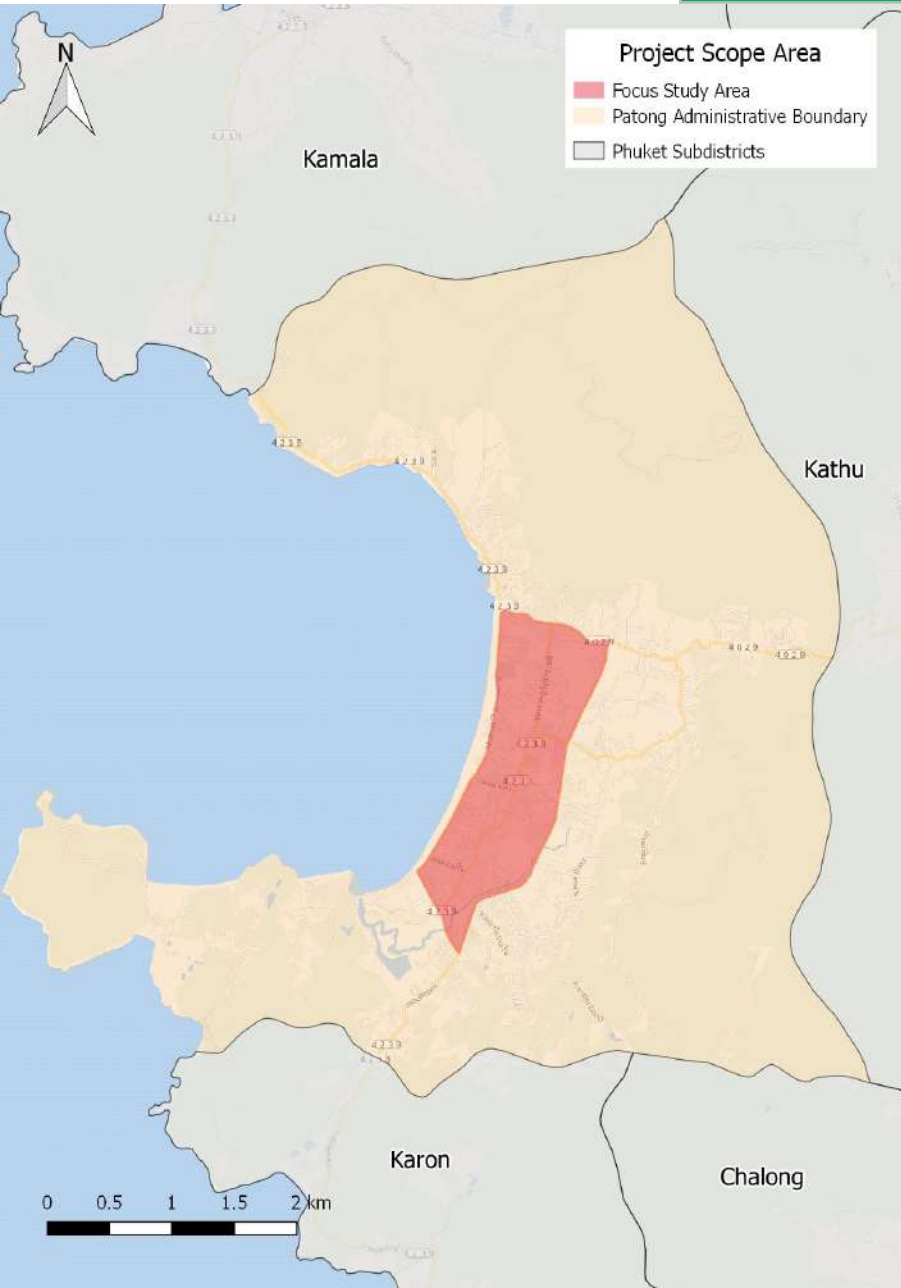


4. Patong

Outline

- 4.1 Overview
- 4.2 Context
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 - 4.2.2 Goal of the Report
- 4.3 Project Scope Area
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Patong is the most popular beach resort in Phuket, located in the west coast of Phuket. It is known to be the busiest 2.5 km of coastline with hundreds of attractions. The nightlife is centered around Bangla Road, which becomes a pedestrian-only street from 6 pm to 4 am every day.

As a tourist destination, the economy in Patong is driven by tourist industries such as hotels, restaurants, shops and other services. Therefore to increase the visitors, the government plans to improve the facilities provided for tourists.

However, the city government understands that good and livable environment as one of the assets of Patong. Therefore to preserve the environment, those improvements should be toward sustainable development.

Getting support from the national government, Patong aims to be not only greenest tourist destination which will be implemented toward environment friendly development but also as a MICE (Meetings, Incentives, Conventions, and Exhibitions) city. The government believes that become a MICE city, it will increase visitors and economic performance, because unlike tourists, meeting and event have no special seasons, but it can exist throughout the year. Having constant visitors coming throughout the year will increase economy of Patong.

4.2.1 Patong as MICE and Green City

Thailand National Government and the City of Patong Government have defined a ten-year development plan for Patong. Besides becoming a MICE special district, Patong Government also has a vision to make Patong as an innovative, green, and walkable city in ten years time, with positive impact on the environment.

From Patong Charter MICE and Greenest City workshop held on April 5th 2019 by Patong city government, in order to achieve these goals, the government has defined these following focus developments:

1. Patong as a MICE City
2. Development of green infrastructure
3. Development of green economy
4. Provision of public parks and green spaces
5. Provision of green transportation
6. Development of housing and real estates
7. Patong urban revitalisation

On the transportation sector, the government focuses to improve the current conditions of mobility which is highly dependent on the private vehicle usage such as motorcycles and minivans. The government has identified that in Patong, public transport services and pedestrian facilities are still limited. Therefore the improvement aims to improve facilities for walking, cycling and public transport which are more sustainable mode of transport for Patong.



Opening speech from the Mayor for Patong MICE and Green City Workshop

To shift the mobility into more sustainable mobility, from the workshop, the transportation division developed plans for improvement as follows:

- Focus of improvements will be done at Thawewong Road and Ratuthit Songroipi Road
- Give priority for pedestrians by improving walkways quality and facilities
- Provide bicycle lanes
- Provide good quality public transport with frequent service
- Build collaboration and cooperation with local taxis



Group discussion to improve public transport during the workshop

With those proposed improvements, the government aims to create Patong as a nice walking and cycling area for tourists, and reduce the private vehicle usage by providing new service of public transport system in Patong.

4.2.2 Goal of the Report

This report will provide guidance and detailed plans to improve walking and cycling facilities in creating Patong as walkable city. The walkways in Patong would be universally accessible and connected.

To reduce high dependency on private vehicles such as motorcycle and taxi, guidance on series of measures to provide good and reliable public transport and managing parking will be analysed in this report. Therefore the mobility in Patong will mainly walking, cycling, and using public transport.

This report could support the ten-year plan from the government as it shares the same goals and objectives.

4.3 Project Scope Area



The focus area of this study is located at the two closest main roads to the beachfront area, Thawewong Road and Ratuthit Songroipi Road, and the small road connections between those roads. The third closest main road to the beach, Phangmueang Soi Kar Road, is allocated for through-traffic, where vehicles that pass Patong without going to the city center should take this road.

Thawewong Road, Ratuthit Songroipi Road, and the surrounding areas are the main roads in Patong which pass through many tourist destinations, such as hotels, restaurants, and shopping centers. These roads have high pedestrian and traffic volume. Phangmueang Soi Kar Road has wider road space and less tourist activities, and connects the city center with other places outside Patong.

Given the touristic importance of Patong, it is necessary to have a more walking-friendly city as Patong is best explored by walking. It is also important to make destinations in Patong more accessible by improving connectivity and public transport service. Therefore, walking-friendly streets and reliable public transport service should be implemented in transforming Patong to become more attractive, accessible, and walkable city.

4.4.1 NMT Overview and Current Situation

With relatively short walking distance from the beachfront, most visitors explore Patong by walking. However, motorcycles and cars still occupy most of the road spaces, making it unpleasant for people to walk.

Non-motorized transport facilities for pedestrians and cyclists in Patong should be improved to create better walking environment, especially for tourists. Pedestrians and cyclists should get more priority, which means providing bigger space on the road, so it will be safer and more comfortable for them to explore Patong.

Despite those three main roads in Patong, the priority of improvements should be implemented throughout all of the roads including secondary roads, small alleys and pedestrian only roads to create good road network which gives priority to pedestrians and cyclists. Therefore, adequate walkways and cycling facilities should also be provided in all roads across the city.



Most of the road space occupied by motor vehicles, leaving no space for pedestrian



Best practice at Bangla walking street while closed for traffic

4.4.2 Current NMT Issues

Sidewalk Facilities

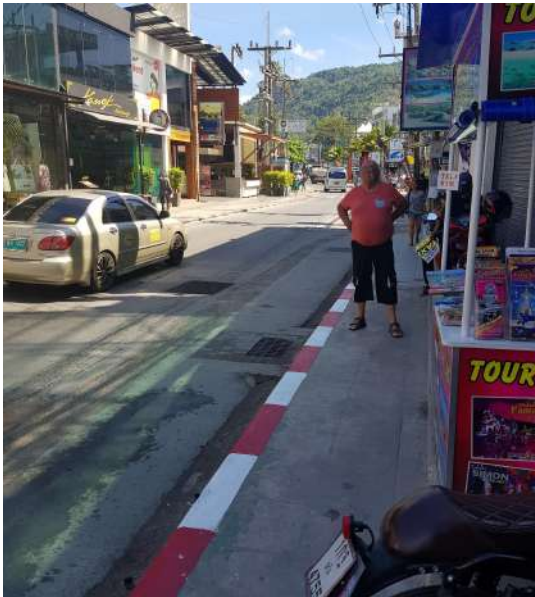
With many people visiting Patong as tourist destination, Patong is expected to be walkable. However, Patong is still lacking good pedestrian facility, such as sidewalk and crossing, making walking unpleasant and often dangerous on some roads.



No sidewalk at main road



Sidewalk occupied by street vendors



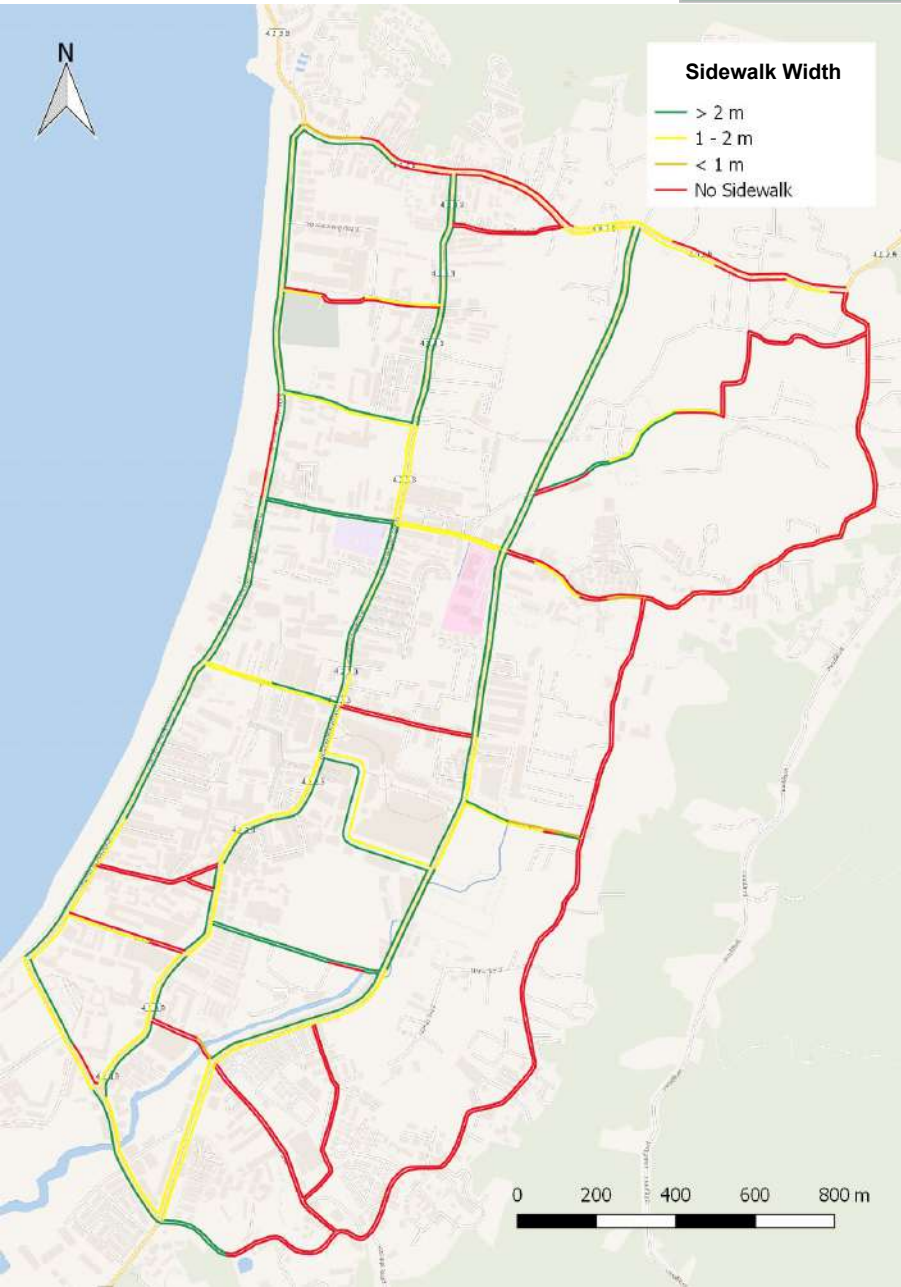
Narrow sidewalk



Noncontinuous walkways



Sidewalk occupied by utilities



Size of the Sidewalks

Sidewalks in Patong should be wide enough to accommodate high pedestrian volume, especially on few streets near the beach. From the sidewalk mapping conducted by ITDP, many sidewalks are found to be below 2 meters-wide or no sidewalk at all.

Sidewalks on small streets to access main roads are also narrow and not continuous. Outside the beach area, towards the Patong Hill, most streets do not even have sidewalks.

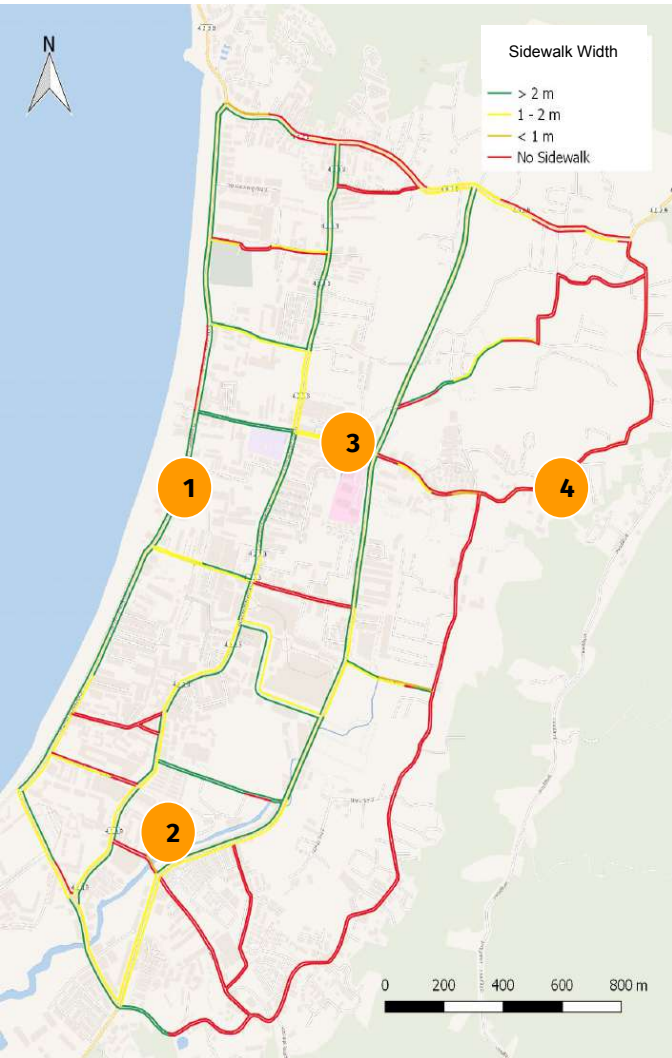
One particular street in Patong beach, Bangla Road, is closed during the evening from 6PM to 4AM, making it a pedestrian-only street.



Bangla walking street while closed for traffic

4.4.2 Current NMT Issues

Streets with different sidewalk width



Street with sidewalk width > 2 m



Street with sidewalk width 1 - 2 m



Street with sidewalk width < 1 m



Street with no sidewalk

4.4.2 Current NMT Issues



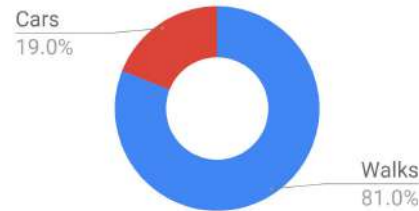
- A. Ratuthit Songroipi (a)
- B. Ratuthit Songroipi (b)
- C. Thawewong Road
- D. Bangla and Sansabai Road

People movement in the main roads of Patong

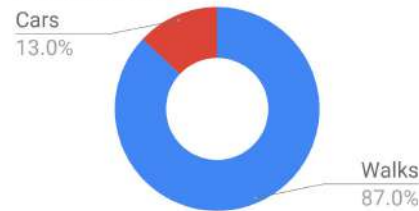
A. Ratuthit Songroipi Road (a)



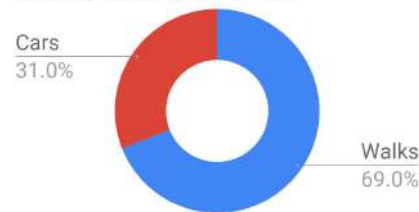
B. Ratuthit Songroipi Road (b)



C. Thawewong Road



D. Bangla and Sansabai Road



Equal space allocation between different users

As one main destination for tourists in Phuket Island, high pedestrian activities are found in Patong.

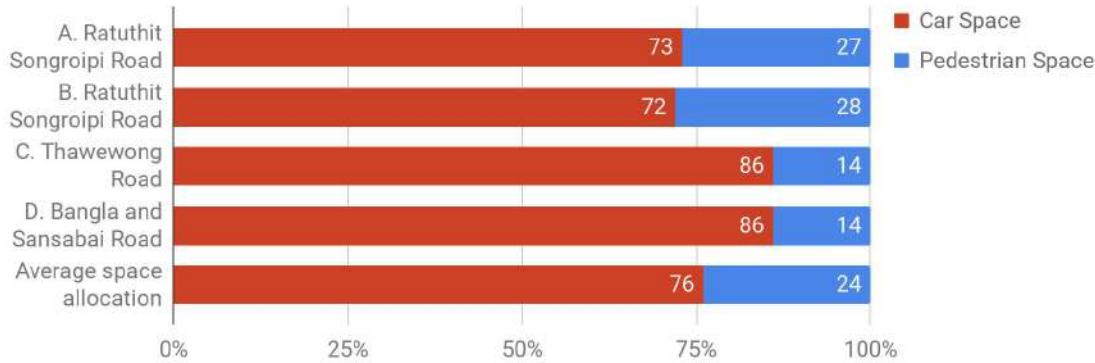
Walking dominates the people movement in this area. Several highlights in the busy area are depicted in the charts.

Despite the high number of pedestrian activities, the street configuration in Patong gives the least priority for pedestrians, as well as non-motorized transport and transit system in general.



On-street parking and drive lane occupy the majority of the road space

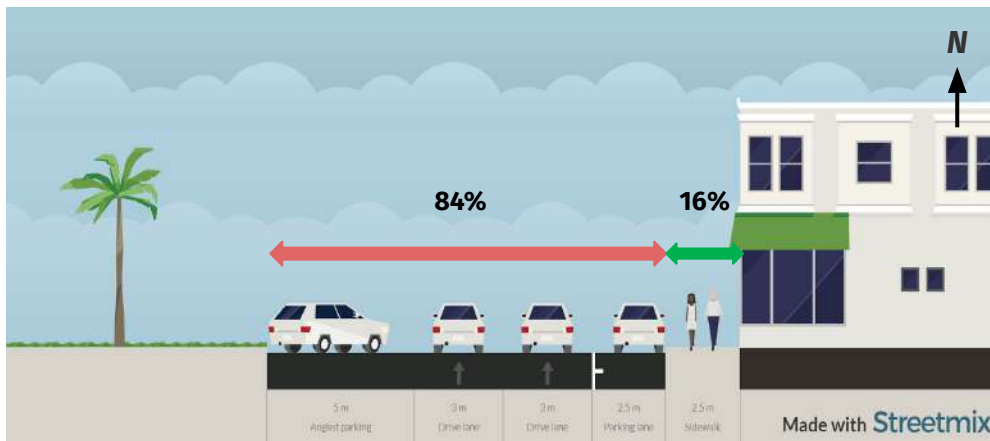
Space allocation in Patong's main roads



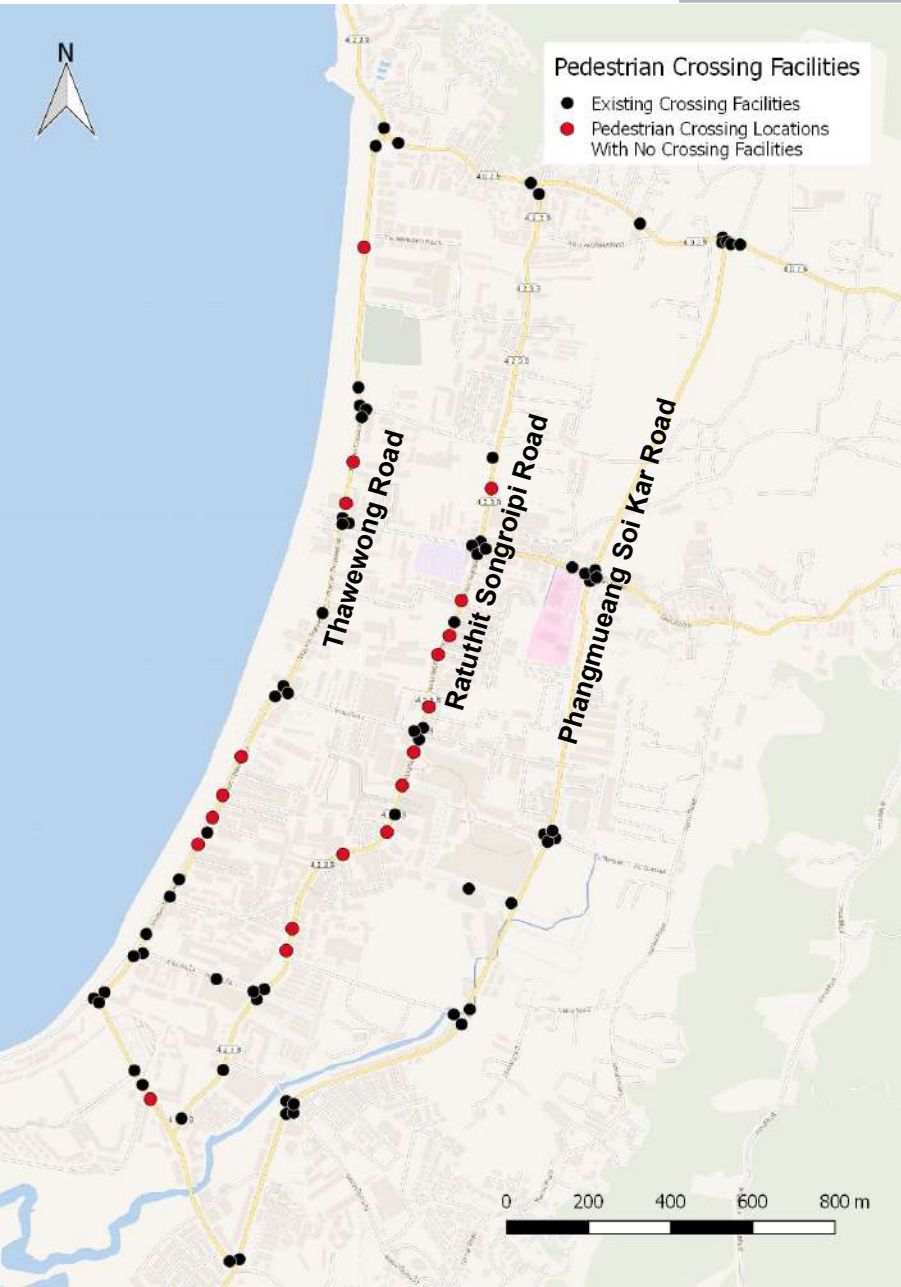
Equal space allocation between different users

In average, 76% of the road space in Patong are dedicated for motorized transport. and only 24% of space is allocated for pedestrians for sidewalks, despite the high pedestrian volume in the area. The space allocated for motorized traffic also include the space for on-street parking.

One example can be observed from Thawewong Road (C). Around 87% of people movement here are done through walking, yet only 14% space allocated for the pedestrians.



Existing street configuration at Thawewong Road (C)



Crossing Facilities

Existing crossing facilities in Patong are mostly located at intersections. However, from crossing locations survey, many people cross the road on locations without any crossing facilities such as zebra cross or pelican crossing. Along the streets with busy shopping and leisure activities such as on Thawewong Road and Ratuhit Songroipi Road

Provision of safe crossing facility can be done through putting pelican crossings and raised crossings every 200 meters along those roads, especially near the location where people cross.



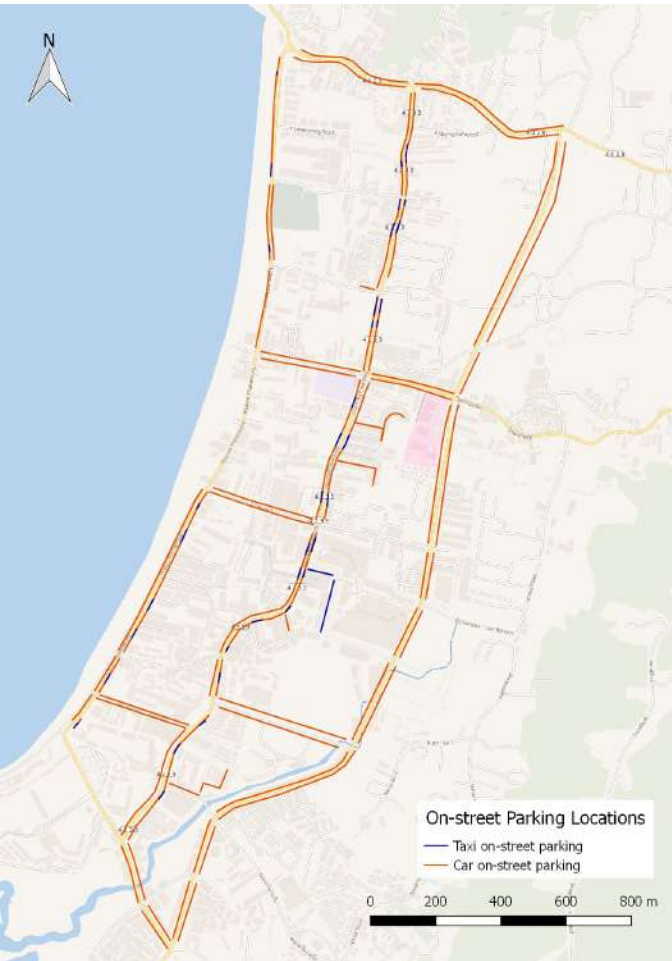
Some locations with high volume of pedestrians crossing still have no crossing facilities

4.4.2 Current NMT Issues

Space taken for on-street parking

With the high volume of private vehicle use, on-street parking is practically available at most roads in Patong, with the exception of small sections of Prachanukhro Road (west part), Thawewong Road (middle part), dan Sawatdirak Road, Hatpatong Road, and street beside Jungceylon Shopping Center. The popularity of motorcycle and car rent and taxi among tourists also contribute to the high number of vehicles that occupy road spaces.

On-street parking in Patong are often found blocking pedestrian movement and causes congestion where it occupies too much of road spaces.



On-street parking blocks pedestrian movement

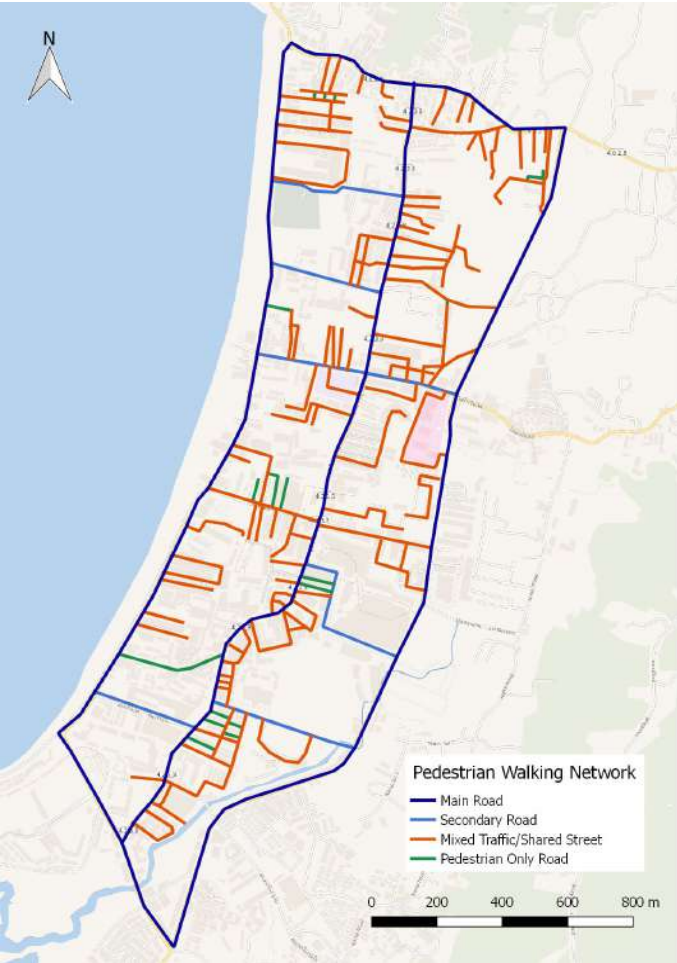


Space for taxi parking (left)

Shorter pedestrian connections

To reach the beach and city center, besides using main and secondary roads, pedestrians can also walk through small pathways as shortcuts to reduce the walking distance. Unfortunately, some of them are located within private properties which are not accessible for public. There are also almost no wayfindings available for pedestrians, therefore it is not easy to find the paths unless for locals.

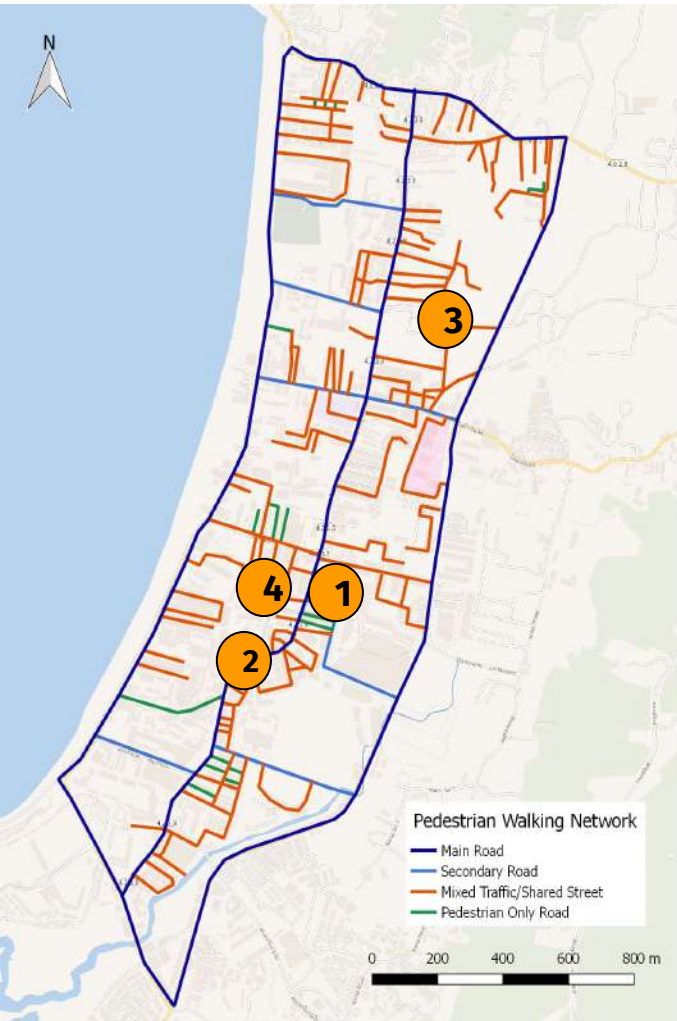
If these small streets and alleys are opened for pedestrians at all times, it could reduce the walking distance for pedestrians to reach different places in Patong.



Shared street with less priority for pedestrians

4.4.2 Current NMT Issues

Shorter pedestrian connections



Pedestrian access amongst the shops



Pedestrian path blocked by wall



Stairs accessible only for pedestrians



Access only for hotel guests and restricted for public

Lack of Cycling Activities and Facilities

In order to improve the environment in Patong and promote more sustainable mobility, the government should give more support and facilities for bicycles. It is well known that cycling can improve the environment and reduce emissions of CO₂ as well as hazardous gasses like particles and NOx.

However, compare to motorcycle, bicycle is not popular in Patong. Bicycle facilities such as bicycle lane, bicycle parking places or priority for cyclist at junctions are not available, these conditions create lack of safe and convenient for cyclists. Despite the lack of infrastructure facilities for bicycle, motorcycle renting places are easier to find compare to bicycle which makes motorcycles more accessible for tourists.

Moreover, according to the geographic condition in Patong, although the east side of the city is more hilly, but the city center area closer to the beachfront could be a nice area for cycling. The size of the area in city center is also easily to reach by bicycle.

For the smaller roads, instead of giving access priority and parking places for motorcycles, these could be bicycle priority access connected those main roads which will create a good shorter cycling network in Patong.



Compare with motorcycle riders, cyclist is barely seen in Patong



Priority road for motorcycles

The following table summarizes traffic, infrastructure, and parking surveys which were conducted in Patong.

Survey Activity		Objective	Methodology	Outcome
Traffic	Peak-hour pedestrian volume	To identify high-priority streets for pedestrian improvements.	Walking and counting the number of pedestrian passing by on every street within the scope area, during the peak hours.	Map of pedestrian volume on every street within the scope area.
	Pedestrian crossing location	To identify the potential crossings to be improved and/or added.	Marking the locations where pedestrian crossing activities occur, on a map.	Map of pedestrian crossing locations within the scope area.
	Motorized traffic count	To identify motorized traffic volumes for potential reorganization of traffic lanes (number of lanes and directions).	Recording several videos of the traffic condition at the selected intersections, where the traffic reorganization is preferable.	Map of motorized traffic volume on the selected streets.
Infrastructure	Sidewalk	To identify the width of the sidewalks in the selected scoping area.	Documentation of the existing width of the sidewalks in the scope area, on a map.	Map of the sidewalk width improvements and recommendations, including the cross section designs of the corresponding streets.
	Junction design	To identify the junction for potential design improvements.	Recording several videos of the traffic condition at the selected intersections.	Information of the existing junction design.
	Pedestrian pathways	To identify the possible shortcuts to build and/or to recommend for the pedestrians.	Walking across the streets within the scope area to identify its connection to the other streets.	Map of the information of the connected and dead-end streets.
Parking	On-street parking locations	To identify the on-street parking location and capacity.	Observing the parking locations along the streets and estimating its capacity.	Map of on-street locations for car and/or motorcycle.
	Taxi stand locations	To identify the taxi parking location and capacity.	Observing the parking locations along the streets and estimating its capacity.	Map of on-street locations for car and/or motorcycle.

4.4.4 NMT Objectives

Issues	Objectives	Measures
Walking Improvement		
Low quality of sidewalk facilities in several tourist areas (e.g. Bangla Road) despite the high pedestrian volume walking across these areas.	To create better and safer walking environment in Patong area by giving higher priority for the pedestrians in terms of space and continuity of the walkways.	Provide safe and continuous walkways by reallocating the space of the streets.
Insufficient crossing facilities in high pedestrian crossing locations (e.g. Ratuthit Songroipi Road), which creates unsafe conditions for them to cross the streets.	To provide safe crossing facilities for pedestrians.	Provision of safe crossing facilities at junctions and other crossing locations.
On-street parking dominates the space of the streets within the scope area and in some streets with a nonexistence/low quality of sidewalks, it blocks pedestrian movement.	To provide more comfortable walking environment for the pedestrians.	Management of on-street parking locations and street reconfiguration.
There are several potential short paths for the pedestrians, however, no information are provided and in some locations the paths end in cul-de-sacs, also occupied by motorcycle parking.	To create a more connected pedestrian network paths and provide sufficient information for pedestrians to walk around Patong.	Extension of the closed-end paths to the nearby streets and provision of wayfindings and signages.
Less priority for pedestrian at the junctions.	To provide junction facilities that prioritize pedestrians first, in particular when heavy pedestrian volumes occur.	Redesigning the important junctions.
Cycling Facility Proposal		
Nonexistence of cycling facilities in Patong.	To promote cycling as one of transportation modes in Patong.	<ul style="list-style-type: none"> • Provision of safe cycling facilities in Patong, especially at roads with high volume of traffic. • Establishment of bike-sharing system in Patong.

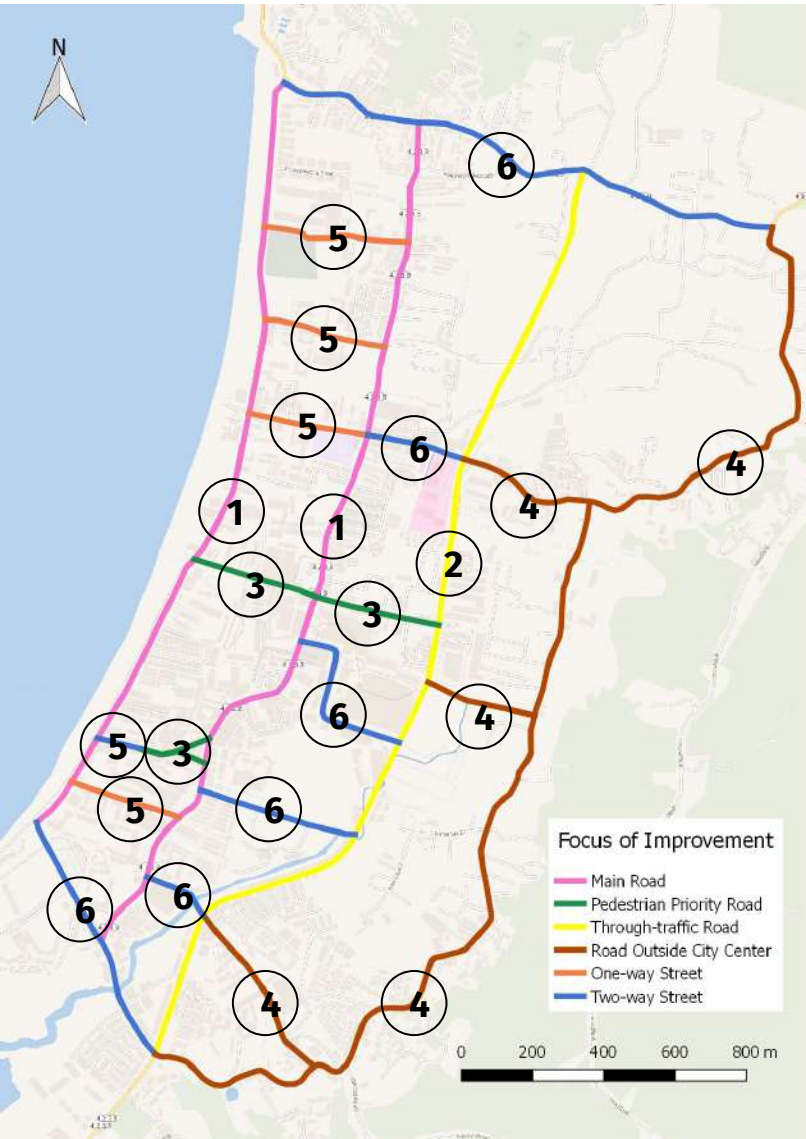
Street Improvement Measures

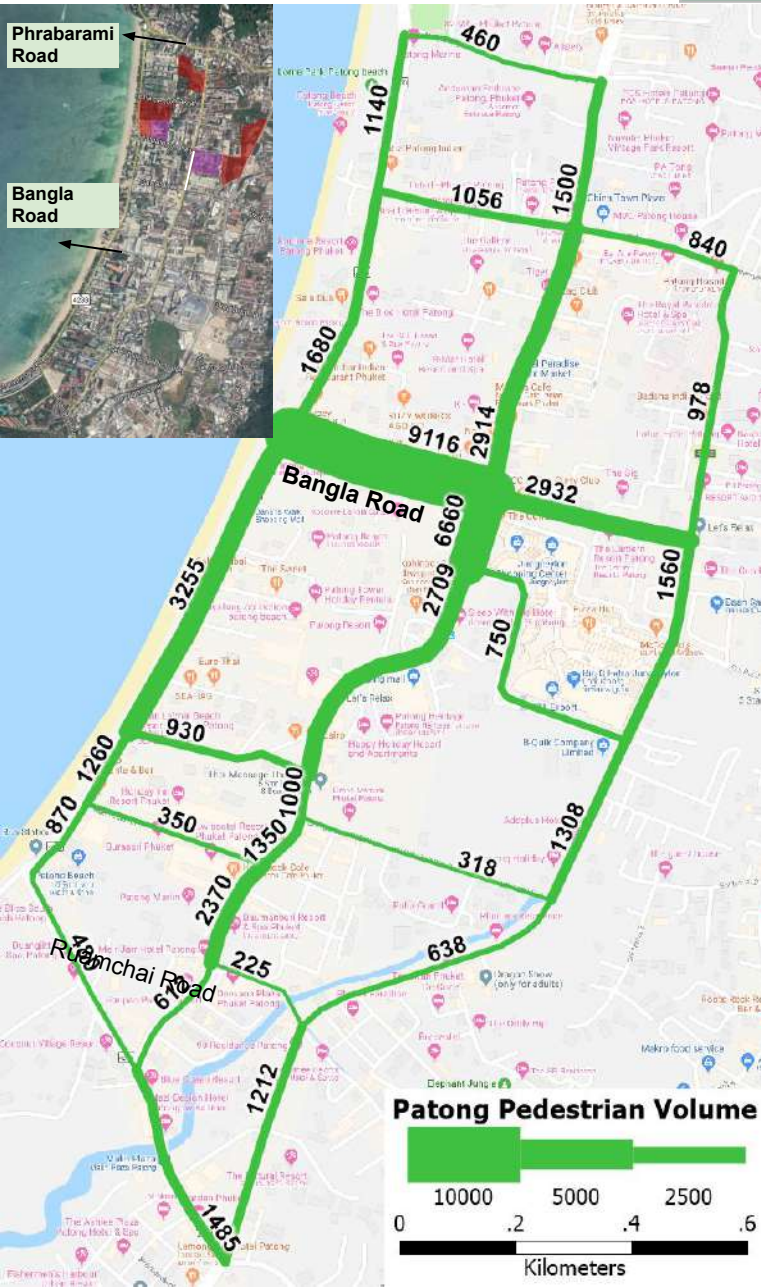
In general, the proposed improvement of walking facilities in Patong are clustered into these six categories as follows:

1. Complete street with universal access at main roads
2. Provide consistent number of lanes at through-traffic road with safe and continuous walking facilities for pedestrian. To reclaim some road segments for pedestrian, on-street parking management is needed
3. Implementation of pedestrian priority road
4. Provision of walking facilities at roads outside city center
5. Provision of convenient and continuous sidewalk, and on-street parking management
6. Provision of continuous sidewalk and on-street parking. These roads are less attractive with less number of pedestrian on the roads. Therefore, on-street parking could be located along the roads

To support walking facilities improvements mentioned, these following improvements are also proposed:

- Crossing facilities improvement
- Pedestrian access improvement
- Provision of bike-sharing and bike lane network
- Junction improvement





Focus of Improvement at High Pedestrian Volume Locations

Detailed designs of this study will be focused at high pedestrian volume locations. From pedestrian volume mapping resulted from the survey, pedestrian volumes were counted as high as 9,116 pedestrians per hour. These high pedestrian volume locations are centered around Bangla Road, beachfront area, and the road in front of Jungceylon Shopping Mall.

At the north side of Patong up to Phrabarami Road, there are some empty places found at that area. The areas highlighted in red are empty areas, while the areas highlighted in purple are where the buildings have side back which makes it less attractive because there are no connection between private properties and public spaces. The south side is more attractive. Shops, night markets, bars, and hotels are mostly located at the south side.



Night food market located at the south side of Patong

Pedestrian-only Streets



To improve pedestrian connectivity to the city center and beachfront area, few roads such as Bangla Road, Sansabai Road and Kep Sab Alley are proposed to be pedestrian-only road at all times. Traffic redirection is proposed at Chaloehrakiat Road, to become one-way street heading west.



Thawewong Road

As the nearest road to the beach, Thawewong Road is the busiest street in Patong. The proposed road improvement plan for Thawewong Road is to create walking-friendly street with universal access.

Walking-friendly street and pedestrian priority:

- Good, safe, accessible walkways
- Sufficient clear path
- Lighting to ensure safety
- Adequate crossing facilities to facilitate busy pedestrian traffic
- Good information system through wayfindings and other relevant signages
- On-street parking removal and place utilities underground

Universal access:

- Guidance for people with visual impairments
- Ramps on crossings

Provision of alternative transportation modes:

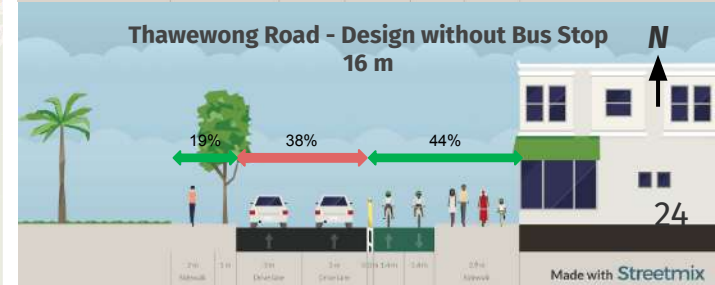
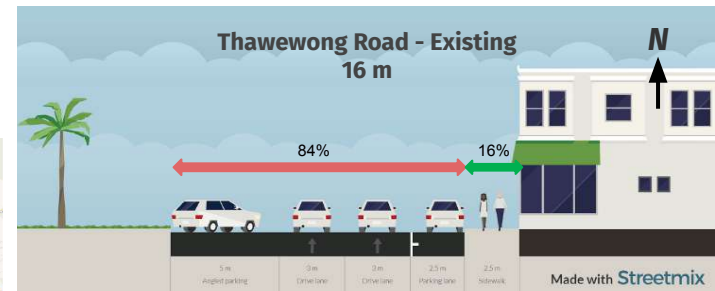
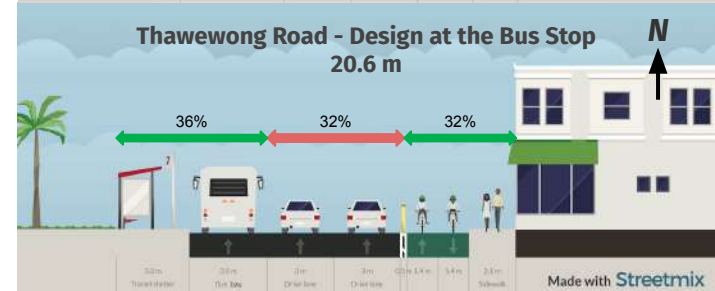
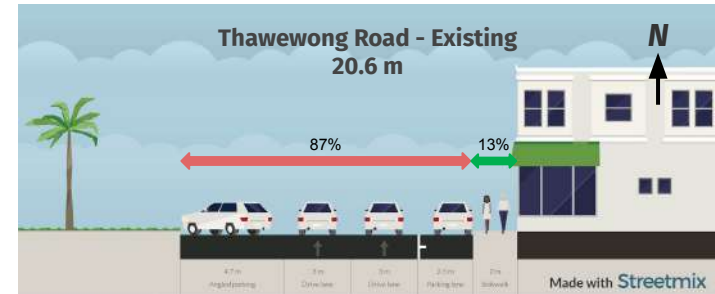
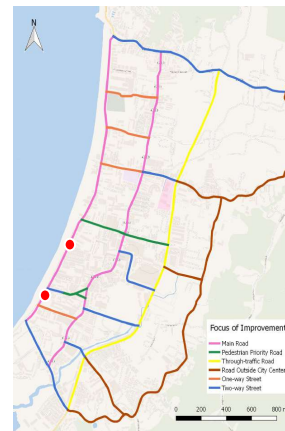
- Dedicated cycle lanes
- Public transport facilities

Proposed plan for improvement at Thawewong Road

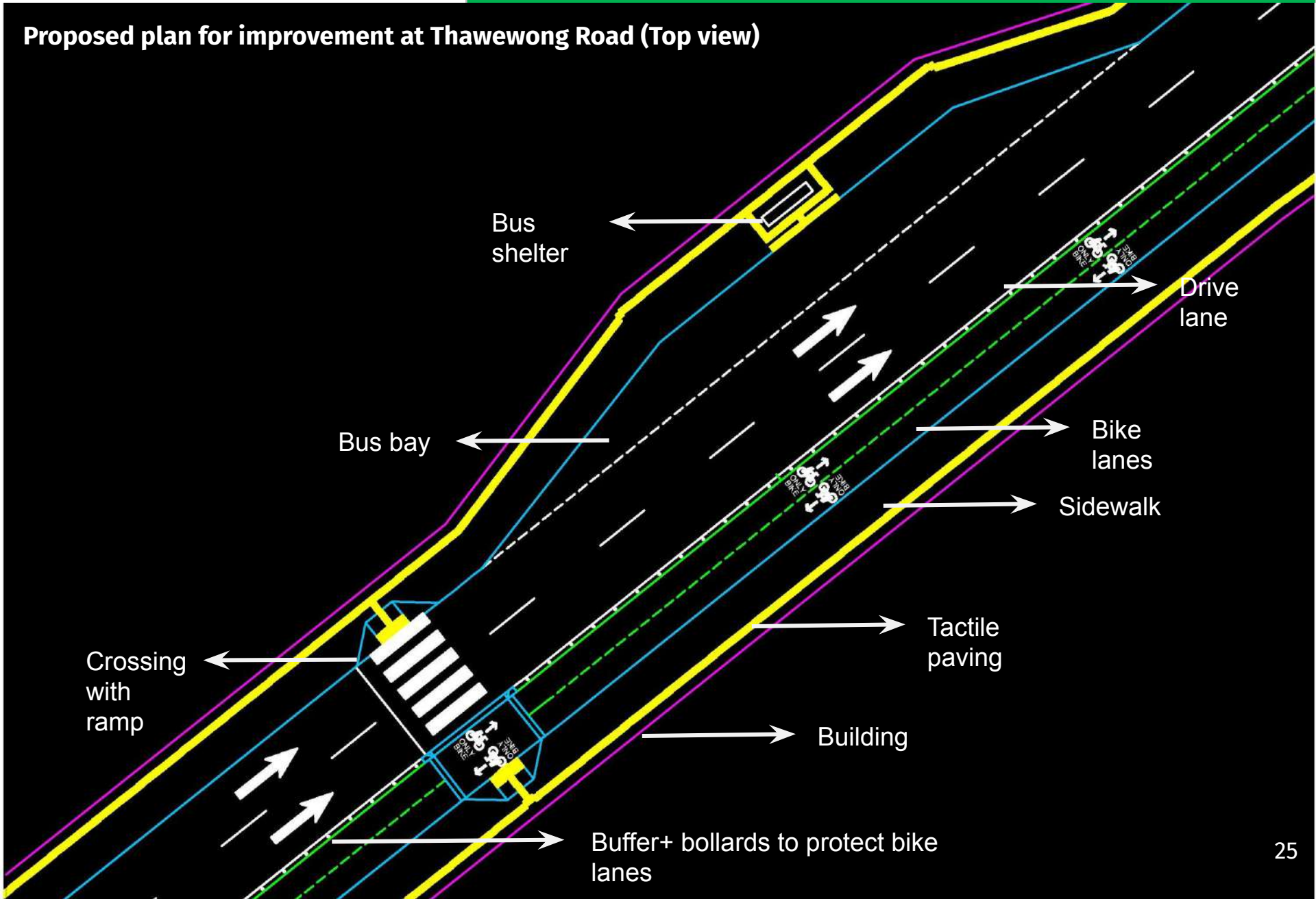
- Widening the space towards the west direction to allow better reconfiguration of the space.
- Sidewalks widening.
- Provision of bike lanes.
- Provision of public transport facilities. Bus stop and bus bay are required to create safer and more convenient boarding-alighting activities for potential high passenger volume coming to this street.
- Boarding island to avoid conflict between cyclists and passenger activities. Additional facility to cross the cycle lane while accessing the boarding island is required (i.e. crossing and ramp).
- Reduction of drive lane width to increase safety.
- Removal of the on-street parking. The vehicles can park in the northern part of this road and in the off-street parking area.
- Placing the wayfindings and signage.
- Provision of sufficient lighting, especially on the left side (facing the North direction).



Current situation at Thawewong Road



Proposed plan for improvement at Thawewong Road (Top view)





Existing - Thawewong Road



Design - Thawewong Road

Ratuthit Songroipi Road

Ratuthit Songroipi Road runs parallel to Thawewong Road. It is also a one-way street that can only be driven from north to south, which creates a looping driving pattern between both roads. There are many activities along the road as much as Thawewong Road, therefore the proposed road improvement plan for Ratuthit Songroipi Road is also to create walking-friendly street with universal access.

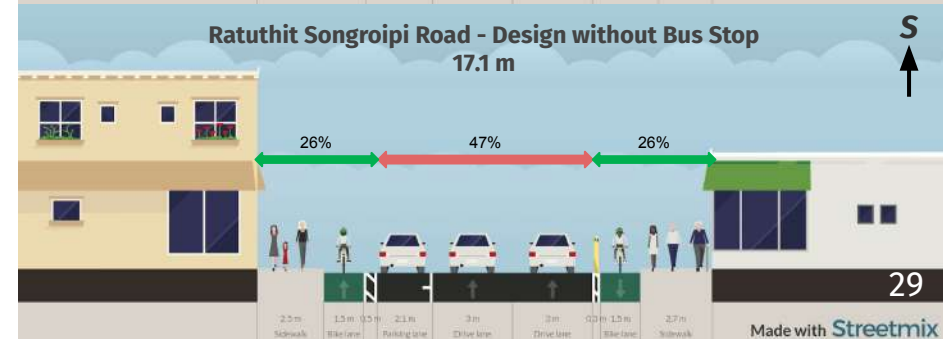
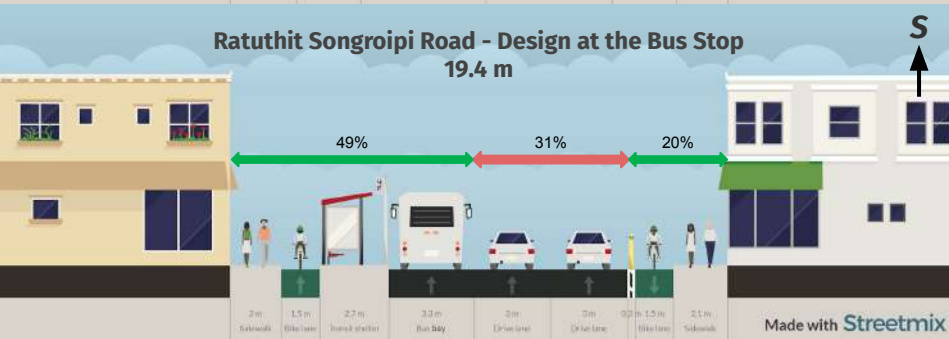
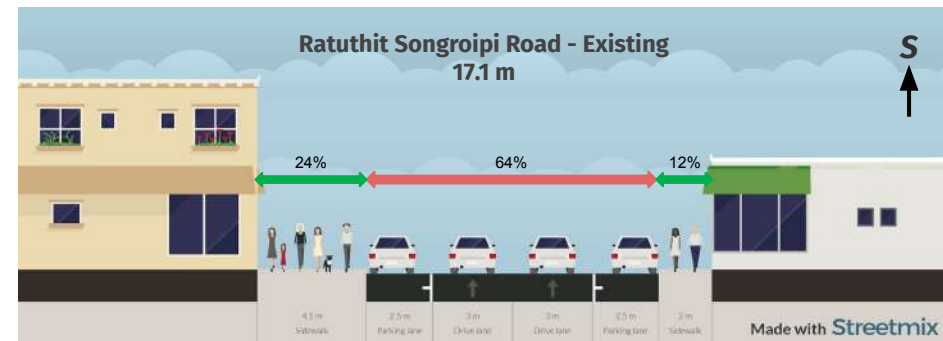
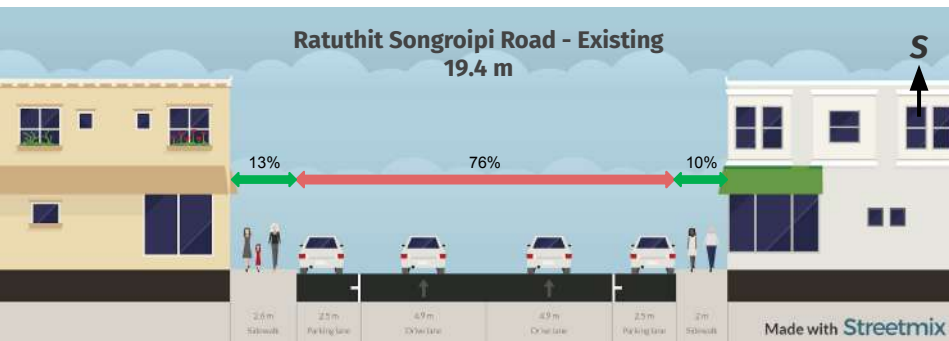
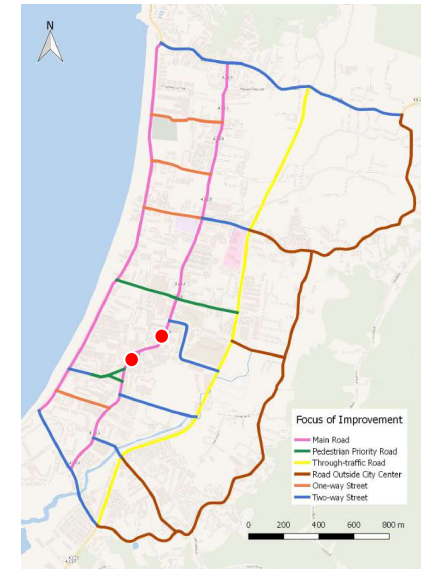
The same features as Thawewong Road are also applied on this road improvement plan. However, since the motorized traffic there is two times heavier than in Thawewong Road, on-street parking is still provided on only some segments this street, but is proposed to be reduced to one side only.



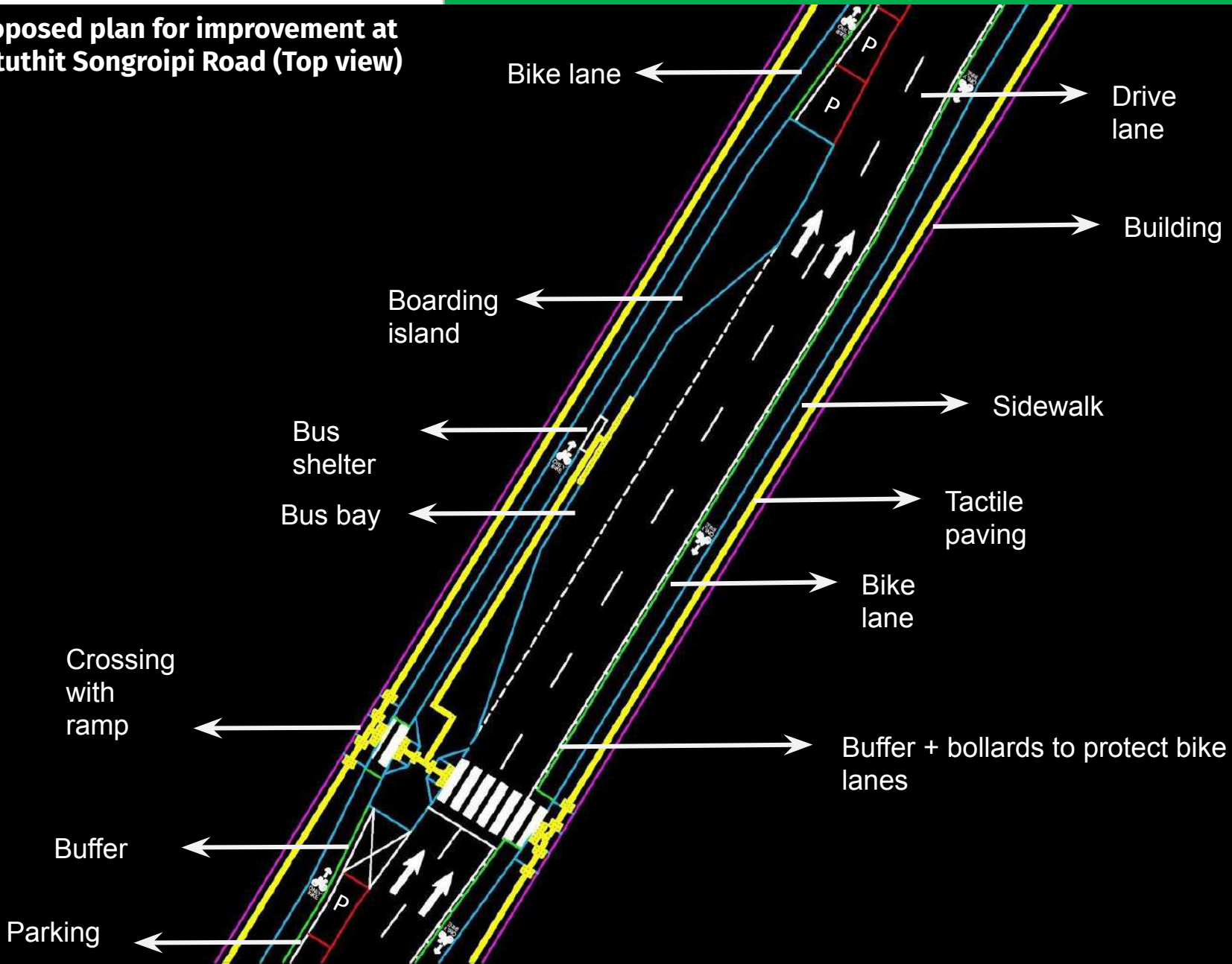
*Design illustration for complete street
(Source: NACTO)*

Proposed plan for improvement at Ratuthit Songroipi Road

- Similar measures as Thawewong Road, with an exception in the parking recommendation.
- Reduction of the on-street parking to the left side-only (facing the South direction). In addition to this, the vehicle can park in the northern side and in the off-street parking area.
- Dedicated parking areas are provided to prevent obstructions of the clear path for the pedestrians. Furthermore, the parking does not need to be continuous. It can be interspaced by the other facilities, for instance, the boarding island and bus bay area.



Proposed plan for improvement at Ratuthit Songroipi Road (Top view)





Existing - Ratuthit Songroipi Road



Design - Ratuthit Songroipi Road

Phangmueang Soi Kar Road

Phangmueang Soi Kar Road is a two-way street that also runs parallel to both Thawewong Road and Rathutit Songroipi Road. As the traffic passing through this road is mainly going to other areas of Phuket, which implicates higher vehicle speed, the proposed road improvement plan for Phangmueang Soi Kar Road is to create safe walking and crossing facilities for pedestrians.

Being the road that connects Patong to the other areas of Phuket, another improvement plan for Phangmueang Soi Kar Road is to have consistency of number of lanes by on-street parking management.

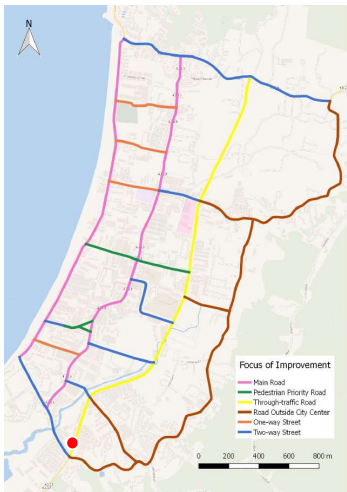
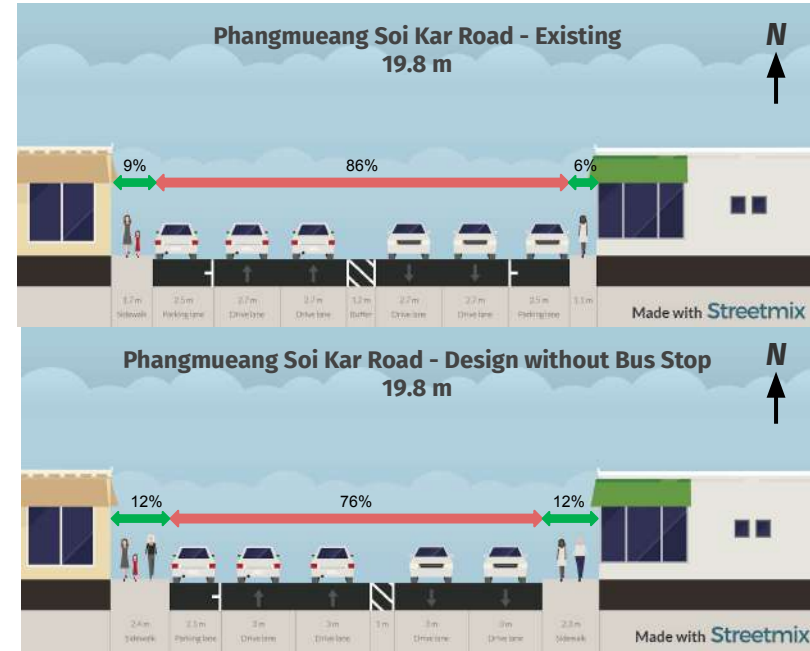


Provide pedestrian refuge island at zebra crossings (Source: fareastbrt.com)

Proposed plan for improvement at Phangmueang Soi Kar Road

Design for cross section between bus stops:

- Provision of pedestrian crossing improvement
- Reduction of the on-street parking to the left side only (facing the North direction), to allow space reconfiguration and consistency of the number of lanes
- Widening the sidewalk, with utilities underground
- Provision of wayfinding and signage

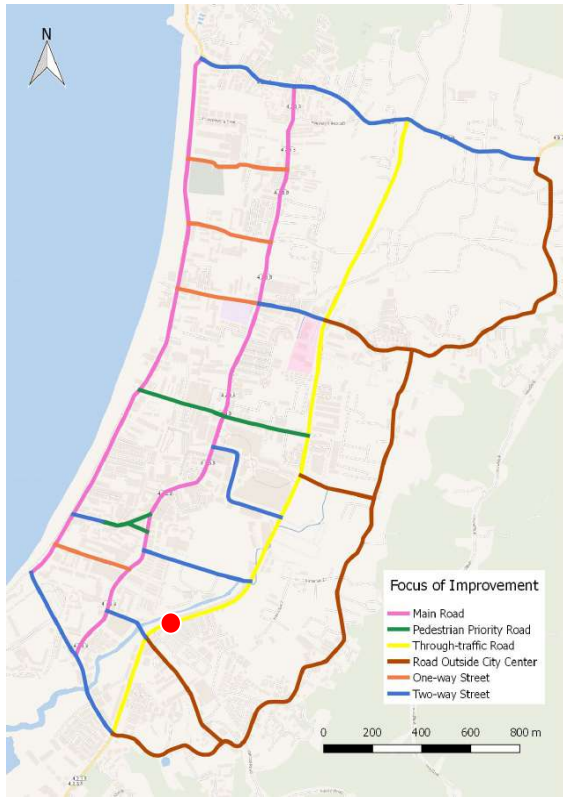
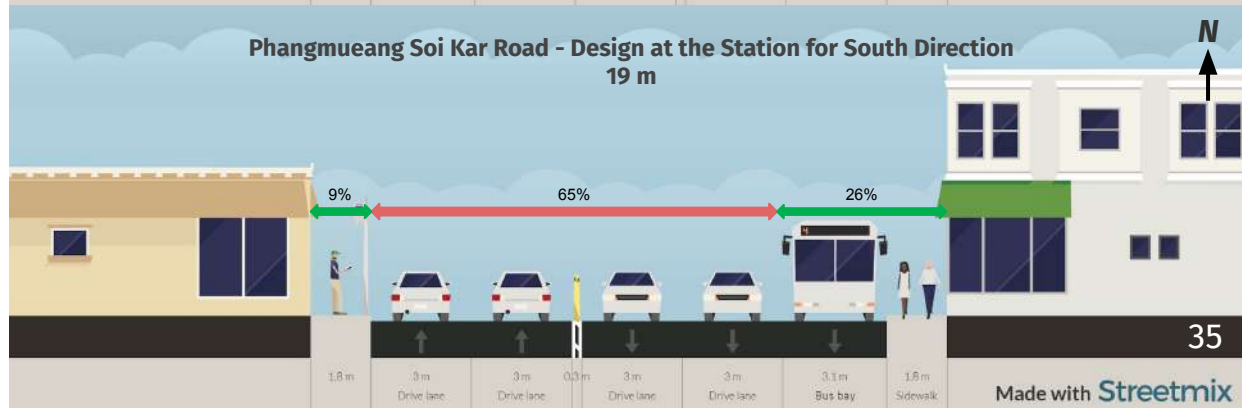
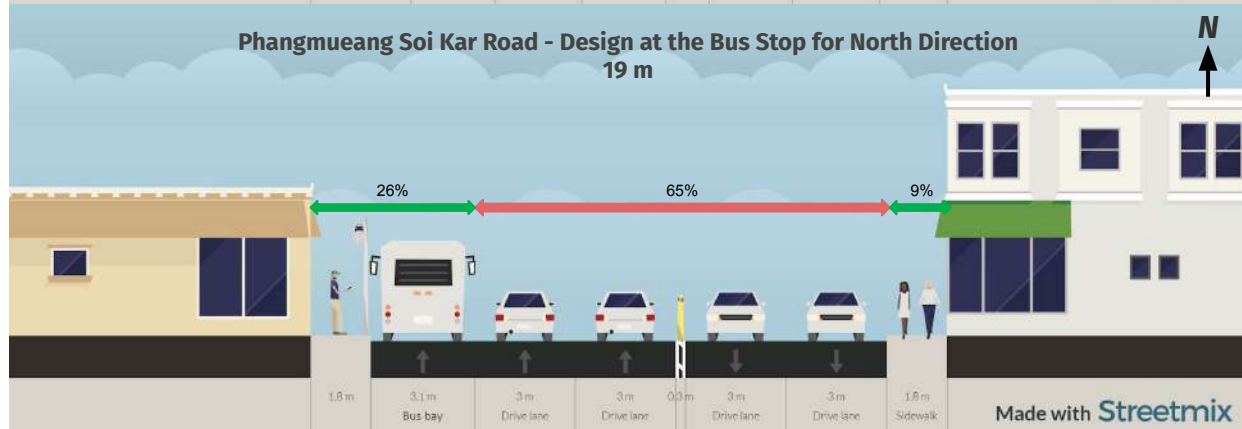
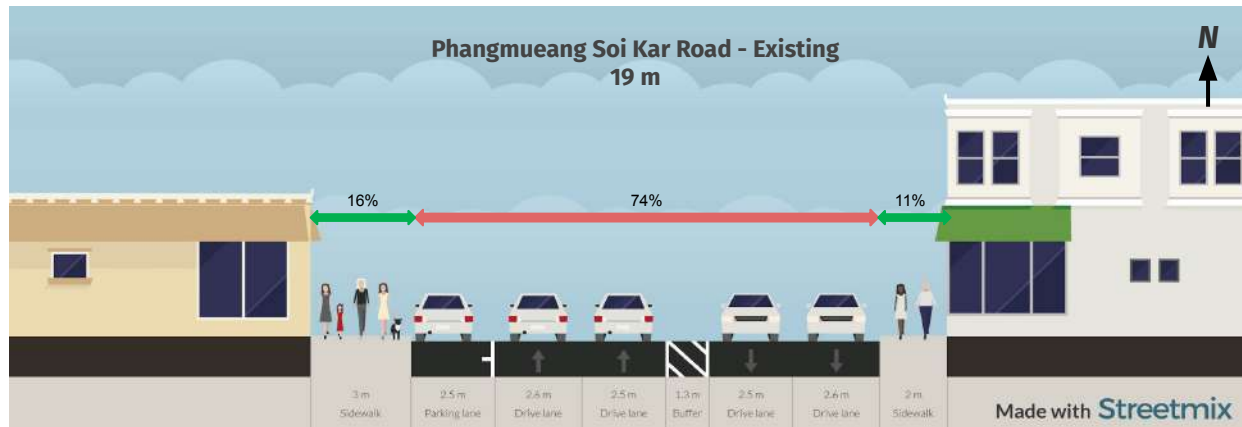


Current situation at Phangmueang Soi Kar Road

4.4.6 Road and Connectivity Improvement

Design for cross section at the bus stop:

- Road curve to add bus stop and bus bay on the both sides of the street.
- Other features are similar to the design for section between the bus stops.



Pisitkoranee - Nanai Road

Pisitkoranee Road and Nanai Road are two-way streets located near mountains of Patong Beach. Many accommodations are available along the road, but the lack of walking facilities makes people hesitant to walk and rent motorcycle instead.

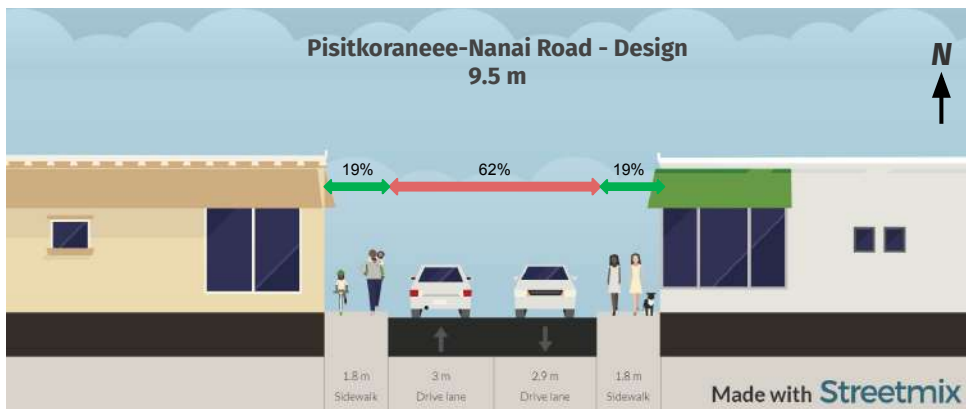
Although it is not located at city center, some hotels, shops, and restaurants are located in this area. Therefore, good sidewalks are necessary to connect places and make it more accessible by walking. The proposed road improvement plan for Pisitkoranee Road and Nanai Road is to provide good and continuous sidewalk.

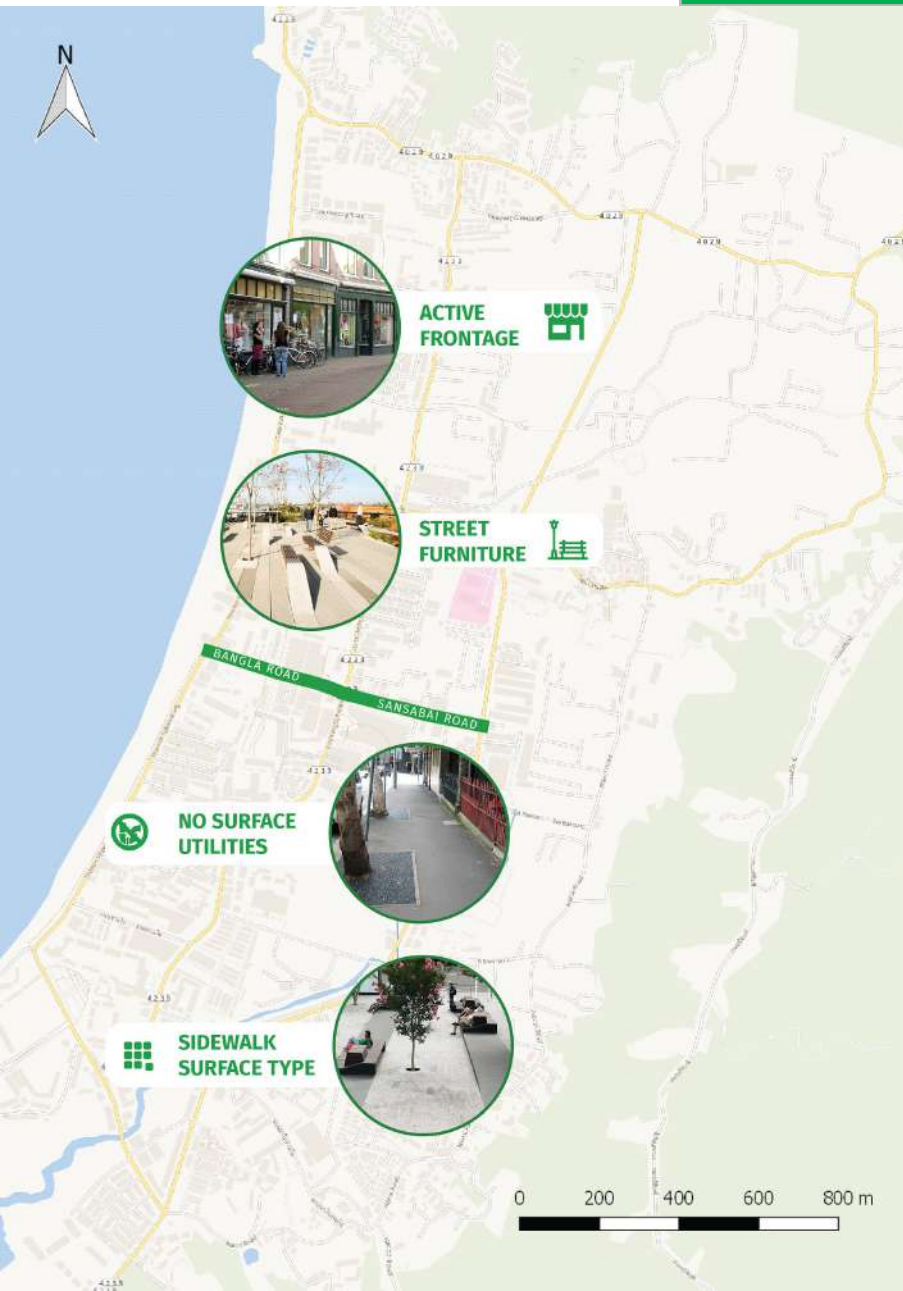


Provide continuous sidewalks for pedestrians

Proposed plan for improvement at Pisitkoranee - Nanai Road

- Reconfiguration of space, especially the width of the driving lanes.
- Provision of sidewalks to accommodate the pedestrians with safe walking environment. At minimum, a clear path of 1.8 meter width on sidewalks is required.
- Provision of other street elements such as lighting, wayfindings, anti-slip sidewalks paving material, to ensure convenience of the pedestrians.





Bangla - Sansabai Road

Bangla Road is famous for its pedestrian only street that applies from 6 pm to 4 am every day. It connects the two closest main roads to the beach and always busy at night. The proposed road improvement plan for Bangla Road is to close the road for traffic at all time, so the space can be only used by pedestrians and cyclists.

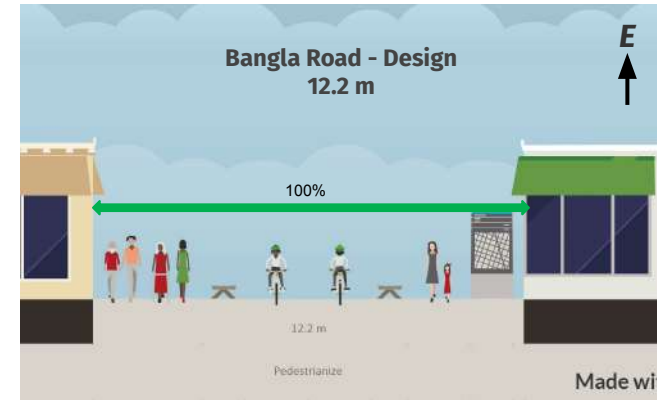
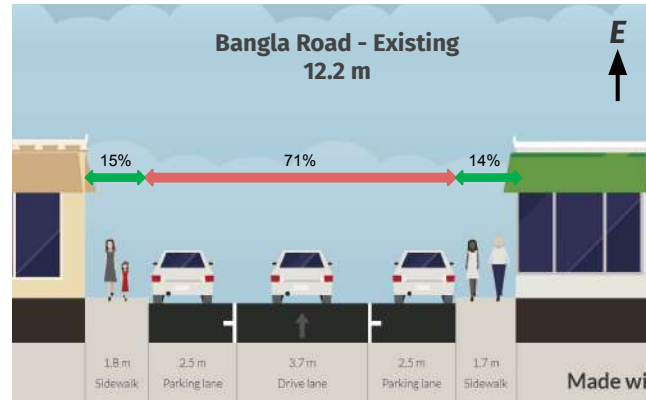
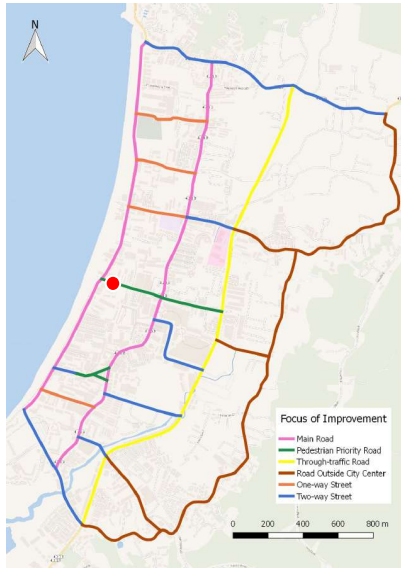
Located just across Bangla Road, Sansabai Road is also proposed to be closed for traffic at all time. It connects Ratuthit Songroipi Road and Phangmueang Soi Kar Road, so pedestrians can reach the coastline more easily with a pleasant walking experience.

Key design improvements:

- Transforming the pedestrian only streets into attractive area with active frontage.
- Using visually interesting pavement such as pre-cast two-toned concrete pavers.
- Leveling the street to achieve busy pedestrian area. Consider to remove the curbs.
- Other street furnitures (e.g. benches) to support pedestrian activities.

Pedestrian Priority Road

1. Bangla Road
2. Sansabai Road
3. Kesub Alley Road



Proposed plan for improvement

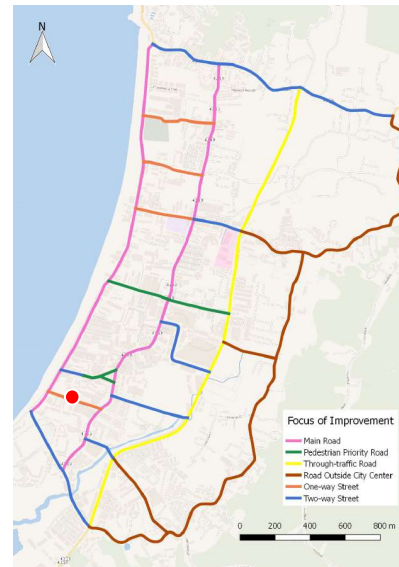
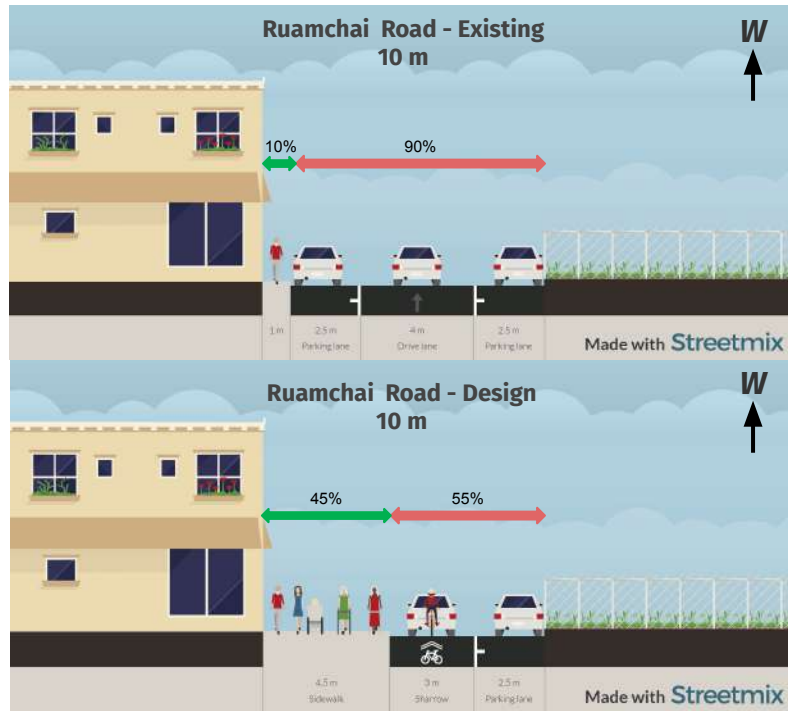
- Redesign the area to be more attractive.
- Limited traffic zones. Only pedestrians and cyclists are allowed to access these streets.
- Changing the pavement into precast two-toned concrete pavers.
- Removal of the obstacles from the streets. When necessary, remove the curb to level the street entirely. The space then can be filled by other pedestrian-attracting elements to create the overall pleasant walking experience.
- Provision of other supporting elements and furnitures to facilitate pleasant walking environment.

4.4.6 Road and Connectivity Improvement One-way Street Design

Ruamchai Road is one of the streets that connect Ratuthit Songroipi Road and Thawewong Road. Currently, there are only a few interesting activities exist on this street.

Proposed plan for improvement at Ruamchai Road:

- Widening sidewalks on the left side (facing the West direction). This road can serve as a short path from people from Ratuthit Songroipi Road to Thawewong Road or vice versa, thus, providing better sidewalks is essential.
- Reducing the driving lane space into 3 meters wide.
- Locating on-street parking on the right side (facing the West direction) since this area is less interesting, to accommodate people parking from the Ratuthit Songroipi Road.
- Provision of other street elements such as lighting, wayfindings, anti-slip sidewalks paving material, to ensure convenience of the pedestrians.



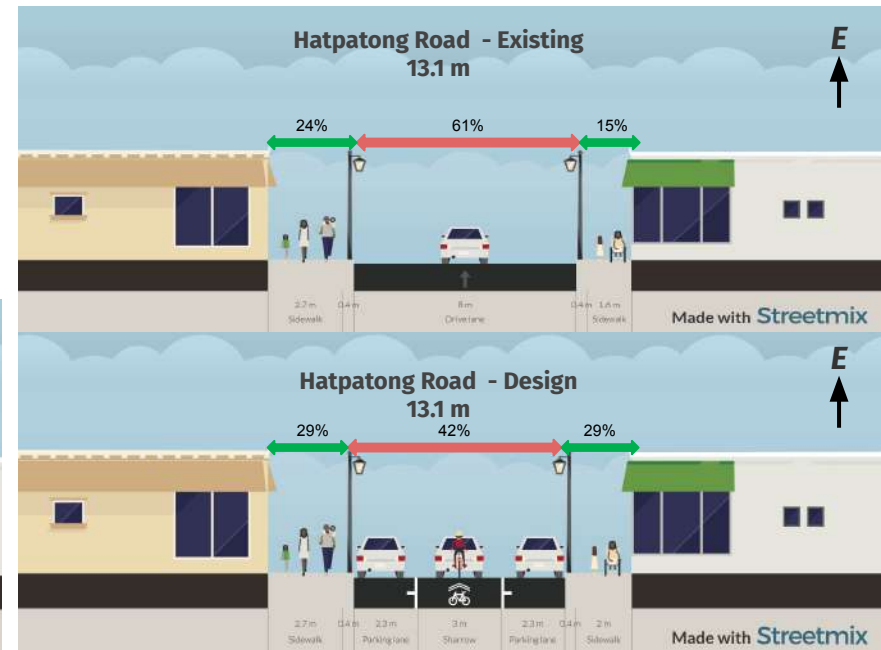
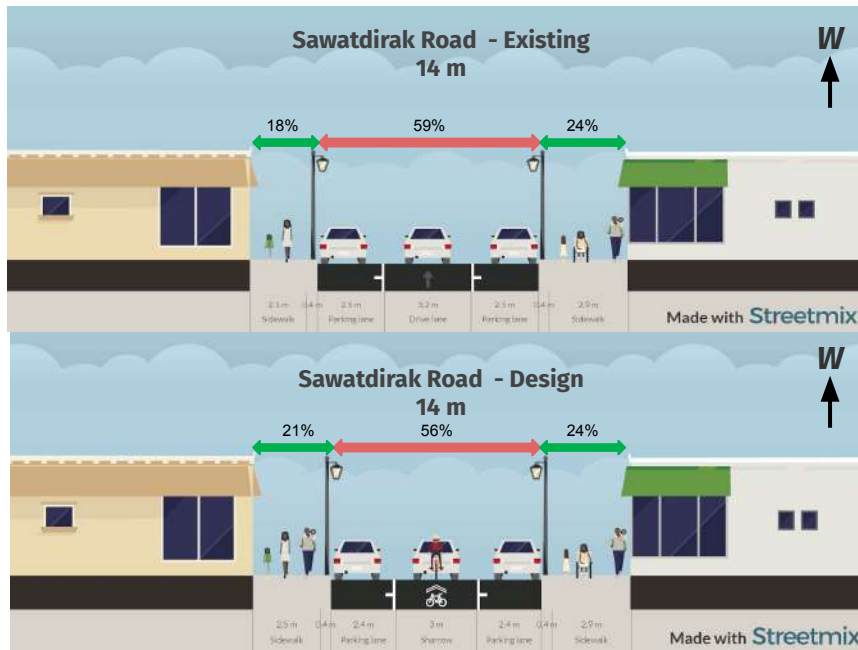
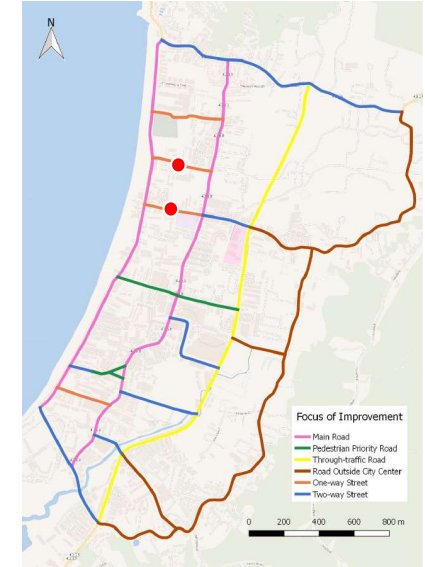
Current situation at Ruamchai Road

4.4.6 Road and Connectivity Improvement One-way Street Design

Sawatdirak Road and Hatpatong Road connect Ratuthit Songroipi Road and Thawewong Road. These streets are located closed to the Bangla Road, one of the tourist attractions.

Proposed plan for improvement at Sawatdirak and Hatpatong Road:

- Widening the space for sidewalks while limiting the driving lane to 3 meters wide.
- Concerning their locations, on-street parking can be provided on these streets to accommodate people from Thawewong Road and Ratuthit Road.



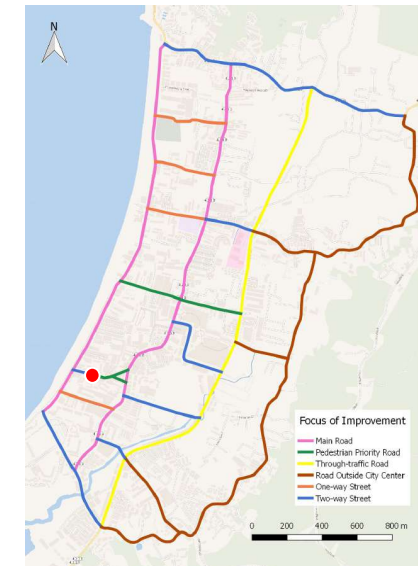
Kep Sab Alley is an alley, which currently functions as a shared street.

Key important aspects to improve the existing shared-street:

- Street is prioritized for pedestrian and only for private vehicles resident access and emergency vehicles.
- No physical distinctions between different road users.
- Low speed area (maximum 10 km/h).
- Provision of signage to inform the motorists of the low speed limit.
- No parking allowed.
- Make it attractive for pedestrians as shared street itself could improve vibrancy of the area.
- Wayfinding placement as it is potential to serve as a short path for pedestrians from Ratuthit Songroipi Road to Thawewong Road or vice versa.
- Provision of other supporting elements and furnitures to facilitate pleasant walking environment such as lighting, wayfindings, and benches.



Current situation at Kep Sab Alley Road



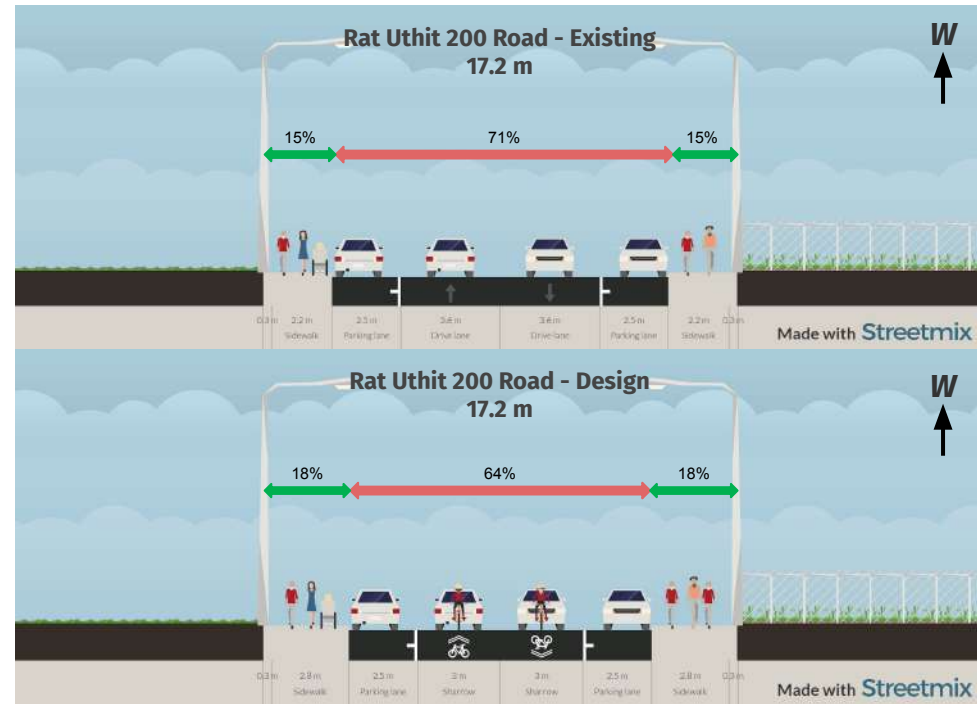
4.4.6 Road and Connectivity Improvement

Two-directional street design

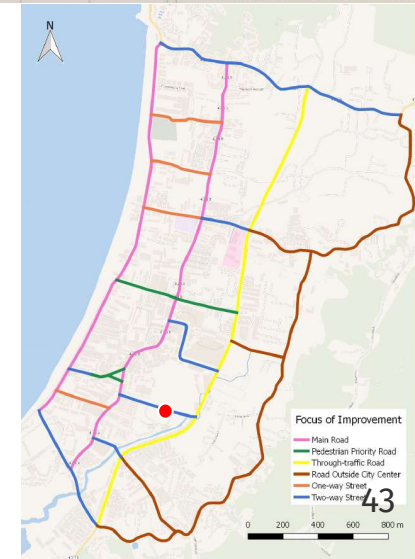
Rat Uthit 200 Road connects Ratuthit Songroipi Road and Phangmueang Soi Kar Road. Low pedestrian volume relative to the other streets is found on this segment and there is not many interesting activities in this area.

Proposed plan for improvement at Rat Uthit 200 Road:

- Utilization of this street to become on-street parking area for people from Ratuthit Songroipi Road and Phangmueang Soi Kar Road.
- Reconfiguration of the space to maximize it for sidewalks and limiting the driving lane into 3 meters width to avoid unexpected speeding.
- Provision of other street elements such as lighting, wayfindings, anti-slip sidewalks paving material, to ensure convenience of the pedestrians.



Current situation at Rat Uthit 200 Road



4.4.6 Road and Connectivity Improvement

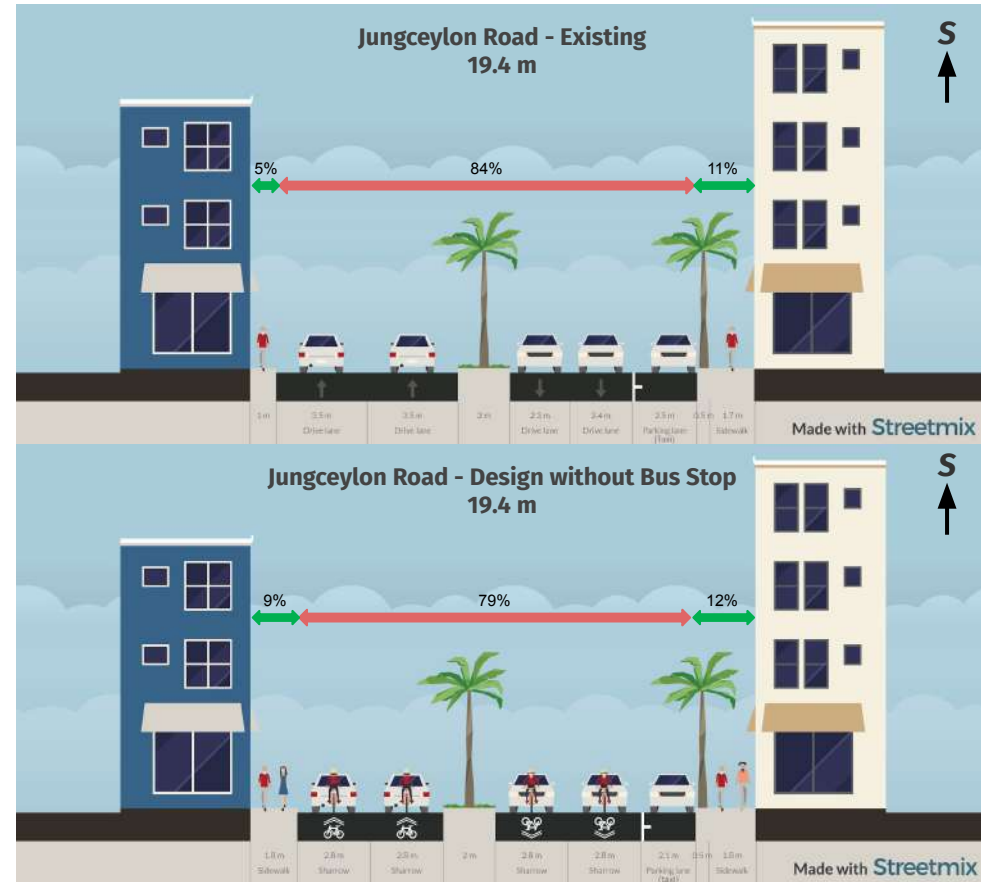
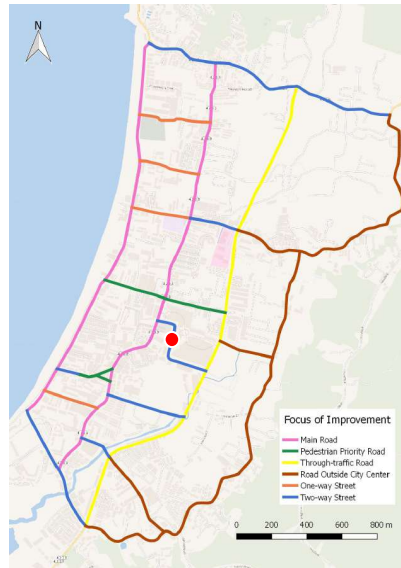
Two-directional street design

Jungceylon Road provides an access to the Jungceylon Shopping Center. The pedestrian traffic in this area is not as high as the other segments.

Proposed plan for improvement at Jungceylon Road:

Design between stations:

- On-street parking remains at this road.
- Widening sidewalks by reconfiguring the parking space and the driving lanes.
- Speed limit for the motorized vehicle up to 30 km/h.



4.4.6 Road and Connectivity Improvement

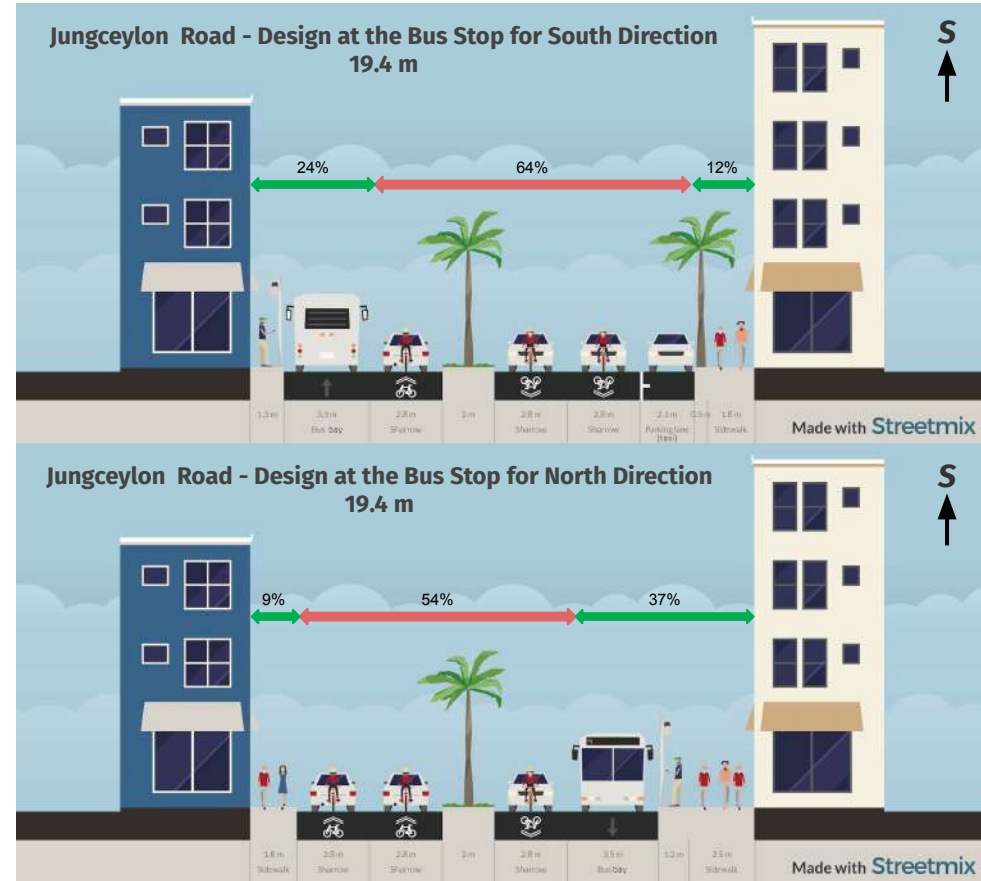
Two-directional street design

Design at the station:

- Provision of bus stop facilities and bus bay.
- In-line stop considering the limited space and low speed traffic.
- Interspace the on-street parking with the bus waiting area.



Current situation at Jungceylon Road



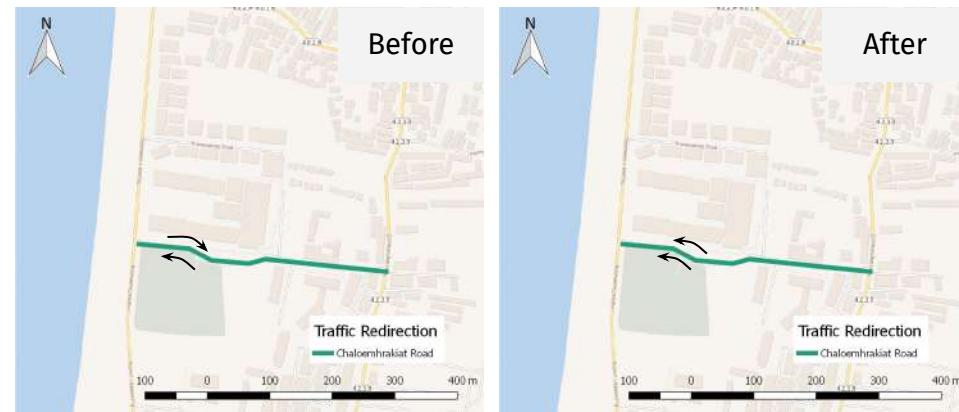
Chaloemhrakiat Road is a two-way street, which connects Thawewong Road and Ratuthit Songroipi Road at the Northern part. It is a narrow street with a width varies between 5-8 meters.

Proposed plan for improvement at Chaloemhrakiat Road:

- Traffic redirection, transform the street into a one-way street. This street has only few interesting activities and does not have enough space for both two-way motorized traffic and pedestrians.
- Direction from East to West. It serves the contra flow of its parallel road (i.e. Hatpatong Road).
- Allocation of space for on-street parking for people coming from Ratuthit Songroipi Road.
- Provision of sidewalks along the street.
- Provision of other street elements such as lighting, wayfindings, anti-slip sidewalks paving material, to ensure convenience of the pedestrians.

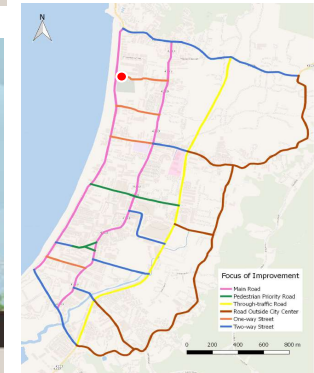
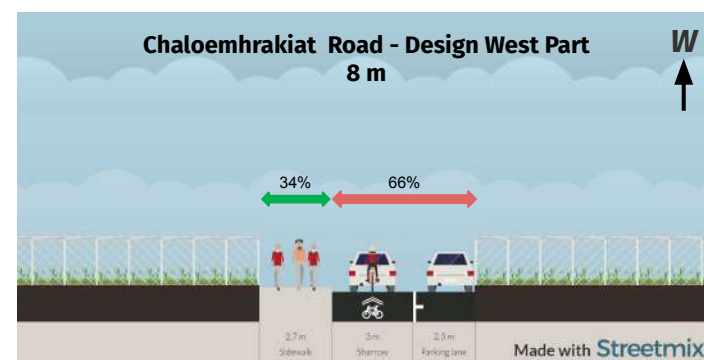
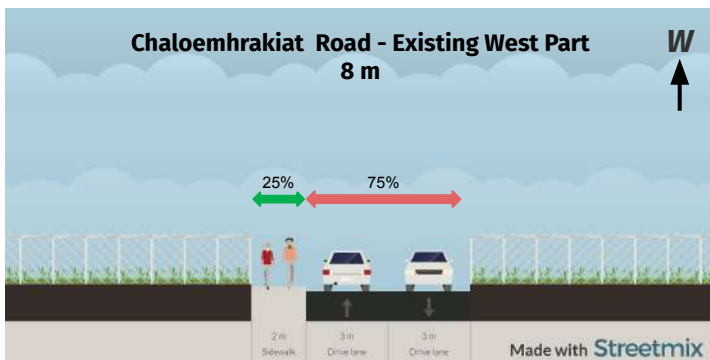
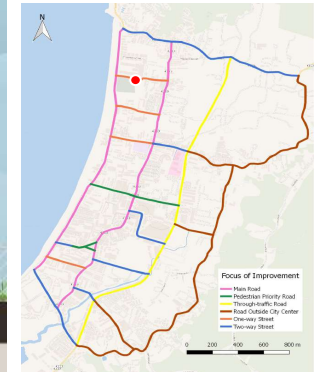
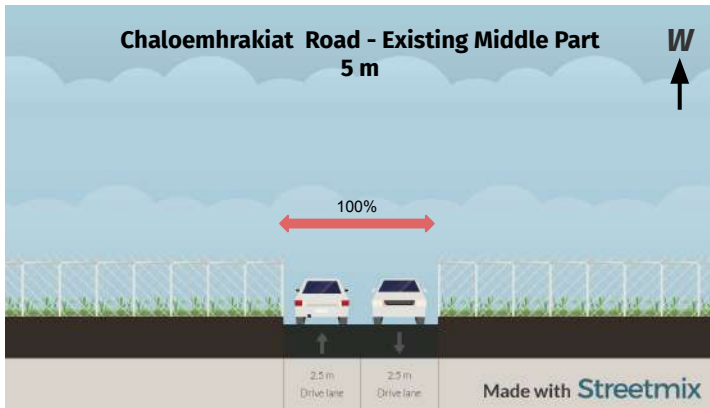
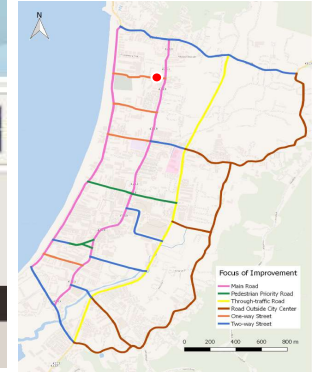
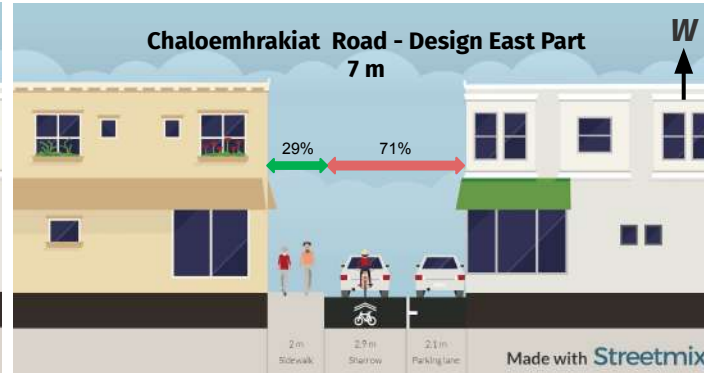
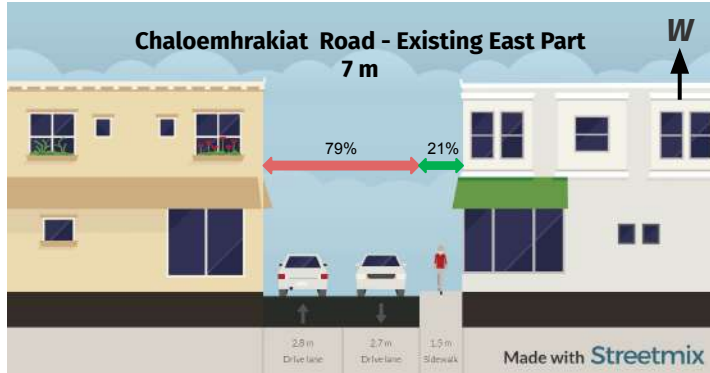


Current situation at Chaloemhrakiat Road



Traffic redirection at Chaloemhrakiat Road

Proposed plan for improvement at Chaloehrakiat Road



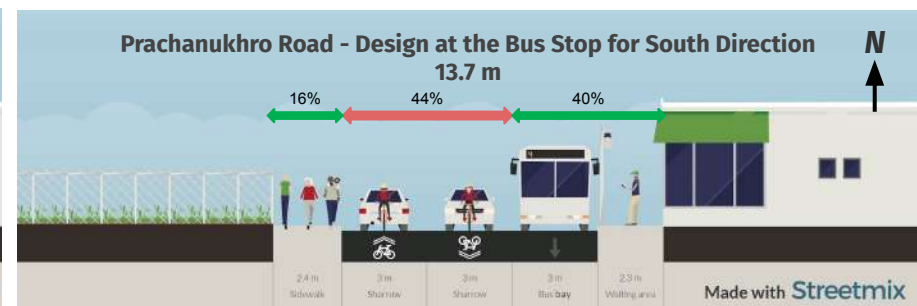
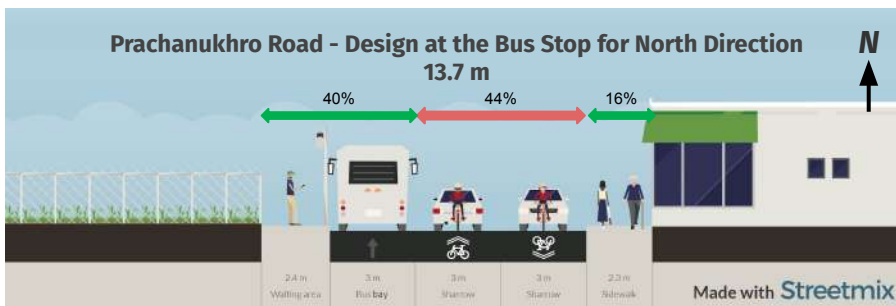
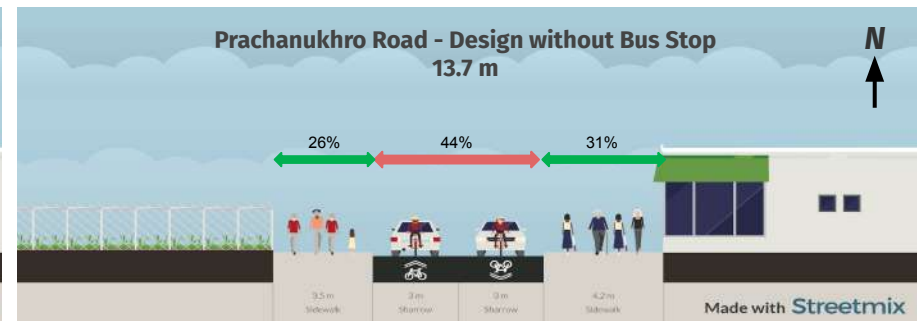
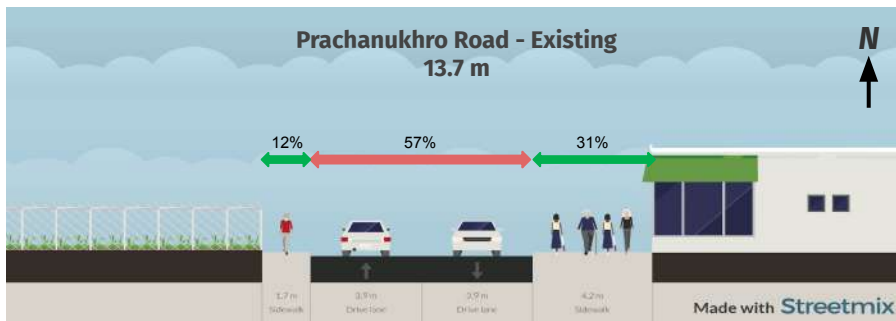
4.4.6 Road and Connectivity Improvement

Two-directional street design

Prachanukhro Road connects the south end of the main roads in Patong.

Proposed plan for improvement at Prachanukhro Road:

- Reconfigure the space to allow sidewalks widening.
- Provision of public transport facility in this area, with a bus bay to allow other vehicle to pass.
- Provision of other street elements such as lighting, wayfindings, anti-slip sidewalks paving material, to ensure convenience of the pedestrians.



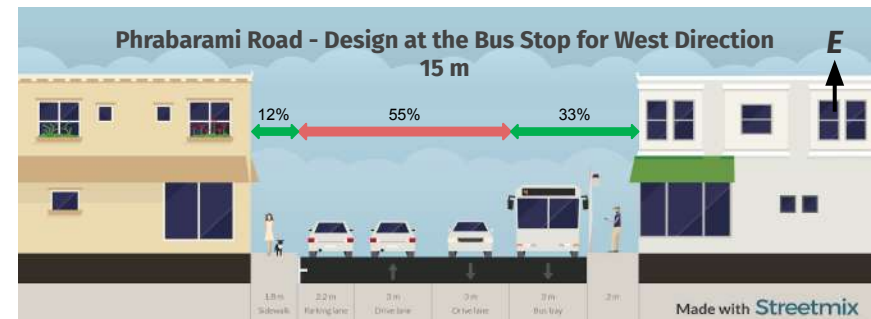
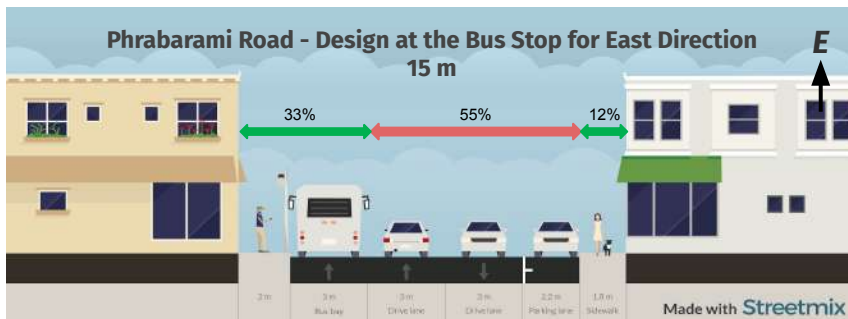
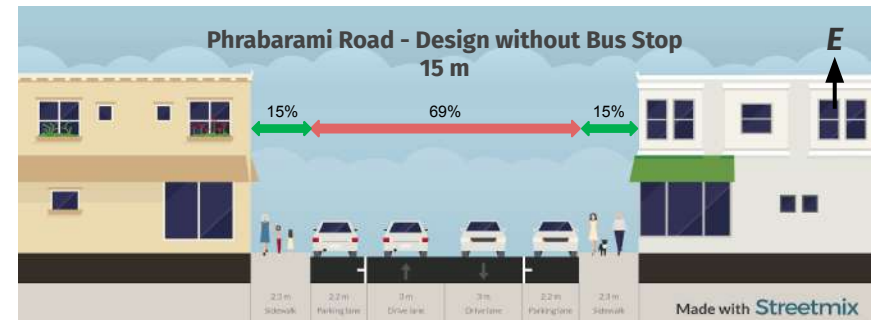
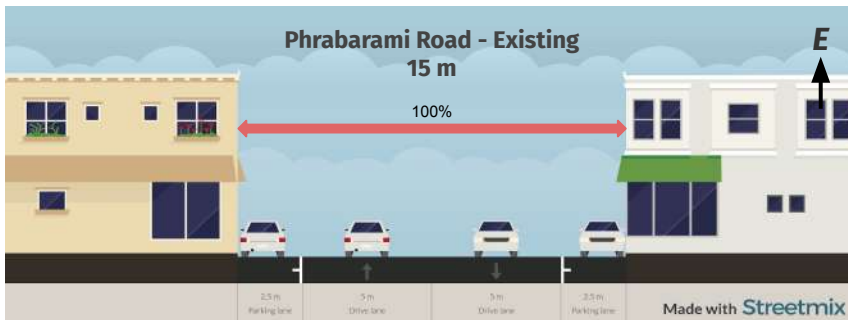
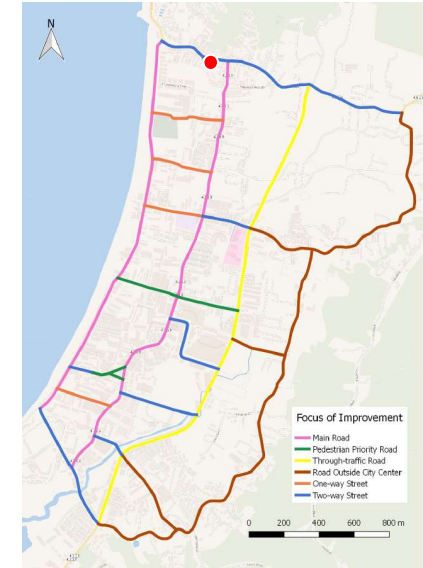
4.4.6 Road and Connectivity Improvement

Two-directional street design

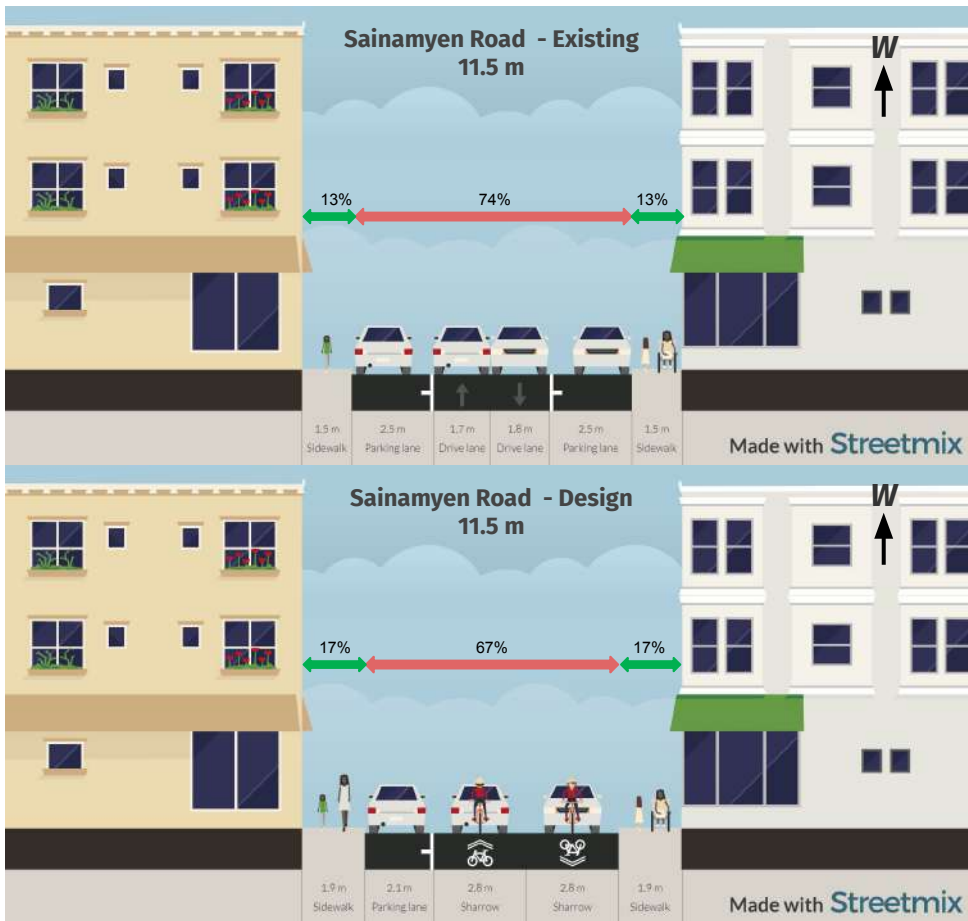
Phrabarami Road is the road that connects the two main roads at the North end. In the current situation, sidewalks do not exist in the most part of the road.

Proposed plan for improvement at Phrabarami Road:

- Reconfigure the space and provide sidewalks for pedestrian.
- On-street parking remains available with 2.2 m width.
- Provision of bus stop and bus bay to accommodate the passengers served by the transit system

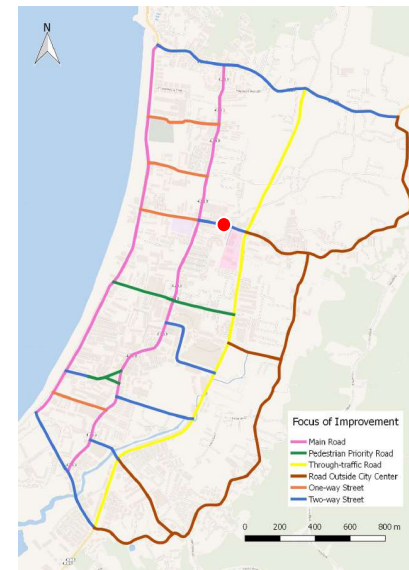


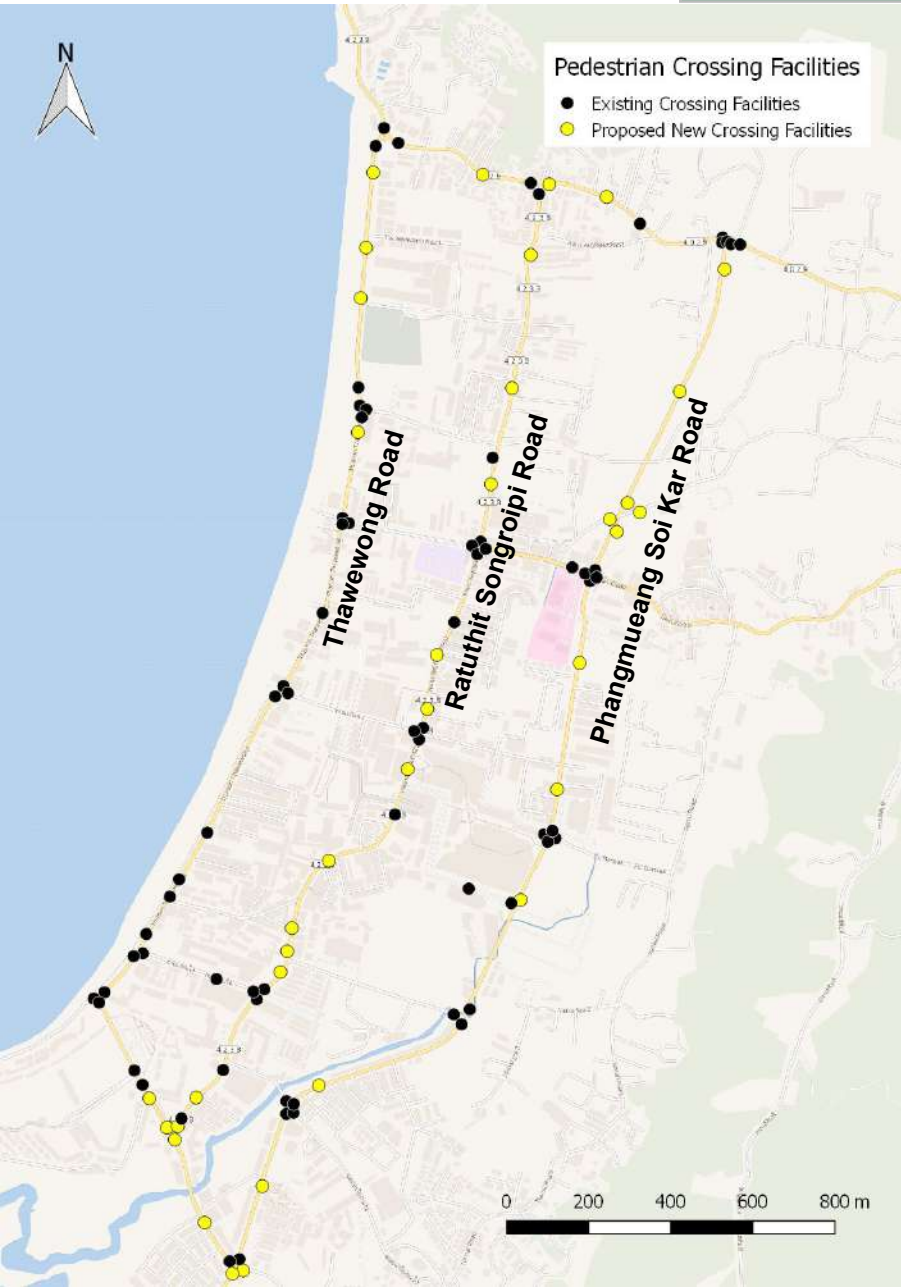
Sainamyen Road connects Phangmueang Road and Ratuthit Songroipi Road. Currently, it has limited space for sidewalks as well as driving lanes due to provision of the on-street parking.



Proposed plan for improvement at Sainamyen Road:

- Reconfigure the space to allow sidewalks widening.
- On-street parking remains available but only on the left side (facing the West direction).
- Provision of other street elements such as lighting, wayfindings, anti-slip sidewalks paving material, to ensure convenience of the pedestrians.



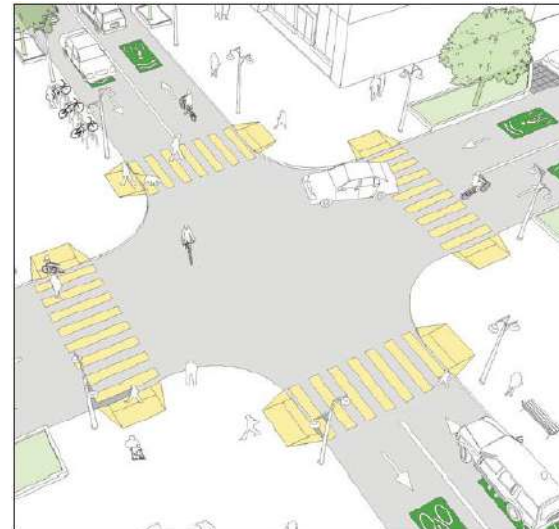


Additional Pedestrian crossing locations

The existing crossing facilities have not accommodated the pedestrian crossing activities well. Therefore, several new crossing locations are proposed as shown from the picture on the left.

It is recommended to place the pedestrian crossing facilities at the following locations:

- Intersections
- Near bus stop
- High pedestrian crossing area (mid block crossing)



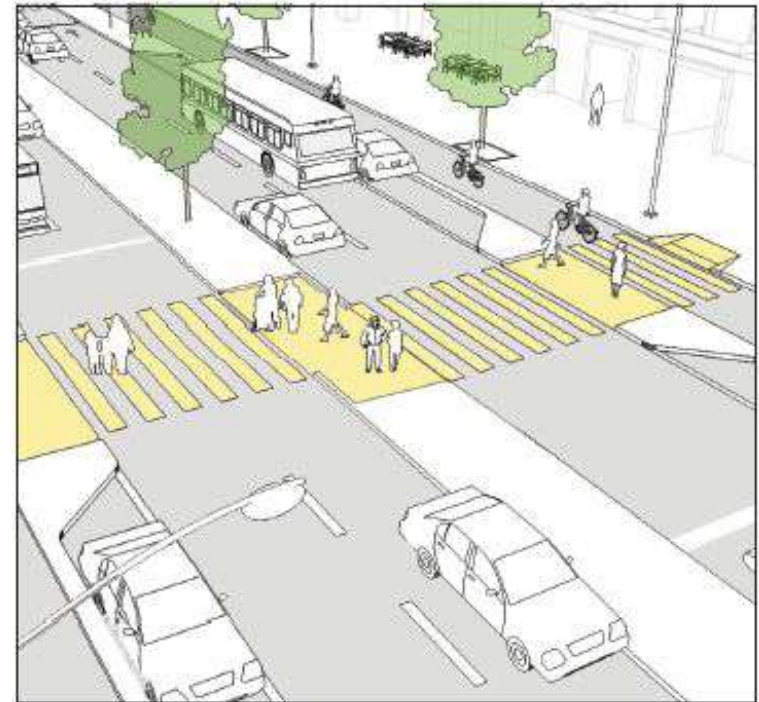
*Illustration of pedestrian crossing design at intersection
(Source: NACTO)*

Mid-block crossing design

In particular for roads with heavier traffic volume such as ,Phangmueang Soi Kar Road, it is recommended to place refuge island at the pedestrian crossing to protect the pedestrian and shorten the crossing distance.



Existing condition at Phangmueang Soi Kar Road



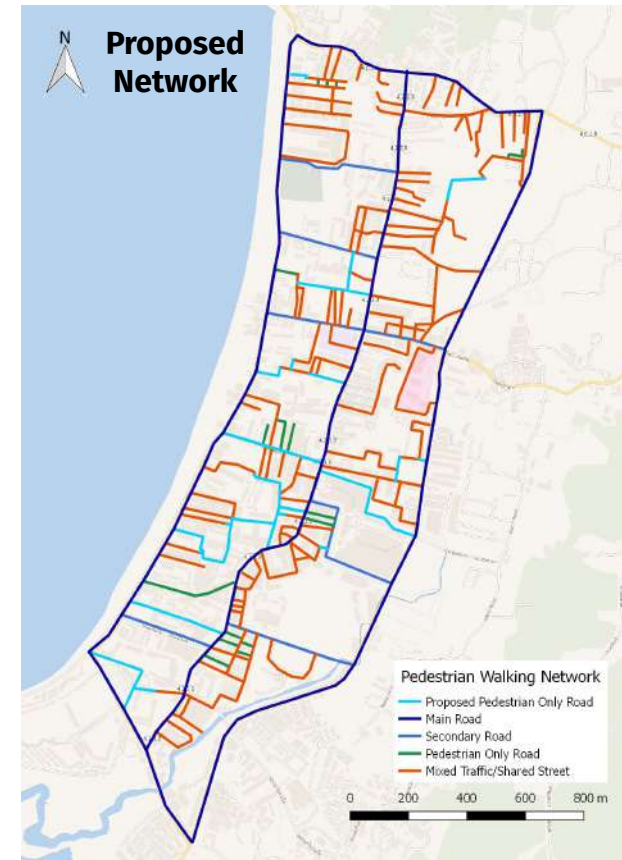
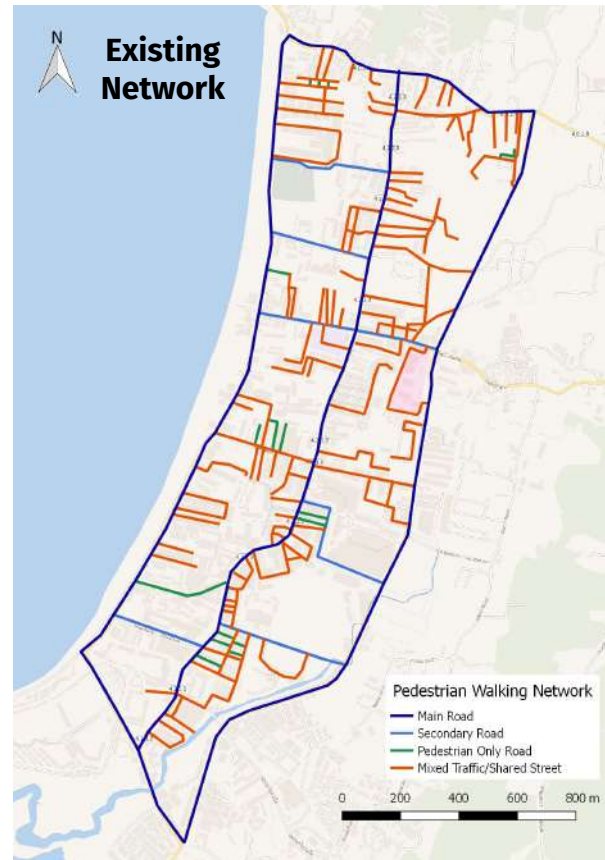
Pedestrian crossing design with refuge island at intersection (Source: NACTO)

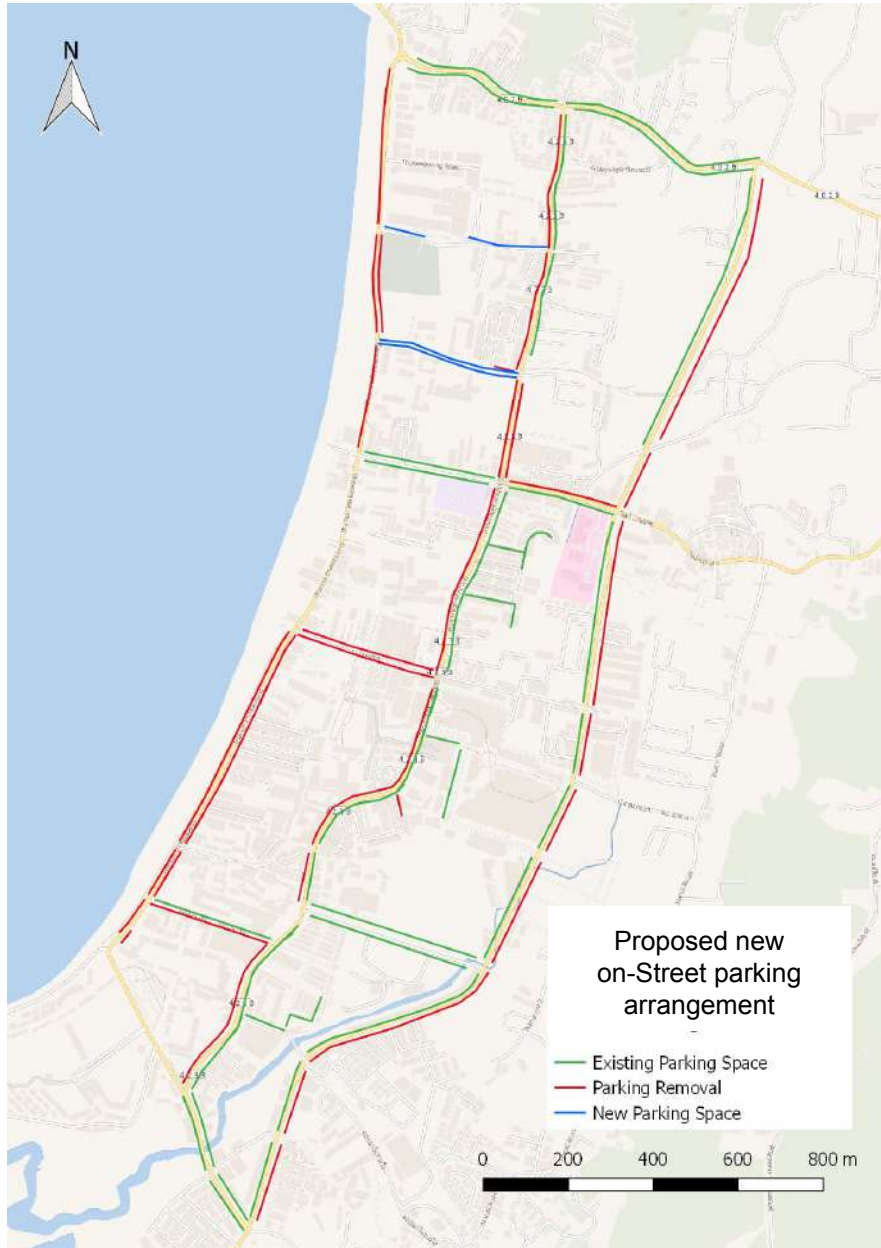
Pedestrian access and wayfindings

To improve pedestrian access to the city center and beachfront area, it is proposed to open pedestrian paths on private properties that can reduce walking distance in between roads.

Wayfindings also need to be provided on those paths, therefore tourists will be well-informed about shortcuts to reach the destinations and give priority for pedestrians as well.

By providing these connections, pedestrians not only walk shorter, but with less vehicles passing on those streets can ensure more safety and comfortable walking experience for pedestrians

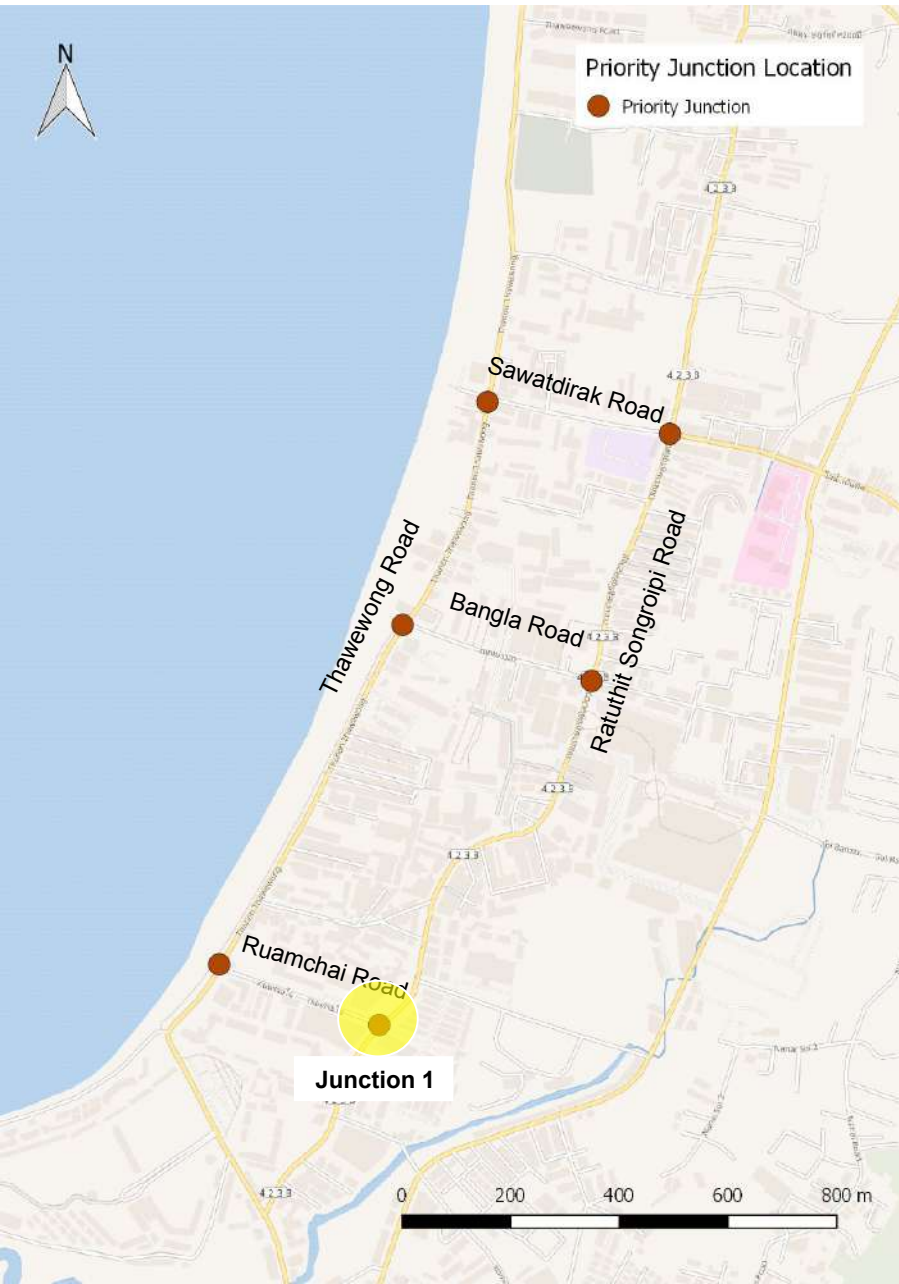




Reclaiming parking space for pedestrians

While prioritizing the space for the pedestrian, the proposed street reconfiguration in the previous chapter suggest to modify the on-street parking, which can be summarized by this figure.

With this proposal, **758 parking spots** are removed to provide more space for the non-motorized vehicle. At the same time, **53 parking spots** are added at the locations where the traffic volume and pedestrians activities are low.



Junction 1

Proposed plan for improvement:

- Adding curb extensions to reduce motorized turning radius
- At-grade crossing for the pedestrians and cyclists
- Protection of bike crossings when there is potential conflict with the turning vehicles and provision of queue box for turn-right bikes
- Buffers for protecting the bike lanes
- Ramps and tactile pavings on pedestrian crossings for universal access
- Pedestrian refuge island in line with parking lane

4.4.10 Junction Design Improvement

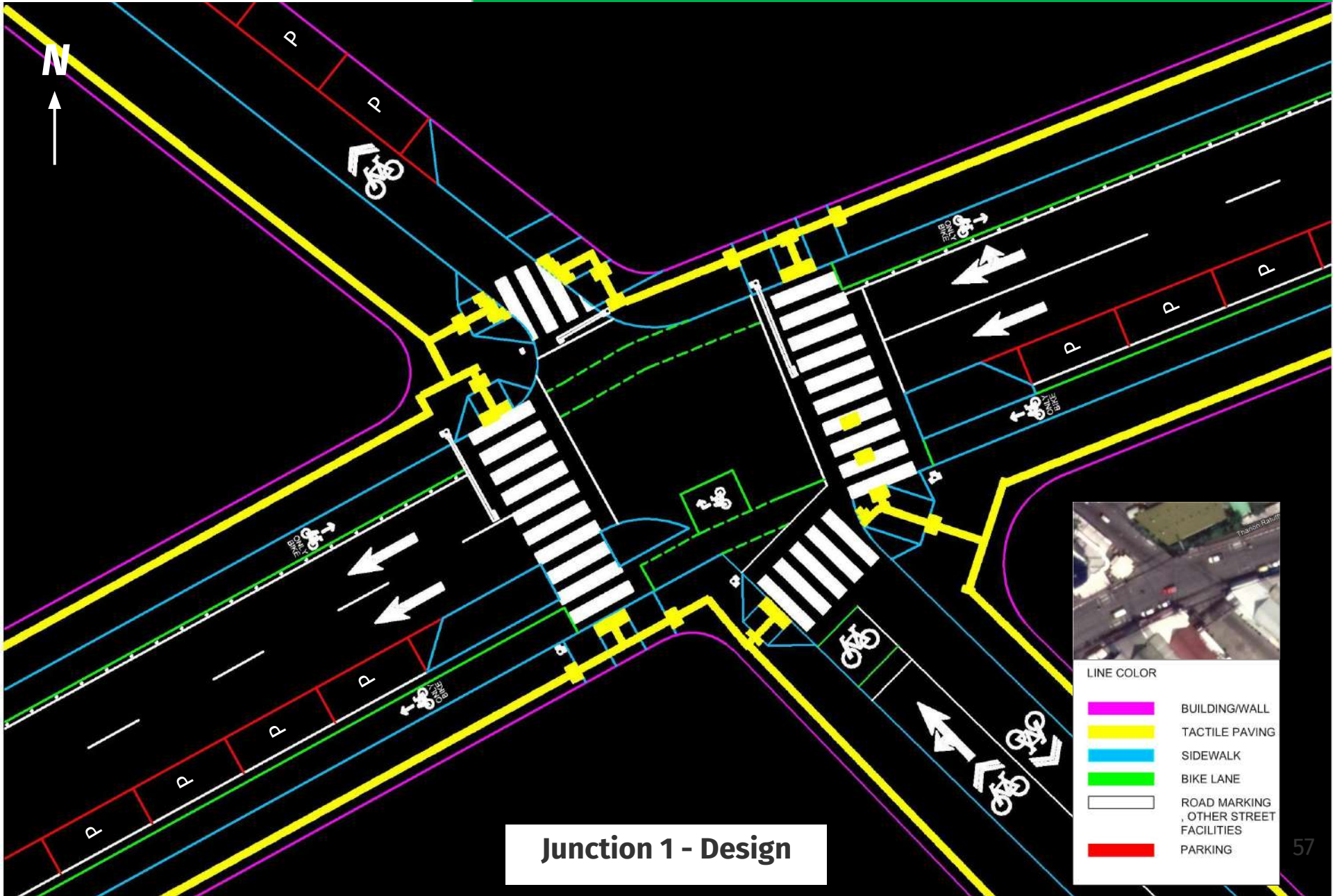


Junction 1 - Existing



LINE COLOR	
█	BUILDING/WALL
█	TACTILE PAVING
█	SIDEWALK
	ROAD MARKING, OTHER STREET FACILITIES
█	PARKING

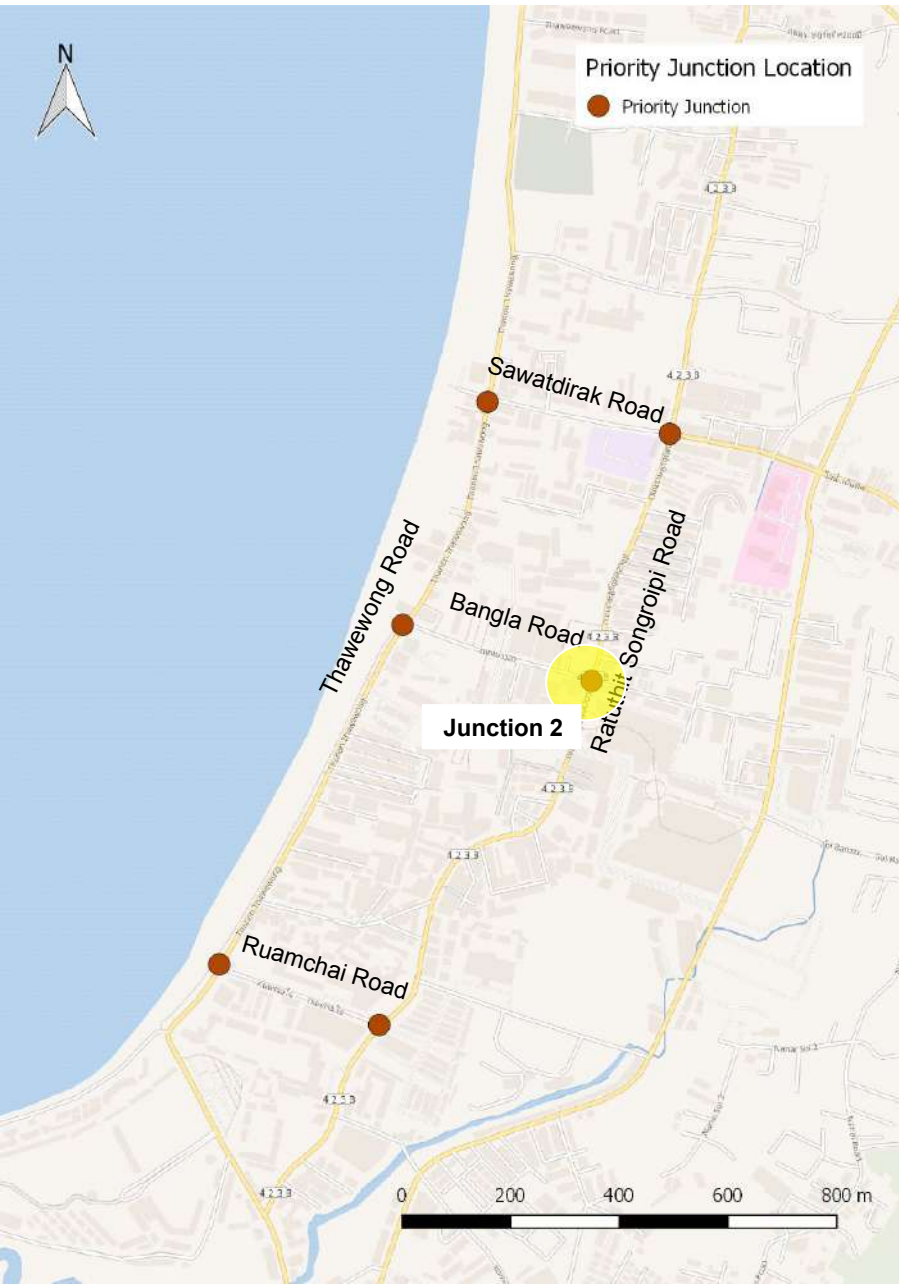
4.4.10 Junction Design Improvement



Junction 1 - Design



LINE COLOR	
█	BUILDING/WALL
█	TACTILE PAVING
█	SIDEWALK
█	BIKE LANE
	ROAD MARKING, OTHER STREET FACILITIES
█	PARKING

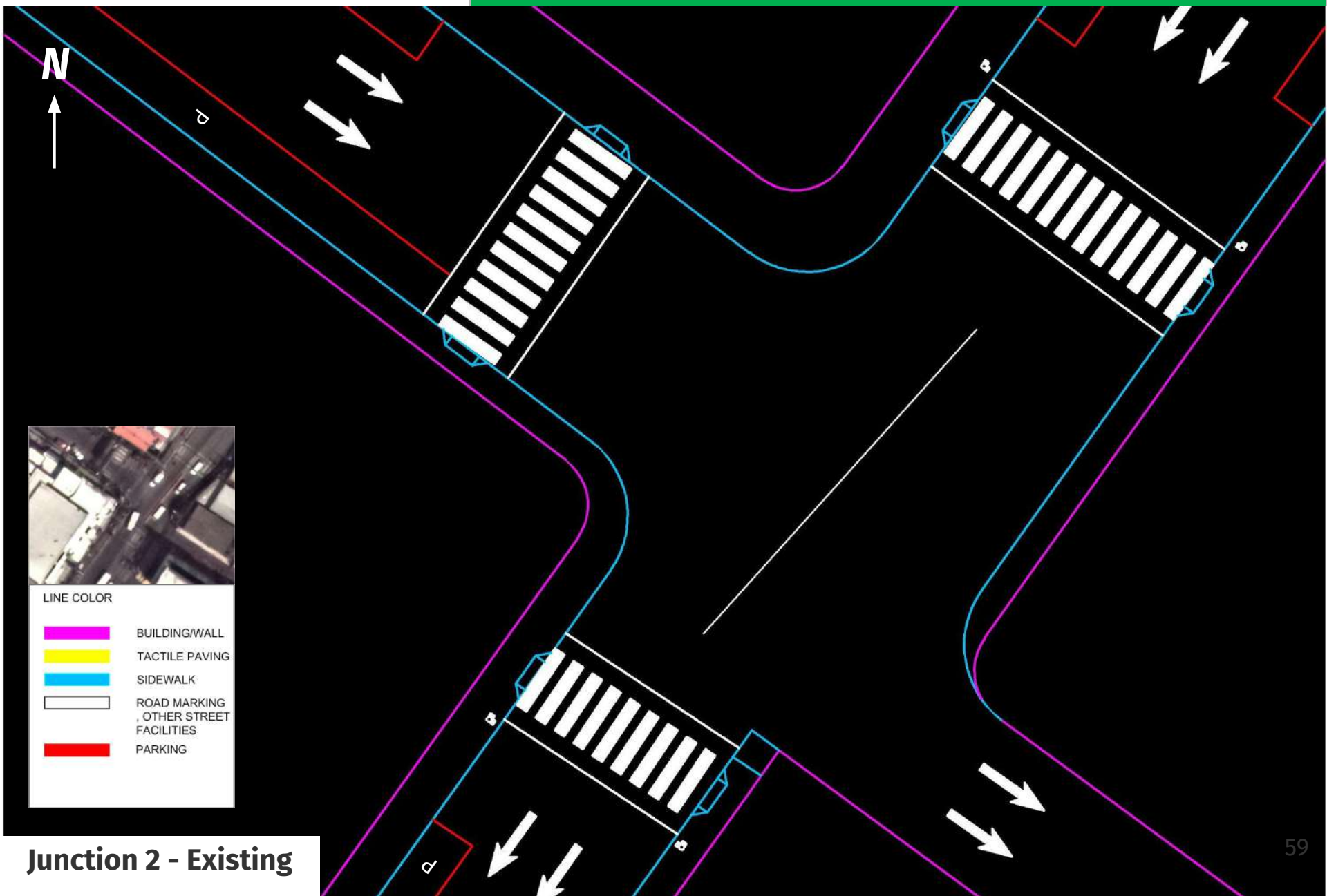


Junction 2

Proposed plan for improvement:

- Buffers for protecting the bike lanes
- Bollards to prevent vehicles entering the pedestrian-only streets
- Adding curb extensions to reduce motorized turning radius.
- At-grade crossing for the pedestrians and cyclists
- Ramps and tactile pavings on pedestrian crossings for universal access
- Pedestrian refuge island in line with parking lane

4.4.10 Junction Design Improvement

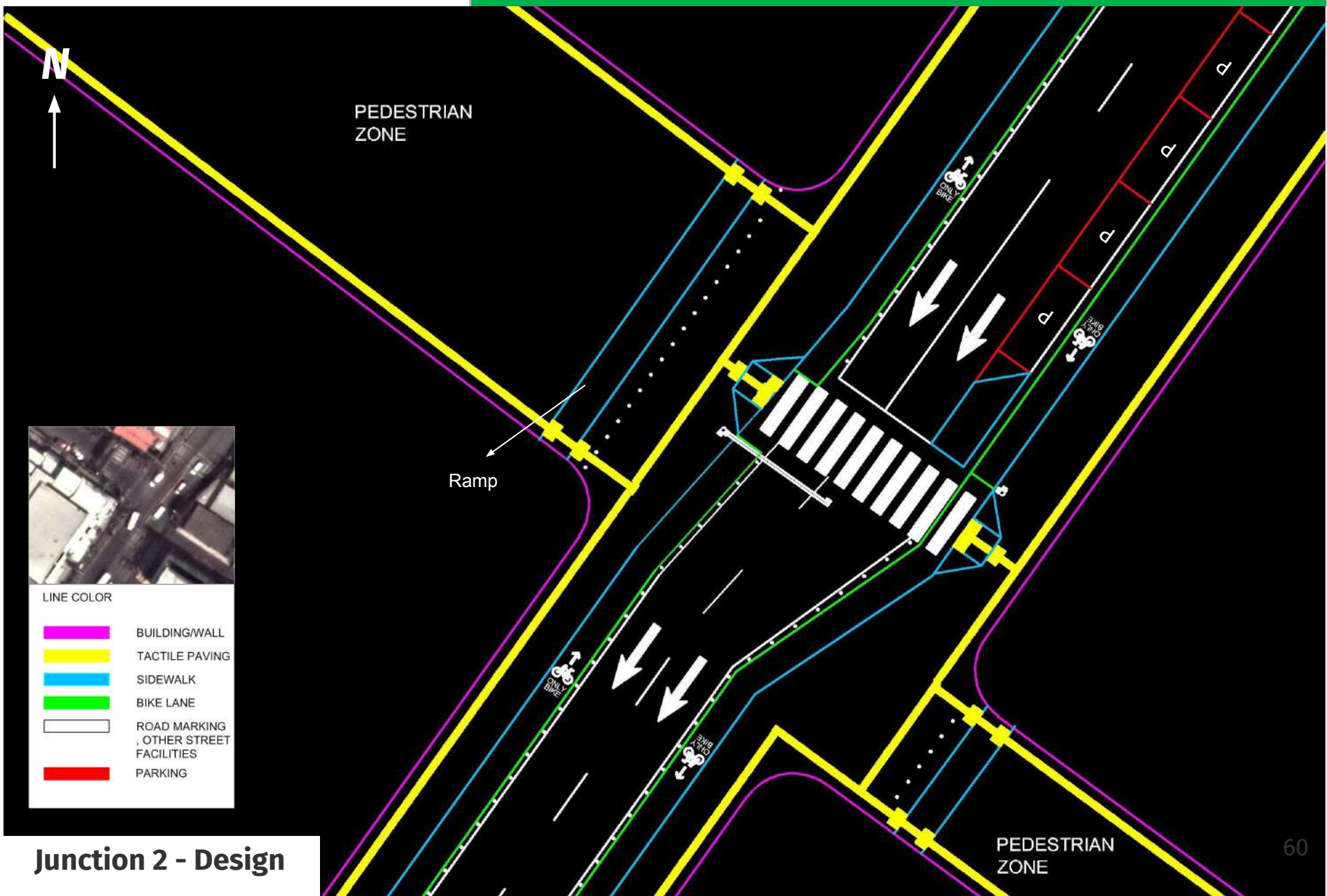


LINE COLOR

	BUILDING/WALL
	TACTILE PAVING
	SIDEWALK
	ROAD MARKING, OTHER STREET FACILITIES
	PARKING

Junction 2 - Existing

4.4.10 Junction Design Improvement



PEDESTRIAN ZONE

Ramp

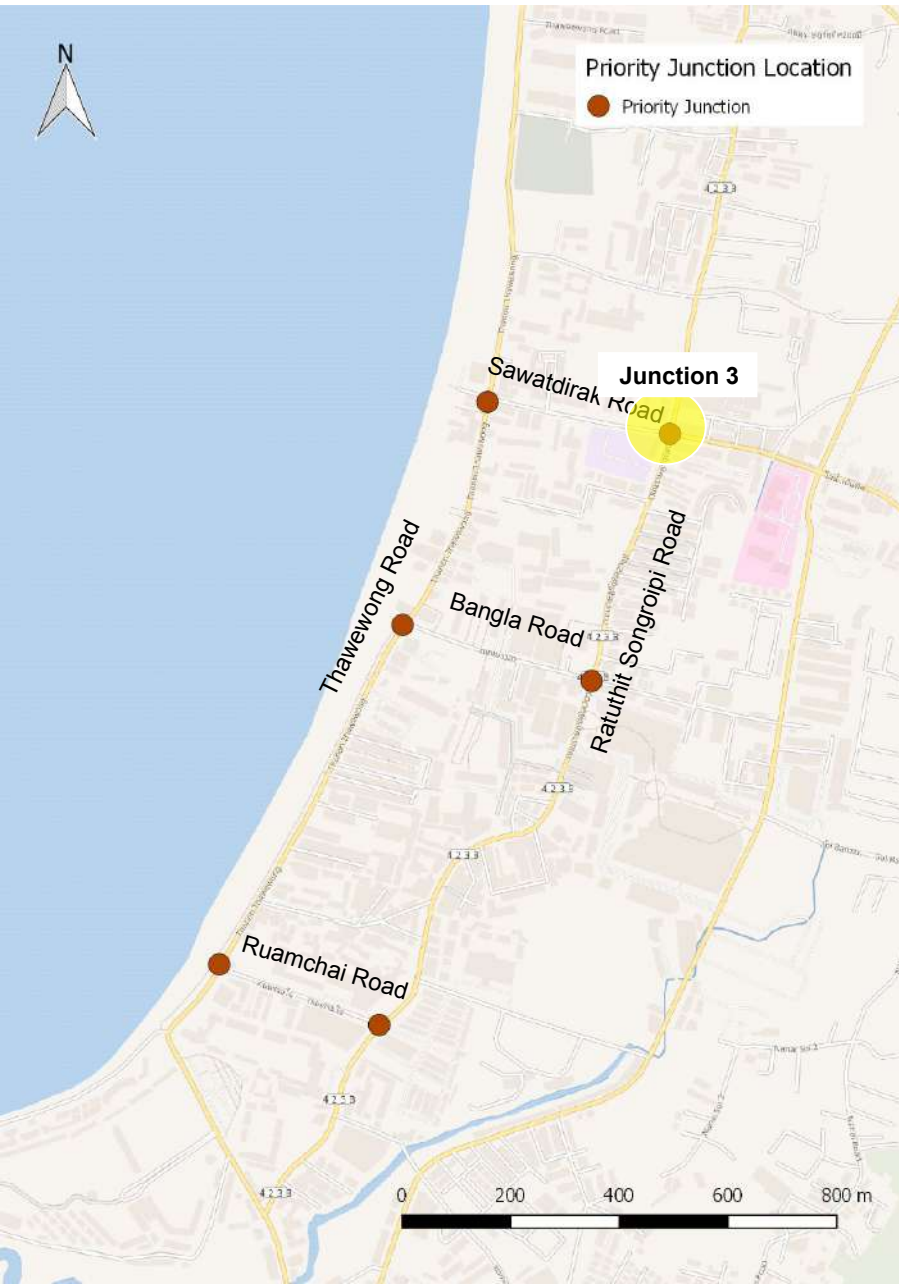


LINE COLOR

- BUILDING/WALL
- TACTILE PAVING
- SIDEWALK
- BIKE LANE
- ROAD MARKING, OTHER STREET FACILITIES
- PARKING

Junction 2 - Design

PEDESTRIAN ZONE



Junction 3

Proposed plan for improvement:

- Adding curb extension to reduce motorized turning radius
- Buffers for protecting the bike lanes
- At-grade crossing for the pedestrians and cyclists
- Ramps and tactile pavings on pedestrian crossings for universal access
- Bike box before the intersection to prevent conflict with turning-left vehicles
- Queue box for turning-right bikes
- Mixing zone to ease turning-left bikes and vehicles

4.4.10 Junction Design Improvement



LINE COLOR

█	BUILDING/WALL
█	TACTILE PAVING
█	SIDEWALK
	ROAD MARKING, OTHER STREET FACILITIES
█	PARKING

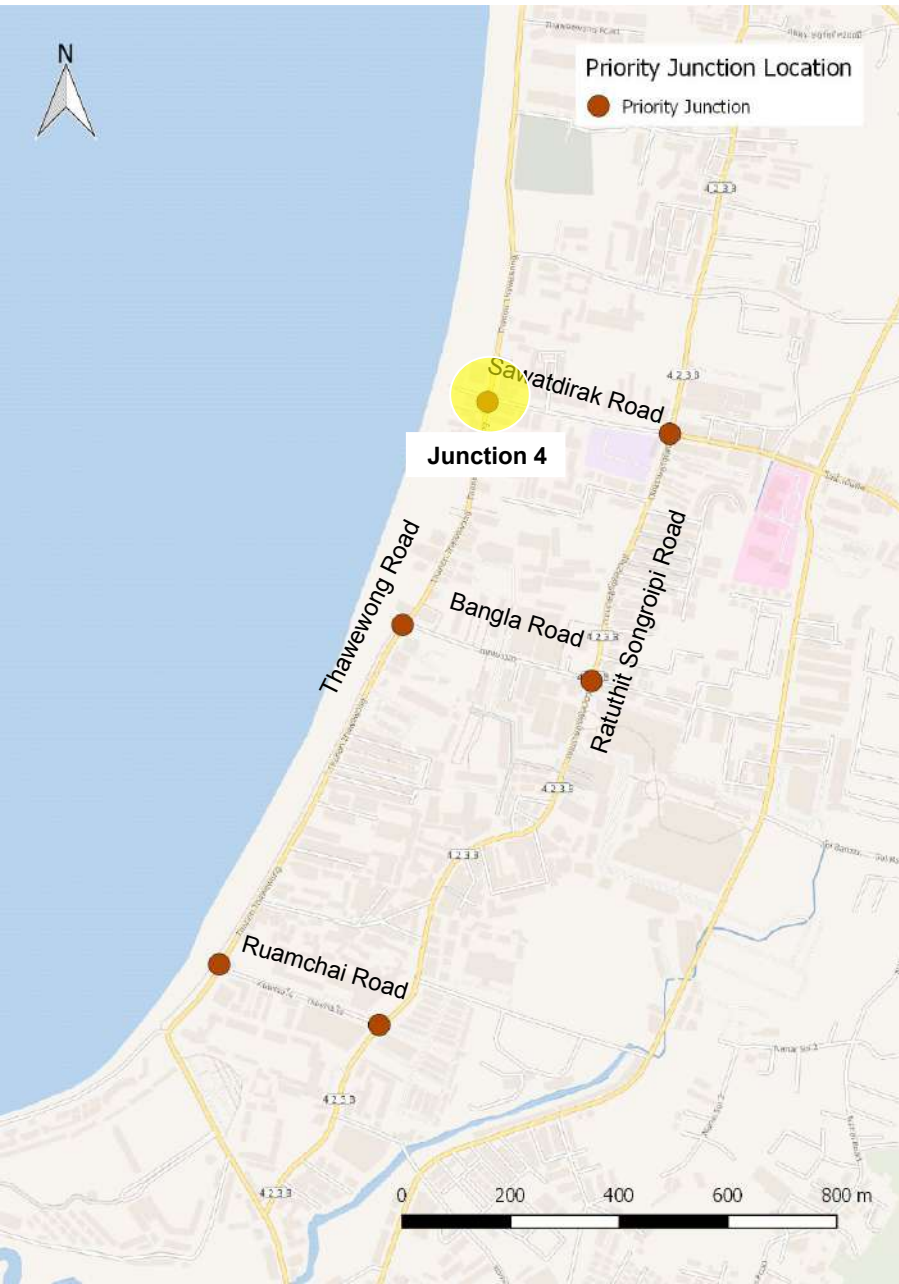
Junction 3 - Existing

4.4.10 Junction Design Improvement



LINE COLOR	
█	BUILDING/WALL
█	TACTILE PAVING
█	SIDEWALK
█	BIKE LANE
	ROAD MARKING, OTHER STREET FACILITIES
█	PARKING

Junction 3 - Design

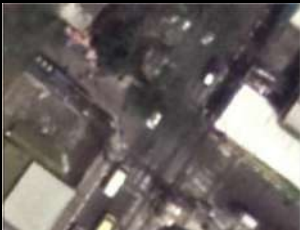


Junction 4

Proposed plan for improvement:

- Bollards to prevent vehicles entering the pedestrian-only streets
- Adding curb extension to reduce motorized turning radius
- At-grade crossing for the pedestrians and cyclists
- Ramps and tactile pavings on pedestrian crossings for universal access
- Bike box before the intersection to prioritize the bike to enter the dedicated bike lanes and prevent conflict with the turning vehicles

4.4.10 Junction Design Improvement



LINE COLOR

█	BUILDING/WALL
█	TACTILE PAVING
█	SIDEWALK
	ROAD MARKING, OTHER STREET FACILITIES
█	PARKING

Junction 4 - Existing

4.4.10 Junction Design Improvement

N



PEDESTRIAN ZONE

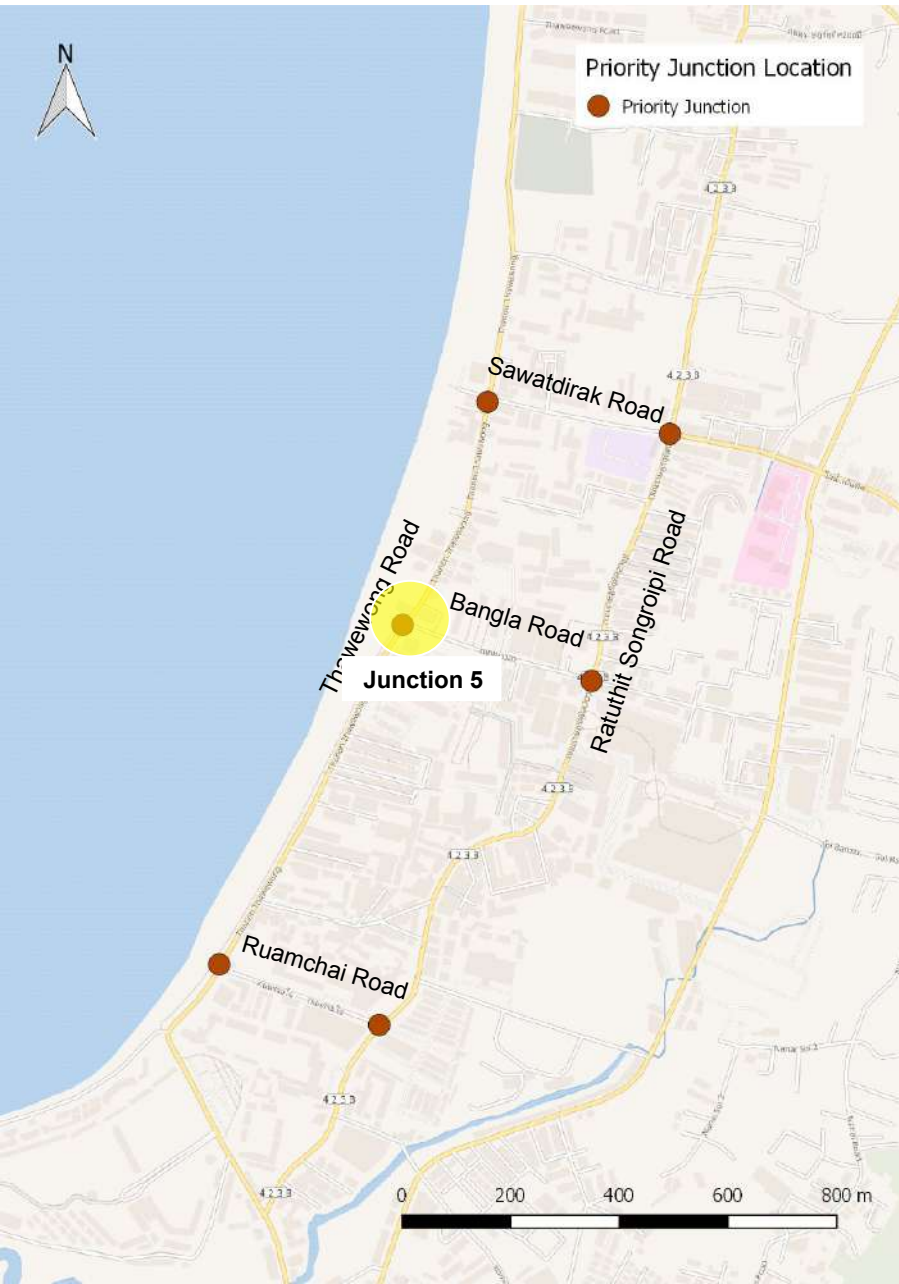


LINE COLOR

- BUILDING/WALL
- TACTILE PAVING
- SIDEWALK
- BIKE LANE
- ROAD MARKING, OTHER STREET FACILITIES
- PARKING

Junction 4 - Design



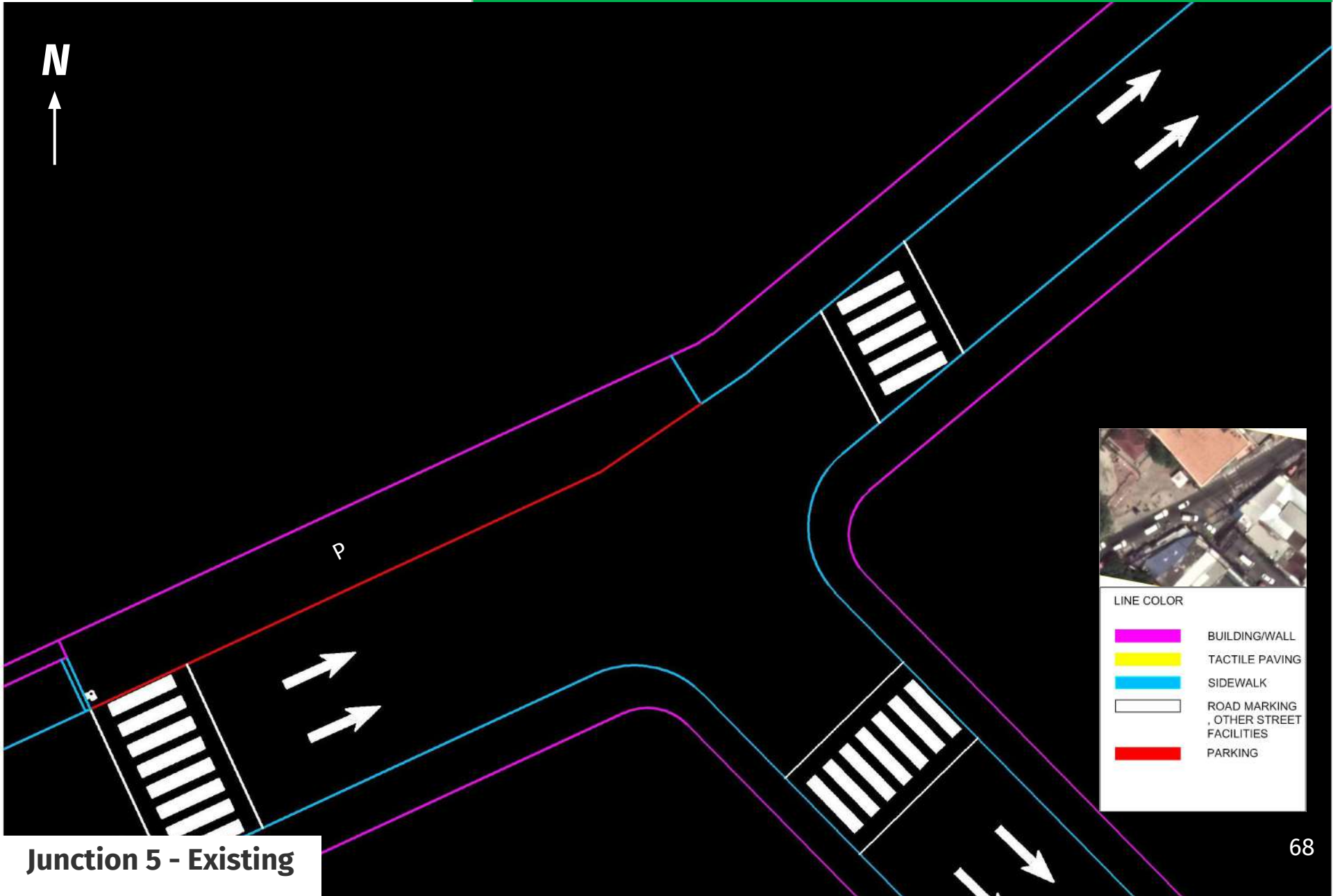


Junction 5

Proposed plan for improvement:

- Bollards to prevent vehicles entering the pedestrian-only streets
- Adding curb extension to reduce motorized turning radius
- At-grade crossing for the pedestrians and cyclists.
- Ramps and tactile pavings on pedestrian crossings for universal access
- Bike box before the intersection to ease the bikes entering the sharrow area

4.4.10 Junction Design Improvement

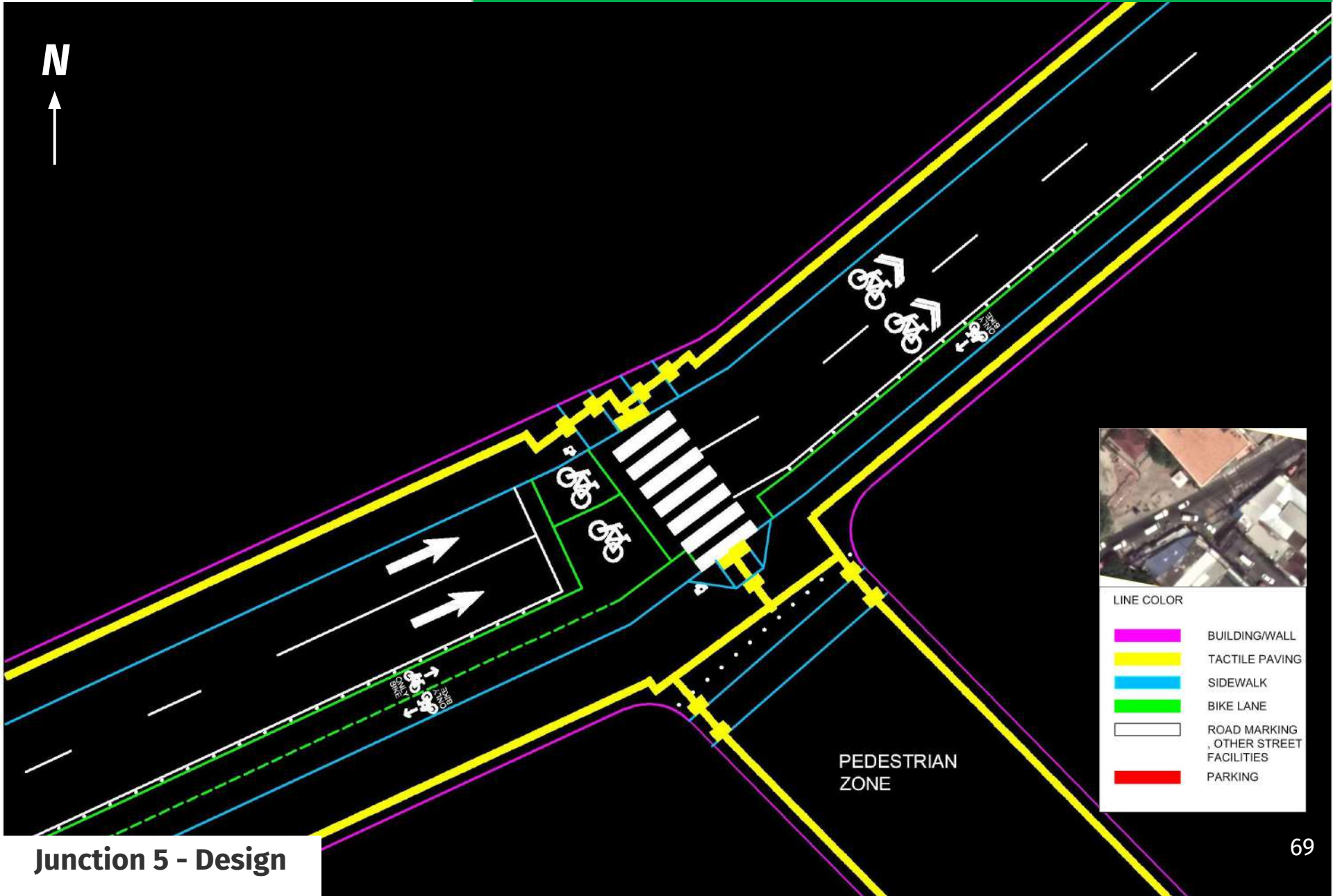


LINE COLOR

█	BUILDING/WALL
█	TACTILE PAVING
█	SIDEWALK
	ROAD MARKING, OTHER STREET FACILITIES
█	PARKING

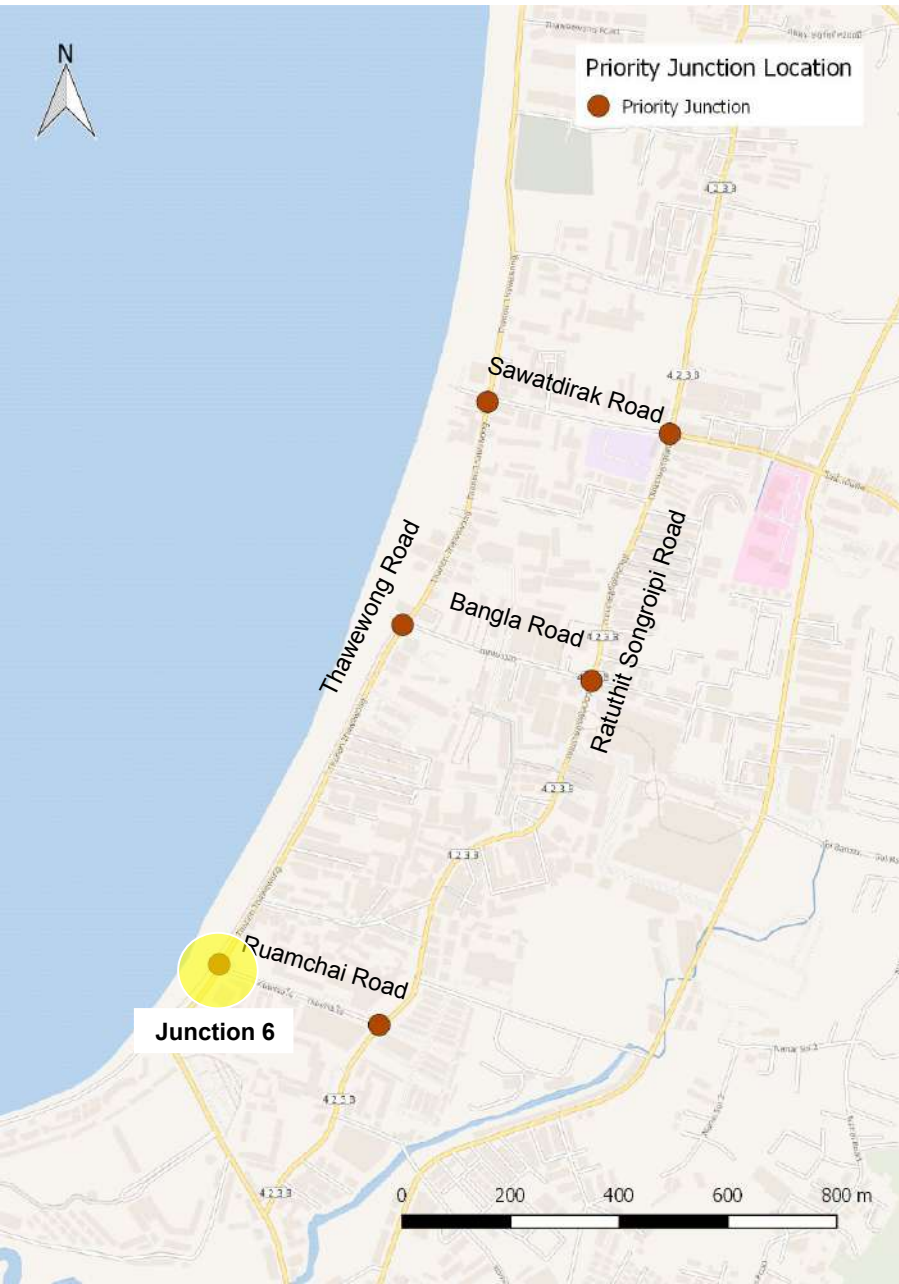
Junction 5 - Existing

4.4.10 Junction Design Improvement



LINE COLOR	
█	BUILDING/WALL
█	TACTILE PAVING
█	SIDEWALK
█	BIKE LANE
	ROAD MARKING, OTHER STREET FACILITIES
█	PARKING

Junction 5 - Design

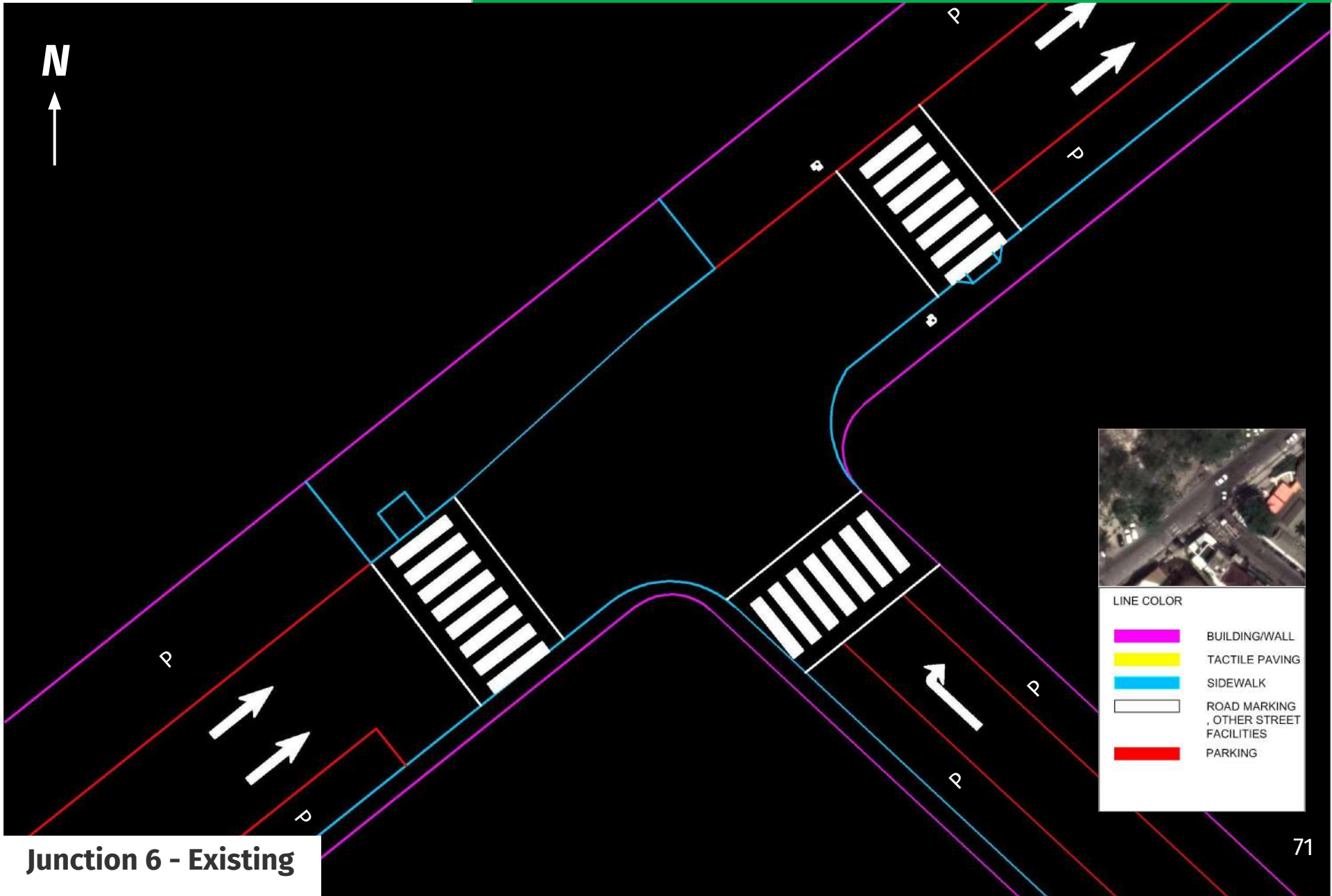


Junction 6

Proposed plan for improvement:

- Adding curb extension to reduce motorized turning radius
- At-grade crossing for the pedestrians and cyclists
- Ramps and tactile pavings on pedestrian crossings for universal access
- Protection of bike crossings when there is potential conflict with the turning vehicle
- Bike box to prevent conflict with the turning vehicles

4.4.10 Junction Design Improvement

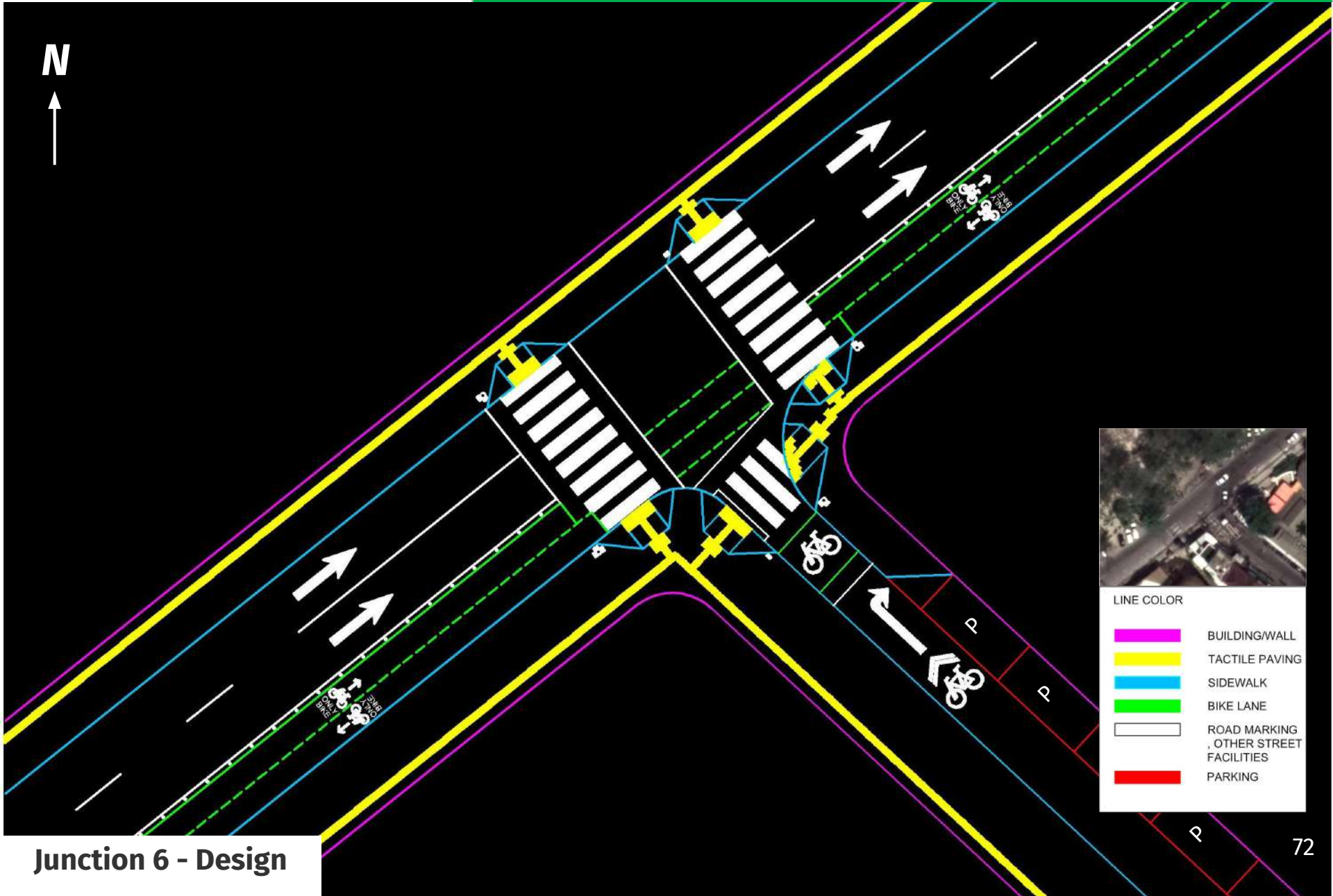


LINE COLOR

█	BUILDING/WALL
█	TACTILE PAVING
█	SIDEWALK
 	ROAD MARKING, OTHER STREET FACILITIES
█	PARKING

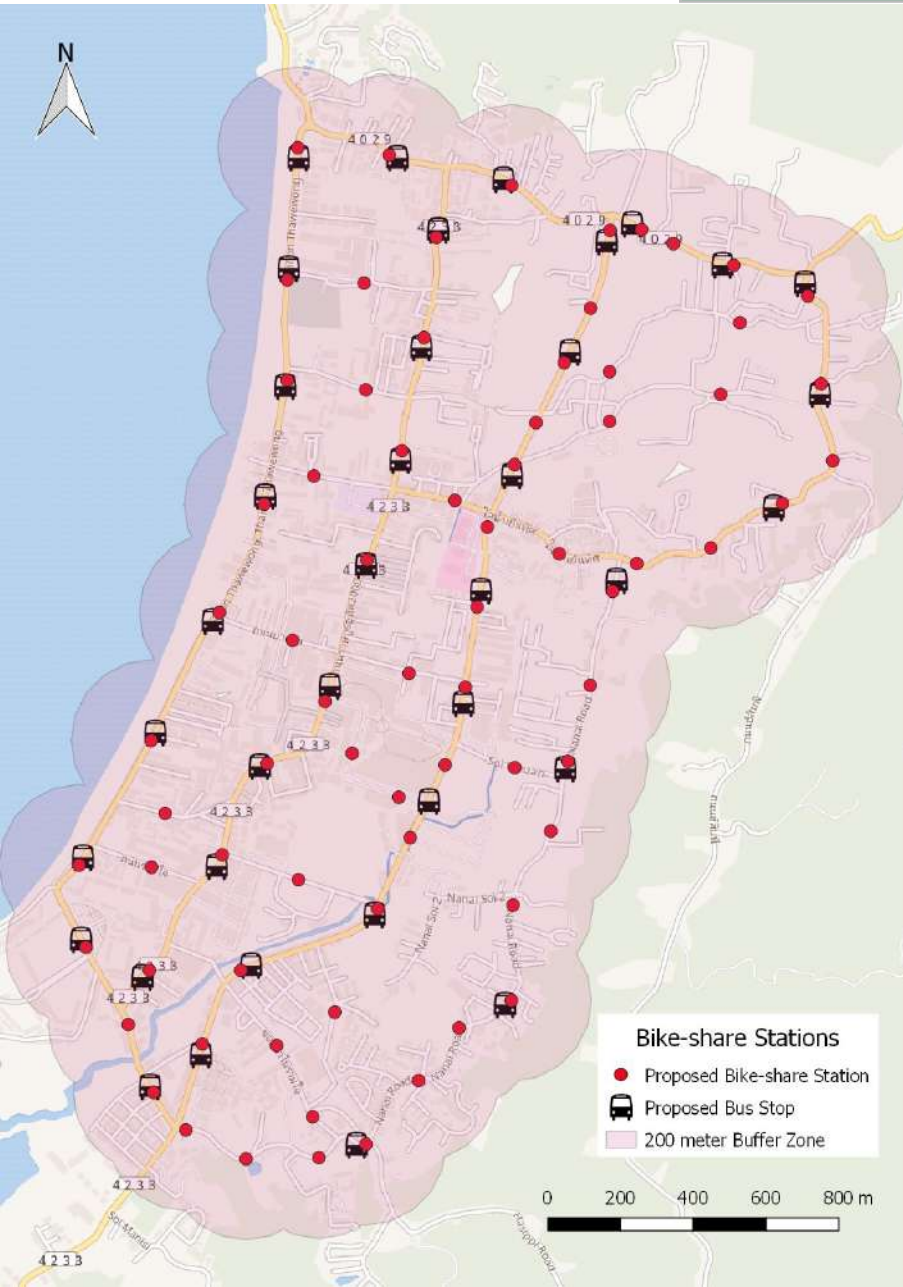
Junction 6 - Existing

4.4.10 Junction Design Improvement



LINE COLOR	
	BUILDING/WALL
	TACTILE PAVING
	SIDEWALK
	BIKE LANE
	ROAD MARKING, OTHER STREET FACILITIES
	PARKING

Junction 6 - Design



Bike-sharing

To promote cycling as one of transportation modes in Patong, bike-sharing system is proposed to be implemented at all areas of the city. Bike-share allows people to borrow bikes from the nearest bike-share stations available for short trips around the city. It is also a part of public transport as the system is connected to the public transport network.

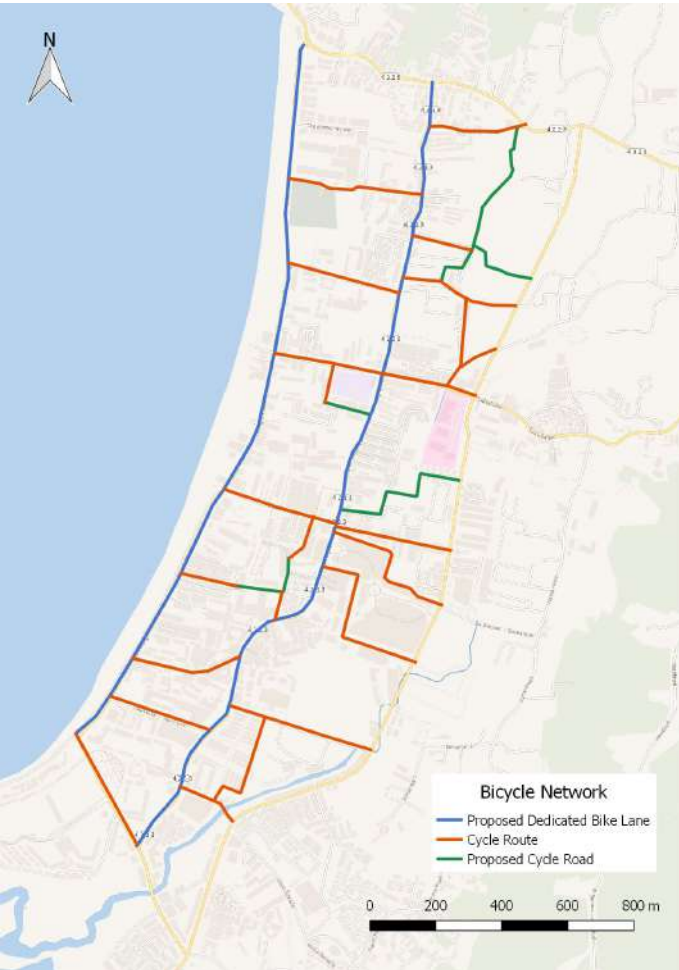
Bike-share stations should be located at bus stops, high density areas such as residential areas, and high demand areas such as shopping centers, hotels, restaurants, and other tourist attractions. Distances between stations should not exceed the walking distance so that people will be more encouraged to cycle.

Number of Bike-share Stations	Estimated Number of Bicycles at Stations	Total
54 (main roads)	20	1,365
19 (other roads)	15	

Bike Network Plan at City Center

To ensure safe and comfortable cycling environment, dedicated bike lanes are proposed to be implemented at Thawewong Road and Ratuthit Songroipi Road.

However, other roads can be used as cycle roads to form a cycle network in Patong. At this network, priority should be given to cyclists than to private vehicles. Signage and other cycle facilities, especially at junctions, are to be provided along the network.



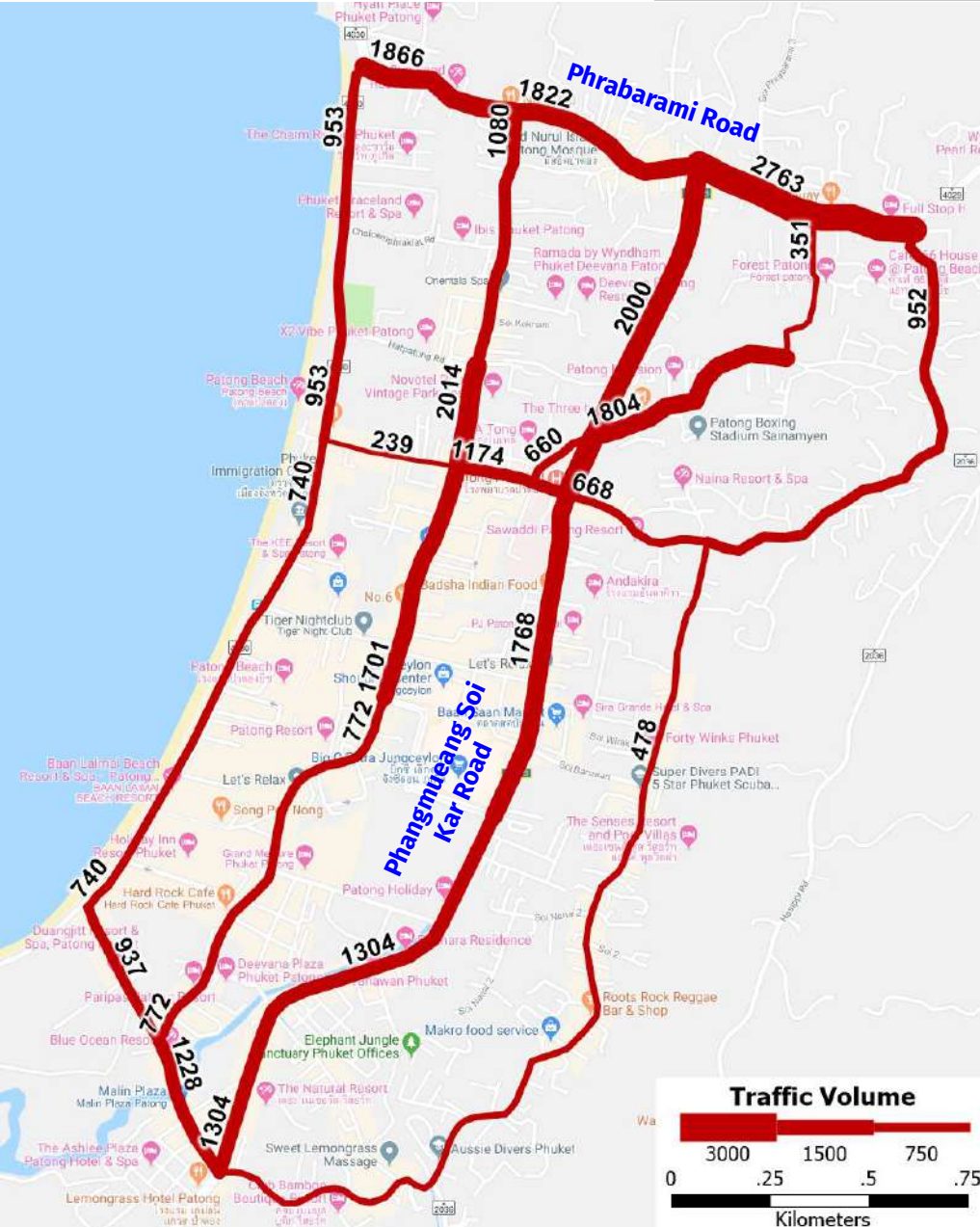
Example of bicycle route at shared street



A cyclist in Patong

Traffic Volume

Phangmueang Soi Kar Road and Phrabarami Road have the consistency of high traffic volumes as they are the roads that connect Patong to other areas in Phuket. As for the beachfront area where people are mostly walking, there are less traffic.



Traffic at Phangmueang Soi Kar Road

4.5.1 Public Transport Overview

Most visitors in Patong are tourists, both domestic and foreign, where most of them come with minivans, private cars, and only a few with buses. Motorcycle rent is also popular since there are limited number of public transport available within the city.

Public transport network are very limited in Patong. There are only buses that goes to airport and Phuket Town, with no local routes available. Other than private vehicles, tourists move around using hotel shuttle bus and taxis, which also offer tours to surrounding beaches and attraction places.



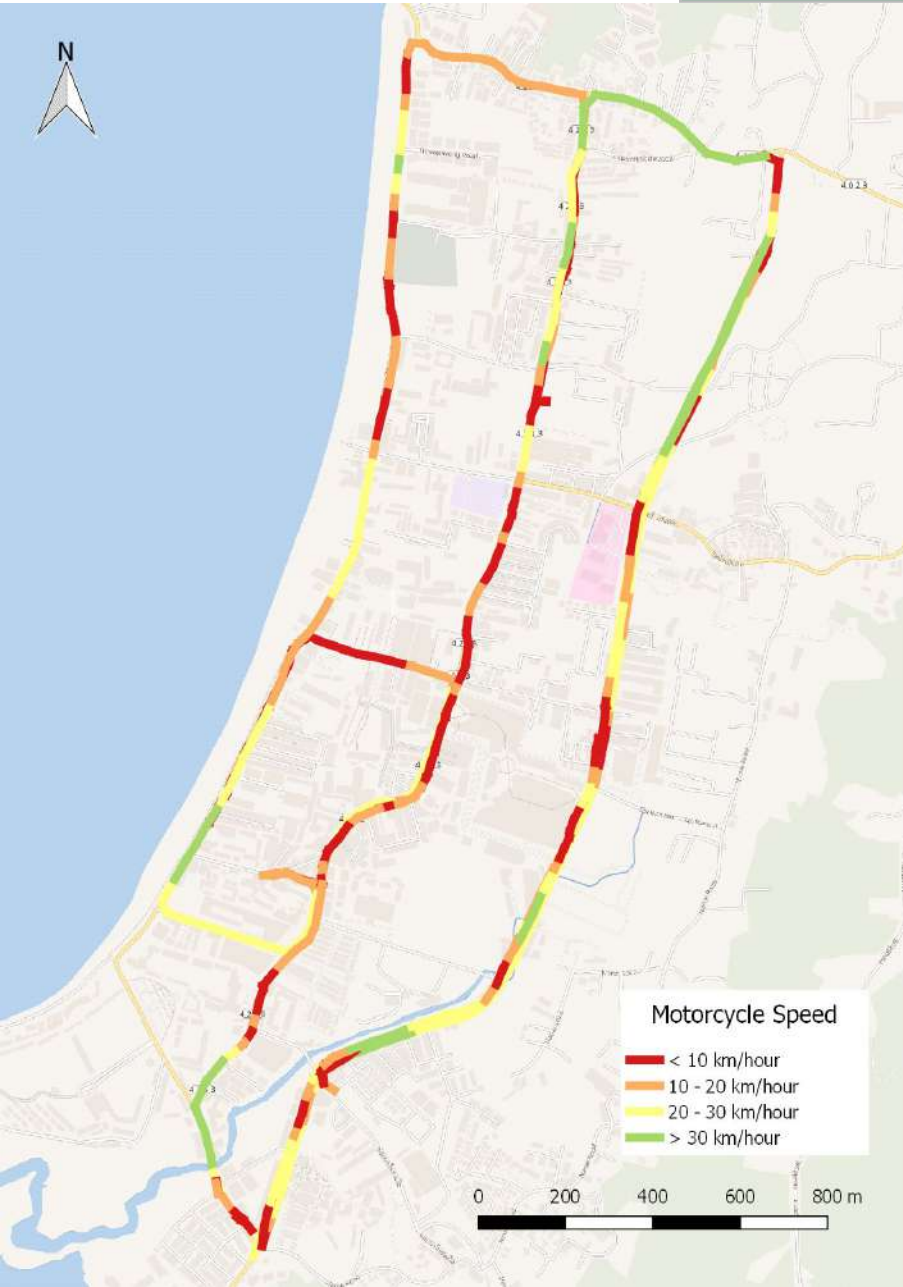
Hotel shuttle service in Patong



Bus from Phuket Town to Patong



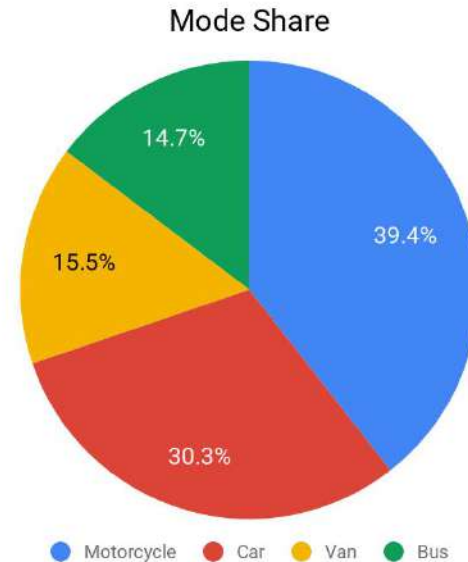
Patong taxis in a form of minibus with 4 seater capacity



Low share of Public Transport

The great amount of private vehicles make travel inefficient as travel speed is very low during peak hours in Patong. For example, average motorcycle speed was observed below 20 km/hour, this is due to high pedestrians activity, as well as on-street parking which reduces the road capacity.

Cars and motorcycles contribute 70% of transportation mode share in Patong, while minivans and buses have a mode share of 30%.



Bus Routes and Services

Public transport system in Phuket currently has 15 bus routes, where three of them stop at Patong. Although the bus fares is very cheap compared to motorcycle and car rent, taking the bus in Patong is quite challenging especially for tourists since there are no information about routes and schedule provided at public areas.



Patong bus from Phuket Town to Patong



Phuket Smart Bus from Airport to Rawai

Different Modes of Public Transport in Patong



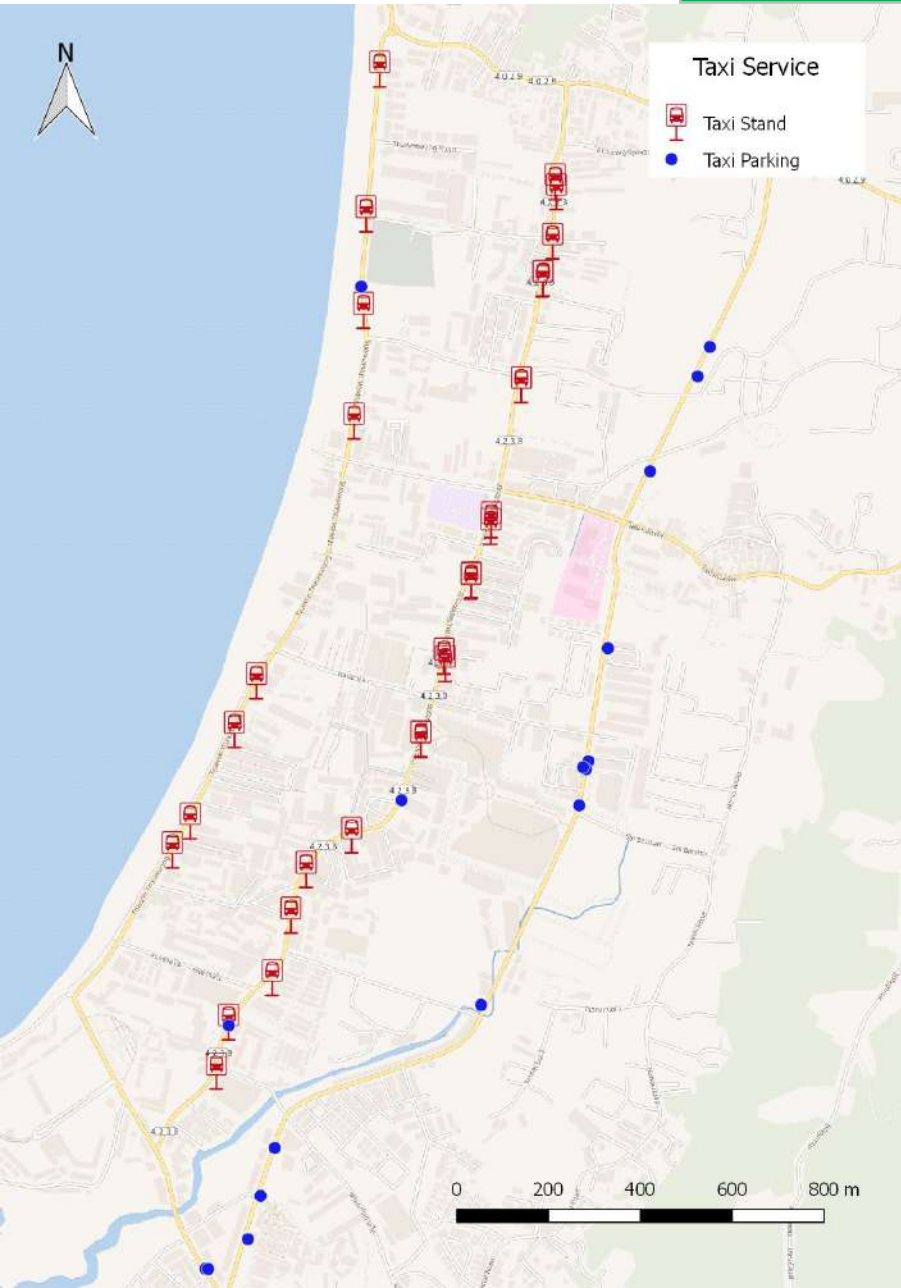
Taxi services



Public transport bus connected to other areas in Phuket



Private bus and minivan service provided by hotels and transportation company



Taxi Service and Motorcycle Rent

With low frequency and unreliable public transport service, taxi and motorcycle become the most popular transport services to get around Patong and other tourist attractions nearby.

Getting a taxi in Patong is also easy since there are a lot of taxi pick-up points along the main roads with a capacity up to 12 taxis. Therefore, taxi becomes the main choice for group trips. As for motorcycle, it is considered to be the best choice for solo and couple travelers because the rent price is relatively cheap, about THB 300 - 500 (USD 9.5 - 15.8) per day.

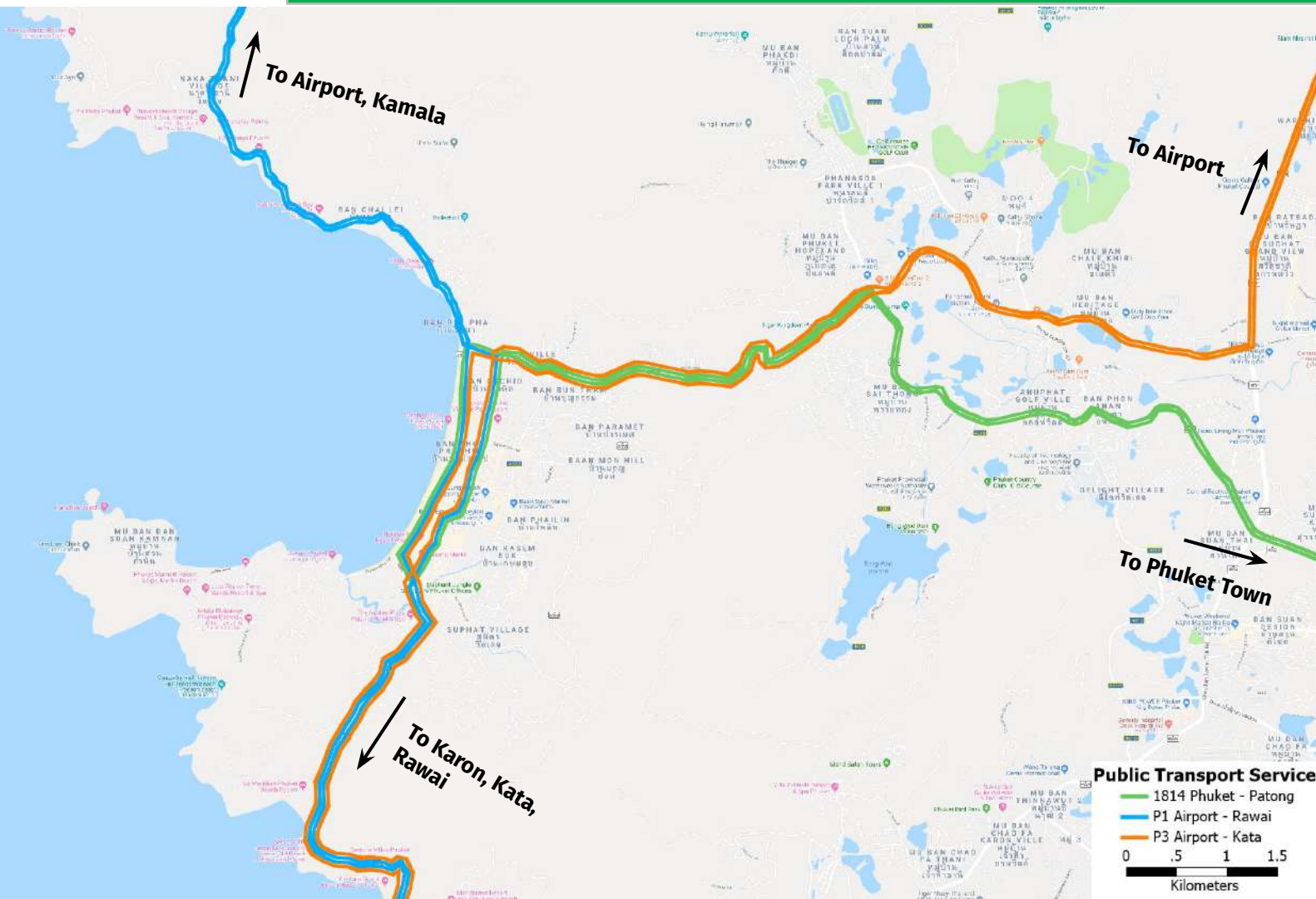


Taxi service



Motorcycles for rent

4.5.3 Public Transport Issues



Service Coverage

The existing bus routes in Phuket focus on serving passengers from Phuket Town and Phuket International Airport to tourist destinations, including the three bus routes that stop at Patong. There are no local routes in Patong to accommodate short distance trips. Currently, only two out of four main roads in Patong that are served by public transport.

Information and operational issues

Although the bus fare is very cheap for such very long routes, the low bus frequency makes it unreliable for getting around Patong and tourist attractions nearby by bus.

For instance, route P1 and P3 from airport are scheduled to depart every 60 to 75 minutes. From the survey, route 1814 was identified with the most frequent service, due to high demand. However, without any fixed timetable or headway, the drivers sometimes only depart when there are enough passengers to carry.

Lack of information about route, fare as well as schedule on bus stops and public areas also make it difficult to attract people using public transport around Patong, despite the potential demand available from tourist.

Route	Route Length	Fleet	Fare	Frequency
1814 Phuket Central Market - Patong	15.2 km	Songtheaw	THB 10 - 50 (USD 0.3 - 1.6)	10 - 30 minutes
P1 Airport - Rawai	55.8 km	Bus	THB 50 - 170 (USD 1.6 - 5.4)	60 minutes
P3 Airport - Kata	50.2 km	Van	THB 200 (USD 6.3)	60 - 75 minutes



No fixed schedule and route information at Patong Bus Stop



Bus schedule information at Phuket Airport

Parking for Minibus Taxis

While waiting for passengers, taxis are allowed to park at taxi pick-up points that can be easily found on main roads in Patong. The parking space on each taxi stands can accommodate up to 12 taxis.

Although this makes getting a taxi easier, the on-street parking system for taxi occupies road space and causes congestion at peak hours.

Despite many taxi stands available, many taxis are still found parking on non-dedicated taxi stand, so that they can be visible to visitors near shopping malls or restaurants.



On-street parking for taxi occupies road space and causes congestion



A taxi parks outside taxi stand



Pedestrian crossing and movement are blocked by on-street parking for taxi

Public Transport Improvement

As an efficient and reliable transportation mode, public transport has to be provided for tourists and people in Patong, which will also reduce private vehicles usage.

This goal can be achieved by regulating the taxi industry to become operator of public transport in Patong.

The Importance of Regulating Current Taxi Industry in Patong

In Patong, along the walkways, it is very common to find taxi drivers offering their services to bring tourists around destinations in Patong. Although it is easy to find, but there are no standard pricing and operation system for taxis. This informal service operations gain potentials for giving problems such as scam, speeding, and safety issues mainly for tourists.

Therefore, since this service has currently exist to serve mobility for tourists in Patong, to improve the quality of service the government should regulate taxi operation system because of the following reasons:

- Regulate the existing taxi industry in Patong will also solve the problem of inefficient service. Based on the survey done on April 3th 2019 at peak hour located in front of Jungceylon, taxi frequency reached 150 taxis per hour while the occupancy is very low, approximately 0.84 passenger per taxi. Therefore, on-street parking on Patong is mostly occupied by taxis waiting for passengers.
- The great of amount of taxis will serve current routes that have been served by them, and also covers the area where public transport are not available but with better operational system.
- Minimizing resistant of having rejection from existing taxi operators because of the introduction of new public transport system provided by the government.

Public Transport Implementation Process

- ❑ Business Plan
- ❑ Infrastructure and Fleet
- ❑ Regulation and Institutional Set-up
- ❑ Business Model, Financial and Operational
- ❑ Taxi Industry Transition Scheme

Taxi Transitional Process

- ❑ Formulate the Business Plan
- ❑ Building Communication and Consensus with Taxi Operators
- ❑ Capacity Building
- ❑ Negotiation Process
- ❑ Implementation

A. Formulate the Business Plan

- ❑ Demand analysis
- ❑ Route coverage
- ❑ Operational planning
- ❑ Tariff

B. Infrastructure and Fleet

- ❑ Bus stops
- ❑ Public transport fleet
- ❑ Technology (including payment system)

C. Business, Financial and Operational Model

- ❑ Cooperation model
- ❑ Tariff scheme and subsidy
- ❑ Financial model

D. Regulatory Framework and Institutional Design

- ❑ Formulation of policies and regulations for the operation of public transport
- ❑ Institution formation and capacity building to manage public transport

E. Transition Model of Taxi Industry

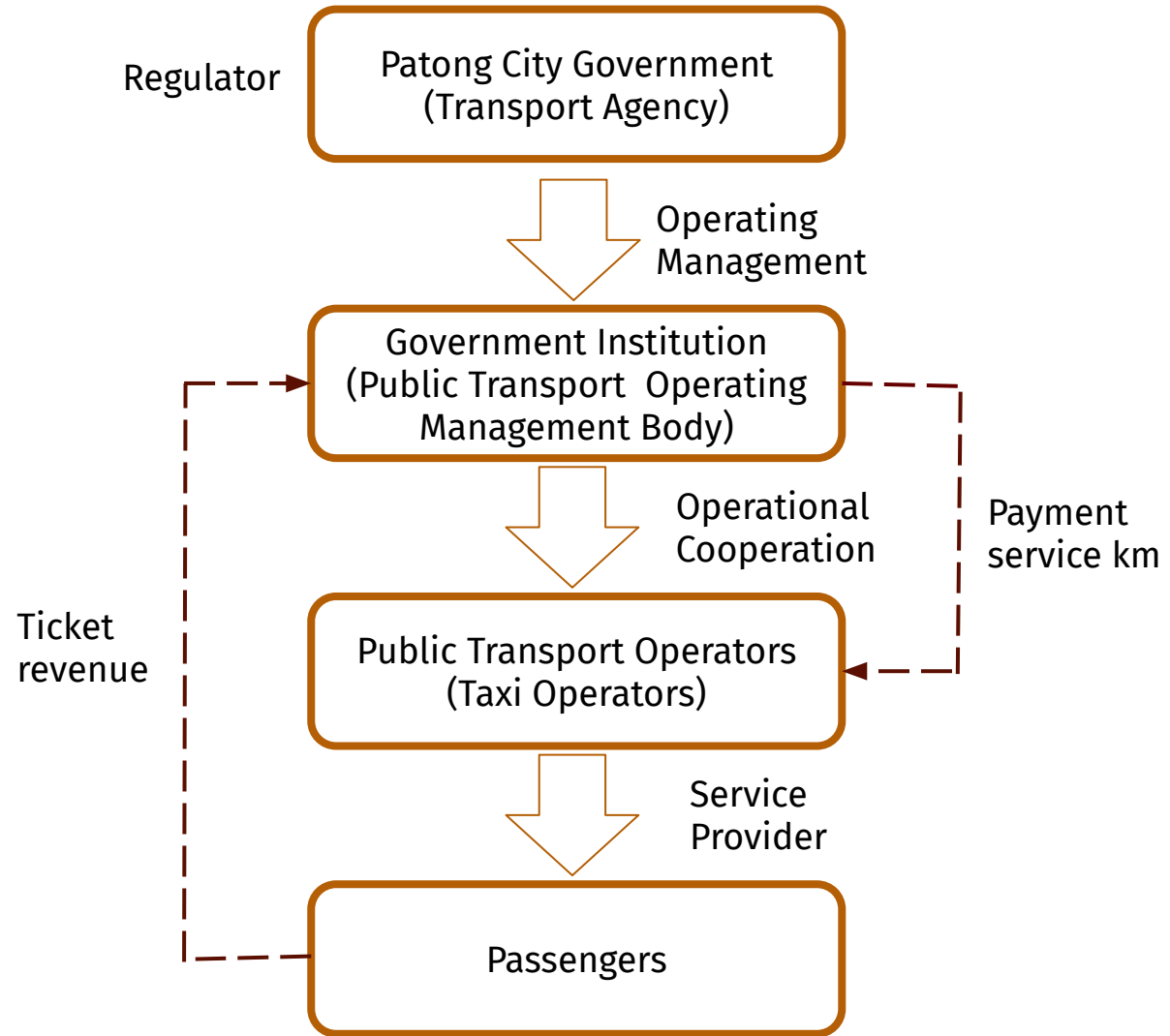
- ❑ Contract framework for new system
- ❑ Design implementation strategies which include operator on the discussion
- ❑ Collaboration consensus with taxi operators
- ❑ Social impact mitigation

Build Institution to Manage Public Transport System	Build government agency or institution to manage the new public transportation system in general.
Set Public Transport Tariff and Integration	The government set the tariff. The integrated payment structure for all public transport systems will be able to provide convenience transfers for users and increase efficiency.
Provide Efficient Network Coverage	Optimizing public transport network coverage by providing public transport service routes that are easier to access, simple, and connected. It will create efficient travel, saves time, and ensure more affordable costs.
Provide Good Quality Public Transport	Public transport fleet (taxi) operation should meet the minimum operational standards set by the government. Punctuality in operation, good fleet conditions, and training for drivers are needed in order to provide reliable public transport system.
Create Professional Public Transport Industry	Create public transport industry that meets the minimum service standard operation. The industry should give insurances, continuity of work, and ensure profits for its stakeholders (operators and drivers).

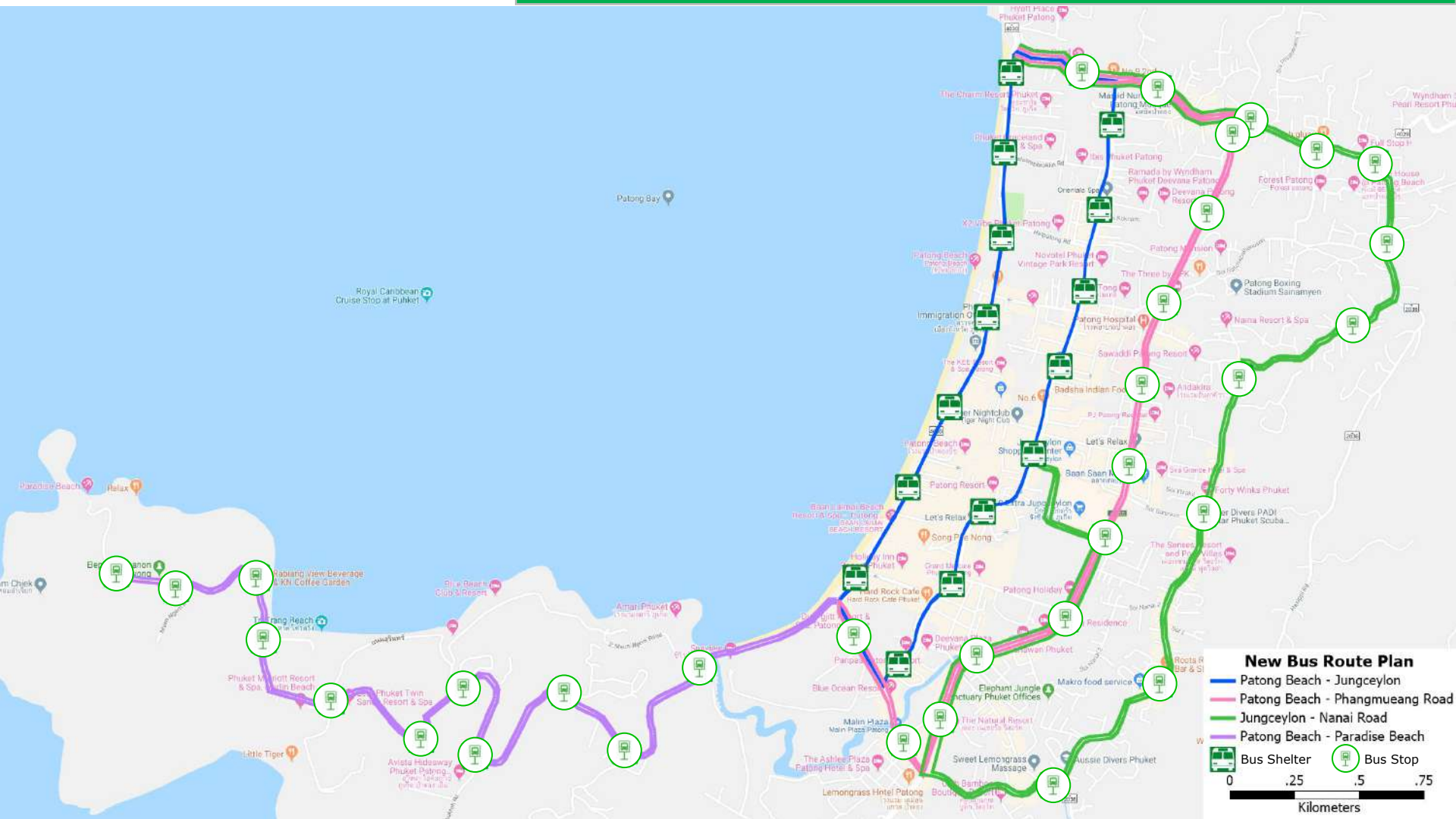
4.5.5 Public Transport Implementation Process Contract System Between Operators & Government

The goal of Patong City Government is providing good public transport services. Therefore, the government setting the public transport tariff (and also providing the subsidies) and creating the management operational institution to ensure that the service is convenient, accessible and affordable for all under the Transport Agency as a regulator.

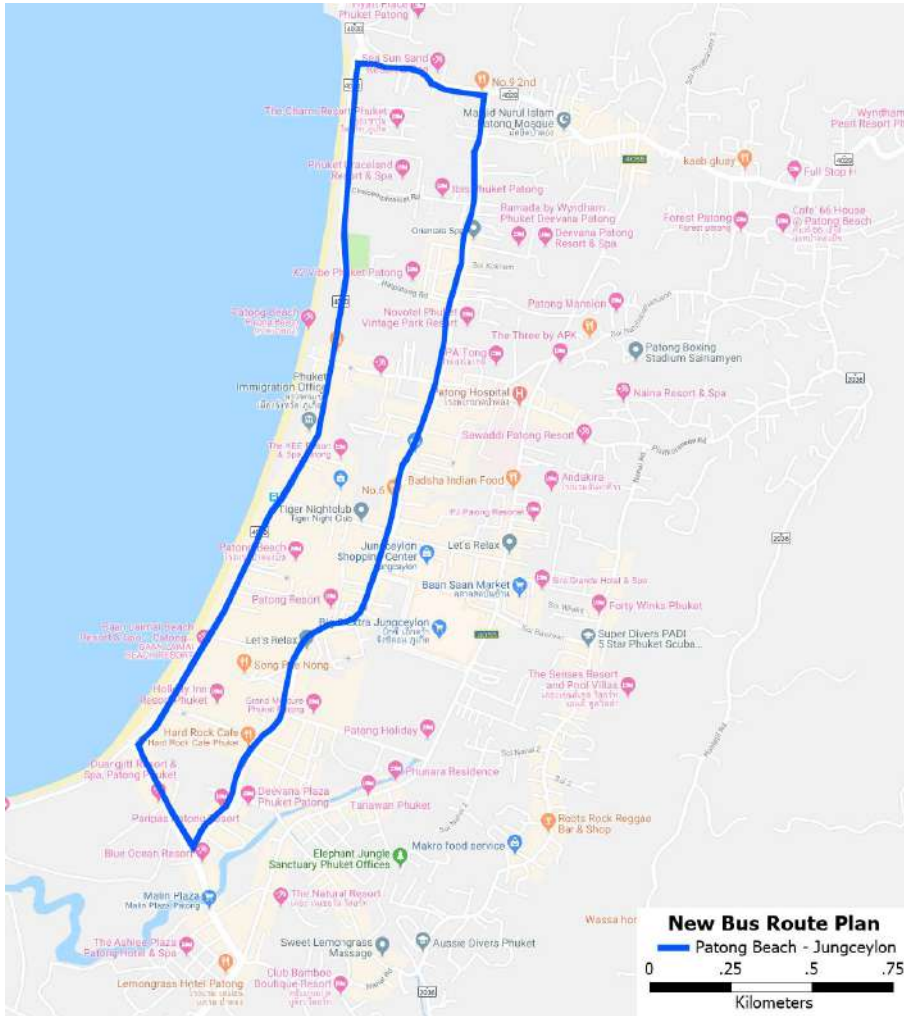
To provide the services, there are contracts for operating the public transport (per km) between the government institution and taxi operators. Ticket and revenue are managed directly by the institution while operators only operates the public transport fleets (taxis).



4.5.6 New Public Transport Route Plan

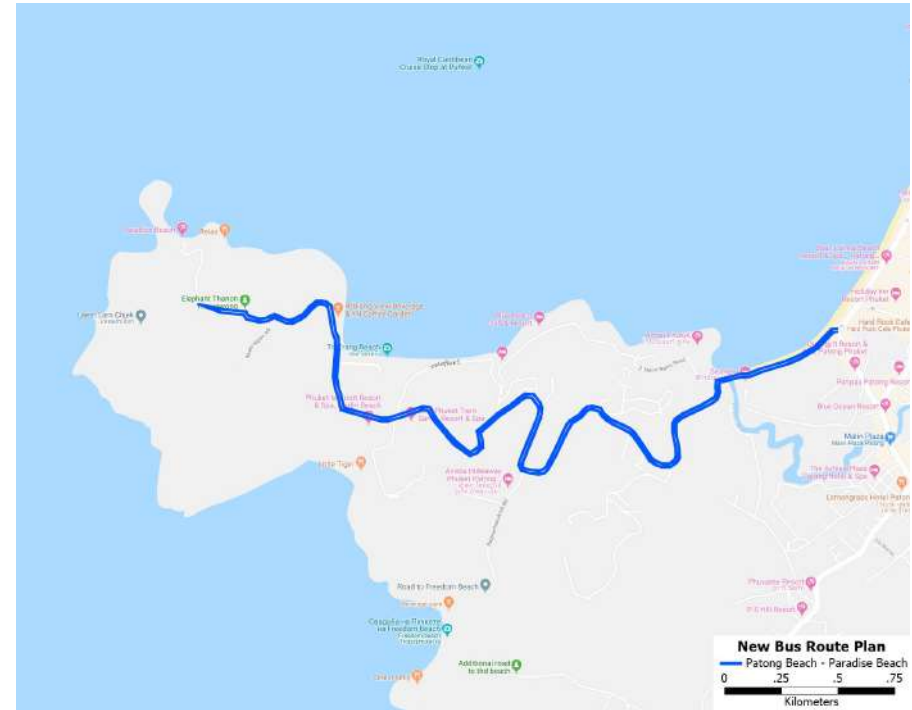


Four new public transport routes are proposed to accommodate short distance trips within Patong. These proposed routes should provide more transit coverage and facilitate people from all around Patong to reach the city center. Bus stops are to be located at high demand areas and have 300 to 500 meters in distances between stations.



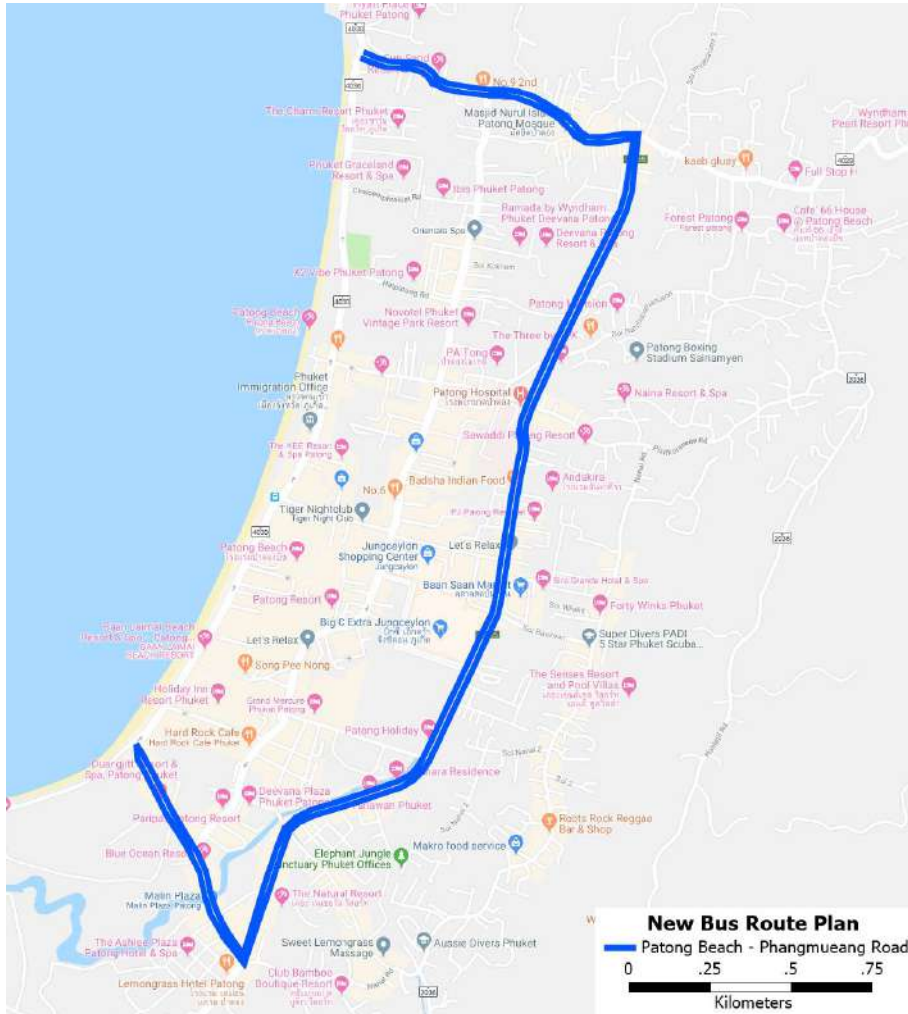
Patong Beach - Jungceylon

This route goes along Thawewong Road and Ratuthit Songroipi Road, the two closest main roads to the beachfront area. With many attractions and accommodations around these roads, this route should facilitate trips between destinations beyond walking distance, therefore motorized vehicle trips will be reduced.



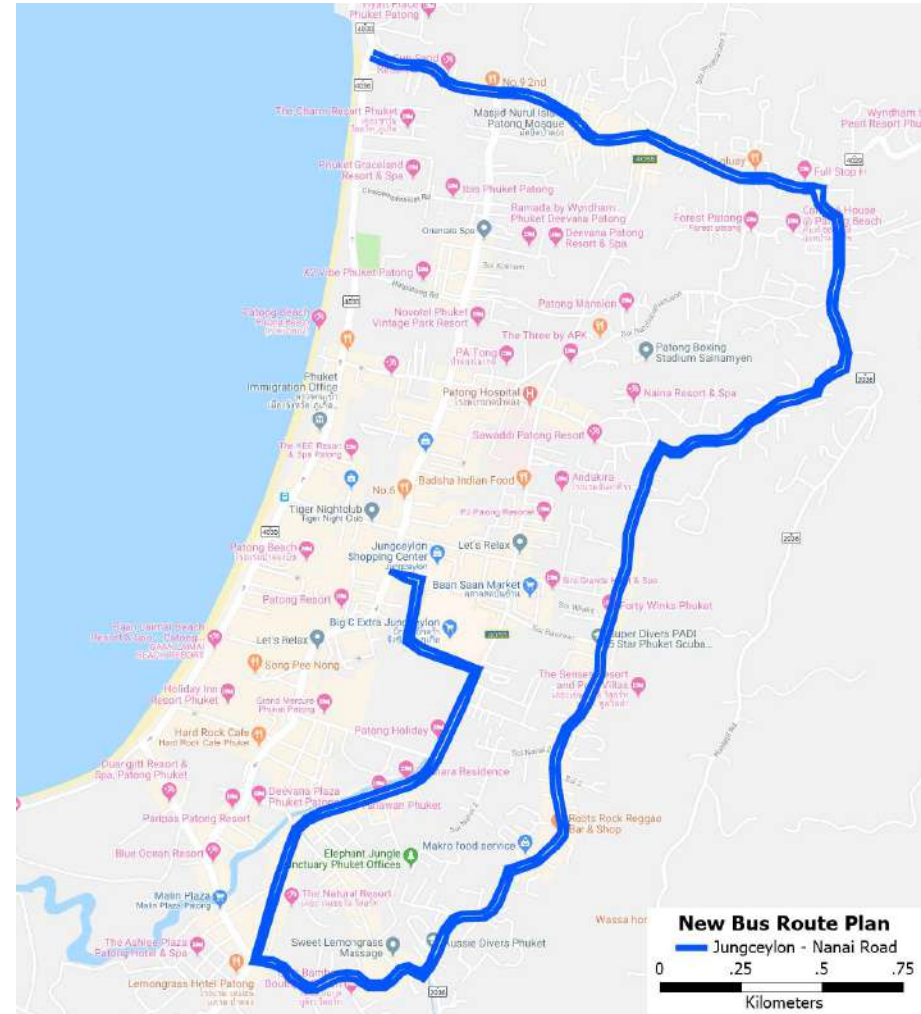
Patong Beach - Paradise Beach

This route goes to Paradise Beach, a tourist destination near Patong. There are several attractions and accommodations along the road as well.



Patong Beach - Phangmueang Road

This route connects other main road in Patong, Phangmueang Road, to the beachfront area.



Jungceylon - Nanai Road

This route provides access from the area outside the city to the city center.

4.5.7 Operation Plan

Operation Plan

To ensure reliable public transport service and comfortable journey, the operation plan of local public transport in Patong is proposed to have peak hour frequency of every 4 minutes due to the high demand and limited passenger capacity for taxi. Higher frequency will result in shorter waiting time for passengers.

Fleet Requirement Calculation

Based on calculation, a total of 54 taxis and 22 buses are needed with several assumptions as follows:

- Proposed average speed: 25 km/hour
- 10 minutes layover time per trip
- 10% spare fleet

Fleet Design and Modernization

The service will operate existing local taxis. However, as the demand increases over time, fleets with bigger capacity should be operated in the future.

The current taxi used as public transport mode in the future should be improved with better standard and better quality bus. This could be achieved by shifting to the electric bus.



Route	One-way Journey Time (hour)	Proposed Peak Hour Frequency	Proposed Average Speed (kph)	Fleet Requirement (Local Taxi)	Fleet Requirement (Bus)
Patong Beach - Jungceylon	0.32	15	25	10	4
Patong Beach - Phangmueang Road	0.39	15	25	12	5
Jungceylon - Nanai Road	0.48	15	25	15	6
Patong Beach - Paradise Beach	0.39	15	25	12	5
Total fleets required with 10% spare				54	22

4.6 Project Cost Estimates for Patong

Improvement	Unit	Price per unit (USD)	Cost (USD)	Total Cost (USD)
Street Design				26,050,210
Sidewalk improvement	91,852 m ²	200	18,370,400	
New pedestrian zebra crossing	36 crossings	360	12,960	
Bike lane	16,867 m ²	300	5,060,100	
Pedestrianization area	12,133 m ²	200	2,426,600	
On-street parking removal	758 parking spaces	50	37,900	
New on-street parking	53 parking spaces	50	2,650	
Bike Sharing System				574,850
New stations	73 stations	3,200	233,600	
New bikes	1,365 bikes	250	341,250	
Public Transport System				315,000
Bus stop with bus bay	15 transit shelters	10,000	150,000	
Bus pole	33 bus stops	5,000	165,000	
TOTAL				26,800,560