Introduction

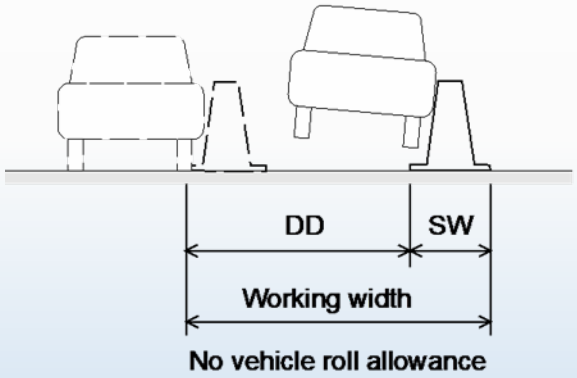
Caltrans – Temporary Structures

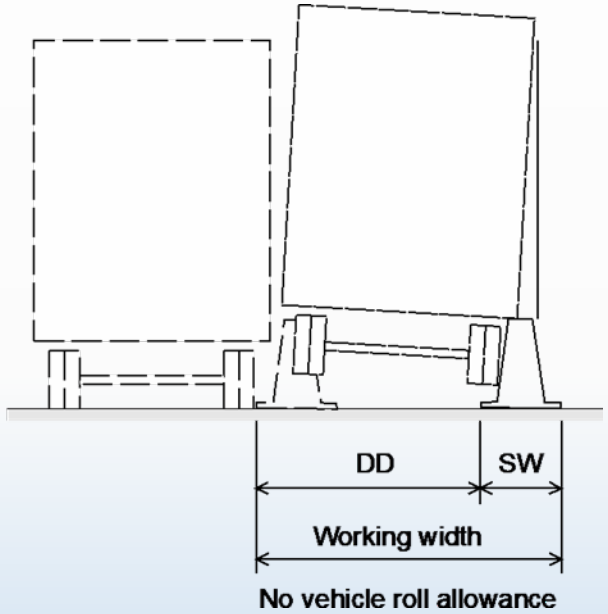
- Jim Nicholls – Falsework Engineer
    - Provide technical support for temporary structures to field staff
    - Develop guidelines and standards
    - Railroad liaison for temporary structures

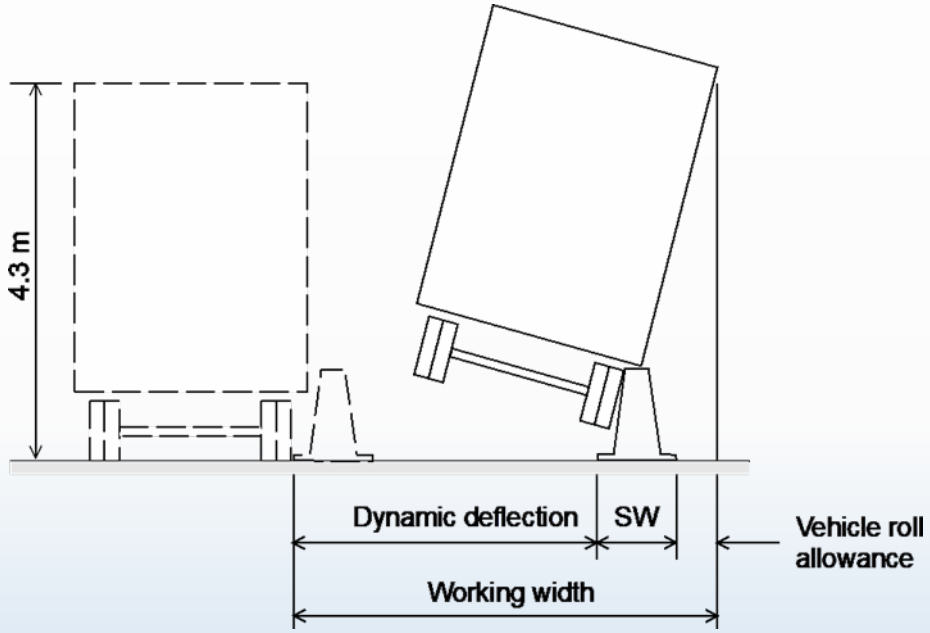
Standard Specification 12-3.20 *Temporary Barrier System*

- Addresses existing products including K-rail and proprietary barriers
- Section 12-3.20 will be revised as additional barriers become available
- Development of Caltrans rail (Cal F-23) complete and has been added to 12-3.20
- Spec 12-3.20 based on requirements of AASHTO Manual for Assessing Safety Hardware (MASH)
- New MASH standards increase the weight, angle of approach, and vertical distance to center of gravity of the test vehicle
- Looking at small cars for example, the test vehicle changes resulted in an increase of 206% in impact severity compared to the previous National Cooperative Highway Research Program (NCHRP) Report 350
- Spec 12-3.20C(2)(c) Do not install Type K railing on projects advertised after December 31, 2026

Working Width Determination







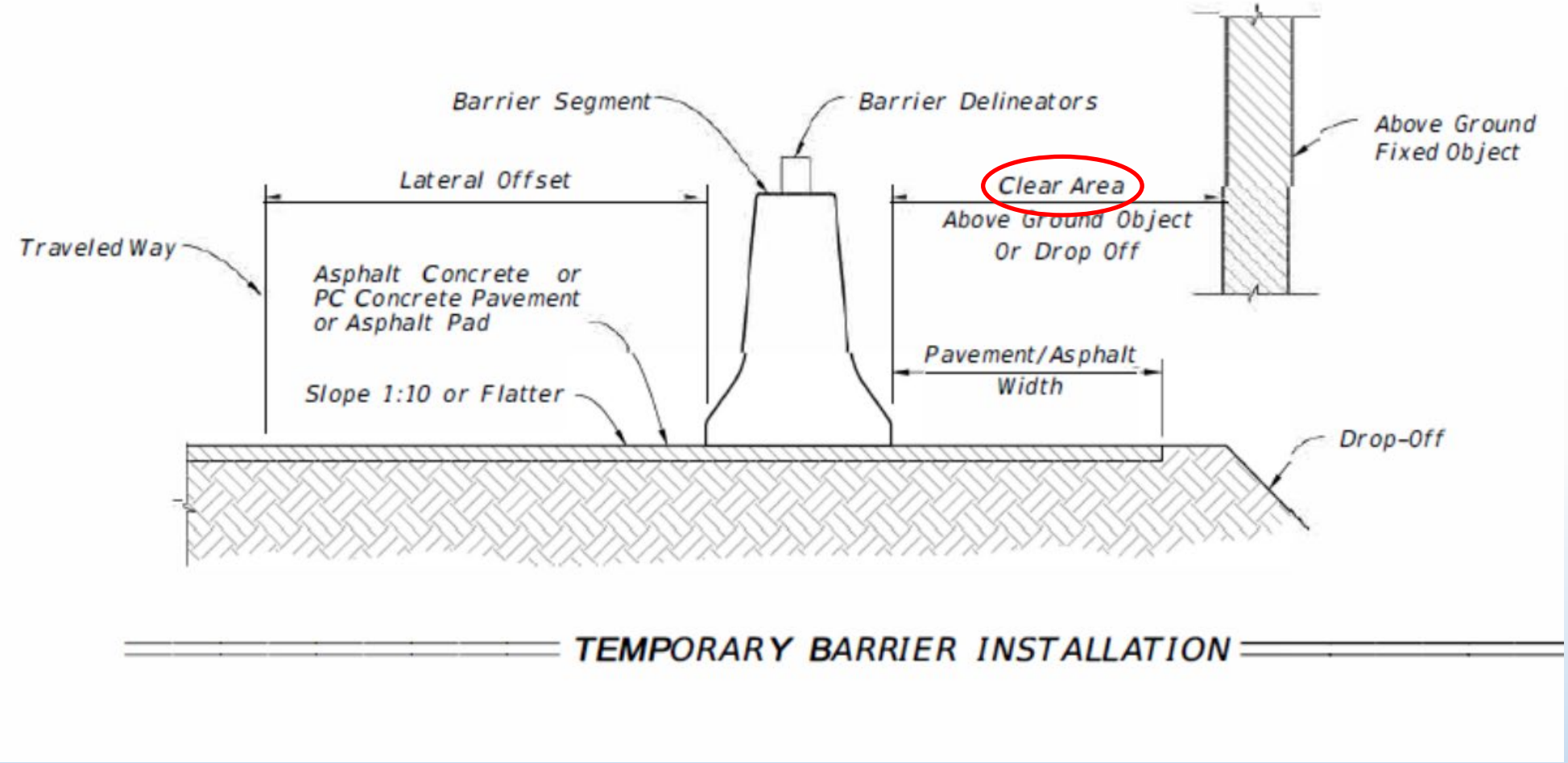
DD - Dynamic Deflection

SW - System Width

Working Width No Rollover

Working Width with Rollover

Clear Area



Clear area = dynamic deflection plus rollover

Rollover clear area measured from traffic face less the system width

Minimum MASH Requirements

MASH requires at a minimum all barriers meet crash Test Level 3

Caltrans clear area based on minimum TL-3 vehicle combined with the TL-4 vehicle (box truck) roll allowance

Table 1 MASH Test Matrix for Traffic Barrier Systems

Test Level	Test Vehicle Designation and Type	Test Conditions		
		Vehicle Weight kg [lb]	Speed km/h [mph]	Angle Degree
1	1100C (Passenger Car)	1,100 [2,420]	50 [31]	25
	2270P (Pickup Truck)	2,270 [5,000]	50 [31]	25
2	1100C (Passenger Car)	1,100 [2,420]	70 [44]	25
	2270P (Pickup Truck)	2,270 [5,000]	70 [44]	25
3	1100C (Passenger Car)	1,100 [2,420]	100 [62]	25
	2270P (Pickup Truck)	2,270 [5,000]	100 [62]	25
4	1100C (Passenger Car)	1,100 [2,420]	100 [62]	25
	2270P (Pickup Truck)	2,270 [5,000]	100 [62]	25
	10000S (Single Unit Truck)	10,000 [22,000]	90 [56]	15
5	1100C (Passenger Car)	1,100 [2,420]	100 [62]	25
	2270P (Pickup Truck)	2,270 [5,000]	100 [62]	25
	36000V (Tractor/Van Trailer)	36,000 [79,300]	80 [50]	15
6	1100C (Passenger Car)	1,100 [2,420]	100 [62]	25
	2270P (Pickup Truck)	2,270 [5,000]	100 [62]	25
	36000T (Tractor/Tanker Trailer)	36,000 [79,300]	80 [50]	15

Clear Area With Determined From Crash Test Data

Presentation Clip.mp4

Standard Specification 12-3.20 Minimum Clear Area Table

Minimum Clear Area Width

Barriers	Configuration	Height differentials 3 feet or less (ft)	Height differentials greater than 3 ft up to 8 feet (ft)	Edge of deck or height differentials greater than 8 feet (ft)	Fixed objects, falsework members, or temporary supports[a] (ft)
10-foot & 30-foot temporary concrete barrier with cross bolt	Freestanding	1	2	5	5
	3 stakes or anchor bolts per segment traffic side	1	1	2	3
20-foot temporary concrete barrier with cross bolt	Freestanding	1	2	5	5
	4 stakes or anchor bolts per segment traffic side	1	1	2	3
12-foot temporary concrete barrier CAL F-23	Freestanding	4	5	8	8
	3 stakes or anchor bolts per segment traffic side	1	1	2	3
20-foot temporary concrete barrier CAL F-23	Freestanding	4	5	8	8
	4 stakes or anchor bolts per segment traffic side	1	1	2	3

Standard Specification 12-3.20 Minimum Clear Area Table continued

12.5-foot temporary concrete barriers with "J" hook	Freestanding	3	4	8	7
	3 stakes per segment traffic side	1	1	2	3
	2 anchor bolts per segment traffic side	1	1	2	3
20-foot temporary concrete barriers with "J" hook	Freestanding	3	4	8	7
	4 stakes per segment traffic side	1	1	2	3
	3 anchor bolts per segment traffic side	1	1	2	3
50-foot temporary steel barriers	Staked or anchored at both ends only	6	7	9	10
	Staked or anchored every 250 feet	5	6	8	9
	Staked or anchored every 33 feet	1	1	3	4
19-foot temporary steel barriers	Freestanding	4	5	7	8
12-foot-9-inch temporary steel barriers	Staked every 30 feet	1	2	4	5

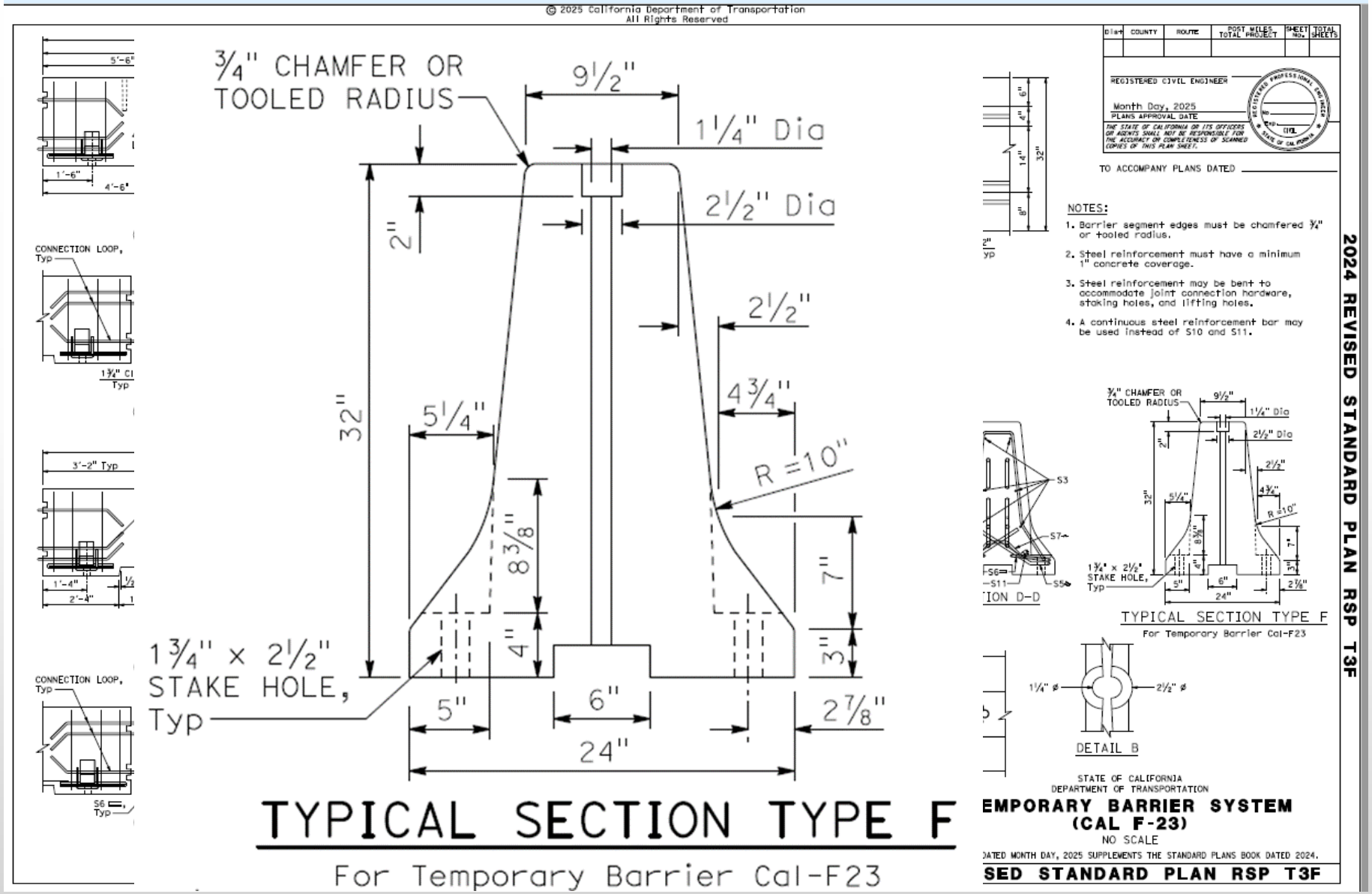
Standard Specification 12-3.20 Minimum Clear Area Table continued

Temporary Barrier Type K remains in table for now

20-foot Type K	Freestanding	2	3	8	7
temporary railings (NCHRP 350)	2 stakes or 2 anchor bolts per segment traffic side	1	1	3	4
	4 stakes or 4 anchor bolts per segment	N/A	N/A	3	3

[a]The minimum clear area width to a falsework or temporary support footing can be 2 feet less than the clear area width shown. Measure clear area width to the footing edge closest to traffic.

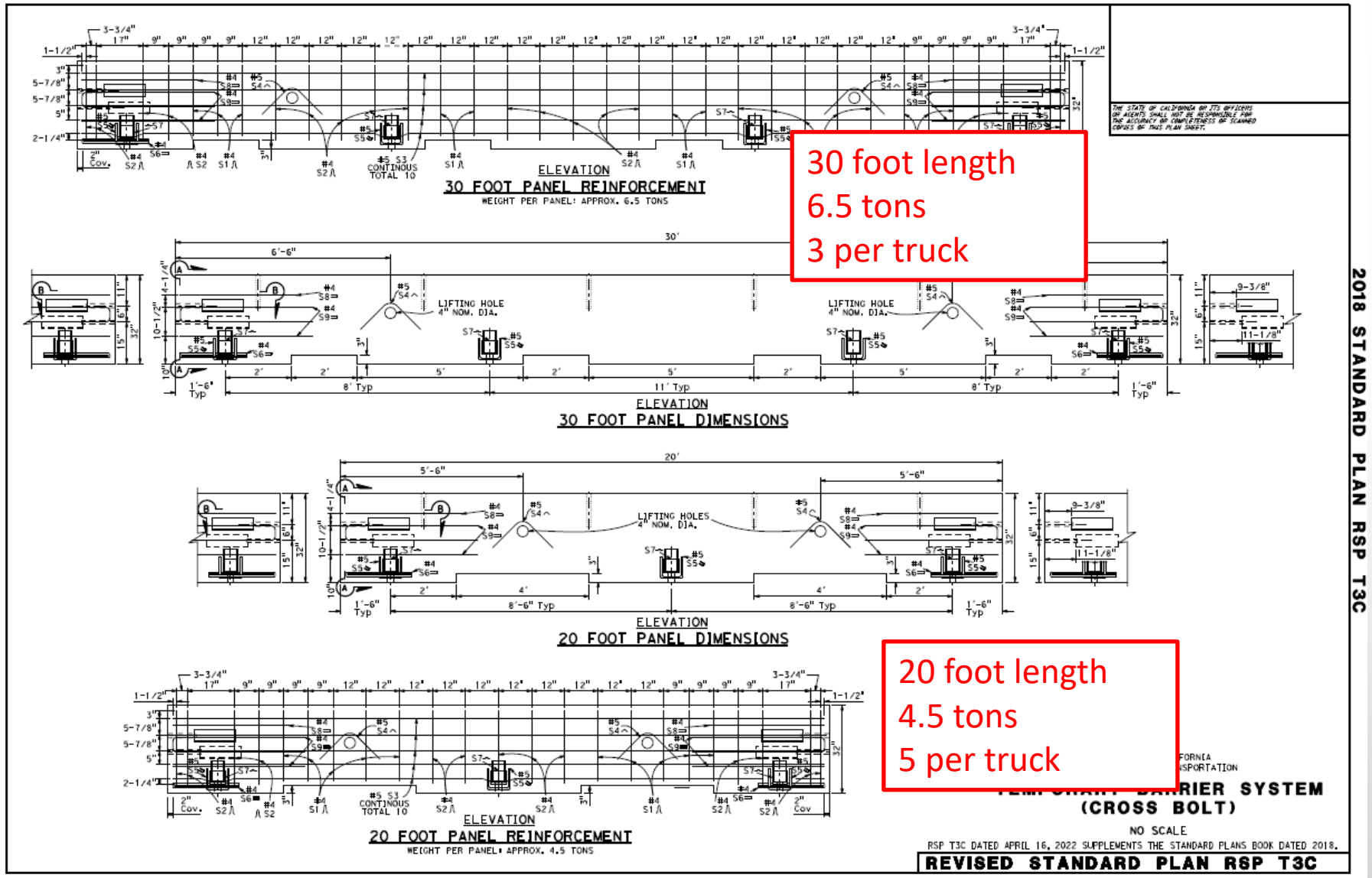
F-Type Barrier Systems (Cal F-23)



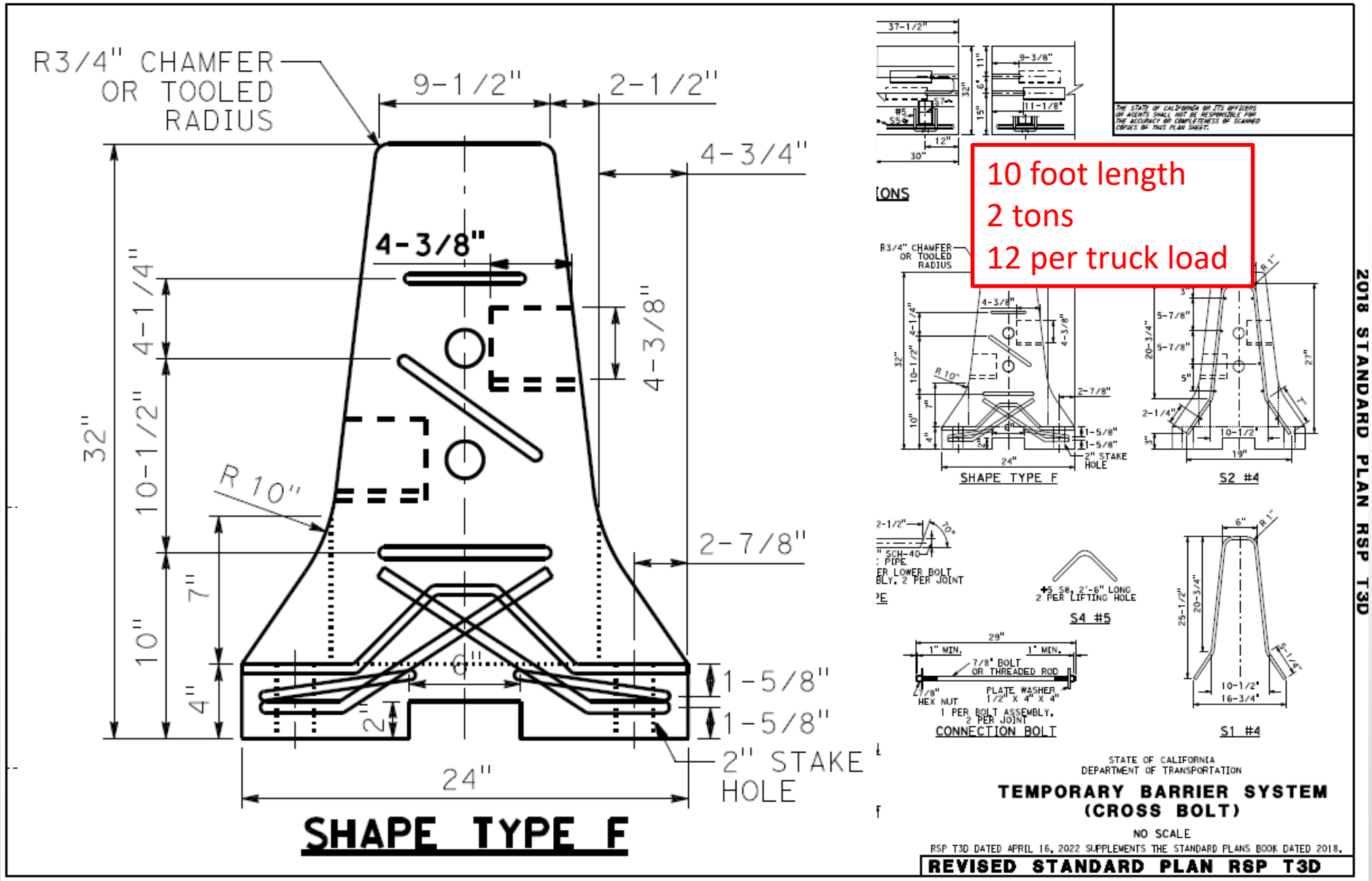
Cross Bolt Barrier Systems

- Temporary Barrier System Cross Bolt previously authorized for free standing use only.

Cross bolt Barrier System



Cross bolt Barrier System



Cross Bolt Barrier Systems

K-Rail / TBS Projected Need

District	Average[#] 2019-2023	2025 Const. Target[#] At least 15%	2026 Const. Target[#] At least 25%
1	62,000	10,000	16,000
2	43,000	7,000	11,000
3	256,000	39,000	64,000
4	336,000	51,000	84,000
5	113,000	17,000	29,000
6	238,000	36,000	60,000
7	550,000	83,000	138,000
8	590,000	89,000	148,000
9	29,000	5,000	8,000
10	126,000	19,000	32,000
11	154,000	24,000	39,000
12	184,000	28,000	46,000
Statewide	2,676,000	408,000	675,000

Rounded up to the next 1000

Temporary Barrier Systems

Temporary Barrier Systems

Questions?

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