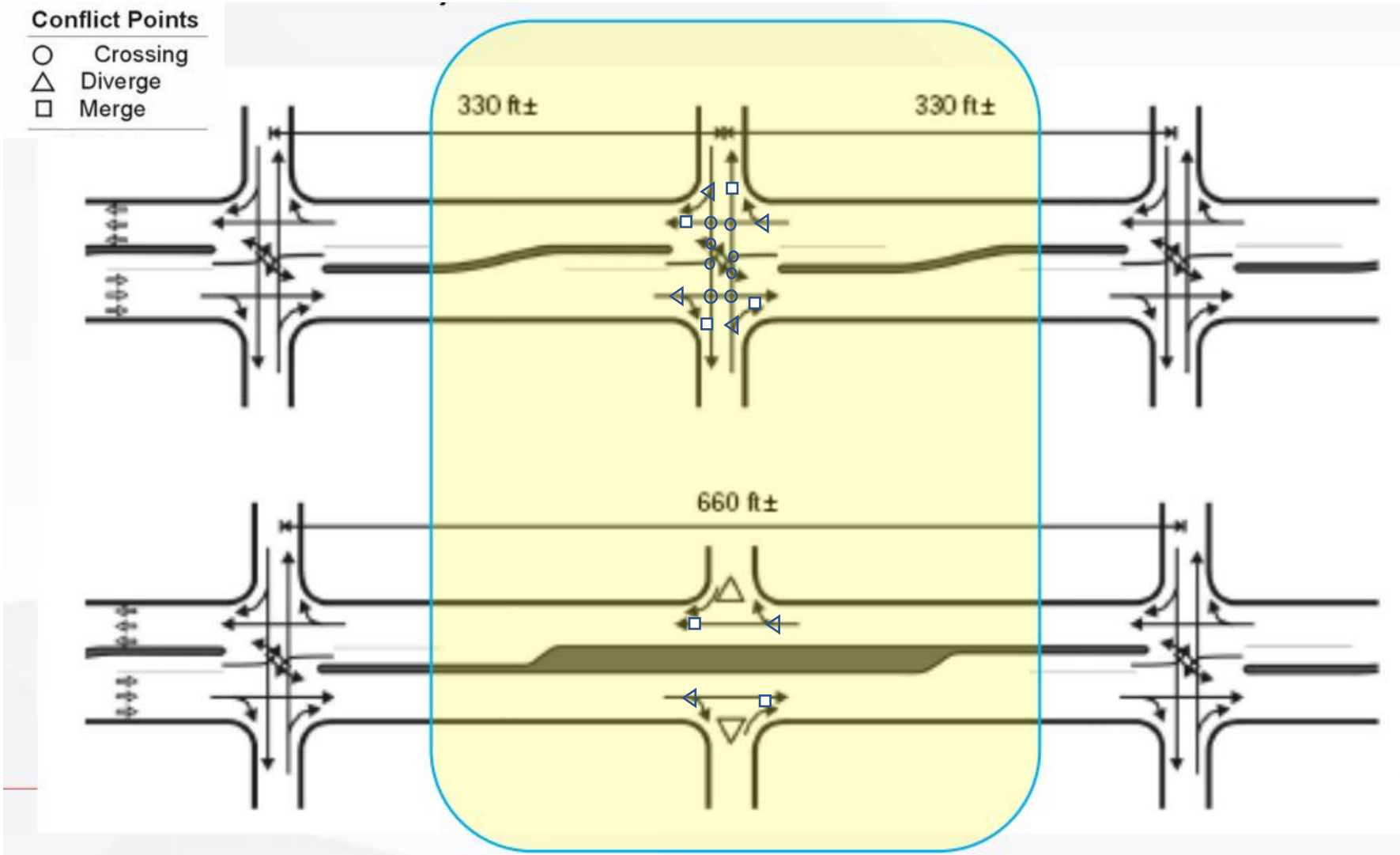
Conflict Points
Crossing
Diverge
Merge
330 ft±
330 ft±
660 ft±

1. Consider the collision and condition diagrams shown in next page. Discuss probable causes of the crashes observed. Recommend improvements. (Figure 8-11 Condition and collision diagram)

Solution: ① The width in South-North is 44 ft.

44 ft is equal to 13.41 m.

The speed of pedestrian is 1.2 m/s. ⇒ Increase the cycle length.

The necessary time is equal to 11.18 s.

11.18 s >> 4 s.

② The width in South-North is 44 ft. (干路)

The width is East-West is 50 ft. (支路)

The way for turning left and going straight should not be set as the outermost one.

⇓

Adjust the outmost way for going straight alone.

2. Median close is a typical way to reduce traffic conflicts at intersection areas, as shown below, in urban areas. If the cross sections of the major and minor roadways are both two-way two-lane, please draw the points of all conflicts before and after the central intersection treatment, and calculate the total number of conflicts before and after (diverge point is weighted as 1, merge point is weighted as 1.5, the cross point is weighted as 2).

Solution: the total number of conflicts before = $1\times4 + 1.5\times4 + 2\times8 = 26$

the total number of conflicts after = $1\times2 + 1.5\times2 = 5$

3. A rural two-lane tangent roadway segment with the following conditions. What is the predicted average crash frequency of the roadway segment for a particular year?

1.5-mi length ✓

Tangent roadway segment

10,000 veh/day △

2% grade ✓

6 driveways per mi ✓

10-ft lane width ✓

4-ft gravel shoulder ✓ △

without centerline rumble strips ✓

without passing lane ✓

Roadside hazard rating = 4 ✓

With automated speed enforcement ✓

Solution: $CMF_{1r} = 1.30$

$CMF_{2r} = 1.15$

$CMF_{3r} = 1.00$

$CMF_{4r} = 1.06 + 3 \times (SV - 0.02)$ for $SV \geq 0.02 = 1.06$

$CMF_{5r} = 1.00$

$CMF_{6r} = \dfrac{0.322 + 6 \times (0.05 - 0.005 \times \ln(10000))}{0.322 + 5 \times (0.05 - 0.005 \times \ln(10000))} \approx 1.01$

$CMF_{7r} = 1.00$

$CMF_{8r} = 1.00$

$CMF_{9r} = 1.00$

$CMF_{10r} = \dfrac{e^{(-0.6869 + 0.0668 \times 4)}}{e^{(-0.4865)}} \approx 1.07$

$CMF_{11r} = 1.00$

$CMF_{12r} = 0.93$

$N_{spf\,rs} = 10000 \times 1.5 \times 365 \times 10^{-6} \times e^{(-0.312)} \approx 4.01$

$C_r = 1.00$

$N_{predicted\,rs} = N_{spf\,rs} \times C_r \times (CMF_{1r} \times CMF_{2r} \times \cdots \times CMF_{12r})$

$= 4.01 \times 1.00 \times 1.30 \times 1.15 \times 1.00 \times 1.06 \times 1.00 \times 1.01 \times 1.00 \times 1.00$

$\times 1.00 \times 1.07 \times 1.00 \times 0.93$

≈ 6.39