

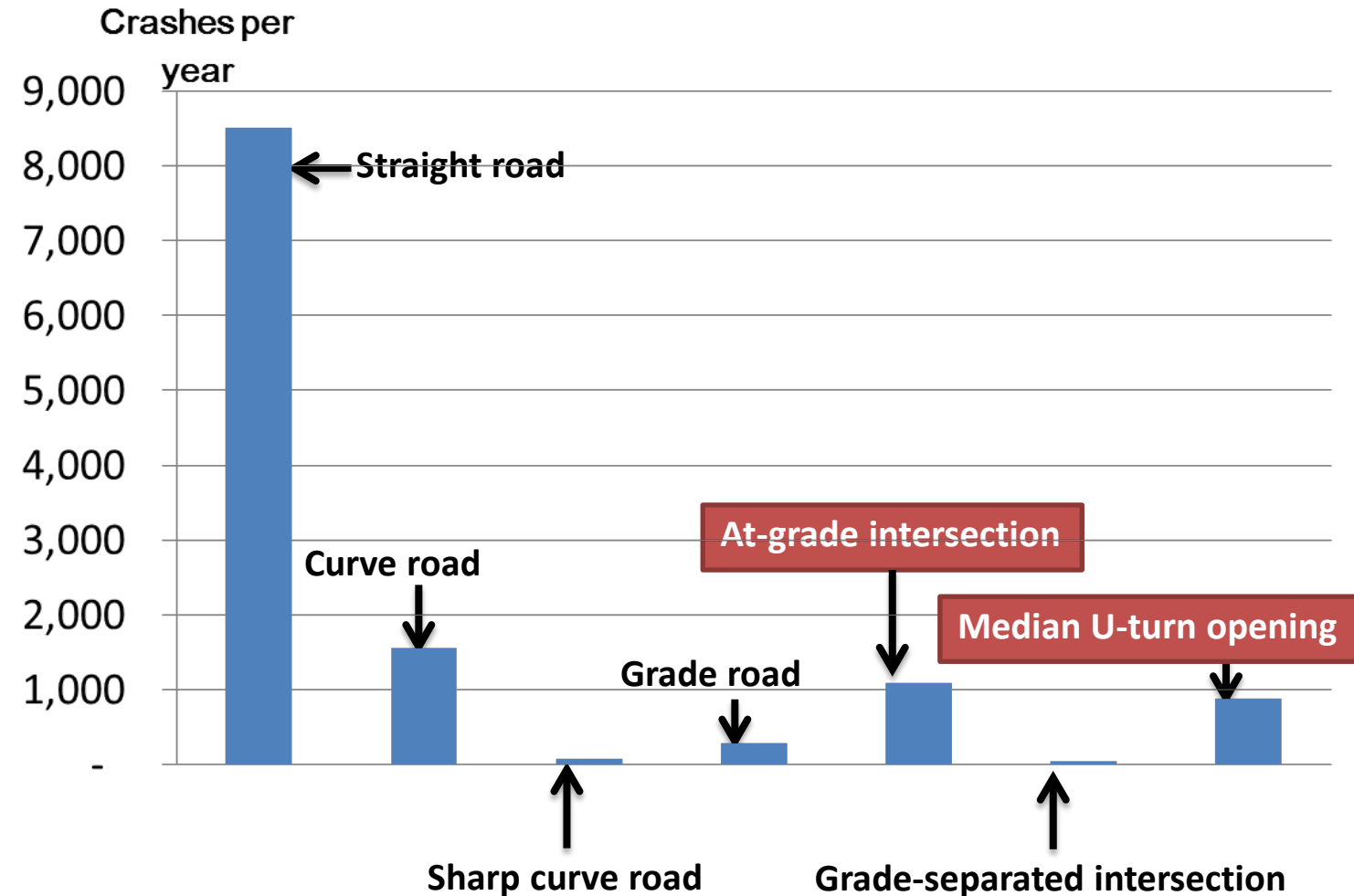
Safety Improvements of Black Spot Intersections in Lampang Municipality

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Introduction

- About half of all crashes and half of all injury crashes occur at intersections. (FHWA)
- Poor intersection design leads to a casualty occurrence.
- In Lampang Municipality, the highest crashes at road section is exceeding 300 crashes per year
- There were 16 intersections that had more than 10 crashes per year.



OBJECTIVES

- Mitigate the road safety problems occurred by a geometry aspect of highways.
- Rectify road hazards leading to traffic accidents at hazardous intersections.



Black Spot Improvement

Definition:

Identifying black spot locations needs to consider a historical crash data as an indicator which can be divided into two parts as follow:

- Black Spots (Hazardous Intersections)
- Black Sections (Hazardous Sections)



Methodology



Geometrical
Condition

Black Spot
Improvement

Identify road
safety
problems

Suggest
treatments

Implement

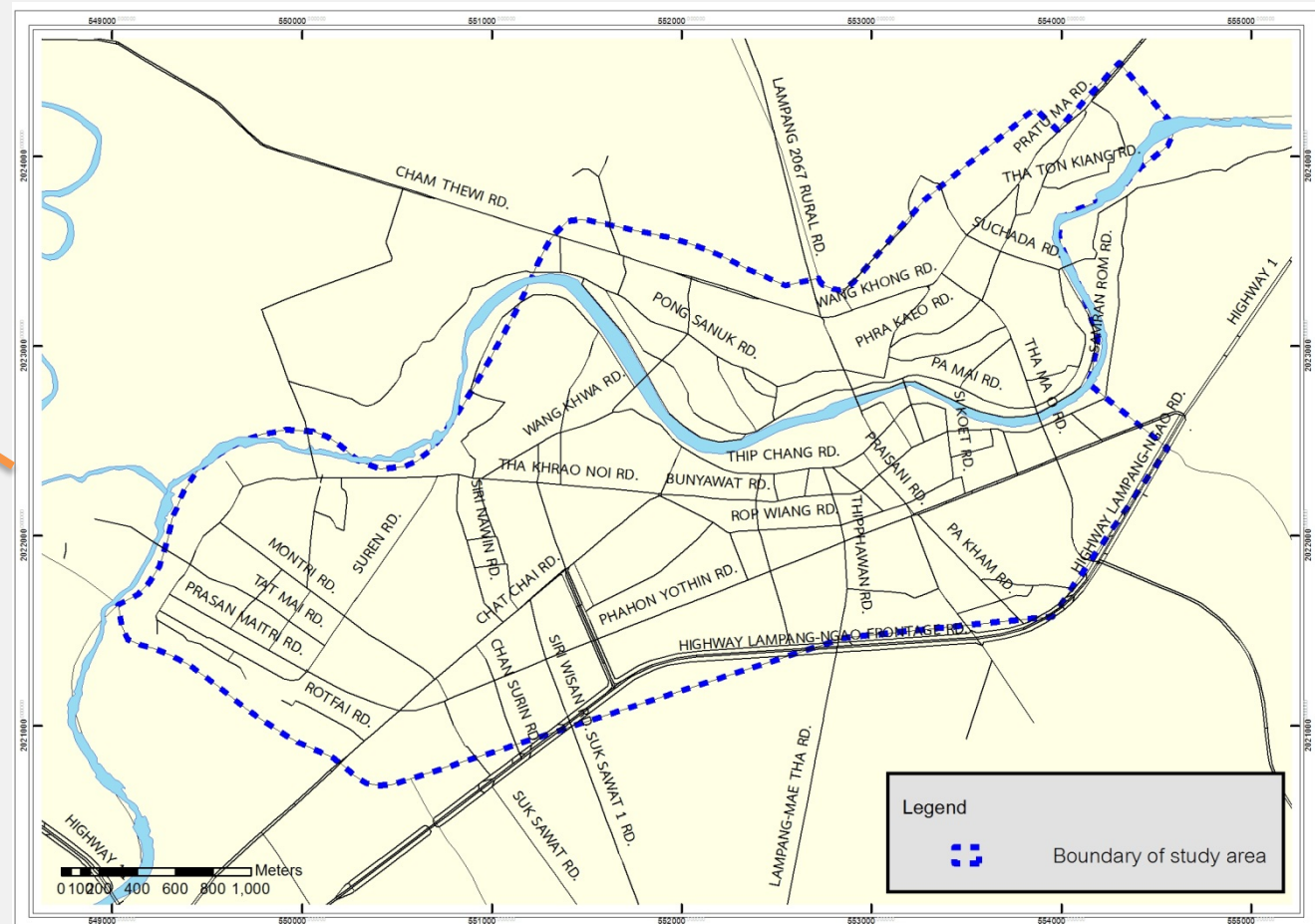
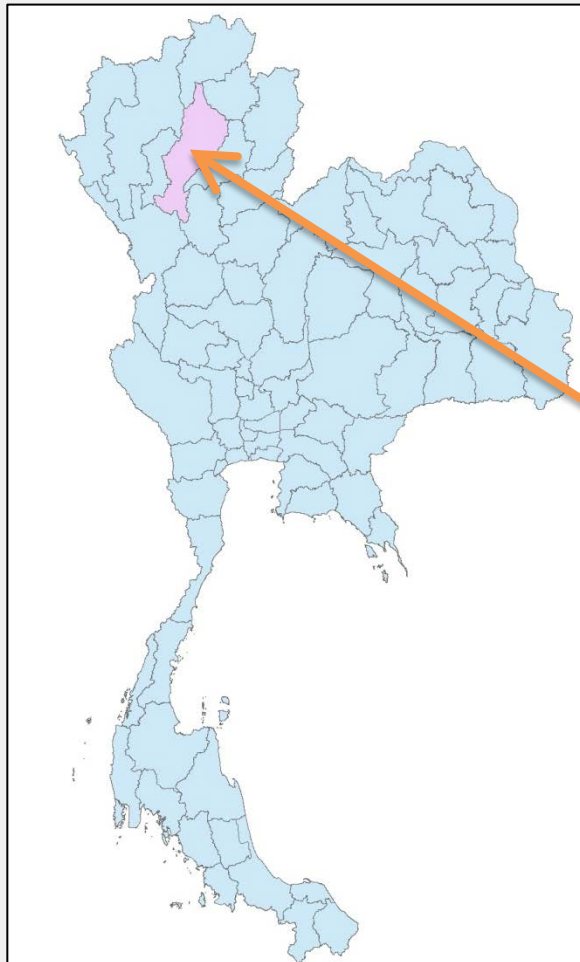
Better
Roads



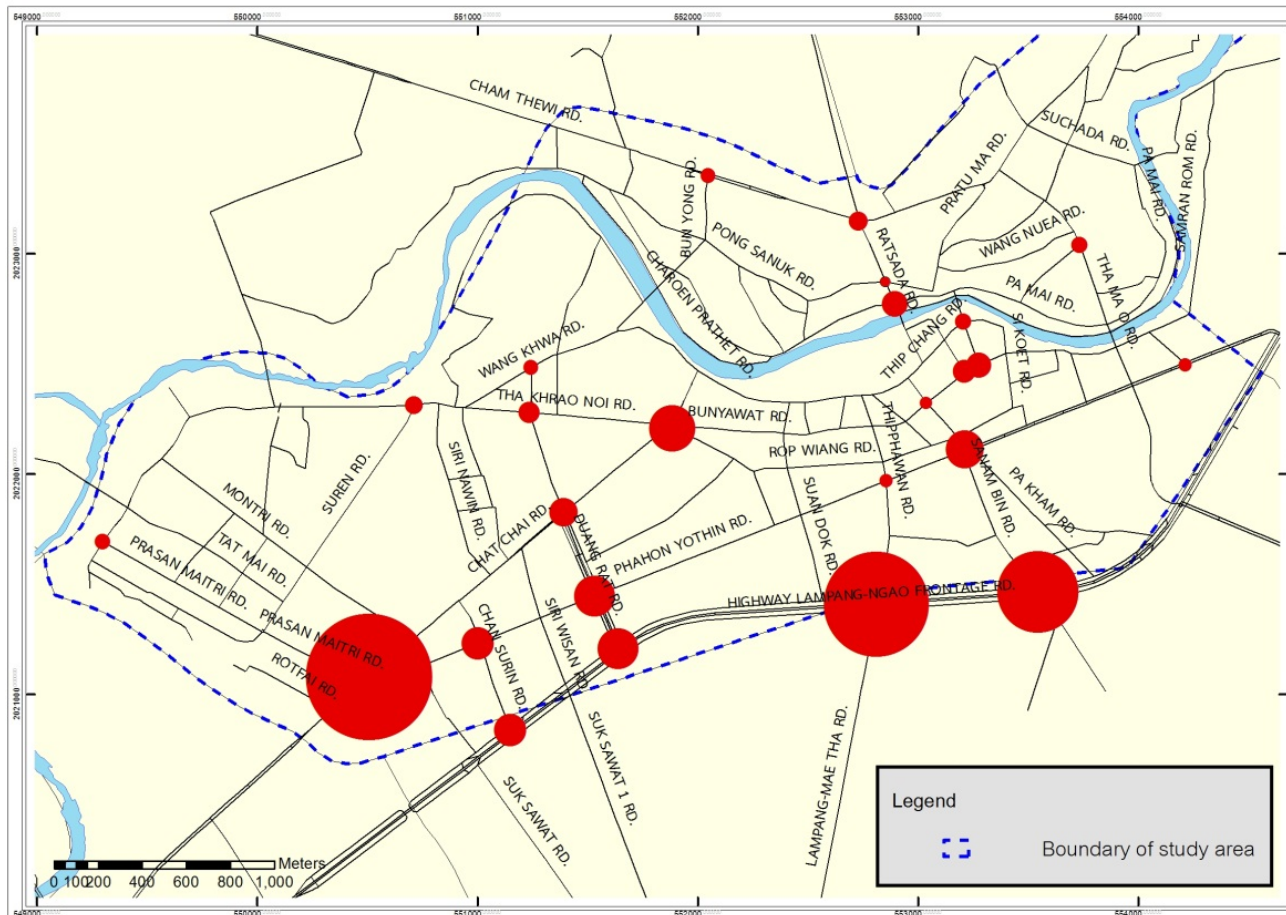
Environmental
Condition

Study Area

Lampang Municipality area.



Black Spot Identification



Road Safety Problems

The problems can be categorized into 4 parts as follows:

- Intersection geometry
- Traffic sign
- Traffic signal
- Pavement marking



Poor condition of signage



Poor visibility of traffic light



Poor intersection design

Applications to Intersection Improvement

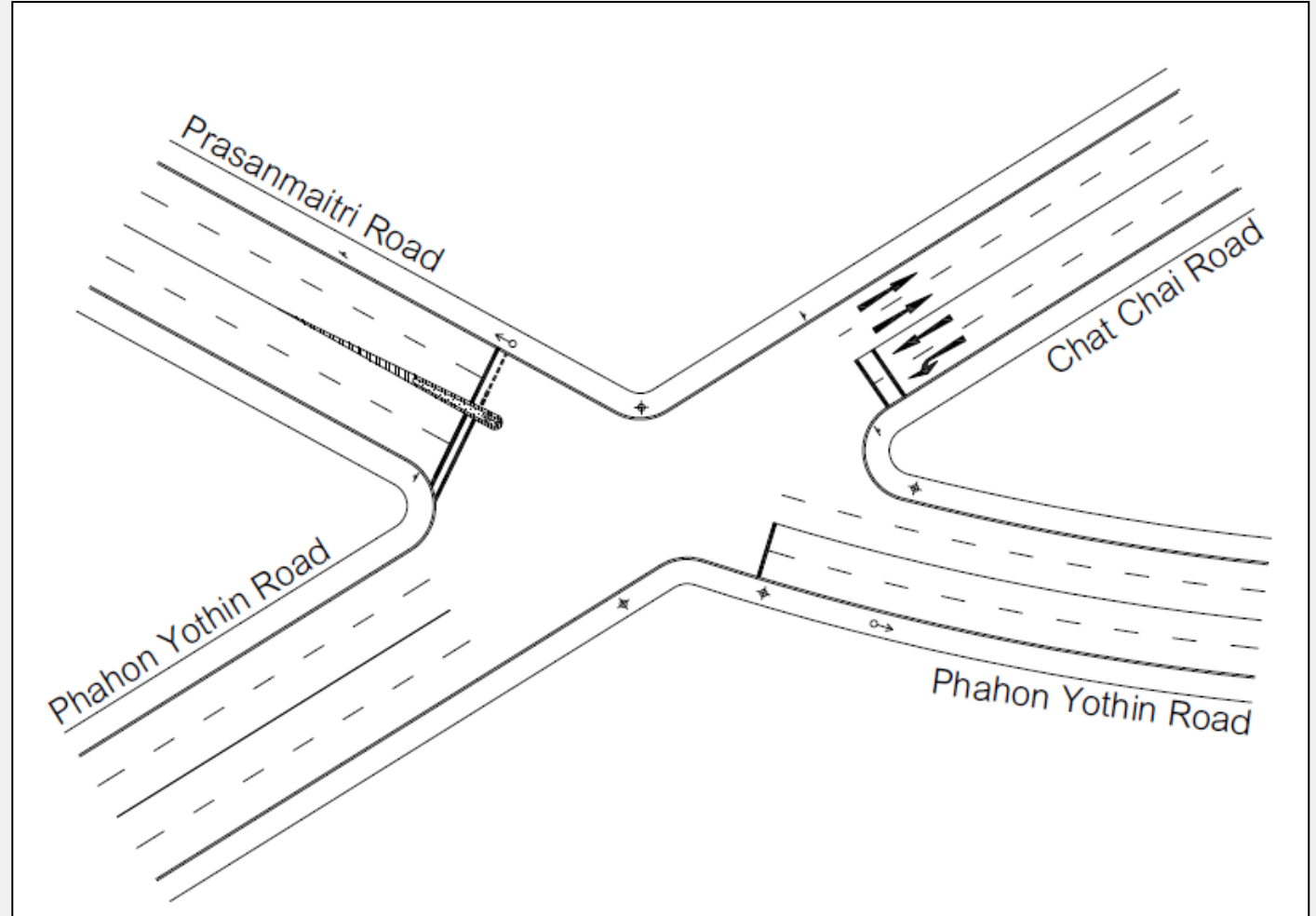
The treatments via three examples varied by their intersection geometry, control, and accident occurrence as follows:

- Four-leg Intersection
- Five-leg Roundabout Intersection
- U-turn Median Opening

Don Pan Signalized Intersection

Safety Problems (High Risk Level)

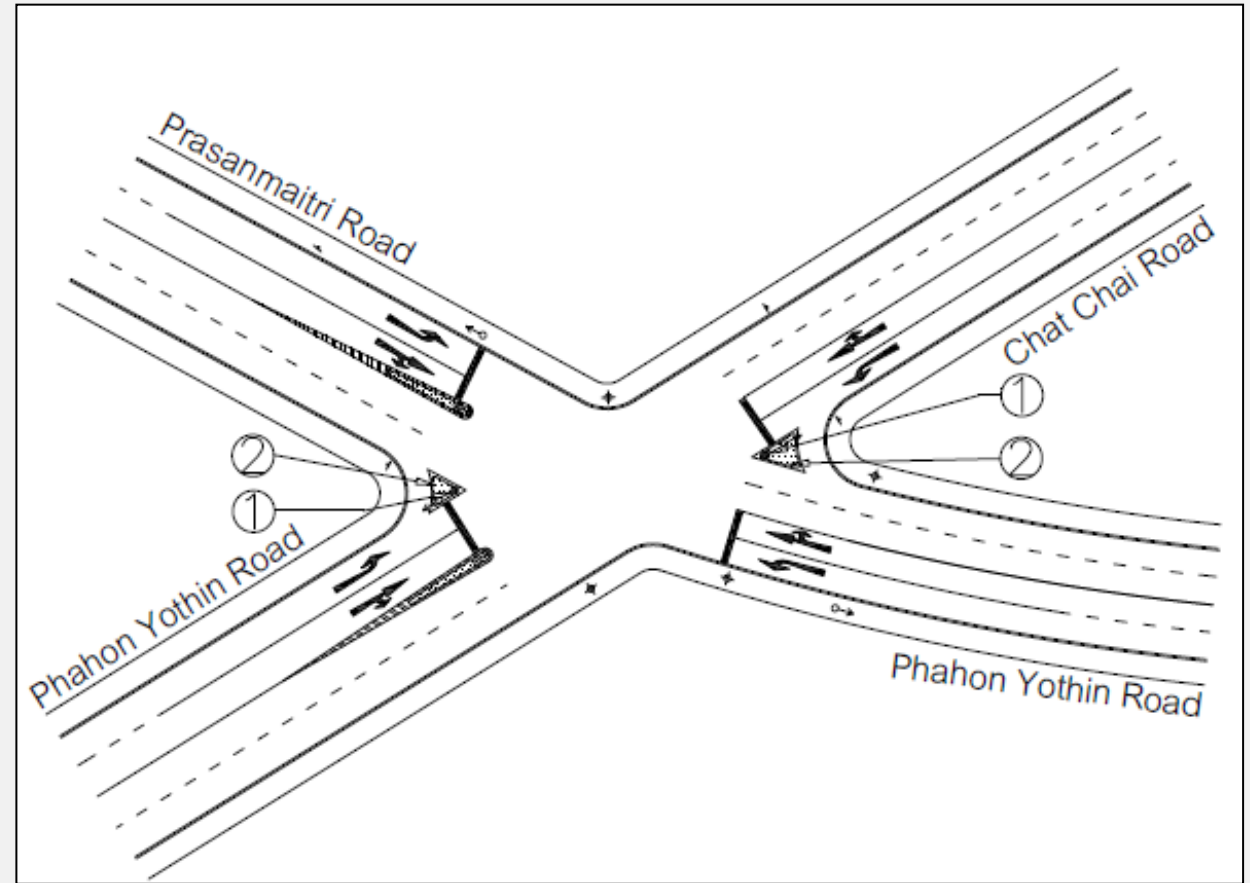
- Intersection area is very wide
- Turning radius
- Insufficient sight distance



Don Pan Signalized Intersection

Safety Treatments

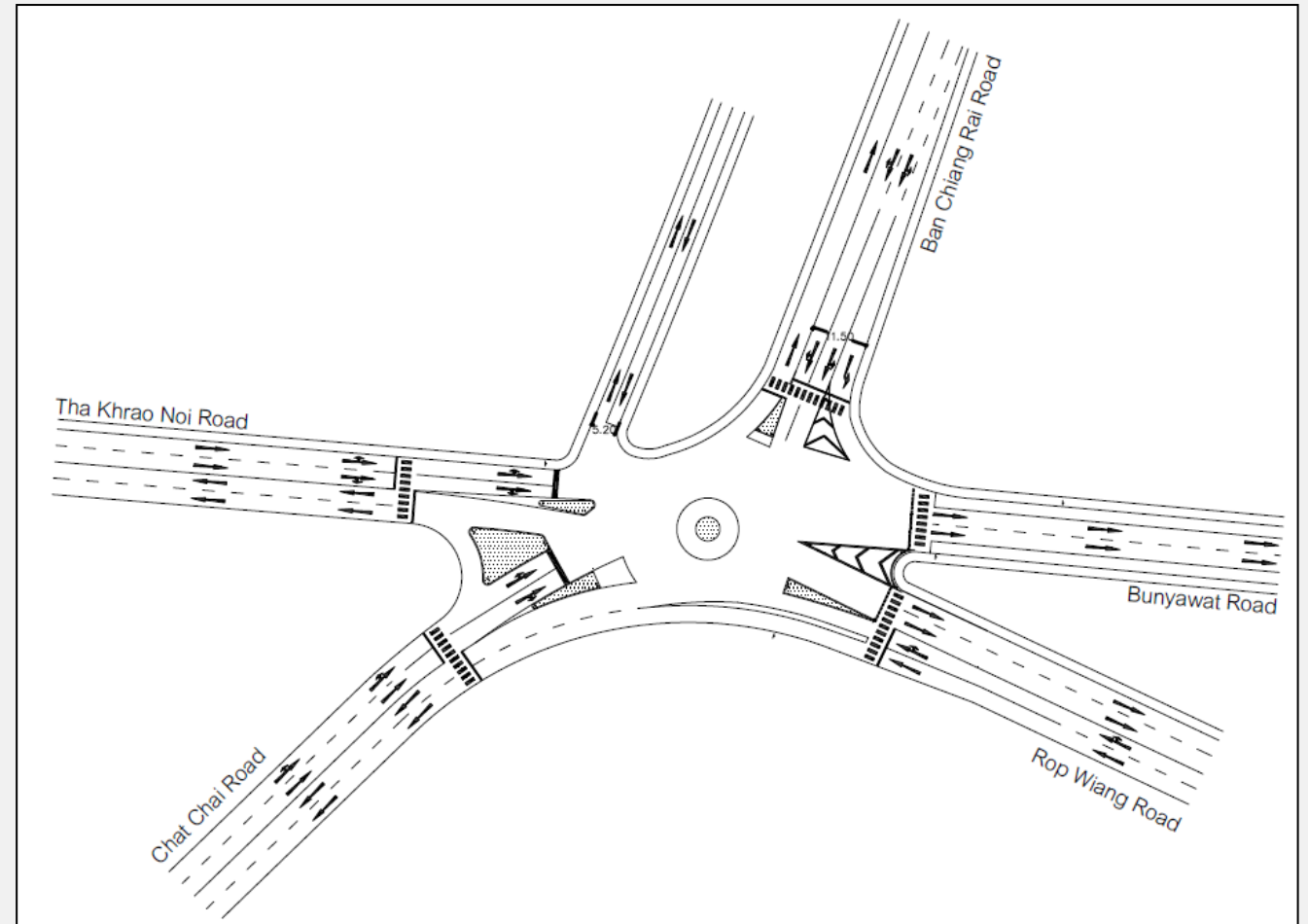
- Design channelization to discourage improper movement
- Shift stop bar to leave unused spaces
- Provide driving guidance path for right-turn maneuver



Clock-tower Roundabout Intersection

Safety Problems (Medium Risk Level)

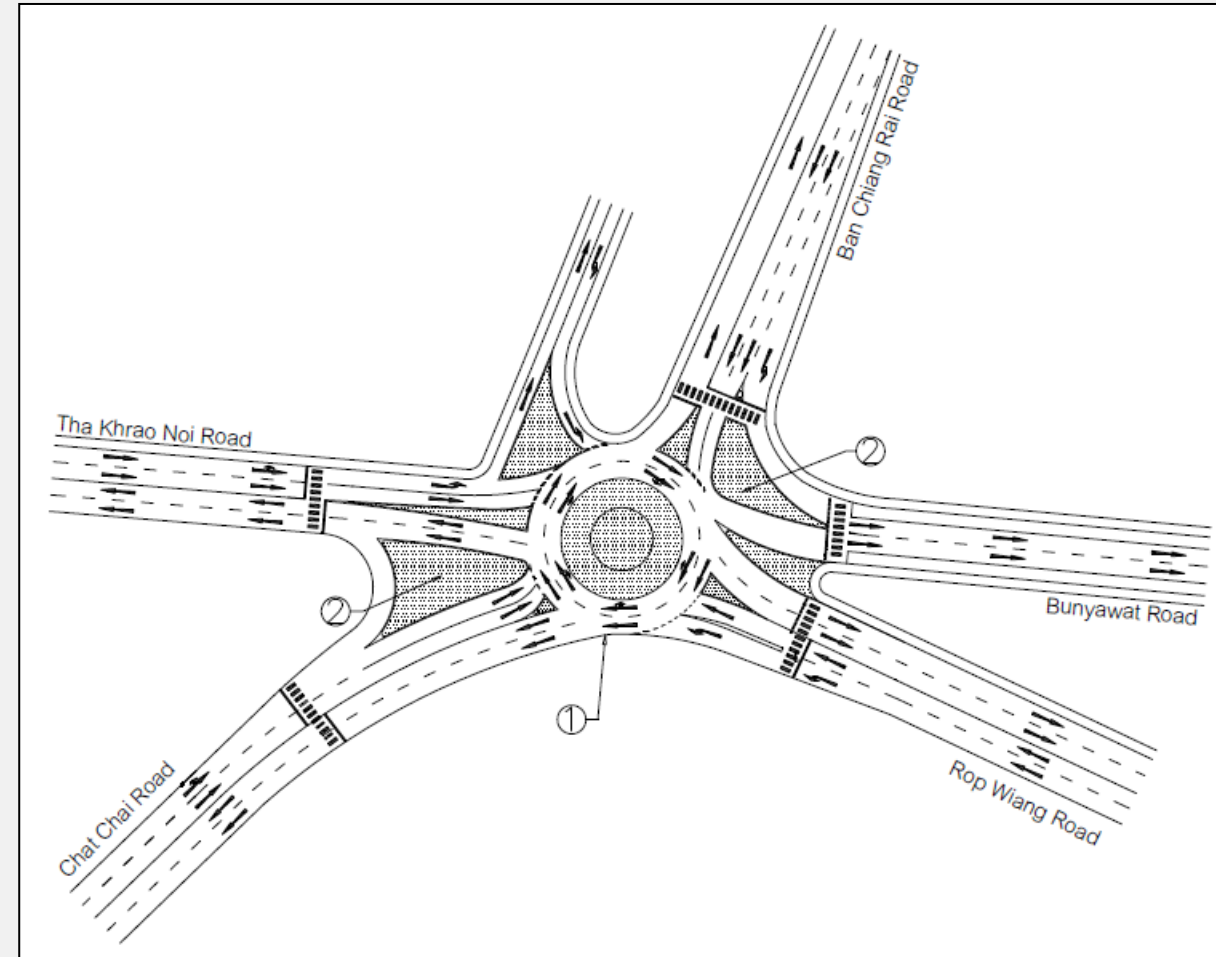
- Unsymmetrical intersection
- A number of entrance and exit lanes is not equal.



Clock-tower Roundabout Intersection

Safety Treatments

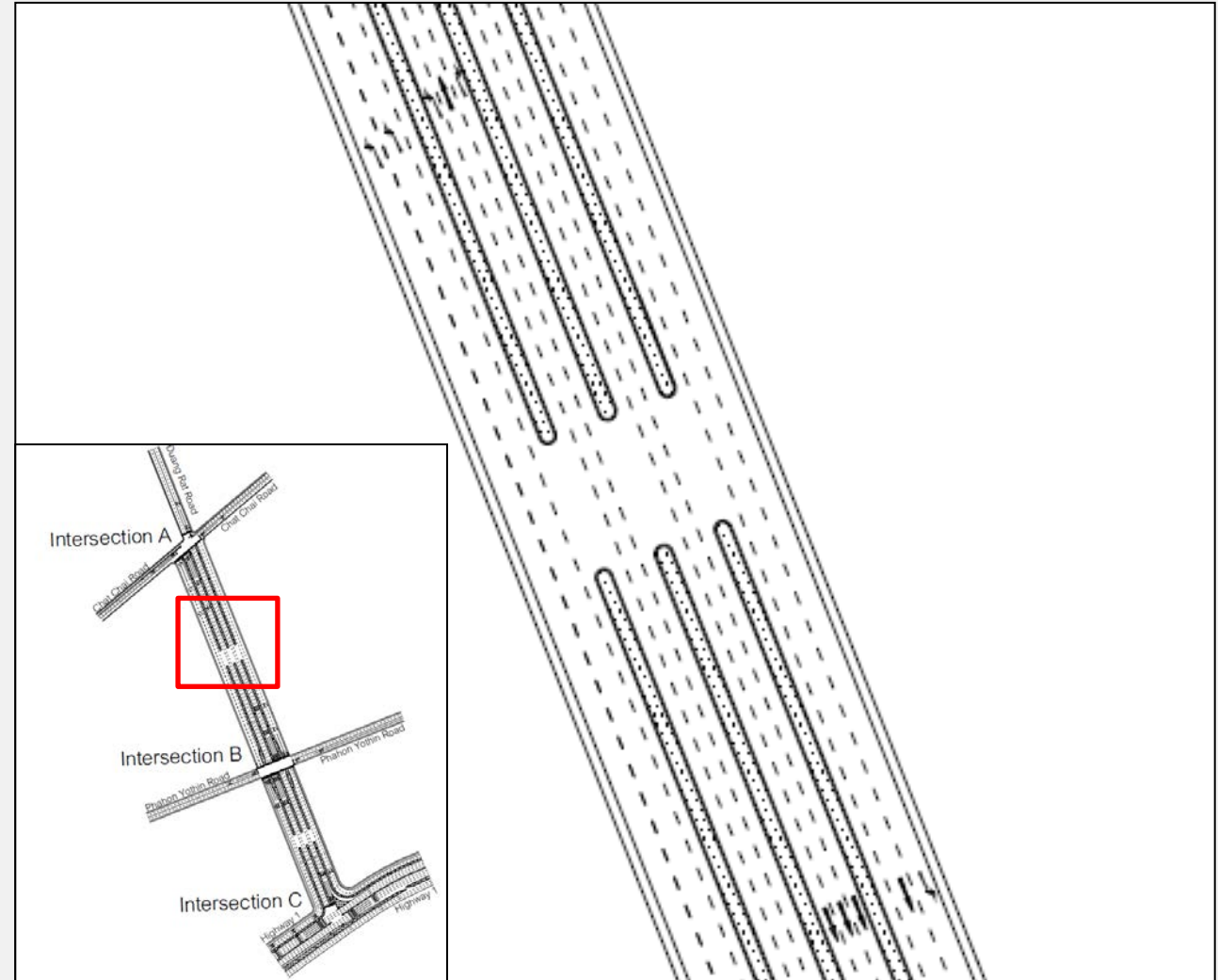
- Expand the diameter of roundabout island to guide the drivers' visibility of roundabout
- Modify the roundabout geometry to a fully 2-lane roundabout
- Realigning the turning path
- Install channelization islands to limit all turning movements



Median-openings on Duang Rat Road

Safety Problems (High Risk Level)

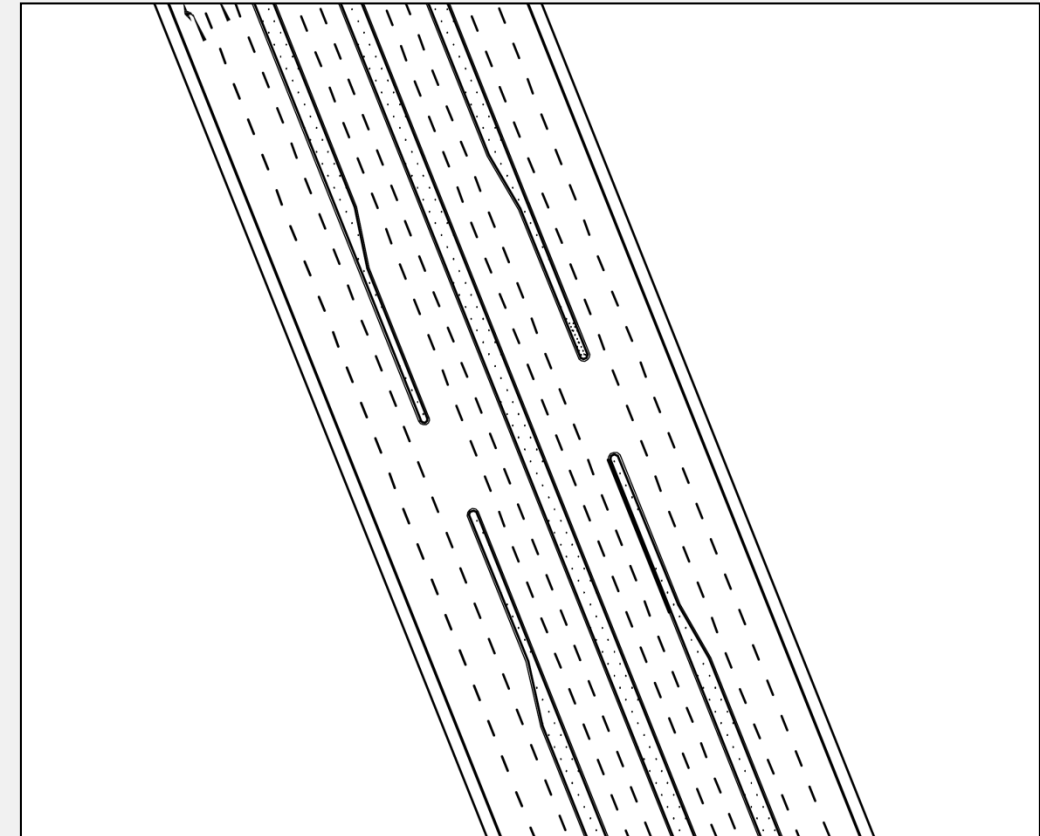
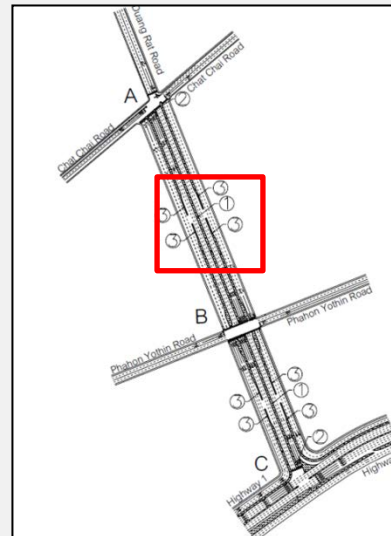
- Five conflicts at the median opening
- The median-opening space is wide
- The U-turn vehicles obstruct the main



Median-openings on Duang Rat Road

Safety Treatments

- Close median openings along the major road to U-turn movements
- Design U-turn treatments at adjacent intersection
- Design safe entry and exit bays between the major road and frontage roads to prohibit illegal movements



Conclusions

- The study applies the Black Spot program concept to improve the real-world intersection safety in Lampang Municipality.
- The Black Spot improvement can be an effective engineering approach to alleviate the safety problems at critical locations.

THANK YOU

