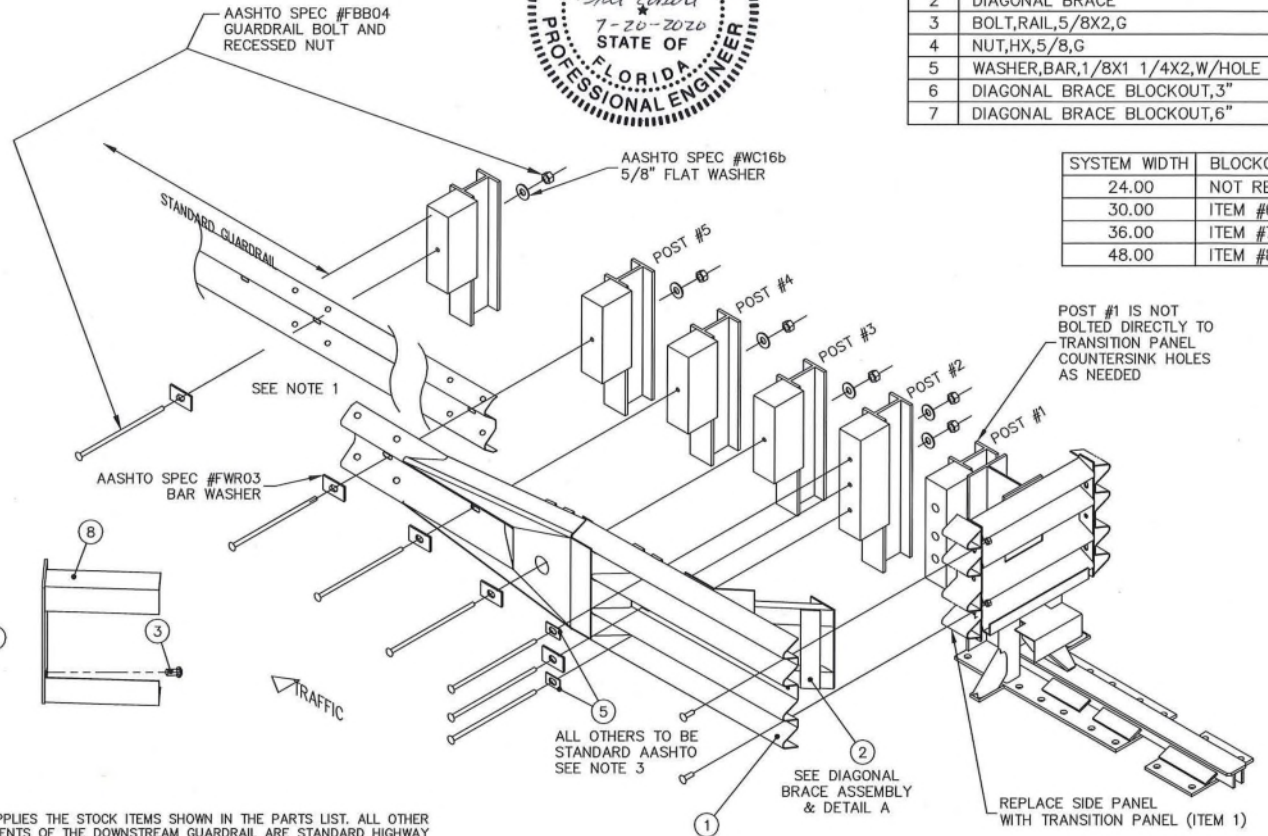
- EAS SUPPLIES THE STOCK ITEMS SHOWN IN THE PARTS LIST. ALL OTHER COMPONENTS OF THE DOWNSTREAM GUARDRAIL ARE STANDARD HIGHWAY MATERIALS AND NOT INCLUDED IN TRANSITION ASSEMBLY.

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



PARTS LIST	
ITEM	DESCRIPTION
1	QUAD TO W-BEAM TRANS. PANEL
2	DIAGONAL BRACE
3	BOLT, RAIL, 5/8X2, G
4	NUT, HX, 5/8, G
5	WASHER, BAR, 1/8X1 1/4X2, W/HOLE
6	DIAGONAL BRACE BLOCKOUT, 3"
7	DIAGONAL BRACE BLOCKOUT, 6"

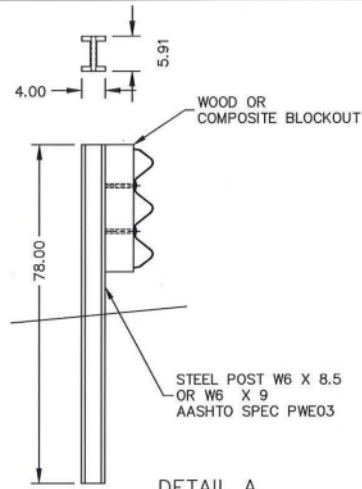
SYSTEM WIDTH	BLOCKOUT
24.00	NOT REQ'D
30.00	ITEM #6
36.00	ITEM #7
48.00	ITEM #8



DESIGNER: K. LOONEY	DATE: 04/26/2012	MODEL NO.:	SEE TABLE
CHECKED: F. J. POWELL	DATE: 07/25/2012	FILE:	60-36-62.dwg
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN INCHES DIMENSIONS ACCORDING TO ASME Y14.5M-1994 AND Y14.5-003 UNLESS OTHERWISE SPECIFIED.			
Revision	ECO	Date	Rev By Chk.
SEE SHEET 1	7	08/19/16	B JMS BRE
UPDATED BORDER AND TITLE BLOCK, ADDED SHEET 24	6303	02/18/19	C JMS BRE
UPDATED TITLE BLOCK, REMOVED DESCRIPTION AND REQ'D FROM PARTS LIST, REMOVED ASSY # FROM CHART	7147	06/26/20	D JMS RCB

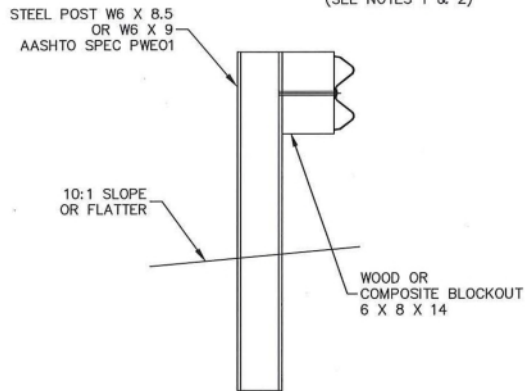
QUADGUARD® II SYSTEM (PERMANENT)	
TRANSITION ASSEMBLY QUAD-BEAM TO W-BEAM APL 544-000-043	
FLORIDA	BRETT
60-36-62	D

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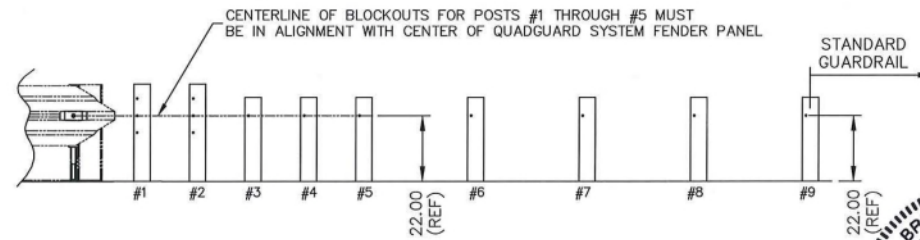
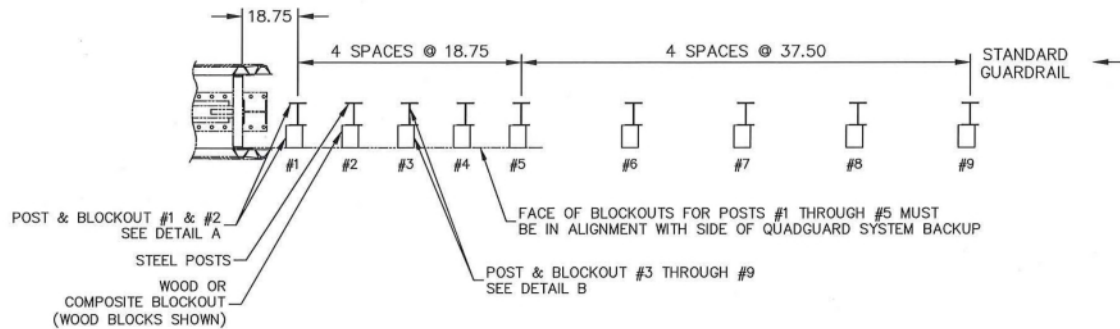
**DETAIL A**

POSTS & BLOCKOUTS #1 & #2 (NON-STANDARD)  
SUPPLIED BY OTHERS  
(SEE NOTES 1 & 2)



**DETAIL B**

POSTS & BLOCKOUTS #3 THRU #9  
SEE NOTE 2



**ELEVATION**  
(SEE NOTE 2)

- NOTES:
1. DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.
  2. GUARDRAIL & TRANSITION PANEL NOT SHOWN FOR CLARITY.



DRAWN J. SIMMONS	DATE 12/02/2014	MODEL NO. SEE TABLE
CHECKED K. MORTENSEN	DATE 12/03/2014	FILE 60-36-62.dwg
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN INCHES DIMENSIONS ACCORDING TO ASME Y14.5M-1994 AND 19P-92-003 UNLESS OTHERWISE SPECIFIED.		
DO NOT SCALE DRAWING		
Revision	ECO	Date Rev By Chk.
SEE SHEET 1	/	08/19/16 B JMS BRE
DIMENSIONS WERE IN MILLIMETERS, UPDATED BORDER AND TITLE BLOCK, ADDED SHEET 24	6303	02/18/19 C JMS BRE
UPDATED TITLE BLOCK	7147	06/26/20 D JMS RCB

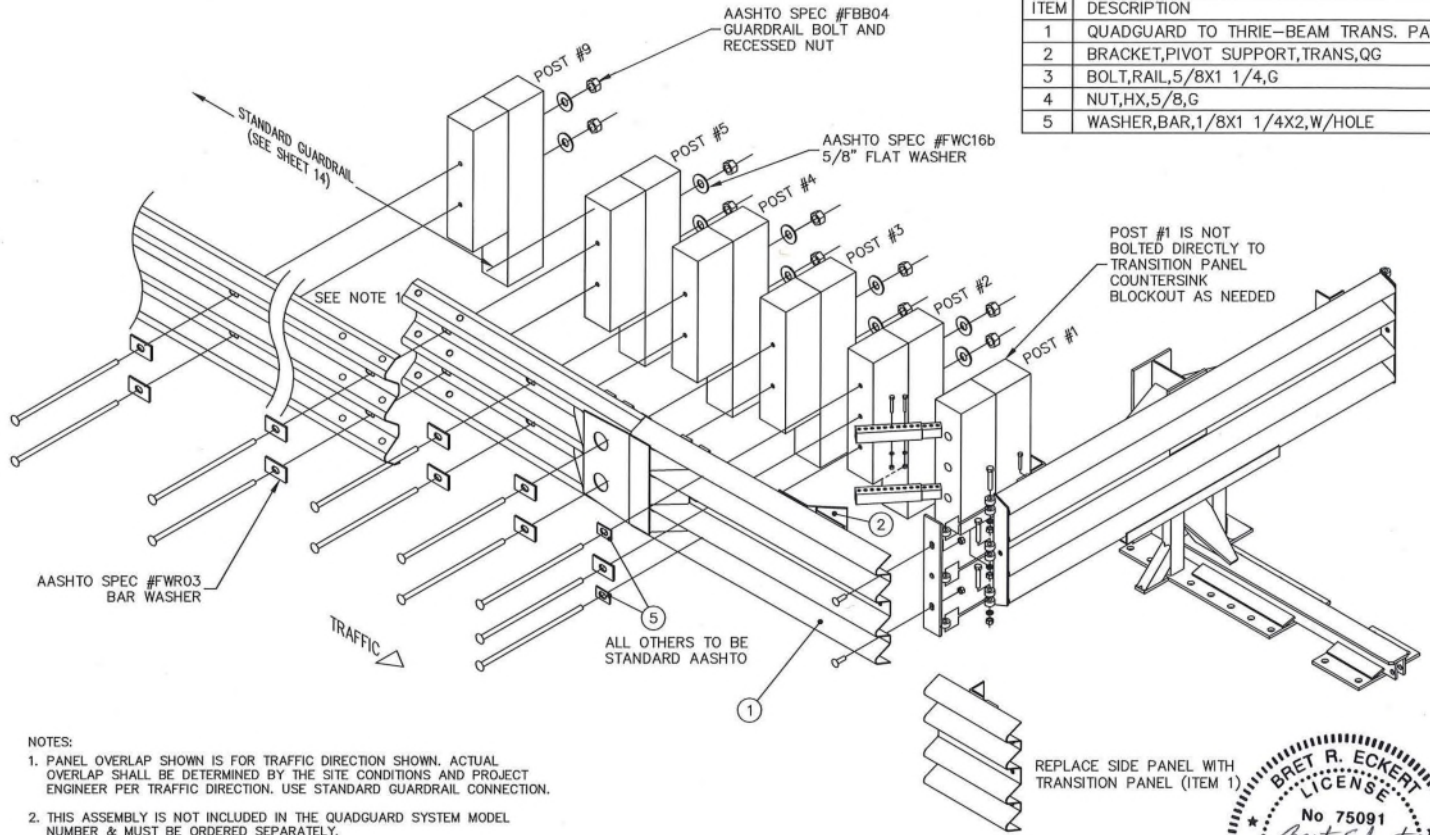
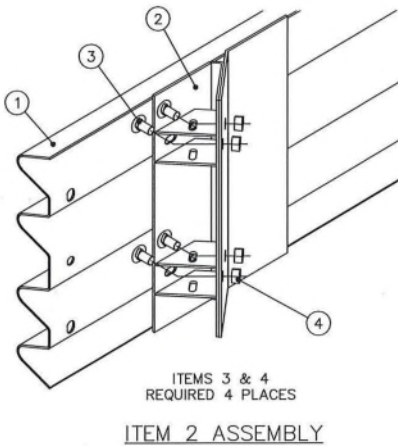
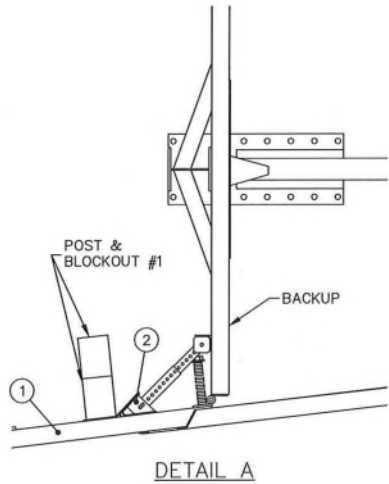
QUADGUARD® II SYSTEM (PERMANENT)

TRANSITION ASSEMBLY  
QUAD-BEAM TO W-BEAM  
APL 544-000-043

FLORIDA  
REV D  
60-36-62  
16 of 26







NOTES:

- 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.
- THIS ASSEMBLY IS NOT INCLUDED IN THE QUADGUARD SYSTEM MODEL NUMBER & MUST BE ORDERED SEPARATELY.
- EAS SUPPLIES THE STOCK ITEMS SHOWN IN THE PARTS LIST WITH THE ASSEMBLY NUMBER. ALL OTHER COMPONENTS OF THE DOWNSTREAM GUARDRAIL (POSTS, HARDWARE AND RAIL ELEMENTS) ARE STANDARD HIGHWAY MATERIALS AND NOT INCLUDED IN TRANSITION ASSEMBLY.
- PANEL MAY BE USED ON LEFT AND/OR RIGHT SIDE.

PARTS LIST	
ITEM	DESCRIPTION
1	QUADGUARD TO THRIE-BEAM TRANS. PANEL
2	BRACKET, PIVOT SUPPORT, TRANS, QG
3	BOLT, RAIL, 5/8X1 1/4, G
4	NUT, HX, 5/8, G
5	WASHER, BAR, 1/8X1 1/4X2, W/HOLE



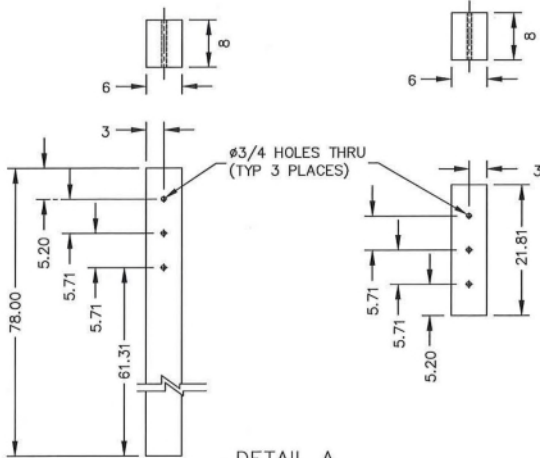
DESIGN	S. TRAGESER	DATE	09/11/2012	MODEL NO.	SEE TABLE
DRAWN	B. ECKERT	DATE	12/07/2012	FILE	60-36-62.dwg
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN INCHES DIMENSIONS ACCORDING TO ASME Y14.5M-1994 AND TYP-92-003 UNLESS OTHERWISE SPECIFIED.					
DO NOT SCALE DRAWING					
Revision	ECO	Date	Rev	By	Chk.
SEE SHEET 1		/ 08/19/16	B	JMS	BRE
UPDATED PARTS LIST, UPDATED BORDER AND TITLE BLOCK, ADDED SHEET 24	6303	02/18/19	C	JMS	BRE
UPDATED TITLE BLOCK, REMOVED STOCK NO. AND REQ'D FROM PARTS LIST	7147	06/26/20	D	JMS	RCB

QUADGUARD® II SYSTEM (PERMANENT)

QUAD-THRIE TRANSITION ASSEMBLY  
FOR 69 & 90" SYSTEMS  
APL 544-000-043

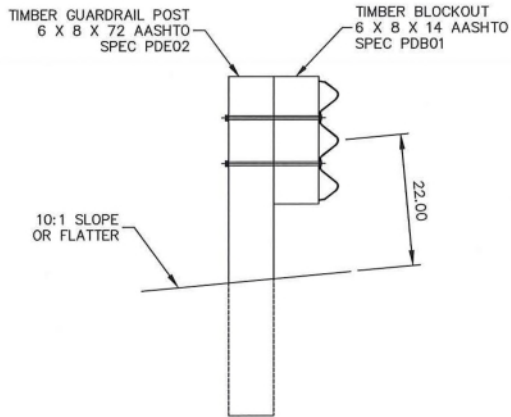


FLORIDA	17 of 26
60-36-62	D



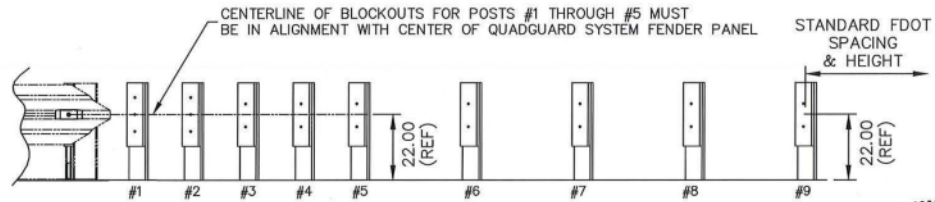
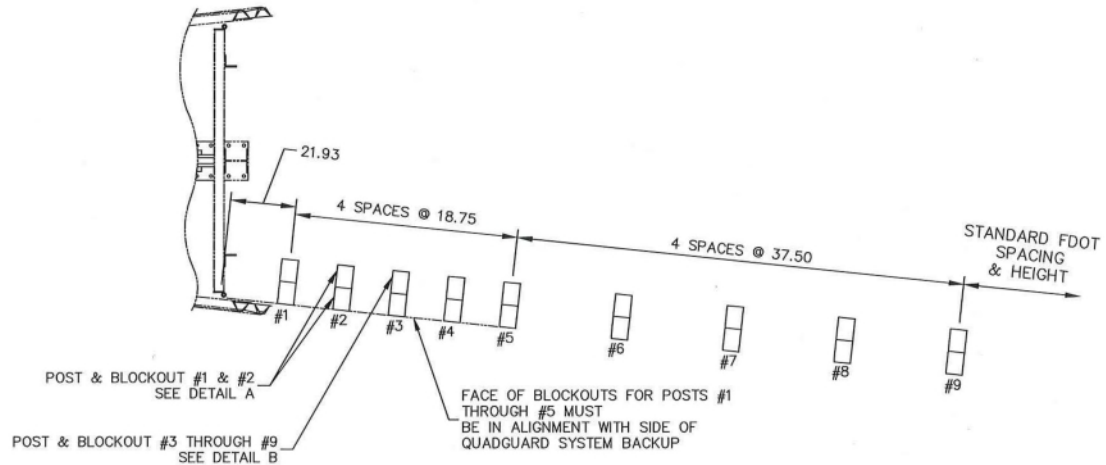
DETAIL A

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



DETAIL B

POSTS & BLOCKOUTS #3 THRU #9



ELEVATION  
(SEE NOTE 2)

NOTES:

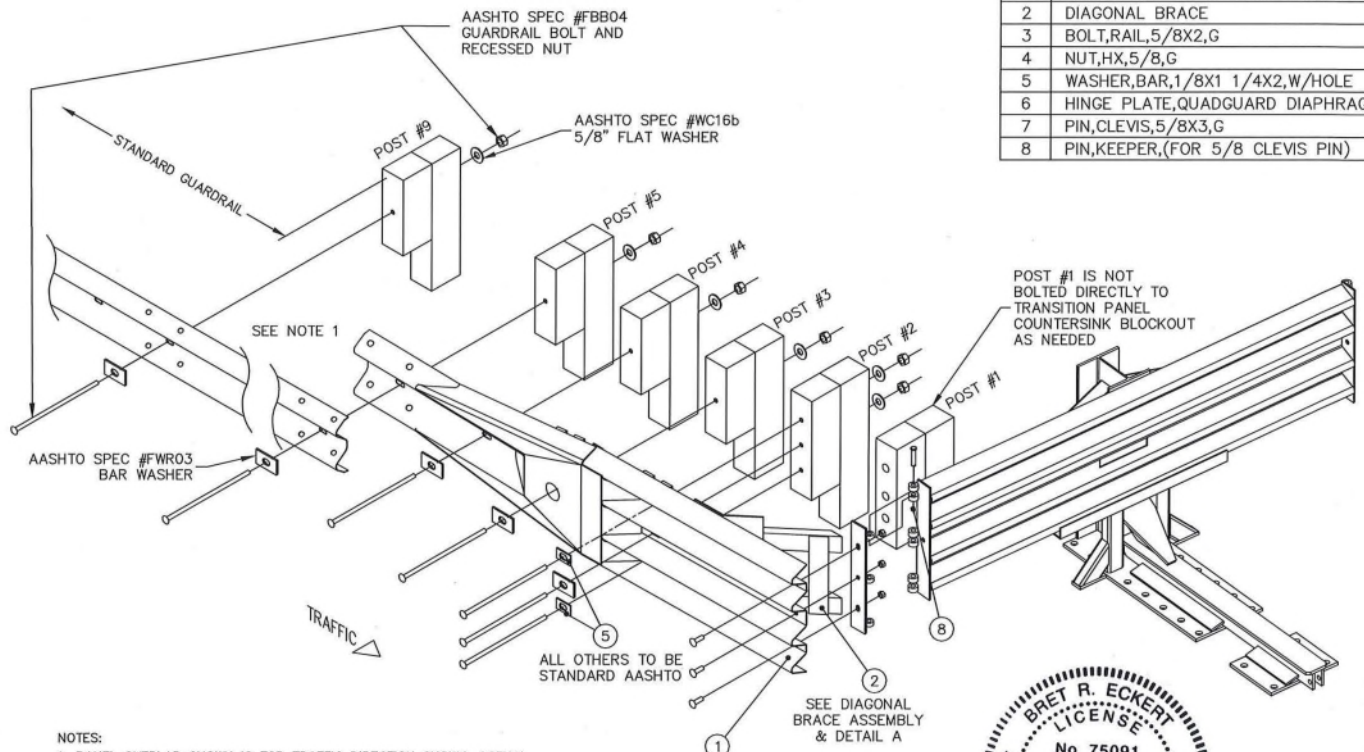
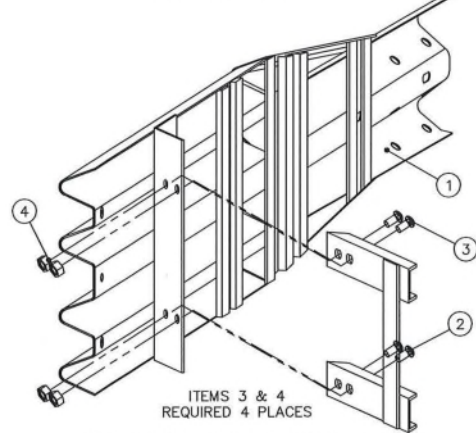
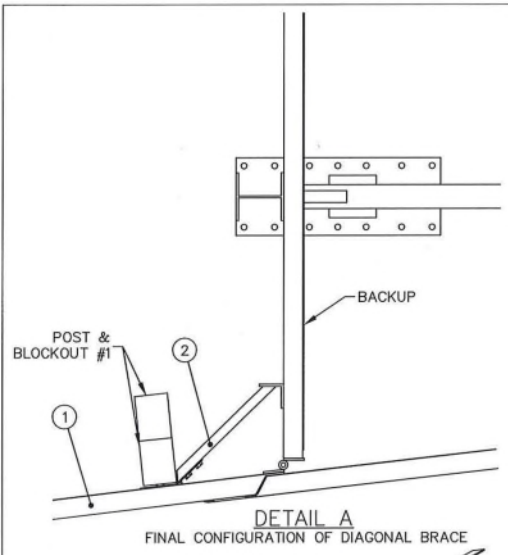
- POSTS & BLOCKOUTS SHALL BE MADE OF TIMBER WITH A STRESS GRADE OF AT LEAST 1100 PSI. STRESS GRADING SHALL BE IN ACCORDANCE WITH THE RULES OF THE WEST COAST LUMBER INSPECTION BUREAU, SOUTHERN PINE INSPECTION BUREAU OR OTHER APPROPRIATE TIMBER ASSOCIATION. TIMBER FOR POSTS SHALL BE EITHER ROUGH SAWN (UNPLANED) OR S4S (SURFACED FOUR SIDES) WITH NORMAL DIMENSIONS INDICATED. THE SIZE TOLERANCE OF POSTS IN THE DIRECTION PARALLEL TO THE AXIS OF THE BOLT HOLES SHALL NOT BE MORE THAN  $\pm \frac{1}{8}$ ". ALL TIMBER SHALL RECEIVE A PRESERVATION TREATMENT IN ACCORDANCE WITH AASHTO M133 AFTER ALL END CUTS ARE MADE AND ALL HOLES ARE DRILLED.
- GUARDRAIL & TRANSITION PANEL NOT SHOWN FOR CLARITY.



OWNER: S. TRAGESER	DATE: 09/11/2012	MODEL NO: SEE TABLE
DRAWN: B. ECKERT	DATE: 12/07/2012	FILE: 60-36-62.dwg
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN INCHES DIMENSIONS ACCORDING TO ASME Y14.5M-1994 AND TYP-3E-03 UNLESS OTHERWISE SPECIFIED.		
DO NOT SCALE DRAWING		
Revision	ECO	Date Rev By Chk.
SEE SHEET 1	/	08/19/16 B JMS BRE
UPDATED PARTS LIST, UPDATED BORDER AND TITLE BLOCK, ADDED SHEET 24	6303	02/18/19 C JMS BRE
UPDATED TITLE BLOCK, UPDATED NOTES	7147	06/26/20 D JMS RCB

QUADGUARD® II SYSTEM (PERMANENT)
QUAD-THREE TRANSITION ASSEMBLY FOR 69 & 90" SYSTEMS APL 544-000-043
FLORIDA D
60-36-62
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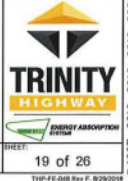
PARTS LIST	
ITEM	DESCRIPTION
1	QUADGUARD TO W-BEAM TRANS. PANEL
2	DIAGONAL BRACE
3	BOLT, RAIL, 5/8X2, G
4	NUT, HX, 5/8, G
5	WASHER, BAR, 1/8X1 1/4X2, W/HOLE
6	HINGE PLATE, QUADGUARD DIAPHRAGM
7	PIN, CLEVIS, 5/8X3, G
8	PIN, KEEPER, (FOR 5/8 CLEVIS PIN)

- 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. THIS ASSEMBLY IS NOT INCLUDED IN THE QUADGUARD SYSTEM MODEL NUMBER & MUST BE ORDERED SEPARATELY.
  3. EAS SUPPLIES THE STOCK ITEMS SHOWN IN THE PARTS LIST WITH THE ASSEMBLY NUMBER. ALL OTHER COMPONENTS OF THE DOWNSTREAM GUARDRAIL (POSTS, HARDWARE AND RAIL ELEMENTS) ARE STANDARD HIGHWAY MATERIALS AND NOT INCLUDED IN TRANSITION ASSEMBLY.

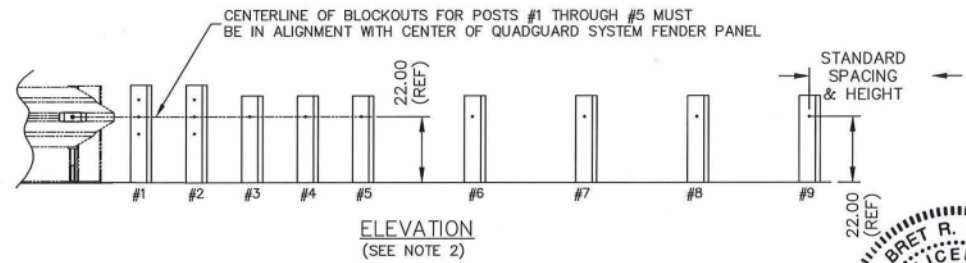
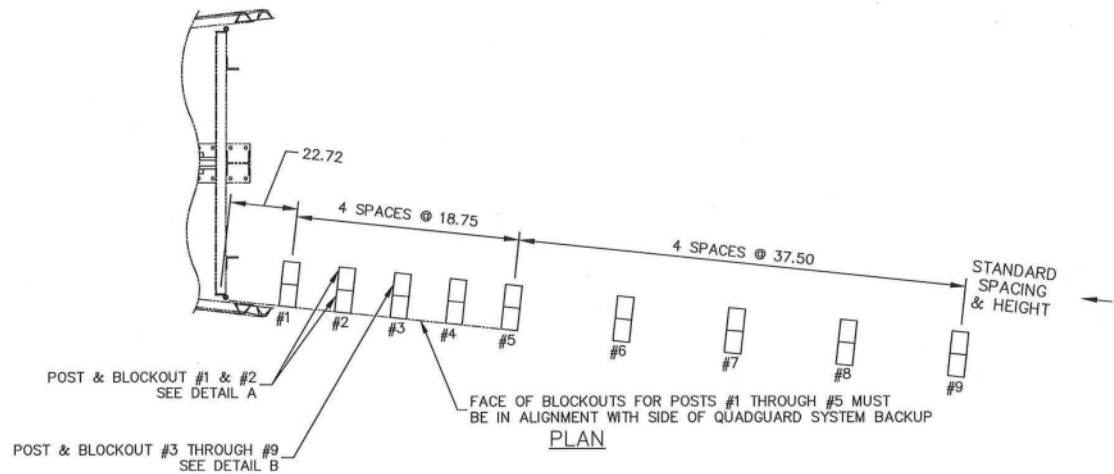
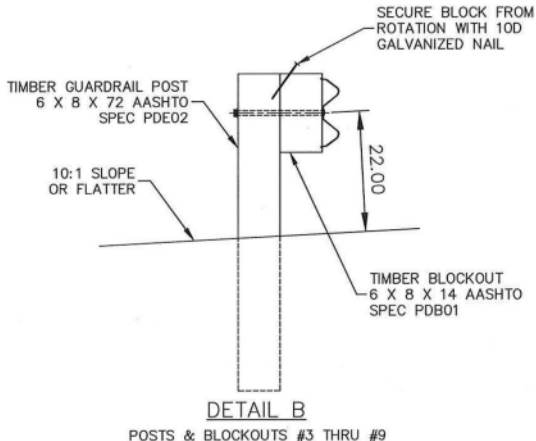
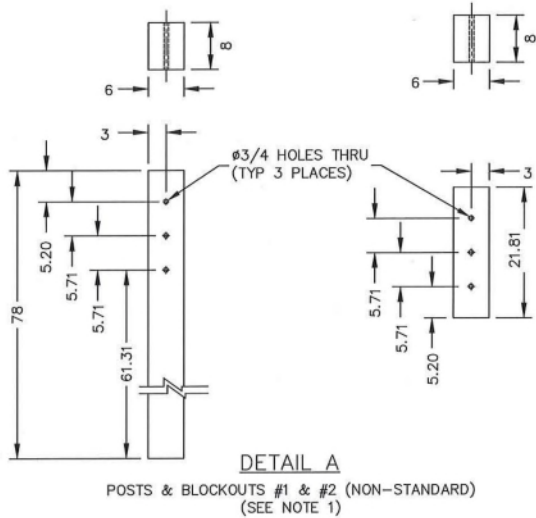


DESIGNED BY T. BUSSE	DATE 05/28/1997	MODEL NO. SEE TABLE			
DRAWN BY J. MACHADO	DATE 06/03/1997	FILE 60-36-62.dwg			
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN INCHES DIMENSIONS ACCORDING TO ASME Y14.5M-1994 AND TSP-3E-000 UNLESS OTHERWISE SPECIFIED.					
Revision	ECO	Date	Rev	By	Chk.
SEE SHEET 1	/	08/19/16	B	JMS	BRE
UPDATED PARTS LIST, UPDATED BORDER AND TITLE BLOCK, ADDED SHEET 21	6303	02/18/19	C	JMS	BRE
UPDATED TITLE BLOCK, UPDATED NOTES, REMOVED STOCK NO. AND REV'D FROM PARTS LIST	7147	06/26/20	D	JMS	RCB

QUADGUARD® II SYSTEM (PERMANENT)	
TRANSITION ASSEMBLY QUAD-BEAM TO W-BEAM - WIDE APL 544-000-043	
FLORIDA	REV: D
60-36-62	19 of 26



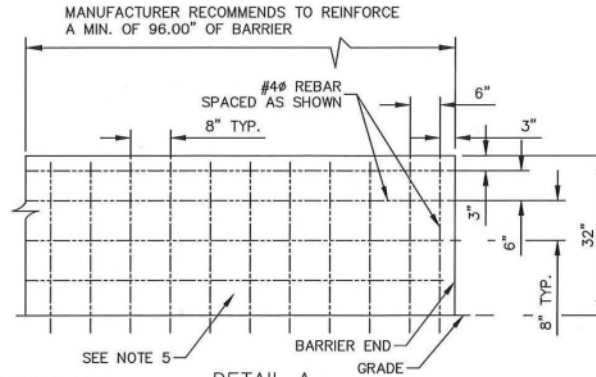
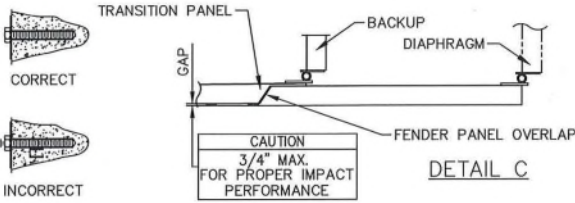
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- NOTES:
- POSTS & BLOCKOUTS SHALL BE MADE OF TIMBER WITH A STRESS GRADE OF AT LEAST 1100 PSI. STRESS GRADING SHALL BE IN ACCORDANCE WITH THE RULES OF THE WEST COAST LUMBER INSPECTION BUREAU, SOUTHERN PINE INSPECTION BUREAU OR OTHER APPROPRIATE TIMBER 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  $\pm \frac{1}{8}$ ". ALL TIMBER SHALL RECEIVE A PRESERVATION TREATMENT IN ACCORDANCE WITH AASHTO M133 AFTER ALL END CUTS ARE MADE AND ALL HOLES ARE DRILLED.
  - GUARDRAIL & TRANSITION PANEL NOT SHOWN FOR CLARITY.

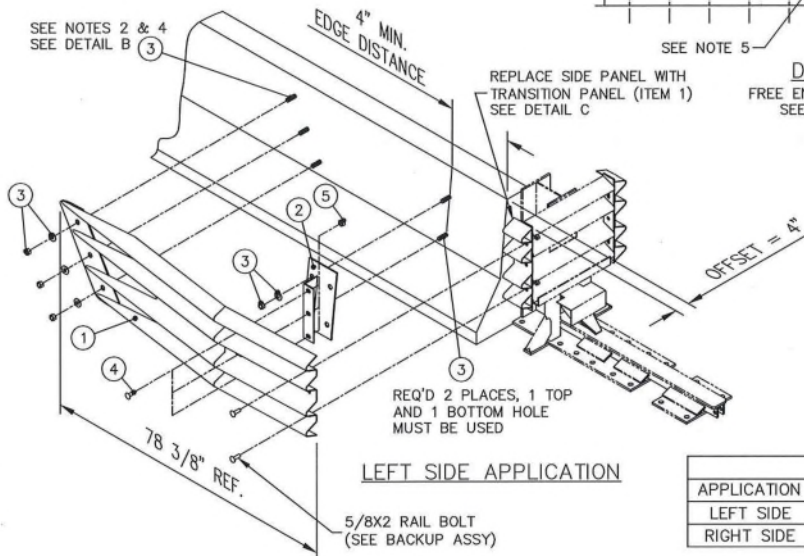


DRAWN: T. BUSSE DATE: 05/29/1997	MODEL NO: SEE TABLE	QUADGUARD® II SYSTEM (PERMANENT)  TRANSITION ASSEMBLY QUAD-BEAM TO W-BEAM - WIDE APL 544-000-043	
CHECKED: J. MACHADO DATE: 06/03/1997	FILE: 60-36-62.dwg		
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN INCHES DIMENSIONS ACCORDING TO ASME Y14.5M-1994 AND TYP-92-003 UNLESS OTHERWISE SPECIFIED.		DO NOT SCALE DRAWING	
Revision SEE SHEET 1		ECO /	Date 08/19/16
DIMENSIONS WERE MILLIMETERS [INCHES] UPDATED BORDER AND TITLE BLOCK, ADDED SHEET 24		Rev 6303	By JMS
UPDATED TITLE BLOCK, UPDATED NOTES		Date 02/18/19	Chk BRE
		Date 06/26/20	Chk RCB
		DRAWING: 60-36-62	REV: D
		SHEET: 20 of 26	

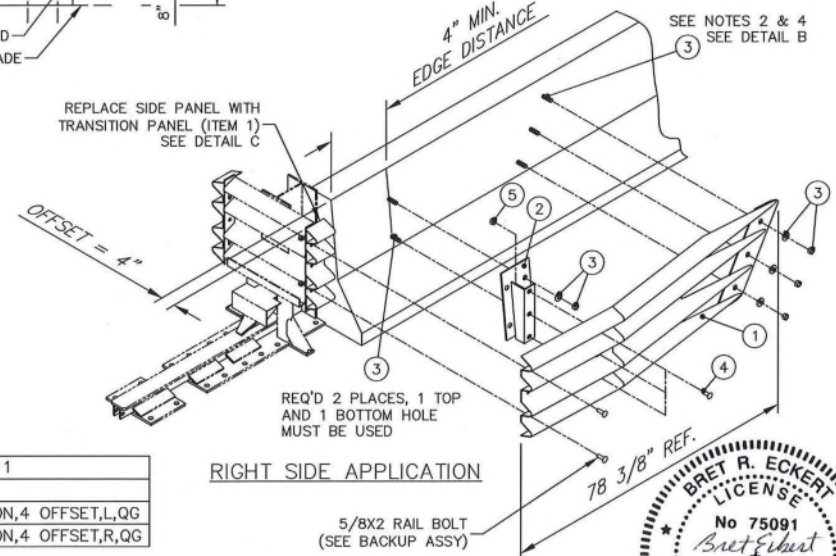


PARTS LIST	
ITEM	DESCRIPTION
1	PANEL, TRANSITION, 4 OFFSET, QG
2	BRACKET, SUPPORT, 4 TRANS TO CMB
3	ANCHOR KIT, HILT, 300ML, 3/4X6 1/2, 4
4	BOLT, RAIL, 5/8X2, G
5	NUT, HX, 5/8, G, RAIL

INCORRECT  
DETAIL B  
NOT TO SCALE

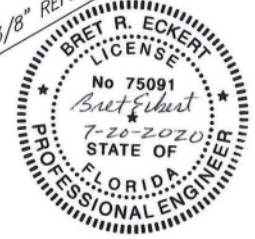


DETAIL A  
FREE END REINFORCEMENT  
SEE NOTES 1 & 3



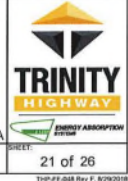
APPLICATION	DESCRIPTION
LEFT SIDE	PANEL, TRANSITION, 4 OFFSET, L, QG
RIGHT SIDE	PANEL, TRANSITION, 4 OFFSET, R, QG

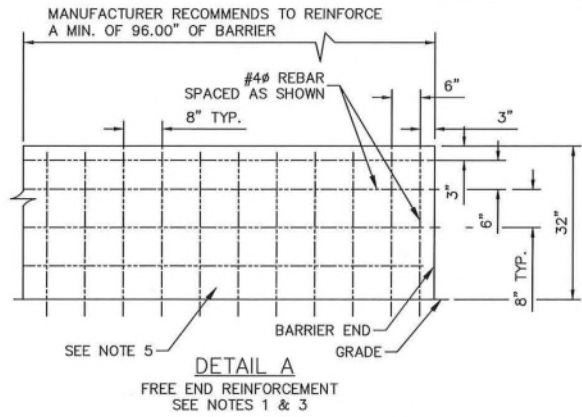
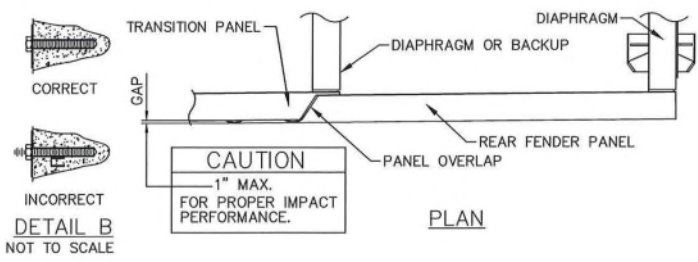
- NOTES:
1. THE CONCRETE BARRIER REINFORCEMENT SHOWN IN DETAIL "A" IS RECOMMENDED TO ENSURE ADEQUATE BARRIER INTEGRITY FOR PROPER IMPACT PERFORMANCE. IT IS APPROPRIATE FOR A STANDARD SAFETY SHAPED BARRIER WITH A 24" BASE AND A 6" TOP. VARIATIONS MAY BE REVIEWED AND DETERMINATIONS MADE AS TO REASONABLE EQUIVALENCE BY PROJECT ENGINEER.
  2. USE TRANSITION PANEL AS TEMPLATE FOR DRILLING. RECOMMENDED HOLE DEPTH 5". FINAL TORQUE TO BE 100 FT-LBS (TYP).
  3. IMPACT FORCES COULD BE TRANSFERRED INTO TERMINAL END OF THE BARRIER. ADEQUATE ANCHORAGE IS REQUIRED FOR PROPER IMPACT PERFORMANCE.
  4. ANCHOR STUD END SHOULD BE FLUSH WITH OUTSIDE SURFACE OF ANCHOR NUT, SEE DETAIL B.
  5. MIN. 4000 PSI P.C. CONCRETE MEDIAN BARRIER.



DESIGNER K. LOONEY	DATE 04/24/2012	MODEL NO. SEE TABLE
DRAWN BY B. ECKERT	DATE 12/07/2012	FILE 60-36-62.dwg
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN INCHES. DIMENSIONS ACCORDING TO ASME Y14.5M-1994 AND TYP-92-003 UNLESS OTHERWISE SPECIFIED.		
Revision	ECO	Date Rev By Chk.
SEE SHEET 1	/	08/19/16 B JMS BRE
DIMENSIONS WERE MILLIMETERS (INCHES) UPDATED BORDER AND TITLE BLOCK ADDED SHEET 24	6303	02/18/19 C JMS BRE
UPDATED TITLE BLOCK, REMOVED STOCK NO. AND REQ'D FROM PARTS LIST, REMOVED PART NO. FROM TABLE	7147	06/26/20 D JMS RCB

QUADGUARD® II SYSTEM (PERMANENT)  
  
TRANSITION QUAD-SAFETY  
SHAPE, QG  
APL 544-000-043





PARTS LIST	
ITEM	DESCRIPTION
1	PANEL, TRANSITION, 4 OFFSET, QG69/90
2	BRACKET, SUPPORT, 4 TRANS TO CMB
3	ANCHOR KIT, HILT, 300ML, 3/4X6 1/2, 4
4	BOLT, RAIL, 5/8X2, G
5	NUT, HX, 5/8, G, RAIL

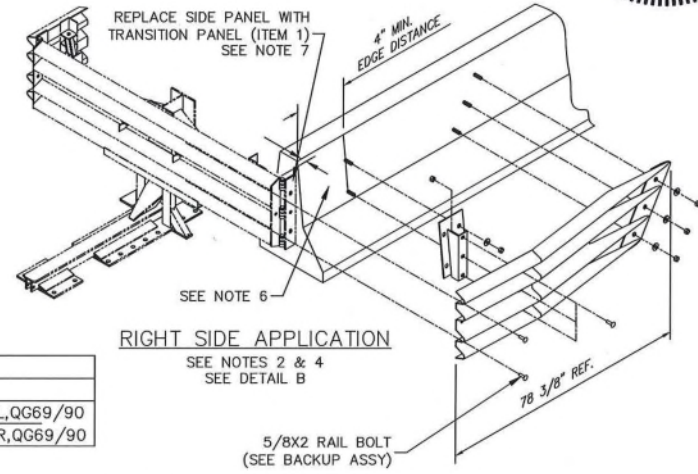
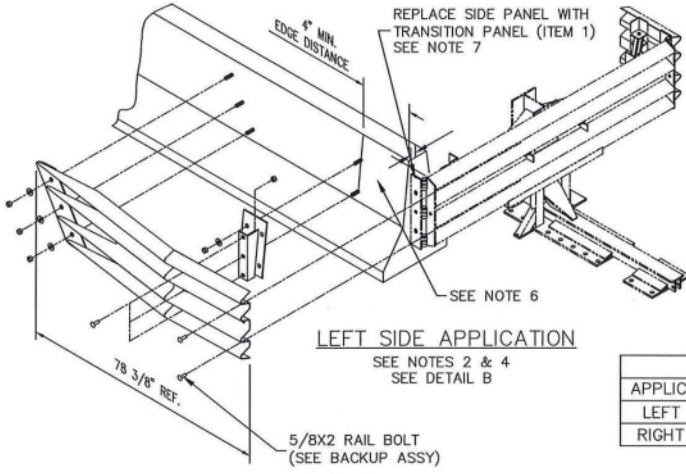


TABLE - ITEM 1	
APPLICATION	DESCRIPTION
LEFT SIDE	PANEL, TRANSITION, 4 OFFSET, L, QG69/90
RIGHT SIDE	PANEL, TRANSITION, 4 OFFSET, R, QG69/90

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" BASE AND A 6" TOP. VARIATIONS MAY BE REVIEWED AND DETERMINATIONS MADE AS TO REASONABLE EQUIVALENCE BY PROJECT ENGINEER.

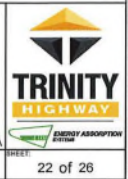
2. USE TRANSITION PANEL AS TEMPLATE FOR DRILLING. RECOMMENDED HOLE DEPTH 5". FINAL TORQUE TO BE 100 FT-LBS (TYP).  
 3. IMPACT FORCES COULD BE TRANSFERRED INTO TERMINAL END OF THE BARRIER. ADEQUATE ANCHORAGE IS REQUIRED FOR PROPER IMPACT PERFORMANCE.

4. ANCHOR STUD END SHOULD BE FLUSH WITH OUTSIDE SURFACE OF ANCHOR NUT, SEE DETAIL B.  
 5. MIN. 4000 PSI P.C. CONCRETE MEDIAN BARRIER.

6. BACKUP SIDE PLATE FOR 69" WIDE SYSTEM TO BE OFFSET 1.38" FROM EDGE OF BARRIER @32" ABOVE GRADE. FOR 90" WIDE SYSTEM THERE WOULD BE NO OFFSET.  
 7. BRACE NOT REQUIRED WITH OFFSET TRANSITION.

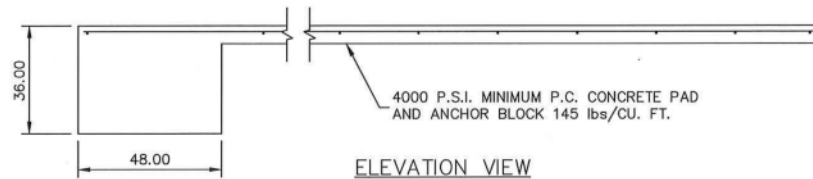
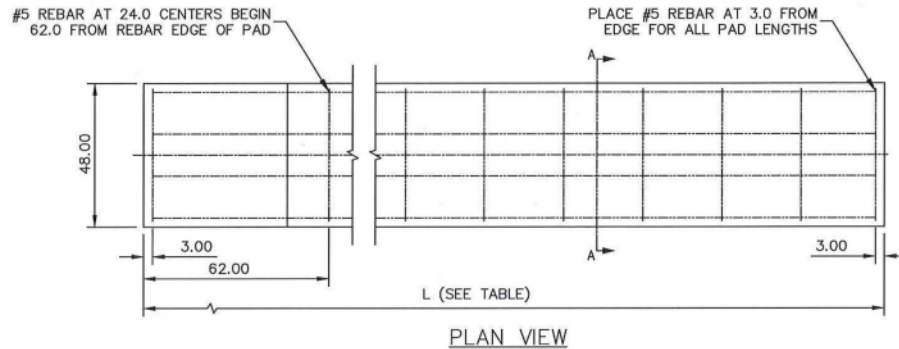
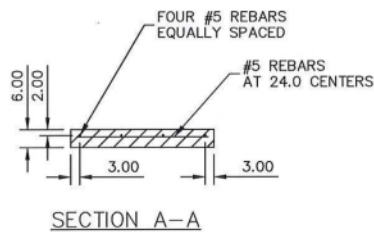
DRAWN: J. ESPINOZA CHECKED: SPT DATE: 09/23/1997 DATE: 10/01/1997	MODEL NO: SEE TABLE FILE: 60-36-62.dwg
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN INCHES DIMENSIONS ACCORDING TO ASME Y14.5M-1994 AND TYP-3E-003 UNLESS OTHERWISE SPECIFIED.	
DO NOT SCALE DRAWING	
Revision SEE SHEET 1 DIMENSIONS WERE MILLIMETERS [INCHES], UPDATED BORDER AND TITLE BLOCK, ADDED SHEET 24 UPDATED TITLE BLOCK, REMOVED STOCK NO. AND REQ'D FROM PARTS LIST, REMOVED PART NO. FROM TABLE	
ECO 6303 7147	Date 08/19/16 02/18/19 06/26/20
Rev B C D	By JMS JMS JMS
Chk. BRE BRE RCB	BRE BRE RCB

QUADGUARD® II SYSTEM (PERMANENT)	
TRANSITION QUAD-SAFETY SHAPE, QG, 69/90 APL 544-000-043	
FLORIDA	D
60-36-62	22 of 26



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TABLE			
NO. OF BAYS	"L" (PAD LENGTH)	REBAR REQUIRED	YARDS OF CONCRETE IN PAD
	ft-in	ft-in	yards <sup>3</sup>
1	9'-0"	48'-8"	2.1
2	9'-0"	48'-8"	2.1
3	12'-0"	68'-0"	2.4
4	15'-0"	83'-8"	2.6
5	18'-0"	103'-0"	2.8



- NOTES:
- CROSS SLOPE OF PAD SHALL NOT EXCEED 8% AND NOT VARY MORE THAN 2% FROM FRONT TO BACK.
  - ANCHOR BLOCK LOCATION IS RECOMMENDED AT BACK OF CONCRETE PAD. EXISTING CONCRETE PADS OR LOCATIONS WITH BELOW GROUND OBSTRUCTIONS ARE ACCEPTABLE WITH ANCHOR BLOCKS AT THE FRONT OF THE PAD.


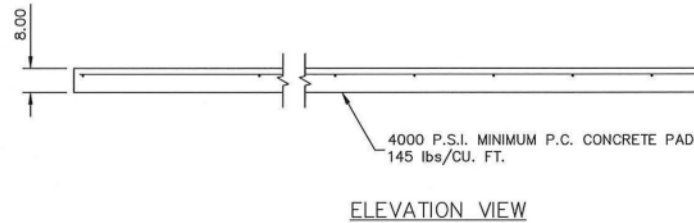
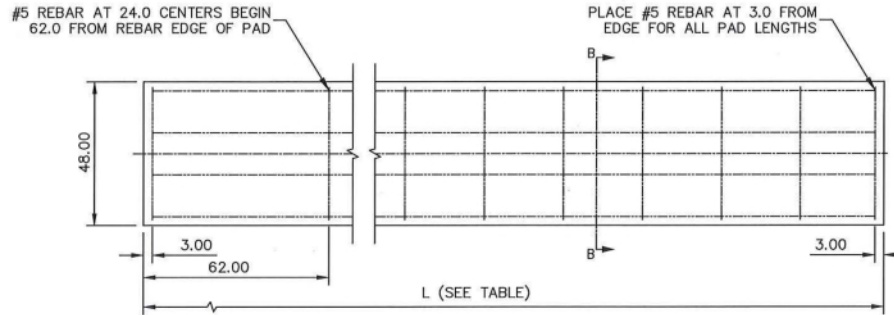
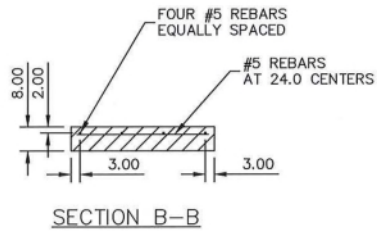
DRAWN: J. SIMMONS	DATE: 06/26/2020	MODEL NO: SEE TABLE	QUADGUARD® II SYSTEM (PERMANENT)		
CHECKED: R. BROUGHNER	DATE: 07/17/2020	FILE: 60-36-62.dwg			
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN INCHES. DIMENSIONS ACCORDING TO ASME Y14.5M-1994 AND TYP-95-003 UNLESS OTHERWISE SPECIFIED.			CONCRETE PAD FOR TENSION STRUT BACKUP APL 544-000-043		
DO NOT SCALE DRAWING			FLORIDA		
Revision	ECO	Date	Rev	By	Chk.
REPLACED SHEET 23 WITH THIS SHEET	7147	06/26/2020	D	JMS	RCB
DRAWING: 60-36-62			REV: D	SHEET: 23 of 26	

TABLE			
NO. OF BAYS	"L" (PAD LENGTH)	REBAR REQUIRED	YARDS OF CONCRETE IN PAD
	ft-in	ft-in	yards <sup>3</sup>
1	9'-0"	48'-8"	0.9
2	9'-0"	48'-8"	0.9
3	12'-0"	68'-0"	1.2
4	15'-0"	83'-8"	1.5
5	18'-0"	103'-0"	1.8



- NOTES:
- CROSS SLOPE OF PAD SHALL NOT EXCEED 8% AND NOT VARY MORE THAN 2% FROM FRONT TO BACK.
  - TO PREVENT SLIDING DURING AN IMPACT, PAD MUST BE INSTALLED AGAINST OR TIED TO AN EXISTING STRUCTURE. OTHERWISE ADDITIONAL BELOW GRADE SUPPORTS MUST BE ADDED AS DETERMINED NECESSARY BY THE PROJECT ENGINEER. THE 8" THICK CONCRETE PAD WITHOUT ANCHOR BLOCK NOT TO BE USED WITH STANDARD 32" F-SHAPE MEDIAN BARRIER.

DESIGN: J. SIMMONS	DATE: 06/26/2020	MODEL NO.: SEE TABLE			
DRAWN: R. BROUGHER	DATE: 07/17/2020	FILE: 60-36-62.dwg			
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN INCHES DIMENSIONS ACCORDING TO ASME Y14.5M-1994 AND TYP-92-003 UNLESS OTHERWISE SPECIFIED.					
DO NOT SCALE DRAWING					
Revision	ECO	Date	Rev	By	Chk.
ADDED THIS SHEET	7147	06/26/2020	D	JMS	RCB

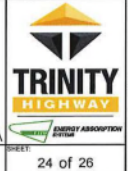
QUADGUARD® II SYSTEM (PERMANENT)

OPTIONAL 8" CONCRETE PAD  
WITH REBAR FOR  
TENSION STRUT BACKUP  
APL 544-000-043

FLORIDA

60-36-62

REV: D



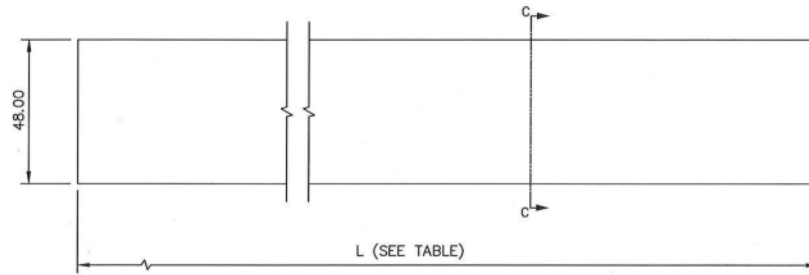
SHEET: 24 of 26



TABLE		
NO. OF BAYS	"L" (PAD LENGTH)	YARDS OF CONCRETE IN PAD
	ft-in	yards <sup>3</sup>
1	9'-0"	0.9
2	9'-0"	0.9
3	12'-0"	1.2
4	15'-0"	1.5
5	18'-0"	1.8



SECTION B-B



PLAN VIEW



ELEVATION VIEW

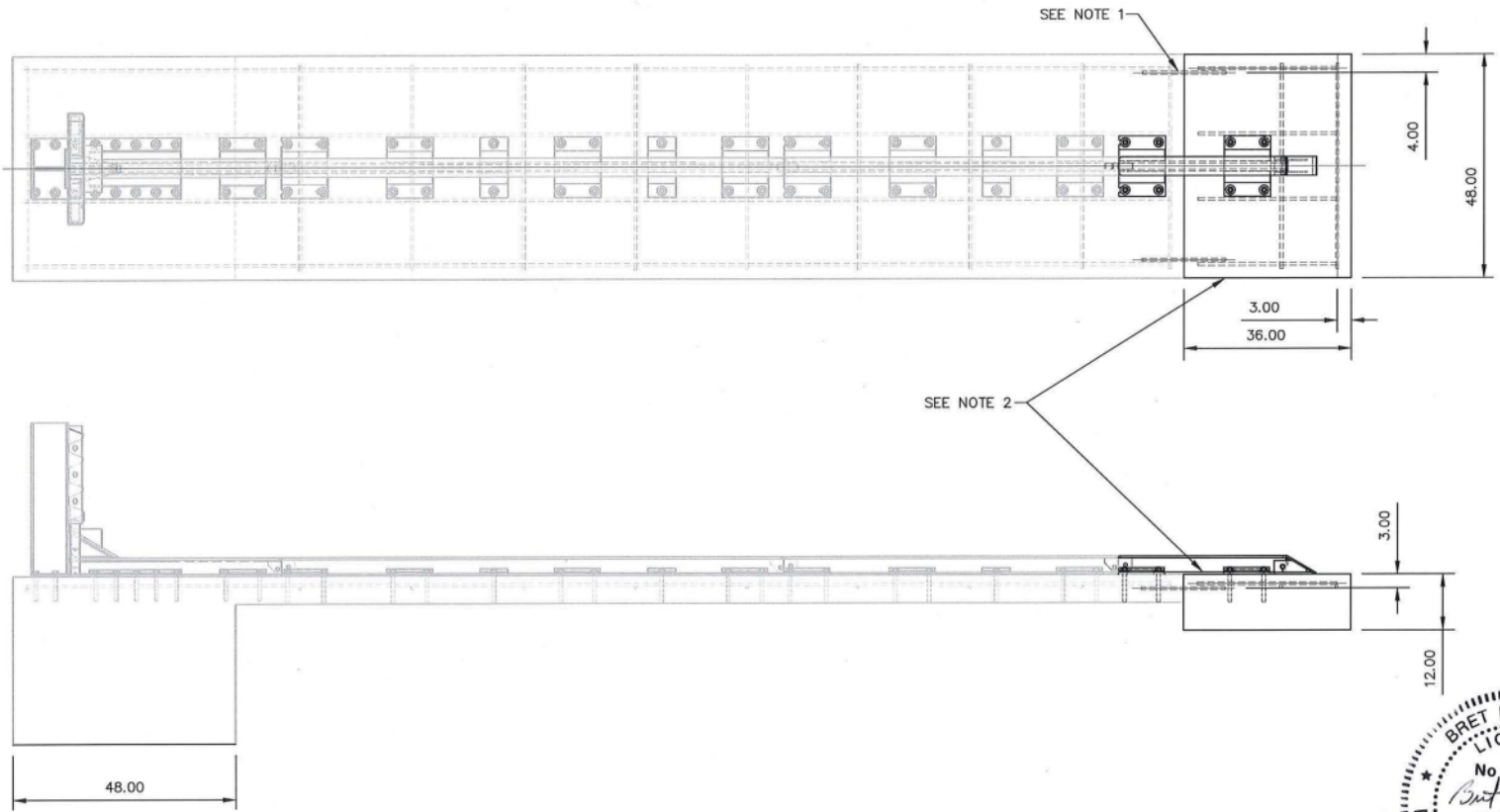
- NOTES:
- CROSS SLOPE OF PAD SHALL NOT EXCEED 8% AND NOT VARY MORE THAN 2% FROM FRONT TO BACK.
  - TO PREVENT SLIDING DURING AN IMPACT, PAD MUST BE INSTALLED AGAINST OR TIED TO AN EXISTING STRUCTURE. OTHERWISE ADDITIONAL BELOW GRADE SUPPORTS MUST BE ADDED AS DETERMINED NECESSARY BY THE PROJECT ENGINEER. THE 8" THICK CONCRETE PAD WITHOUT ANCHOR BLOCK NOT TO BE USED WITH STANDARD 32" F-SHAPE MEDIAN BARRIER.
  - CONCRETE PADS WITHOUT REINFORCEMENT MAY CRACK WHEN PLACED IN ENVIRONMENT WITH DRAMATIC TEMPERATURE CHANGES. TO PREVENT CRACKING, REINFORCE PAD AS SHOWN ON SHEET 24.



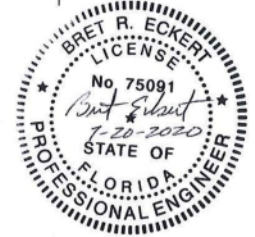
DRAWN: J. SIMMONS	DATE: 06/26/2020	MODEL NO.:	SEE TABLE
CHECKED: R. BROUGHER	DATE: 07/17/2020	FILE:	60-36-62.dwg
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN INCHES DIMENSIONS ACCORDING TO ASME Y14.5M-1994 AND Y14.5-2003 UNLESS OTHERWISE SPECIFIED.			
DO NOT SCALE DRAWING			
Revision	ECO	Date	Rev By Chk.
ADDED THIS SHEET	7147	06/26/2020	D JMS RCB

QUADGUARD® II SYSTEM (PERMANENT)	
OPTIONAL 8" CONCRETE PAD WITH REBAR FOR TENSION STRUT BACKUP APL 544-000-043	
FLORIDA	REVISION: 60-36-62
DATE: 06/26/2020	BY: D

FLORIDA  
SHEET: 25 of 26  
TYP: F-028 Rev. F. 9/29/2018



- NOTES:
1. DOWEL PADS WITH (QTY. 3)  $\phi 2$  [#6] X 18.00" LONG AT APPROX. 3" CLEAR TOP FACE. REBAR TO BE GRADE 60 EPOXY COATED. BIND WITH SAME EPOXY AS USED FOR SURFACE OF COLD JOINT.
  2. EXTENDED CONCRETE PAD 3' LONG X 4' WIDE. COLD CONCRETE TO BE TREATED WITH EPOXY (SIKADUR 32 OR BURKE HI-VIS OR EQUAL). PAD ADDITION TO BE 12.00" MIN. THICK, 4000psi MIN. REINFORCE WITH  $\phi 8$  [#5] BOTH WAYS AT 12" MAX. CENTERS AT 2" MIN. CLEAR TOP FACE.



	DRAWN: <b>J. SIMMONS</b> CHECKED: <b>R. BROUGHER</b>	DATE: 06/26/2020 DATE: 07/17/2020	MODEL NO: SEE TABLE FILE: 60-36-62.dwg	QUADGUARD® II SYSTEM (PERMANENT)  EXTENSION, CONCRETE PAD, 1 BAY APL 544-000-043				
	<small>UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN INCHES. DIMENSIONS ACCORDING TO ASME Y14.5M-1994 AND TYP-92-003 UNLESS OTHERWISE SPECIFIED.</small>					DO NOT SCALE DRAWING		
	Revision WAS SHEET 24, UPDATED TITLE BLOCK	ECO 7147	Date 06/26/2020			Rev D	By JMS	Chk. RCB
	DRAWING: 60-36-62					REV: D	SHEET: 26 of 26	