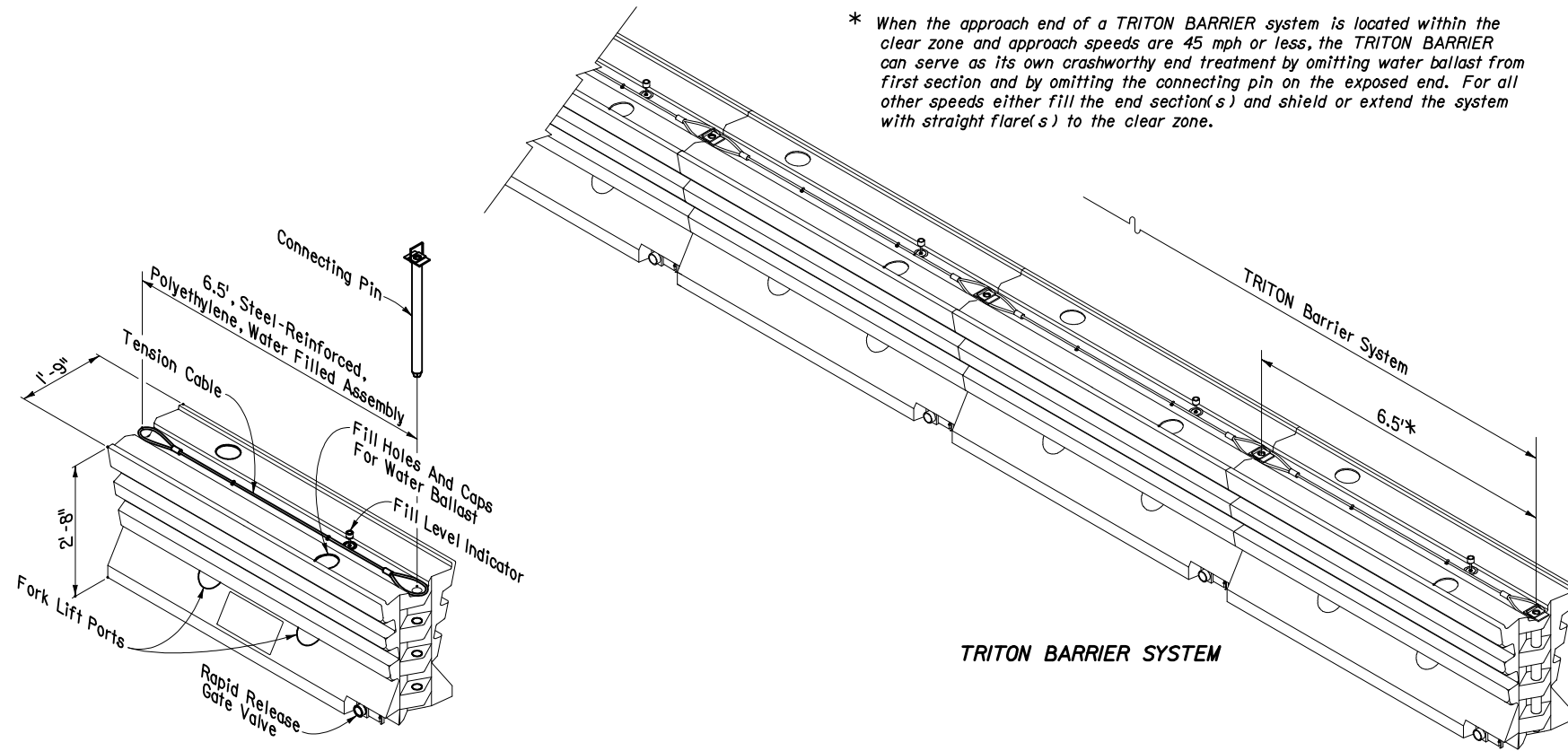


* When the approach end of a TRITON BARRIER system is located within the clear zone and approach speeds are 45 mph or less, the TRITON BARRIER can serve as its own crashworthy end treatment by omitting water ballast from first section and by omitting the connecting pin on the exposed end. For all other speeds either fill the end section(s) and shield or extend the system with straight flare(s) to the clear zone.



TRITON BARRIER SECTION

TRITON BARRIER SYSTEM

GENERAL NOTES

1. This standard drawing (index) presents proprietary temporary water filled barrier designs and is produced by the Florida Department Of Transportation solely for use by the Department and its assignees.
2. Any system presented on this index can be used as a temporary barrier in traffic control work zones and other Department permitted traffic control zones but cannot be constructed as a permanent barrier.
3. All systems shall be assembled and installed in accordance with the manufacturer's detailed drawings, procedures and specifications; however, installation will be limited to the applications shown on this index, except when otherwise detailed in the plans or approved by shop drawings or approved by the Engineer.
4. Water filled barrier systems are to be used only as longitudinal systems. A longitudinal system may include encapsulating work space barriers within low speed intersections only where the approach longitudinal system deflects the traffic alignment around the work space enclosure.
5. One type proprietary water filled barrier system is not to be used in conjunction with another type proprietary water filled barrier system, except when specifically called for and detailed in the plans.
6. All water filled barrier system sections shall be interconnected with manufacturer and Department approved crash tested connections, i.e., no individual sections or interconnected sections of substandard length are to stand alone, except when specifically called for and detailed in the plans, or for specific applications of interconnected sections around work spaces shown on this index.
7. Water filled barrier systems are not to be used on surfaces with cross slopes exceeding 0.05 (steeper than 1:20), including the surface within the design deflection space behind the barrier.
8. Water filled barrier systems are not to be used on grades steeper than 5%, nor placed over surface irregularities that cause vertical deflection exceeding 1:20 between connected sections.
9. Water filled barrier systems are not permitted on bridges or approach slabs; however, they can be placed over box culverts, including those of bridge length, where design deflection space is adequate. The system should be used on concrete pavements only where the Engineer determines that the dynamic loading of pavement slabs will not cause the system to crab out of alignment.
10. Temporary water filled barriers are to be paid for under the contract unit price for Barrier (Temporary) (Water Filled), LF, or Barrier (Temporary) (Optional), LF. If the plans specify Barrier (Temporary) (Optional), the Contractor has the option to furnish either concrete or water filled barriers. If the plans specify Barrier (Temporary) Water Filled, substitution with concrete barriers will not be permitted. For additional payment information see the supplemental general notes for the individual barrier systems.

Type C Steady-Burn lights are to be mounted on top of all water filled barriers used along travelways in work zones. The lights are to be spaced at 50' centers on transitions, 100' centers on curves and 200' centers on tangent roadways. Lights shall be paid for under the contract unit price for Lights (Temporary Barrier Wall Mount) (Type C Steady-Burn), ED.

SUPPLEMENTAL GENERAL NOTES FOR THE TRITON BARRIER

1. The system presented on this standard drawing (index) under the label TRITON BARRIER is a proprietary design by Energy Absorption Systems, Inc. and is marketed under the trade name TRITON BARRIER.
2. This index provides the general graphics and information necessary to field identify component parts of the TRITON BARRIER and their incorporation as a whole system for Department standard applications.
3. The TRITON BARRIER system can be installed as a free standing system or in combination with other Department temporary and permanent barrier systems, exclusive of other proprietary water filled barrier systems.
4. Connections between the TRITON BARRIER and other barrier systems shall be as shown in the 'TRITON BARRIER TRANSITION HARDWARE ASSEMBLIES'. Variation from these connections shall be as detailed in the plans or as prescribed by the manufacturer.
5. The TRITON BARRIER section or sections are not to be used as perpendicular road closure blocks, whether connected, unconnected, filled or unfilled.
6. Sections shall be installed in alternating white and work zone safety orange colors.
7. The TRITON BARRIER systems shall be paid for under the contract unit price for Barrier (Temporary) (Water Filled), LF, or Barrier (Temporary) (Optional), LF and shall be full compensation for furnishing and installing TRITON BARRIER in accordance with this index, with the plans and with the manufacturer's detailed drawings, procedures and specifications. The cost for transition hardware detailed in this index shall be included in the contract unit price for the barrier. TRITON modules considered a part of the systems crashworthy end treatment shall be included in the linear measure; other crashworthy end terminals, crash cushions or other shielding required for use of the TRITON barrier will not be included in the contract unit price for the barrier.

SUPPLEMENTAL DESIGN NOTES AND GUIDELINES FOR THE TRITON BARRIER

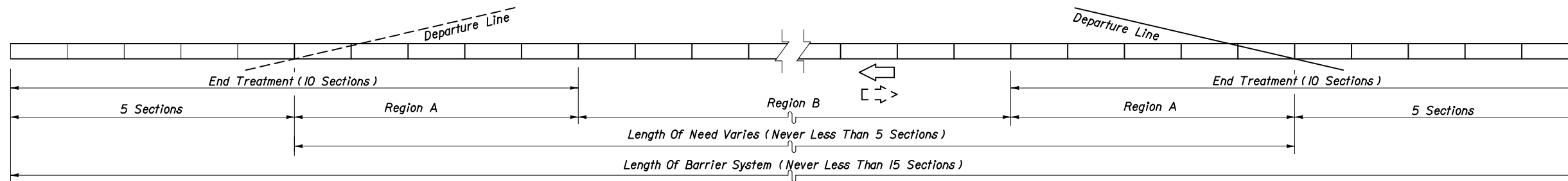
1. The longitudinal system can be used for work zone speeds of 60 mph or less. Transition hardware can be used in areas where speeds are limited to 45 mph or less.
2. Currently the Department does not recognize other proprietary items as being equally suitable alternatives to the TRITON BARRIER, and until such alternatives are available, the TRITON BARRIER need not be bid against other proprietary items.

DESIGN NOTES

1. The TRITON and GUARDIAN water filled barriers are considered by the Federal Highway Administration to be innovative temporary barriers, and, may be used as such toward compliance with the percentage of innovative barrier required in the total median barrier on Federal Aid Projects.

TRITON BARRIER

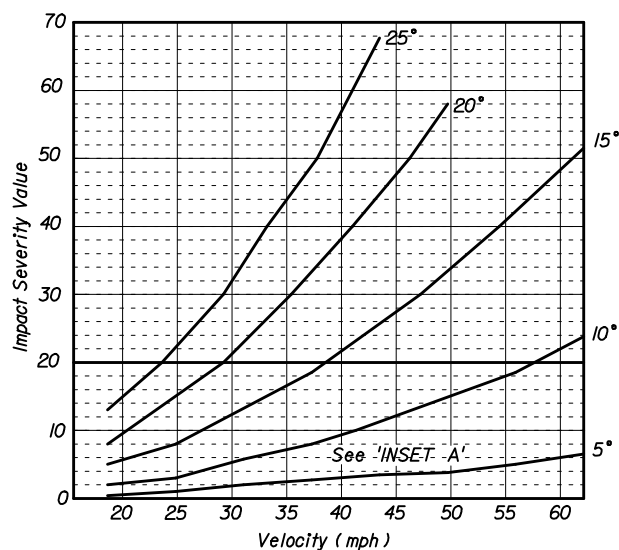
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TEMPORARY WATER FILLED BARRIERS				
	Names	Dates	Approved By	
Designed By	MFG/HKH	6/95	<i>Brian Blankenship</i> State Roadway Design Engineer	
Drawn By	HKH	6/95	Revision	Sheet No. Index No.
Checked By	JVG	6/95	00	1 of 5 416



Note: For Departure Line requirements see Index No. 400.

When TRITON BARRIER is used as its own end treatment fill all sections with water ballast except the approach end section(s). Do not use connecting pin on the exposed end of the end section(s).

SYSTEM LENGTHS FOR UNIDIRECTIONAL OR BIDIRECTIONAL TRAFFIC

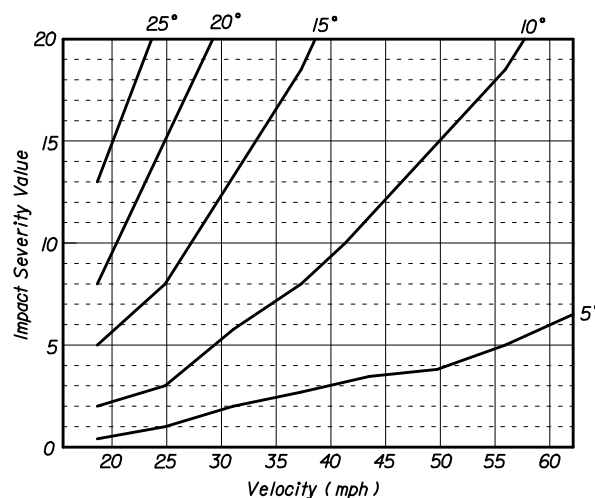
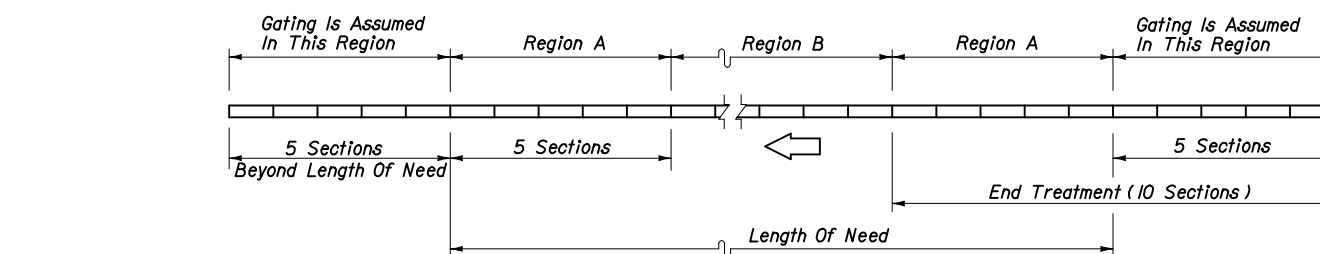


DETERMINING THE IMPACT ANGLE CURVE TO APPLY

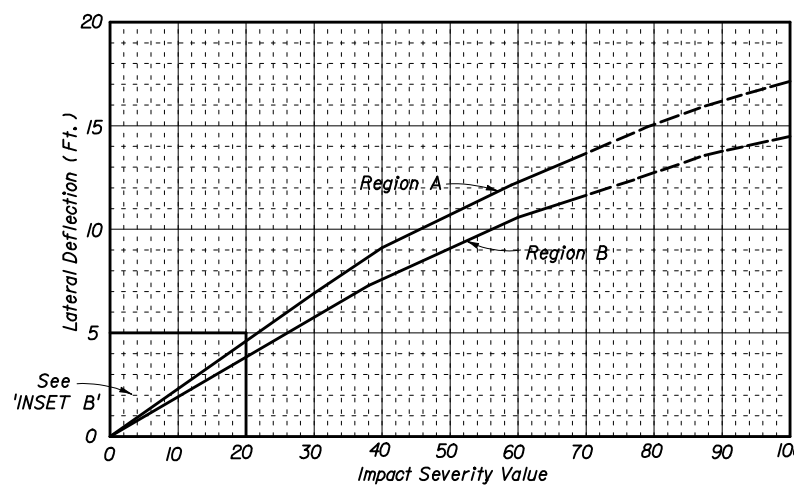
Except where the plans call for the use of a certain impact angle curve, or where a certain impact angle is anticipated by site specific conditions, the impact angle curve to be used in determining impact severity will be selected on the following basis:

Barrier Location	Graph Curve
Parallel to tangent roadway	5°
Parallel to and on the inside of roadway curve	5°
Standard lane shift or drop ($WS & \frac{WS^2}{60}$)	5°
Parallel to and on the outside of roadway curve	5° (10°) [15°]
Approach flared end section on inside of roadway curve	10°
Approach flared end section on approach tangent roadway	10°
Approach flared end section on outside of roadway curve	10° (15°) [25°]
() Max. Curvature (Min. Radius), High Speed Facilities	
[] Max. Curvature (Min. Radius), Low Speed Facilities	

IMPACT SEVERITY DETERMINATION FOR VEHICLES
≤4400 LB IMPACTING SINGLE ROW TRITON SYSTEM



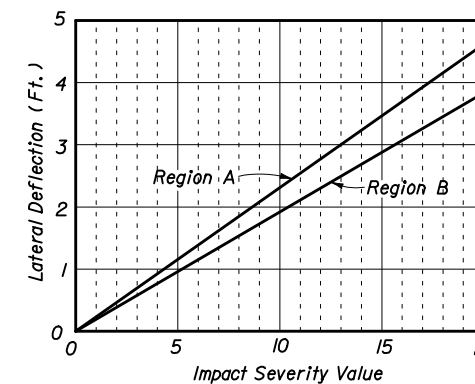
INSET A



Notes: Curves for Regions 'A' and 'B' apply to vehicles ≤ 4400 lbs.

--- Indicates impact severity levels created by higher impact angles not anticipated in work zone.

SINGLE ROW TRITON BARRIER INSTALLATION DEFLECTION CURVES



INSET B

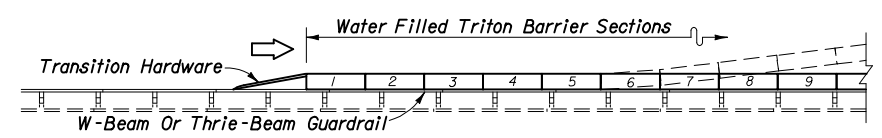
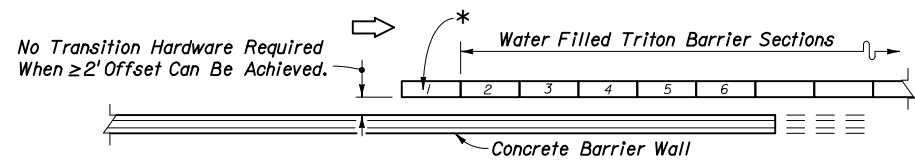
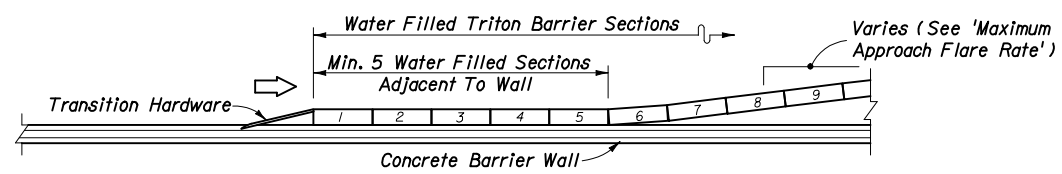
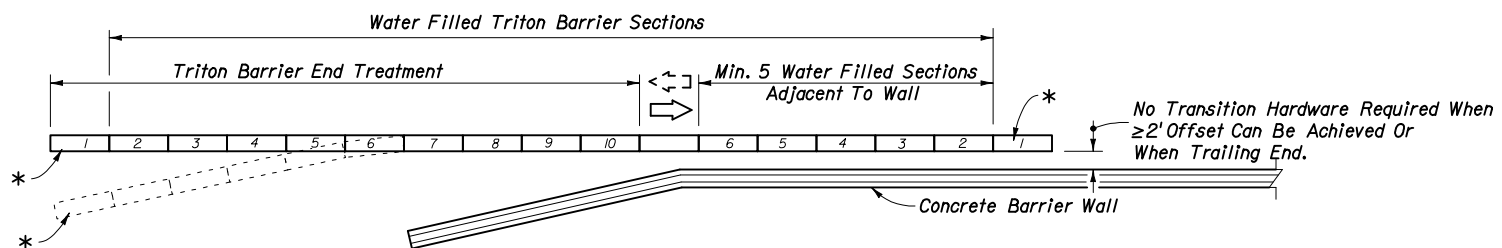
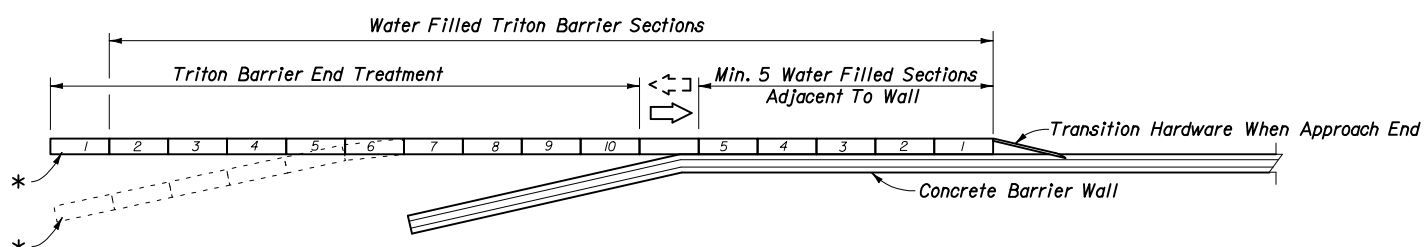
IMPACT SEVERITY AND LATERAL DEFLECTION DISTANCES

TRITON BARRIER SYSTEM LENGTHS AND DEFLECTIONS

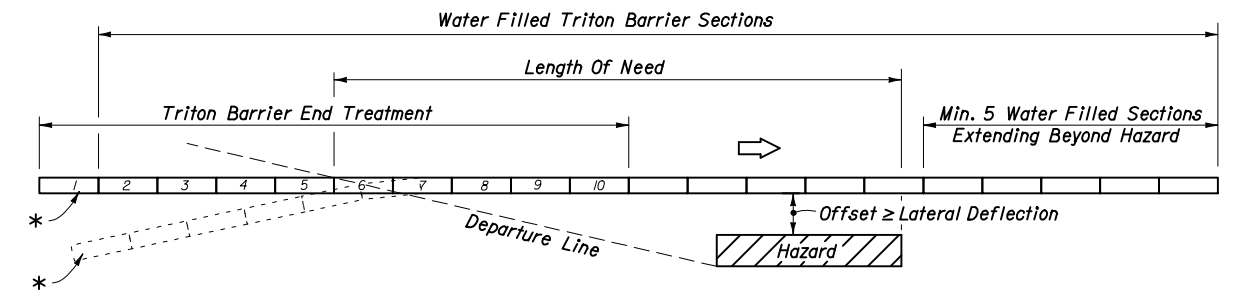
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

TEMPORARY WATER FILLED BARRIERS

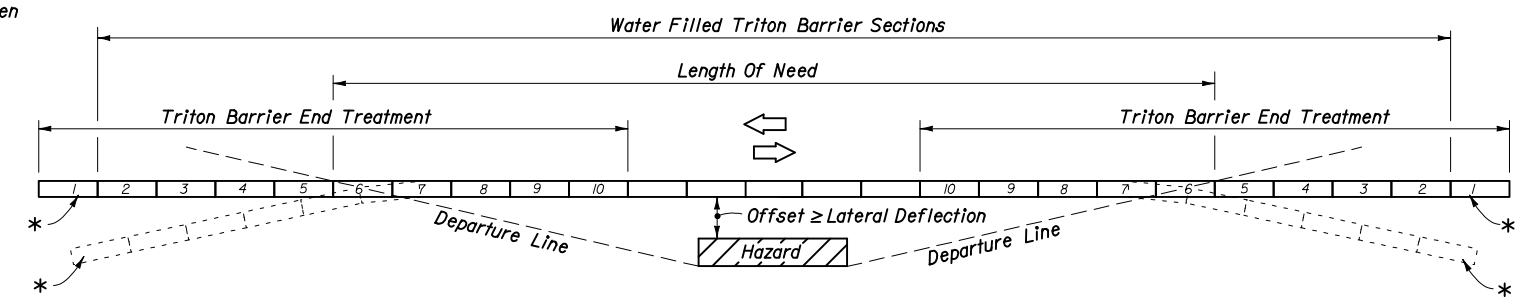
Names	Dates	Approved By		
Designed By	MFG/HKH 6/95	<i>Blair Blackwell</i> State Roadway Design Engineer		
Drawn By	HKH 6/95			
Checked By	JVG 6/95	Revision	Sheet No.	Index No.
		00	2 of 5	416



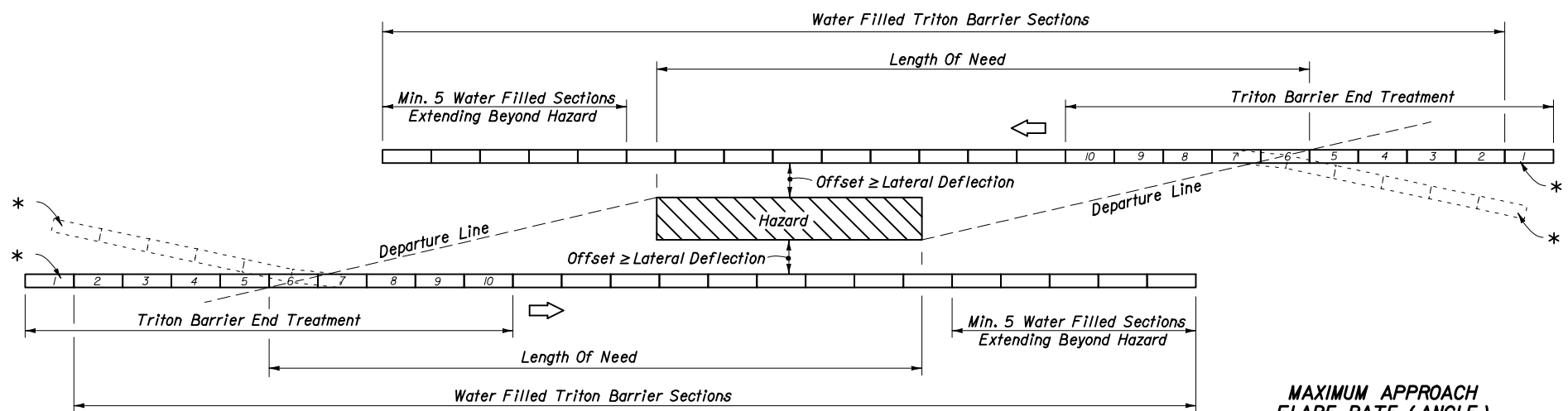
BARRIER SYSTEM IN COMBINATION WITH OTHER BARRIER SYSTEMS WHEN SPEEDS ARE ≤45 mph



TYPICAL UNIDIRECTIONAL SHOULDER LAYOUT



TYPICAL BIDIRECTIONAL SHOULDER LAYOUT

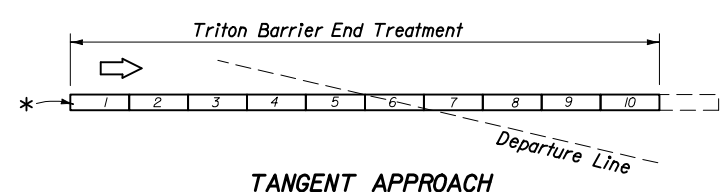


TYPICAL MEDIAN LAYOUT FREE STANDING BARRIER SYSTEMS

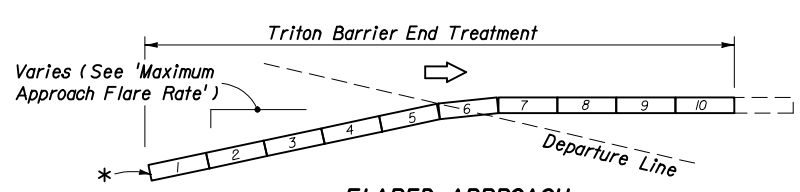
MAXIMUM APPROACH FLARE RATE (ANGLE)

≤40 mph	1:9 (6°)
45 mph	1:10 (5.5°)
50 mph	1:11 (5°)
55 mph	1:12 (4.5°)
60 mph	1:13 (4°)

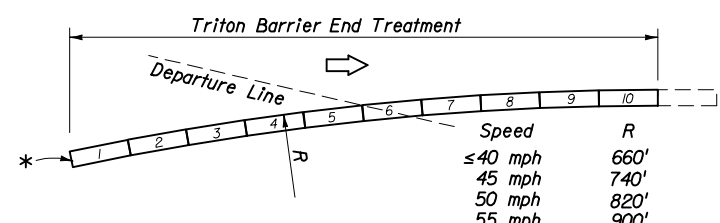
For Departure Line requirements see Index 400.
 * When used as an approach end treatment for speeds ≤45 mph, omit water ballast from first section and omit connecting pin on exposed end. For speeds ≥50 mph fill and shield or extend with straight flare to CZ.



TANGENT APPROACH



FLARED APPROACH



RADIAL APPROACH

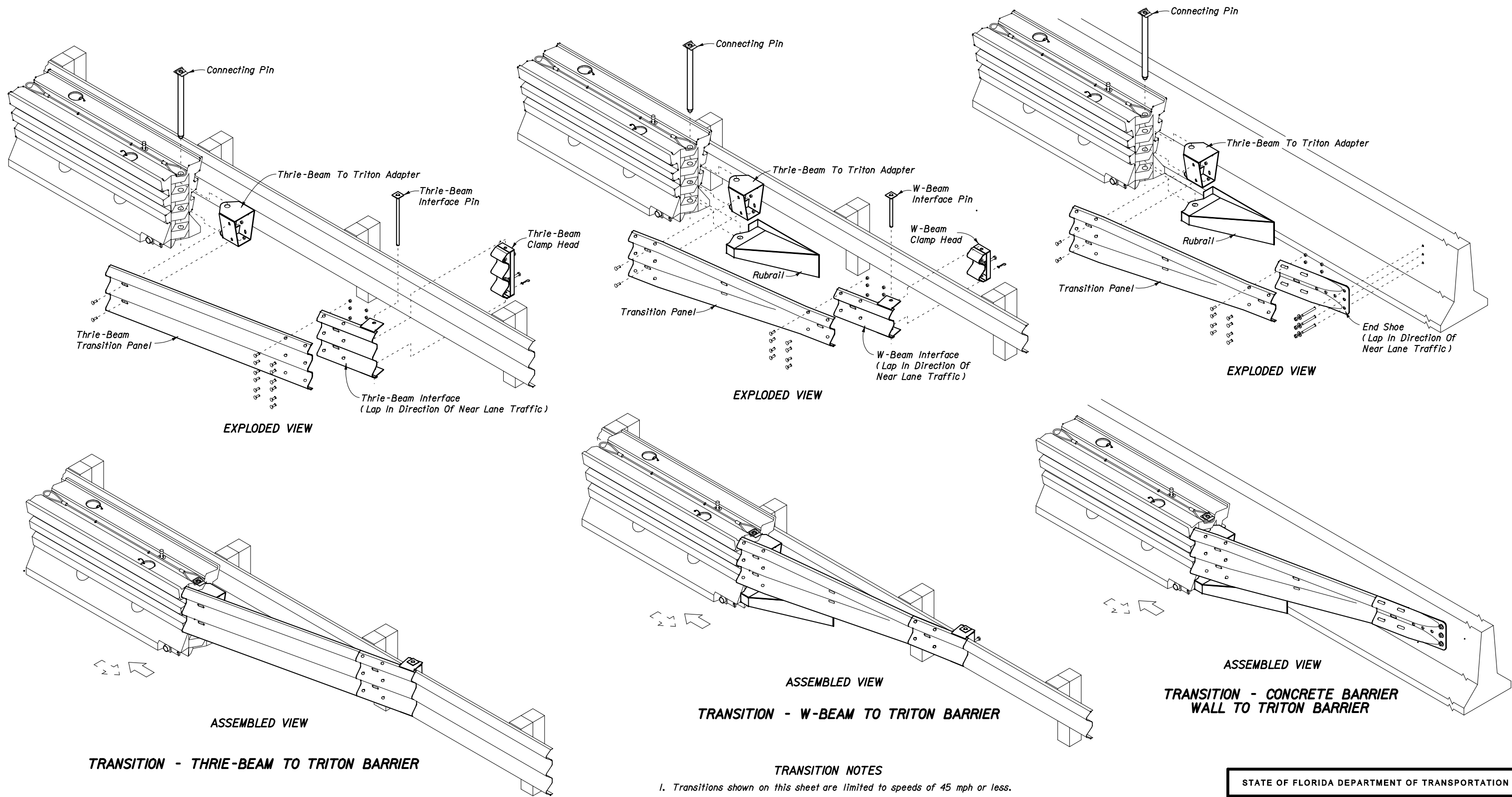
END TREATMENT CONFIGURATIONS

TRITON BARRIER - TYPICAL APPLICATIONS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

TEMPORARY WATER FILLED BARRIERS

Names	Dates	Approved By		
Designed By	MFG/HKH	6/95	State Roadway Design Engineer	
Drawn By	HKH	6/95		
Checked By	JVG	6/95		
Revision	00	Sheet No.		
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TRANSITION - THRIE-BEAM TO TRITON BARRIER

TRANSITION - W-BEAM TO TRITON BARRIER

TRANSITION - CONCRETE BARRIER WALL TO TRITON BARRIER


TRANSITION NOTES

1. Transitions shown on this sheet are limited to speeds of 45 mph or less.
2. Transition hardware can be placed on either end of TRITON section.
3. Transition hardware can be located on left or right side of roadway, right side shown.
4. TRITON Barrier end sections must be filled with water when using transition hardware assemblies.
5. Install transition hardware in accordance with the manufacturer's recommendations and specifications.

TRITON BARRIER TRANSITION HARDWARE ASSEMBLIES

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

TEMPORARY WATER FILLED BARRIERS

Names			Dates			Approved By		
Designed By	MFG/HKH	6/95	 State Roadway Design Engineer			Revision	Sheet No.	Index No.
Drawn By	HKH	6/95				00	4 of 5	416
Checked By	JVG	6/95						

SUPPLEMENTAL GENERAL NOTES FOR THE GUARDIAN BARRIER

1. The barrier units presented on this standard drawing (index) and the label GUARDIAN are proprietary designs by Safety Barrier Systems and are marketed under the trade name GUARDIAN Safety Barrier.
2. This index provides general schematics and information necessary to field identify the water filled polyethylene segmental barrier module and the module frame and basic connections, but does not identify the incorporation of the modules and frame connections into a whole system. Any use of the GUARDIAN must be in accordance with the details on the plans, or by shop drawing approval or by the Engineer in absence of plan detail.
3. The GUARDIAN modules are approved for use on highways with all design speeds and only when the "GUARDIAN 350 Highway Kit" is incorporated throughout the system in use.
4. The GUARDIAN modules can be used only in a stand alone system. i.e., not connected to other types of barrier systems.
5. The GUARDIAN can be used only as a longitudinal barrier on the State maintained highway system. Any longitudinal system must have a minimum of eleven (11) longitudinally connected modules in advance of and following the length of need; in no case can the longitudinal run of barrier be less than 33 modules.

The approach end of the GUARDIAN must either extend to the outer limit of the clear zone; be shielded by a crash cushion; or, begin behind but not connected to another barrier or shielding feature.

6. The GUARDIAN system must be placed on a cross slope not exceeding 1:10, and located to provide a deflection distance between the system and hazards in accordance with the table below.

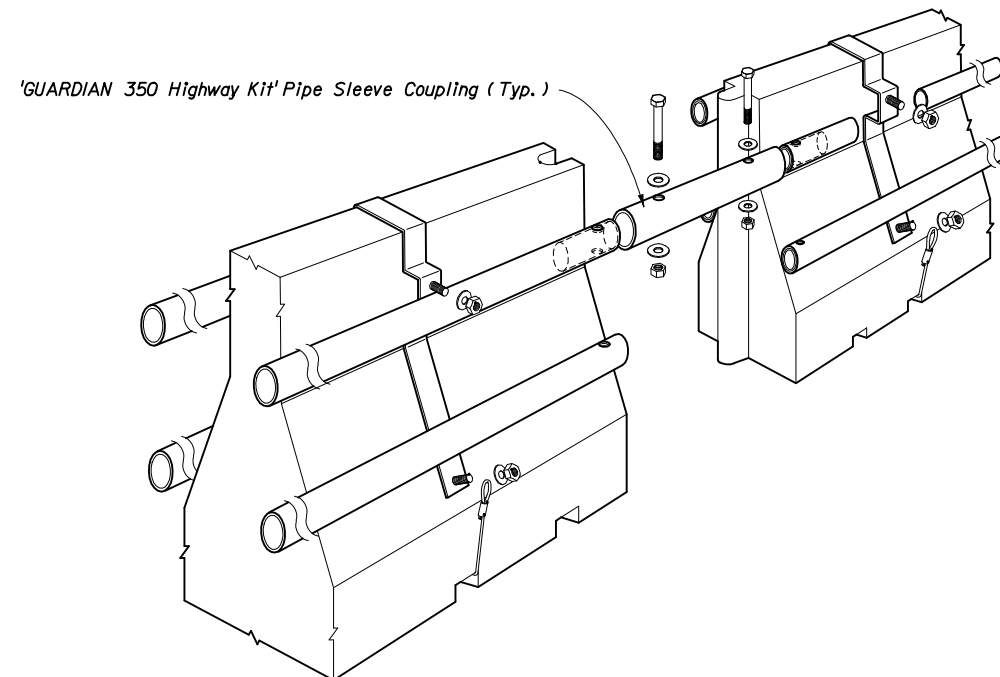
GUARDIAN BARRIER WITH 350 HIGHWAY KIT ESTIMATED BARRIER DEFLECTION (FEET)					
Vehicle Speed (mph)	Vehicle Impact Angle (Degrees)				
	25°	20°	15°	10°	5°
≤ 45	6.5	5.3	4.0	2.7	1.3
50	8.0	6.4	4.9	3.3	1.6
55	9.5	7.7	5.8	4.0	2.0
60	11.2*	9.0	6.9	4.6	2.3

* Observed Value (Crash Test Result)
Other Values Manufacturers Calculated Estimates


7. The GUARDIAN barrier system shall be paid for under the contract unit price for Barrier (Temporary) (Water Filled), LF, or Barrier (Temporary) (Optional), LF, and shall be full compensation for furnishing and installing GUARDIAN barrier in accordance with this index, with the plans and with the manufacturer's detailed drawings, procedures and specifications. Any crashworthy end terminal, crash cushion or other shielding required for use of the GUARDIAN barrier will not be included in the contract unit price for the barrier.

SUPPLEMENTAL DESIGN NOTES FOR THE GUARDIAN BARRIER

1. At time of publication of this standard no crash test data was available to provide a crashworthy end terminal design using the barrier modules; only the requirement for eleven (11) interconnected modules preceding and following the length of need, based on available crash test data.
2. Systems included in any maintenance of traffic plan will require detailed location and placement information.
3. Currently the Department does not recognize other proprietary items as being equally suitable alternatives to the GUARDIAN barrier, and until such alternatives are available, the GUARDIAN barrier need not be bid against other proprietary items.



GUARDIAN BARRIER WITH 350 HIGHWAY KIT

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION					
TEMPORARY WATER FILLED BARRIERS					
	Names	Dates	Approved By		
Designed By	MFG/HKH	6/95	 State Roadway Design Engineer		
Drawn By	HKH	6/95			
Checked By	JVG	6/95	Revision	Sheet No.	Index No.
			00	5 of 5	416