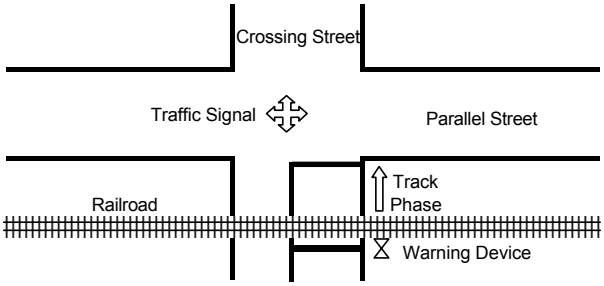
GUIDE FOR DETERMINING TIME REQUIREMENTS FOR TRAFFIC SIGNAL PREEMPTION AT HIGHWAY RAIL GRADE CROSSINGS

City _____ Date _____

County _____ Completed by _____

District _____ District Approval _____

Show North Arrow



Parallel Street Name _____

Crossing Street Name _____

Railroad _____ Railroad Contact _____

Crossing DOT# _____ Phone _____

SECTION 1: RIGHT-OF-WAY TRANSFER TIME CALCULATION

Preempt verification and response time

Remarks

1. Preempt delay time (seconds) ..... **1.** [ ]
2. Controller response time to preempt (seconds) ..... **2.** [ ] Controller type: _____
3. Preempt verification and response time (seconds): add lines 1 and 2 ..... **3.** [0.0]

Worst-case conflicting vehicle time

4. Worst-case conflicting vehicle phase number ..... **4.** [ ] **Remarks**
5. Minimum green time during right-of-way transfer (seconds) ..... **5.** [ ]
6. Other green time during right-of-way transfer (seconds) ..... **6.** [ ]
7. Yellow change time (seconds) ..... **7.** [ ]
8. Red clearance time (seconds) ..... **8.** [ ]
9. Worst-case conflicting vehicle time (seconds): add lines 5 through 8 ..... **9.** [0.0]

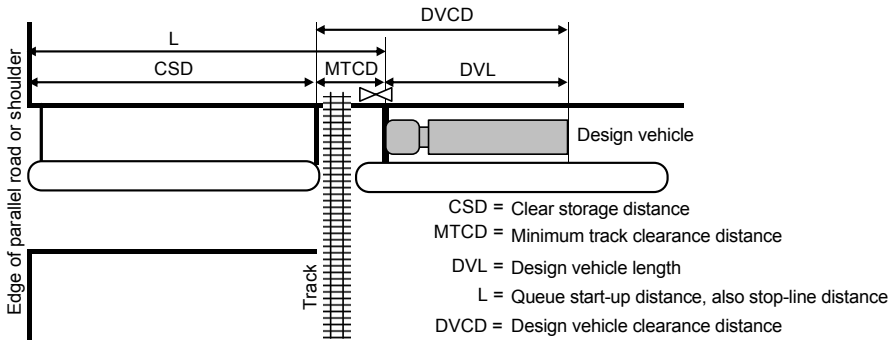
Worst-case conflicting pedestrian time

10. Worst-case conflicting pedestrian phase number..... **10.** [ ] **Remarks**
11. Minimum walk time during right-of-way transfer (seconds) ..... **11.** [ ]
12. Pedestrian clearance time during right-of-way transfer (seconds) ..... **12.** [ ]
13. Vehicle yellow change time, if not included on line 12 (seconds) ..... **13.** [ ]
14. Vehicle red clearance time, if not included on line 12 (seconds) ..... **14.** [ ]
15. Worst-case conflicting pedestrian time (seconds): add lines 11 through 14 ..... **15.** [0.0]

Worst-case conflicting vehicle or pedestrian time

16. Worst-case conflicting vehicle or pedestrian time (seconds): maximum of lines 9 and 15..... **16.** [0.0]
17. **Right-of-way transfer time (seconds): add lines 3 and 16** ..... **17.** [0.0]

SECTION 2: QUEUE CLEARANCE TIME CALCULATION



			Remarks
18.	Clear storage distance (CSD, feet) ..... **18.**		
19.	Minimum track clearance distance (MTCD, feet) ..... **19.**		
20.	Design vehicle length (DVL, feet) ..... **20.**		Design vehicle type:
21.	Queue start-up distance, L (feet): add lines 18 and 19 ..... **21.**	0	
22.	Time required for design vehicle to start moving (seconds): calculate as 2+(L÷20) ..... **22.**	0.0	**Remarks**
23.	Design vehicle clearance distance, DVCD (feet): add lines 19 and 20 ..... **23.**	0	
24.	Time for design vehicle to accelerate through the DVCD (seconds) ..... **24.**		Read from Figure 2 in Instructions.
25.	**Queue clearance time (seconds): add lines 22 and 24 ..... 25.**	0.0	

SECTION 3: MAXIMUM PREEMPTION TIME CALCULATION

			Remarks
26.	Right-of-way transfer time (seconds): line 17 ..... **26.**	0.0	
27.	Queue clearance time (seconds): line 25 ..... **27.**	0.0	
28.	Desired minimum separation time (seconds) ..... **28.**	4.0	
29.	**Maximum preemption time (seconds): add lines 26 through 28 ..... 29.**	4.0	

SECTION 4: SUFFICIENT WARNING TIME CHECK

				Remarks
30.	Required minimum time, MT (seconds): per regulations ..... **30.**	20.0		
31.	Clearance time, CT (seconds): get from railroad ..... **31.**			
32.	Minimum warning time, MWT (seconds): add lines ..... **32.**		20.0	Excludes buffer time (BT)
33.	Advance preemption time, APT, if provided (seconds): get from railroad ..... **33.**			
34.	Warning time provided by the railroad (seconds): add lines 32 and 33 ..... **34.**		20.0	
35.	**Additional warning time required from railroad (seconds): subtract line 34 from line 29, round up to nearest full second, enter 0 if less than 0 ..... 35.**		0	

If the additional warning time required (line 35) is greater than zero, additional warning time has to be requested from the railroad. Alternatively, the maximum preemption time (line 29) may be decreased after performing an engineering study to investigate the possibility of reducing the values on lines 1, 5, 6, 7, 8, 11, 12, 13 and 14.

Remarks:

SECTION 5: TRACK CLEARANCE GREEN TIME CALCULATION (OPTIONAL)

Preempt Trap Check

36. Advance preemption time (APT) provided (seconds): ..... **36.** [ ] Line 33 only valid if line 35 is zero.

37. Multiplier for maximum APT due to train handling ..... **37.** [ ] See Instructions for details.

38. Maximum APT (seconds): multiply line 36 and 37 ..... **38.** 0.0

Remarks

39. Minimum duration for the track clearance green interval (seconds) **39.** 15.0

For zero advance preemption time

40. Gates down after start of preemption (seconds): add lines 38 and 39 ..... **40.** 15.0

41. Preempt verification and response time (seconds): line 3 ..... **41.** 0.0

Remarks

42. Best-case conflicting vehicle or pedestrian time (seconds): usually 0..... **42.**

43. Minimum right-of-way transfer time (seconds): add lines 41 and 42 ..... **43.** 0.0

44. Minimum track clearance green time (seconds): subtract line 43 from line 40 ..... **44.** 15.0

Clearing of Clear Storage Distance

45. Time required for design vehicle to start moving (seconds), line 22 ..... **45.** 0.0

46. Design vehicle clearance distance (DVCD, feet), line 23 ..... **46.** 0

Remarks

47. Portion of CSD to clear during track clearance phase (feet) ... **47.** [ ] CSD* in Figure 3 in Instructions.

48. Design vehicle relocation distance (DVRD, feet): add lines 46 and 47 ..... **48.** 0

49. Time required for design vehicle to accelerate through DVRD (seconds) ..... **49.** [ ] Read from Figure 2 in Instructions.

50. Time to clear portion of clear storage distance (seconds): add lines 45 and 49 ..... **50.** 0.0

51. Track clearance green interval (seconds): maximum of lines 44 and 50, round up to nearest full second **51.** 15

SECTION 6: VEHICLE-GATE INTERACTION CHECK (OPTIONAL)

52. Right-of-way transfer time (seconds): line 17 ..... **52.** 0.0

53. Time required for design vehicle to start moving (seconds), line 22 ..... **53.** 0.0

54. Time required for design vehicle to accelerate through DVL (on line 20, seconds) ..... **54.** [ ] Read from Table 3 in Instructions.

55. Time required for design vehicle to clear descending gate (seconds): add lines 52 though 54 ..... **55.** 0.0

Remarks

56. Duration of flashing lights before gate descent start (seconds): get from railroad ..... **56.**

Remarks

57. Full gate descent time (seconds): get from railroad ..... **57.**

58. Proportion of non-interaction gate descent time ..... **58.** [ ] Read from Figure 5 in Instructions.

59. Non-interaction gate descent time (seconds): multiply lines 57 and 58 ..... **59.** 0.0

60. Time available for design vehicle to clear descending gate (seconds): add lines 56 and 59 ..... **60.** 0.0

61. Advance preemption time (APT) required to avoid design vehicle-gate interaction (seconds): subtract line 60 from line 55, round up to nearest full second, enter 0 if less than 0 ..... 61. 0