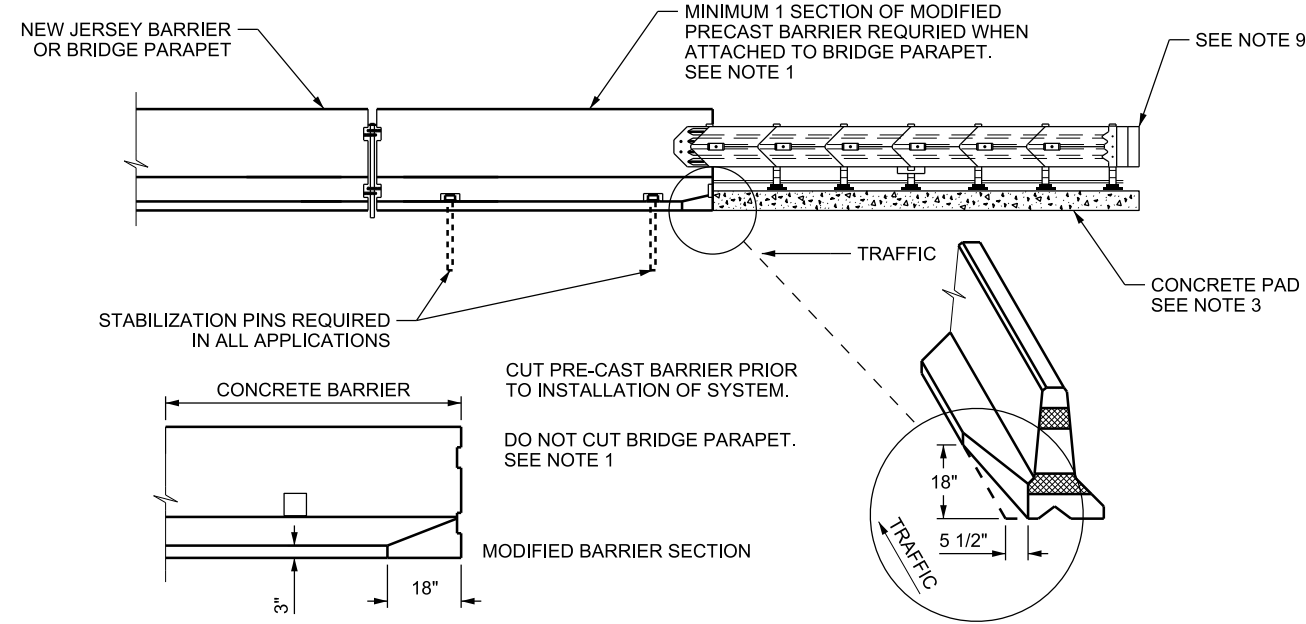


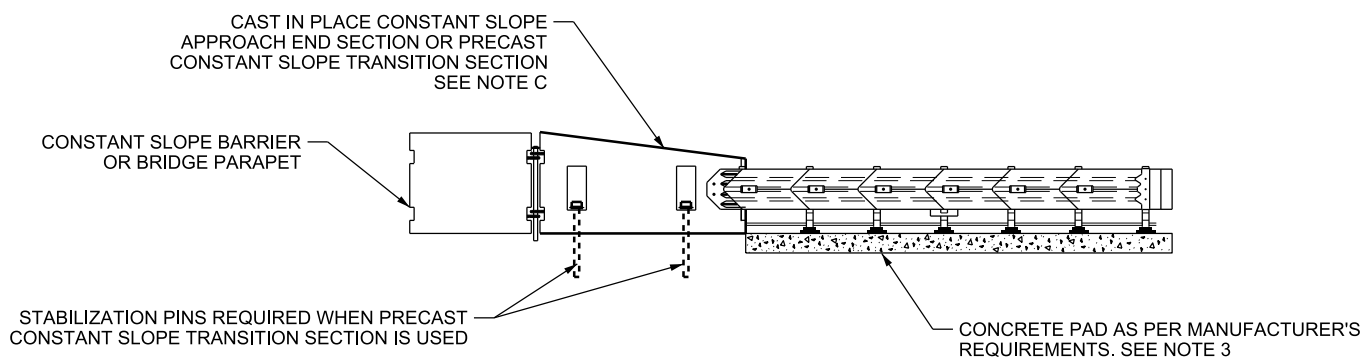
**TYPICAL SECTION A-A**

SPEED MPH	MIN LENGTH (L)
LESS THAN 40	50 FT
40 TO 55	70 FT
60 TO 80	100 FT

**END TREATMENT TYPE F**



**USE THIS DETAIL WHEN SYSTEM IS INSTALLED WITH NEW JERSEY SHAPED BARRIER**



**USE THIS DETAIL WHEN SYSTEM IS INSTALLED WITH CONSTANT SLOPE BARRIER**

**DESIGN-ONLY NOTES:**

- A. THE QUADTREND-350 IS MANUFACTURED BY ENERGY ABSORPTION SYSTEMS, SEE GUIDELINES FOR CRASH CUSHIONS AND BARRIER END TREATMENTS FOR SPECIFIC SYSTEM DETAILS.
- B. USE SYSTEM WHEN DIRECT ATTACHMENT TO BARRIER IS REQUIRED AND THE LONGITUDINAL SPACE IN FRONT OF THE HAZARD IS EQUAL TO THE REQUIRED MINIMUM APPROACH LENGTH AS STATED IN TABLE 1. INSTALL SYSTEM ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
- C. REFER TO BA 3 SERIES STD DWGS BEFORE ATTACHING CRASH CUSHION OR END TREATMENT TO CONSTANT SLOPE BARRIER. CONCRETE TRANSITION SECTION REQUIRED.
- D. MEET SLOPE REQUIREMENTS IN RECOVERY AREA AS DETAILED IN APPLICABLE UDOT ROADWAY DESIGN MANUAL DRAWINGS. THE ADDITIONAL INFORMATION LISTED BELOW IS THE MINIMUM ACCEPTABLE SLOPE REQUIREMENTS FOR THE APPROACH AREA OF THE END TREATMENT AND THE RECOVERY AREA.
  - 1. APPROACH AREA: THE AREA PRIOR TO IMPACTING A SYSTEM.
    - A) USE 10:1 OR FLATTER FORESLOPES IN APPROACH AREAS.
  - 2. A FORESLOPE AREA OF 12 FT x 25 FT AT 6:1 OR FLATTER REQUIRED FOR REAR ANCHOR FOUNDATION INSTALLATION
  - 3. RECOVERY AREA: THE AREA BEHIND THE END TREATMENT AND BARRIER SYSTEM EXTENDING FROM THE APPROACH END OF THE END TREATMENT TO THE END OF THE CALCULATED LENGTH OF NEED.
    - A) USE A 4:1 OR FLATTER FORESLOPE OR BACKSLOPE IN RECOVERY AREA.
    - B) USE A 3:1 FORESLOPE IN RECOVERY AREA IF IT IS IMPRACTICAL TO USE A 4:1 FORESLOPE. ESTABLISH A RECOVERY AREA AT THE TOE OF THE 3:1 FORESLOPE OF 6:1 OR FLATTER TO CLEAR ZONE LIMITS. REFER TO THE UDOT ROADWAY DESIGN MANUAL AND AASHTO ROADSIDE DESIGN GUIDE FOR ADDITIONAL INFORMATION.
    - C) USE A 4:1 OR FLATTER BACKSLOPE IN RECOVERY AREA TO THE CLEAR ZONE LIMIT, IF A 4:1 OR FLATTER BACKSLOPE CANNOT BE PROVIDED A 3:1 IS ACCEPTABLE.
- E. MATCH ROADWAY GRADE PROFILE TO THE HEAD OF THE SYSTEM INSIDE THE APPROACH AREAS. REFER TO THE AASHTO ROADSIDE DESIGN GUIDE TO ESTABLISH CLEAR ZONE AND LENGTH OF NEED (LON) REQUIREMENTS. LENGTH OF NEED BEGIN AT POST 3.
- F. 2 FT MINIMUM BARRIER OFFSET IS OPTIONAL WHEN ROADWAY DESIGN REQUIRES A 12 FT OR WIDER EFFECTIVE SHOULDER.
- G. DO NOT PLACE SIGNS, POSTS, OR OTHER HAZARDS IN APPROACH AREA. USE BREAKAWAY SIGNS OR POSTS WHEN PLACED IN RECOVERY AREA, AND MAINTAIN A MINIMUM 10 FT CLEARANCE TO THE SIDE AND 25 FT FROM THE REAR OF THE SYSTEM. MITIGATE POTENTIAL HAZARDS IN THE RECOVERY AREA.

**NOTES:**

- 1. CUT PRE-CAST NEW JERSEY BARRIER ACCORDING TO DETAIL, PRIOR TO INSTALLATION OF SYSTEM. SEAL CUT WITH THE SAME TYPE OF SEALER USED ON BARRIER. DO NOT CUT BRIDGE PARAPET, INSTALL 1 SECTION OF MODIFIED NEW JERSEY PRECAST BARRIER, CUT ACCORDING TO DETAIL. INSTALL STABILIZATION PINS IN BARRIER SECTION. MODIFICATION TO CONSTANT SLOPE BARRIER TRANSITION NOT REQUIRED, SEE BA 3 SERIES STD DWGS. THE REQUIRED BARRIER SECTIONS AND TRANSITION SECTION ARE A SEPARATE PAY ITEM FROM THE END TREATMENT.
- 2. HAVE SHOP DRAWING AVAILABLE ON SITE FOR REFERENCE DURING INSTALLATION.
- 3. INSTALL CONCRETE PAD ACCORDING TO MANUFACTURER'S REQUIREMENTS.
- 4. PLACE CABLE ANCHOR FOUNDATION IN SUCH A MANNER THAT THE REDIRECTING CABLE LAYS 6:1 OR FLATTER ON TOP OF THE GROUND, AND THE FOUNDATION WITH THE CABLE ANCHOR BRACKET ATTACHED DOES NOT EXCEED 4 INCHES ABOVE GROUND LEVEL. DO NOT BURY REDIRECTION CABLE.
- 5. COMPLETE SLOPE PREPARATION BEFORE INSTALLING SYSTEM.
- 6. CONSTRUCT PLATFORM AS REQUIRED WHEN THE SPACE IS AVAILABLE EVEN IF THE PLATFORM EXTENDS BEYOND THE CLEAR ZONE REQUIREMENTS.
  - A) CONSTRUCT 6:1 OR FLATTER SLOPE FOR TRANSVERSE SLOPE FROM APPROACH PAD.
- 7. CLEAR RECOVERY AND APPROACH AREAS OF ANY FIXED OBJECTS OR HAZARDS.
- 8. ATTACH SAND CONTAINERS AT POSTS 1, 3 AND 4.
- 9. INSTALL REQUIRED MARKING ACCORDING TO STD DWG CC 1.

SUPPLEMENTAL DRAWING

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION  
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION  
SALT LAKE COUNTY, UTAH

GRADING AND  
INSTALLATION DETAILS  
END TREATMENT  
TYPE F  
QUAD TREND 350  
STANDARD DRAWING TITLE

STD. DWG. NO.  
CC 7A

RECOMMENDED FOR APPROVAL  
APPROVED  
CHAIRMAN STANDARDS COMMITTEE  
APPROVED  
DEPUTY DIRECTOR

DATE  
AUG 30, 2018  
DATE  
AUG 30, 2018