運輸署
Transport Department

Agreement No. TD 194/2009

Traffic and Transport Consultancy Study on Cycling Networks and Parking Facilities in Existing New Towns in Hong Kong

Executive Summary

March 2013



ATKINS

運輸署
Transport Department

TRANSPORT DEPARTMENT

THE GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION

AGREEMENT NO. TD 194/2009 TRAFFIC AND TRANSPORT CONSULTANCY STUDY ON CYCLING NETWORKS AND PARKING FACILITIES IN EXISTING NEW TOWNS IN HONG KONG

Executive Summary

March 2013

CONTENTS

TABLES

FIGURES

1. INTRODUCTION

1.1 Background

1.1.1 Atkins China Ltd (ACL) was commissioned by the Transport Department (TD) of the Government of the Hong Kong Special Administrative Region in May 2010 to undertake a Traffic and Transport Consultancy Study on Cycling Networks and Parking Facilities in Existing New Towns in Hong Kong (the Study) in 9 new towns of Hong Kong, namely, Shatin/Ma On Shan, Tai Po, Fanling/Sheung Shui, Tin Shui Wai, Yuen Long, Tuen Mun, Tsuen Wan, Tung Chung, and Tseung Kwan O.

1.2 Objectives of Study

1.2.1 The objectives of the Study are:

- to identify deficiencies of the existing cycle track networks and cycling facilities within the 9 new towns, examine ways of improving the current management practice for cycle tracks/cycle parking facilities and to recommend general improvement measures to produce safe, coherent and environmentally sustainable infrastructure with reference to overseas experience but with due regard to the local situation;
- to investigate suitable types of cycle parking facilities to suit different demand needs (e.g. recreational, commuting, etc.) and to look into various management options to address the current cycle parking problems at Public Transport Interchanges (PTIs), railway stations and major transport hubs in the existing new towns;
- to review and recommend suitable cycling infrastructure planning and design standards and guidelines by making reference to overseas practice and standards;
- to identify a suitable area out of the 9 prescribed new towns to establish a Pilot Scheme to illustrate the effectiveness of proposed improvement measures recommended, including the new initiatives and facilities, with detailed layout plans;
- to propose feasible improvement schemes for accident prone sites, identified and prioritised based on accident records, and problematic sites, referred as locations subject to frequent public complaints or strong requests for improvement, with layout plans; and
- to conduct a survey to identify the behaviour of local cyclists on wearing safety helmets.

1.3 Purpose of Executive Summary

1.3.1 The purpose of this Executive Summary is to summarize the key findings and recommendations of the Study.

Not Used

2. GENERAL ISSUES OF CYCLING FACILITIES

2.1 Cycle Parking Facilities Issues

2.1.1 The existing cycle parking facilities in the 9 new towns have been generally reviewed for potential improvement. The major areas of concern include:

- provision of cycle parking spaces (including location, parking facilities and number of parking spaces); and
- management of cycle parking spaces (abuse/ illegal parking).

2.1.2 Bicycle parking surveys were conducted at major attraction ends, including railway stations and major PTIs. The survey results indicated that most of the cycle parking areas is fully occupied and even overloaded due to insufficient provision of cycle parking spaces and abuse of parking spaces.

2.1.3 Illegal cycle parking is very common in the new towns, in particular, at popular locations including railway stations, major PTIs and in the vicinity of some residential areas. It is observed that many bicycles are locked on railings, light posts or other inappropriate locations. The reasons of illegal parking are listed below:

- the location of illegal parking is convenient for accessing attraction points;
- the location of illegal parking is sheltered from inclement weather; and
- the designated cycle parking spaces nearby are inadequate.

2.1.4 It is observed that some cycle parking locations are inconvenient and under-utilized, including those cycle parking areas along trunk cycle tracks without major attraction points in the vicinity, and those cycle parking areas remote from cycle track network.

2.1.5 The public cycle parking facilities allow parking of a bicycle at one location for a maximum of 24 hours. However, frequent abuse of the facilities is observed as follows:

- Prolonged parking: bicycles parked in designated parking spaces for a duration exceeding the permitted maximum period;
- Abandoned bicycles: designated parking spaces occupied by worn-out bicycles; and
- Occupied by other objects: designated parking spaces occupied by objects other than bicycles, such as goods and trolleys.

2.1.6 Site observations revealed that there is generally a paucity of signage guiding cyclists towards designated parking facilities, so that some designated parking areas are under-utilized whilst illegal parking exists in the vicinity.

2.1.7 The existing public parking facilities are not installed with shelters or with weather-proof design to protect parked bicycles. Illegal parking is commonly observed at weather-proof areas such as inside pedestrian subways and underneath footbridges.

2.1.8 Most home-ends and attraction ends are provided with only limited bicycle parking spaces, and the over-subscription of these limited bicycle parking spaces generally leads to illegal bicycle parking nearby.

2.1.9 The security of public parking facilities is a concern for the public as theft of bicycles is not uncommon. Presently, there is no active security management and surveillance system to uphold the security at the public cycle parking facilities.

2.1.10 There are various laws in force for removing illegally parked bicycles on unleased Government land and PTIs, and overstayed bicycles at designated parking areas. Enforcement departments, such as Lands Department (LandsD) and Transport Department (TD), can mount their own enforcement actions by utilising the existing legal instruments under their purview to tackle illegal cycle parking.

2.1.11 In more complicated cases which involve different government departments, District Offices (DOs) of Home Affairs Department (HAD) may assist in coordinating inter-departmental joint operations with TD, LandsD, Hong Kong Police Force(HKPF) and Food and Environmental Hygiene Department (FEHD) on a need basis to clear illegally parked bicycles that cause serious obstruction and inconvenience to road users.

2.1.12 Since the joint operations involve extensive collaboration and have to accommodate work schedules, priorities and resource availability of different departments, the inter-departmental joint operations are invariably resource-intensive and cannot be too frequently mounted. Despite the significant amount of resources and long-standing efforts from various departments, the problem of illegal cycle parking usually relapses again in a few days after joint operations.

2.2 Cycle Track Network Issues

2.2.1 Similar to cycle parking, the existing cycle track networks within the 9 new towns have been reviewed. A number of issues has been identified and categorized as follows:

- safety issues of cycle tracks;
- management of cycle tracks; and
- connectivity of cycle tracks.

2.2.2 From the analysis of available accident record and site inspection, cycling-related accidents are primarily associated with the following common issues and cycle track features:

- steep ramp, sharp bend and insufficient visibility;
- obstacles/ improper steel bollards along cycle track; and
- narrow width of cycle track.

2.2.3 The management concerns of cycle tracks were identified based on extensive site investigation and analysis of related information in the 9 new towns. The issues relating to the management of cycle track include the following:

- Inconsistent colours of cycle tracks in respect to trunk or local routes;
- missing centre line to segregate directional flows;
- overgrowing trees obstructing/ reducing usable space of cycle track;
- varied skill level of cyclists;
- lack of or insufficient directional signage and routing signboard along cycle tracks for destinations or parking areas;
- cyclists not following traffic regulations;
- other users on cycle tracks, e.g. pedestrians, joggers, wheelchairs, scooters, rollers, baby strollers, pets, etc; and
- Graphical traffic signs for cycling restrictions (T.S. 227) and end of cycling restrictions (T.S. 228) often being misunderstood as opposite meaning by the public.

2.2.4 The common issues of cycle track connectivity have been classified into the following sub-categories:

- missing link;
- detour; and
- lack of continuity.

2.2.5 Missing link is defined as a missing cycle track section or broken cycle track sections in the existing or planned cycle track networks in connection with major attraction ends within the 9 new towns. The following examples illustrate the definition:

- sections of cycle tracks are not connected to each other, especially the case of local cycle track network within new town is not connected to trunk cycle tracks; and
- cycle track network within new town does not reach major attraction ends, e.g. rail stations, station PTIs, government municipal complexes, large shopping malls, schools and recreational facilities.

2.2.6 Most of the individual new towns were developed in different phases, and the associated cycle track networks were completed in a discrete manner. This results in cycling detour such that the cyclists have to travel via indirect and longer routes to reach their destinations.

2.2.7 Some cycle tracks within the 9 new towns are discontinued in particular for the sections adjacent to bus stops, Light Rail stops, run-in/out, road junctions or other obstructions due to pedestrian movements or waiting spaces. Under these situations, cyclists have to dismount, wheel their bicycles over the discontinued section, then resume cycling on the next sections of cycle track.

3. IMPROVEMENT MEASURES OF EXISTING CYCLING FACILITIES

3.1 Overview

3.1.1 For review of existing cycling facilities, overseas practices have been reviewed and analyzed. The advantages and disadvantages of these overseas practices have been compared for their application in Hong Kong in view of the unique local conditions. Recommendations have been made taking account of the practicality of implementation.

3.1.2 The unique local conditions of Hong Kong have also been considered in studying the appropriateness of applying the relevant improvement measures in Hong Kong in respect of management as well as design standards and guidelines.

3.1.3 Each of the studied improvement measures has been assessed. Some measures have been recommended for immediate / trial implementation, while some require further studies or not recommended.

3.2 Cycle Parking Facilities Improvements

3.2.1 To tackle the existing cycle parking issues in the 9 new towns, improvement measures have been explored in various aspects including:

- improvement of parking facilities;
- measures to increase or reactivate cycle parking spaces;
- management measures for cycle parking; and
- modification to planning standards and guidelines on cycle parking.

Improvement of Parking Facilities

3.2.2 To improve the infrastructure of the existing parking facilities, various types of parking facilities currently used overseas have been studied and compared for their practicality of implementation in Hong Kong. The list of studied parking facilities and comparison are summarized in **Table 3.1**.

Table 3.1: Comparison of Overseas Parking Facilities

Type	Description	Pros	Cons	Adopted Countries
Inverted-U (Sheffield Stand)	• A typical bicycle stand • Suggested design envelop of 700mm wide x 1750mm long • Suggested minimum horizontal spacing between bicycle racks is 1200mm	• Provide high level of bicycle frame support and security • Cost effective • Easy to install and maintain	• Bicycles parked at the rack can look disorganised • Bicycle clashing is expected	New Zealand, Canada, Denmark, UK, US
Vertical/ Wall-mounted	• Bicycles are vertically mounted on the wall • Suggested design envelop of 700mm wide x 1750mm long x 1200mm deep • Suggested minimum horizontal spacing between bicycle racks is 700mm if the hooks are at the same level or 400 mm if hooks are staggered vertically by more than 500mm	• Suitable for short stay needs • Require less depth	• Require large strength to lift the bicycles • Not suitable for installation on a site without a wall	New Zealand, Canada, Denmark, UK, US
1-Up-1-Down	• Bicycles are parked in grid style within a rectangular site • Suggested overall length of 2m for bicycle and stand	• Higher capacity per unit length	• Not suitable for some parking areas in a non-rectangle shape of layout	New Zealand, Canada, Denmark, Japan, UK, US
Angled Parking	• Bicycles are parked along a strip of parking areas, normally at an angle of 45 degree • Suggested overall length of 1.4m for bicycle and stand	• Easier to manoeuvre bicycles in and out • Require less depth and manoeuvring area	• Less favor to access the angled parking stands from their opposite directions	New Zealand, Denmark, UK

Type	Description	Pros	Cons	Adopted Countries
Double Deck Parking System	• A double level parking system • Use leverage laws and roller bearings, spring-loaded, fitted with hydraulic pistons or gas struts to facilitate pulling out of the upper-level's positioning rail, lowering it for loading/ unloading bicycle and returned into the upper parked position with a small effort. • Require a typical ceiling height of at least 2.7m (excluding shelter) and sufficient aisle space in front of the stands to enable the bike to be loaded on to the stand	• Increase parking capacity without increasing floor space, suitable for location with limited spaces • Less potential damage as the rack grips both wheels and has the rail to lock bicycle frame	• Less suitable for non-rectangular parking layout • Less effective for parking sites along footpath/ cycle track • Headroom requirement • Parking at upper level requires more strength and relatively lower utilization is expected • Limitation on users' height of using the upper racks • Protruding parts are at users' head level which may be hazardous to users • Accidents prone to happen for unfamiliar users • Potential damage to bicycles on upper level by wind load, requiring additional support and protection • Prefer for covered environment and away from shorelines to extend bearing life	Canada, Denmark, Japan, China, UK & Several European countries
Automated/ Biceberg	• An electrical and mechanical automatic underground bicycle park • Operated by a microchip card with user's personal identification number • Take time (approx. 30 seconds) to load and unload a bicycle	• High security level • Suitable for locations with little above ground space available	• Only provides single point of service and users may require to wait • High construction and maintenance cost • Significant land cost for providing parking at popular locations	Canada, Denmark, Japan

Type	Description	Pros	Cons	Adopted Countries
Bicycle Locker	• Individual storage unit • Locking mechanism includes personal padlocks, normal key operation, electronic keys and coin-operated locks	• Offer good security, weather protection and additional storage	• Take up a lot of space on site • High management and maintenance cost	New Zealand, Canada, Denmark, US, UK
Underground/ Multi-storey Parking Garage	• Multi-level parking with controlled access at entrance • Normally access through a ramp leading to each level	• Suitable for locations with high parking demand but limited space • Suitable for high quality and long term bicycle parking • Offer good security and weather protection	• High construction cost	New Zealand, Canada, Denmark, Japan, UK, US

3.2.3 The practicality of adopting the above types of parking facilities in Hong Kong has been reviewed. The recommended parking facilities for improving cycle parking in 9 new towns with their corresponding criteria of usage are summarized in **Table 3.2**.

Table 3.2: Recommended Parking Facilities for Improvement

Types	Criteria of Usage
Inverted-U	• Most commonly used parking facility • Recommended at locations without site constraint and without high demand of usage • Suitable for use at locations in irregular shapes
Angled Parking	• Recommended at locations with constraint in width (e.g. pedestrian subway) • Can be used to replace inverted-U to increase the capacity of cycle parking, should site conditions warrant • Trial required
1-Up-1-Down	• Recommended at locations with constraint in length (e.g. facet of buildings/ along planter) • Trial required
Double Deck Parking System	• Recommended at locations with high demand of usage and with constraint in length but without constraint in headroom • Sufficient operation area must be available adjacent to the double deck parking system • Demand of footpath adjacent to double deck parking system should be considered for loading/ unloading of bicycle to/ from upper deck • Trial required (including the pending trial in Fanling and further trial)

Measures to Increase or Reactivate Cycle Parking Spaces

3.2.4 Measures to increase provisioning and reactivation of cycle parking spaces in the 9 new towns have been explored.

3.2.5 To identify suitable sites for provisioning of new cycle parking spaces, consideration has been made to sites of different natures, such as pedestrian footpaths with low demand, spaces in between columns or planters, areas immediately outside PTI, and covered areas underneath existing structures.

3.2.6 To facilitate effective management of cycle parking, it is recommended to promote cycle parking facilities being provided and managed by private sectors, such as transport operators, shopping mall management offices, schools, and social enterprises.

3.2.7 In order to reactivate the underutilized designated parking areas, it is recommended to erect additional signs to direct cyclists to the available designated cycle parking facilities in the vicinity. Besides, it is recommended to consider installation of shelters at the underutilized designated parking areas to promote the usage.

3.2.8 The recommended measures to increase or reactivate cycle parking spaces are summarized in **Table 3.3**.

Table 3.3: Recommended Measures to Increase or Reactivate Cycle Parking Spaces

Measures	Considerations
Site Search on Public Area	• Provide cycle parking along footpath if appropriate • Provide cycle parking by utilizing spaces in between columns, planters or any physical structures if appropriate • Provide cycle parking in covered areas underneath existing bridge structures if appropriate • Conversion of existing planter areas into parking spaces if appropriate • Recommended if site conditions allow
Provision and Management by Private Sectors	• Encourage private sectors to provide parking spaces, e.g. MTRC, shopping mall management offices, schools and social enterprises • Recommended but further study required
Reactivating Underutilized Parking Spaces	• Install weather-proof shelters to attract more cyclists to use the underutilized designated parking spaces • Erect additional traffic signs to direct cyclists to designated parking spaces nearby • Installation of weather proof shelters is recommended with trial required • Erection of additional traffic signs is recommended

Management Measures for Cycle Parking

3.2.9 Various management measures to tackle the existing cycle parking issues have been considered and are summarized in **Table 3.4**.

Table 3.4: Recommended Management Measures for Cycle Parking

Measures	Description	Comments	
		Pros	Cons
Amending Existing or Introducing New Laws	• Consider introducing new laws/ amend existing laws for clearance of illegally parked bicycles in cycle parking areas • Further study is required	• It can clearly define the activity of illegal parking • It would be much easier for enforcement and clearance actions	• Require provisioning of reasonable amount of parking spaces and support from general public as prerequisite • Difficult to define overstaying of bicycles and to identify owners for prosecution or penalty • Legislation takes longer time to implement, and may not be able to address the immediate illegal parking problems
Streamlining Clearance Procedures	• Shorten the existing 14 days notice period for suspension of designated parking area for clearance • Further study is required	• The lead time for arranging clearance action can be shortened	• Probably involve more government resources for speeding up the clearance operation
Setting up Illegal Cycle Parking Clearance Zone	• Set up clearance zone by erecting appropriate traffic signs to give warning to cyclists of stepping up enforcement action • Further study is required	• Less illegal parking at the popular illegal parking areas such as in the vicinity of railway stations and PTIs	• Require provisioning of reasonable amount of parking spaces and support from general public as prerequisite • Require frequent clearance operations
Deterring Overstayed/ Abandoned Bicycles	• Erect supplementary sign and a user guide at public parking spaces to educate the public not to park the cycles over 24 hours • Trial is required	• Less overstayed/ abandoned bicycles in the public parking spaces	• May not be effective unless it is introduced together with more frequent clearance operations
Deterring Illegal Parking – Replacing Kerbside Amenity Railings	• Replace the amenity railing by “7” type railing or G.I bollards to deter illegal parking • Trial is required	• Some locations already implemented this measure on a trial basis	• N/A

Measures	Description	Comments	
		Pros	Cons
Deterring Illegal Parking – Installing Transparent Plastic Board or Mesh	• Install transparent plastic board or mesh on railings to deter illegal parking • Not recommended for implementation	• Only an add-on to existing railings without requiring substantial works	• Frequent maintenance required to ensure visibility of road users not being affected • Not visually accepted in general
Deterring Illegal Parking – Building Planter next to Railings	• Build planter adjacent to railings to deter illegal parking • Recommended if space is available	• Less visual impact compared with other objects installed on railings	• Reduced footpath width
Charged Parking	• The parking is required to be paid such as in the form of meter parking • Not recommended for implementation	• Minimize overstaying • Parking fee to be used in upgrading the parking facilities	• Around 75% of respondents in a survey opposed charging • Lead to more illegal parking in vicinity • Cycling associations support the status-quo of uncharged parking facilities
Public Rental System	• Public rental scheme by locating a number of rental stations at various locations • Not recommended for implementation	• Provide a sustainable and low emission form of transport • Potential shift of transport mode from car to cycling	• Spatially unfeasible given the limited available space near major attraction points • Public rental system could not practically reduce the ownership of bicycles and solve the parking problems • Difficult to be implemented and effectively operated • Potential impact to private rental operators
Bicycle Registration	• Each bicycle is to obtain a registration from government and display the unique registration number on the bicycle • Not recommended for implementation	• Enable illegally parked cyclists to be fined • Enable statutory control on cyclists and cycling behaviour	• Unlikely to obtain supports from cyclists for the sake of deterring illegal parking • Substantial amount of investment on administration, promotion, enforcement and maintenance • Considered as ineffective in overseas cities with bicycle registration

Modification to Planning Standards and Guidelines on Cycle Parking

3.2.10 It is recommended to modify the existing Hong Kong Planning Standards and Guidelines (HKPSG) and TD's in-house design guidelines by including the requirements of cycle parking provisioning for various attraction ends. The modification details shall be further reviewed by making reference to the recommendations of the Study which covers different major attraction ends, and/ or the pending results of the on-going Travel Characteristics Survey 2011 which may provide indicators on cycling behaviour and bicycle parking demand.

Summary of Recommended Cycle Parking Improvements

3.2.11 The recommended improvement measures for cycle parking are summarized in **Table 3.5** and categorized as follows:

- Category 1: Recommended measures without further study required, subject to site constraints;
- Category 2: Recommended measures subject to pilot test and evaluation results as discussed in the following **Chapter 4**;
- Category 3: Recommended measures subject to further study; and
- Category 4: Measures reviewed and not recommended for implementation.

Table 3.5: Summary of Recommended Cycle Parking Improvements

Approach	Measures	Category of Recommendations(1)
Improvement of Parking Facilities	Inverted-U (Sheffield Stand)	1
	Angled Parking	2
	1-Up-1-Down	2
	Double Deck Parking System	2
	Vertical/ Wall-mounted	4
	Automated/ Biceberg	4
	Bicycle Locker	4
	Underground/ Multi-storey Parking Garage	4
Measures to Increase or Reactivate Cycle Parking Spaces	Site Search on Public Area	1
	Provision and Management by Private Sectors	3
	Reactivating the Underutilized Parking Spaces	2

Approach	Measures	Category of Recommendations(1)
Management Measures of Cycle Parking	Amending existing or introducing new laws	3
	Streamlining Clearance Procedures	3
	Setting up Illegal Cycle Parking Clearance Zone	3
	Sign Display for Deterring Overstayed / Abandoned Bicycles	2
	Deterring Illegal Parking – replacing the kerbside amenity railings	2
	Deterring Illegal Parking – Building planter next to railings	1
	Deterring Illegal Parking – Installing transparent plastic board and mesh on railings	4
	Charged Parking	4
	Public Rental System	4
	Bicycle Registration	4
Modification to Planning Standards and Guidelines on Cycle Parking	Modification to HKPSG on requirement of parking provision	3

Note: (1) Category 1 refers to recommended measure without further study/ testing required subject to site constraints; Category 2 refers to recommended measure subject to pilot test and evaluation results; Category 3 refers to recommended measure subject to further study; and Category 4 refers to measure not recommended for implementation.

3.3 Cycle Track Network Improvements

3.3.1 To tackle the existing cycle tack issues in the 9 new towns, improvement measures have been explored in various aspects including:

- design of cycle track;
- regulatory and educational measures for cycling;
- management measures for cycle track facilities;
- enhancement of cycle track connectivity; and
- modification to design standards and guidelines on cycle track.

Design of Cycle Track

3.3.2 To enhance the safety on cycle tracks, in particular at cycle track sections which consist of steep ramps, sharp bends and/ or locations with insufficient visibility, improvement measures have been proposed to enhance safety of cycling in those potential hazardous cycle track sections. Some improvement measures are considered to be feasible for implementation immediately, including erection of appropriate traffic signs and widening of cycle track at curved sections.

3.3.3 There are also new measures on cycle track improvements subject to trial and evaluation before general implementation. Those new measures are currently under trial in a Pilot Scheme being implemented in Tai Po, including:

- road markings "Beware of Bicycles" at cycle track/ footpath junction;
- transverse yellow bars along straight ramps;
- cushion protection/ soft landing adjacent to sharp bends;
- convex mirror to enhance visibility; and
- yellow surface at potential hazardous location.

3.3.4 In order to reduce severity of potential cycling injuries, it is proposed to replace traditional steel bollards by collapsible plastic bollards, except for those used for segregating carriageway and cycle track.

3.3.5 It is proposed to paint road markings to guide cyclists away from obstacles along cycle track, and properly cover the existing U-channels to prevent bicycle wheels from being trapped.

3.3.6 It is recommended to explore opportunities of possible local widening of cycle tracks currently with sub-standard width to achieve standard dimensions if site conditions allow.

3.3.7 To improve lighting along cycle tracks, the lighting provision should be checked for compliance with the Public Lighting Design Manual and inspected regularly to avoid tree shades from shielding street lights.

Regulatory and Educational Measures for Cycling

3.3.8 From a regulatory and education perspective, several improvement measures have been studied, including compulsory enforcement in wearing safety helmet and cycling qualification. The measures studied and the corresponding findings are summarized in **Table 3.6**.

Table 3.6: Recommended Regulatory and Educational Measures for Cycling

Measures	Comments
Training	• LCSD currently subsidize cycling training courses to both primary and secondary school students, including demonstration course and practising course • Recommended to organize more courses related to basic cycling skill and knowledge of traffic regulation • Recommended for implementation subject to availability of resources
Promotion	• Enhance awareness by displaying consequences of accidents to the public • Leverage the use of internet to promote cycling safety in particular for youngsters • Strengthen publicity measures, with emphasis on the proper use of cycle track facilities • Recommended for implementation
Compulsory Wearing Safety Helmet	• Still a controversial issue in most overseas countries • May not be suitable for all cyclists • Cost implication of buying safety helmets • Discourage cycling activities • Not recommended for compulsory implementation • But recommended to promote the use of safety helmet through education and publicity

Measures	Comments
Cycling Qualification	• High administrative costs and license fees not supported by cyclists • Difficult to create one standardized licensing test suitable for both adults and children • Unlikely to reduce accident rate • No immediate need to implement cycle licensing as majority of cyclists riding on cycle tracks for leisure or short commuting trips • Unlikely a cost-effective approach to improve cycling safety and obtain support from general public • Not recommended for implementation
Third Party Insurance	• Most overseas countries do not have this as compulsory requirement • Do not directly reduce accident rate • Not recommended for implementation
Speed Control	• Most overseas cycle track networks do not have speed limit requirements specifically for cycling • Significant resource implication due to enforcement and installation of speedometer • Not recommended for implementation

Management Measures for Cycle Track Facilities

3.3.9 Management measures have been proposed to improve and upgrade cycle tracks and associated supporting facilities. The details of these management measures and the location for applications are summarized in **Table 3.7**.

Table 3.7: Proposed Management Measures for Cycle Track Facilities

Measures	Description	Location
Abuse of Cycle Track		
Physical Barriers	• At illegal parking black spot area, adopting "7" type railing or warning signs (to deter illegal cycle parking) • Planter beds/ shrubs	Choice of barrier depends on availability of spaces, visibility and sightline constraint, and site condition
Paving Materials	• Hot-mixed asphalt to provide distinctive appearance	Cycle track
Cycle Track Colour	• Red	Trunk route
	• Green	Local route
	• Yellow	Sharp bends, potential hazards and common conflicting points of cyclists/ pedestrians
Road markings	• Boundary white line (RM1162)	For locations with special constraints where provision of physical barriers to separate cycle tracks and footpaths not feasible/ practicable

Measures	Description	Location
	• Yellow colour	Kerbs between cycle track and footpath without physical barrier
	• Centre lines (RM1161)	Cycle track
	• Bicycle symbol (RM1171)	Intersections
	• Pedestrian symbol (RM1172)	
	• Directional arrows (RM1017)	
Enforcement	• Further review on the fine of the law on abusing cycle track	Cycle track
Maintenance of Cycle Tracks		
Regular Inspection	• Increase frequency of inspection to be conducted by riding bicycle • Contract out the inspection • Information signs indicating the presence of cycle track defects prior to completion of repairing works	Cycle track
Upgrading Cycle Track Facilities		
Traffic Sign Improvement	• Further study on legislation amendments for replacing the existing symbols displayed on traffic signs TS 227 and TS 228 by words “Cyclists Dismount / 騎單車者下車” and “End of Cyclists Dismount Zone / 下車管制區終止”, respectively.	Cycle track
	• Enlarge the plate size of TS179 / TS180 “Repeater” to the standard size of “Starter” to improve visibility.	Cycle track
Street Lighting	• Regular inspection by means of cycling during night time along the cycle track to ensure the adequacy of street lighting and identify any potential sites shaded by overgrown trees.	Cycle track
Tree Shade	• Planting of suitable types of trees where spatially feasible to provide shades on cycle tracks and footpath to reduce weather effect while also act as physical barrier to separate the two groups of road users.	Exposed cycle track
Upgrading Supporting Facilities		
Information Centre on cycling facilities	• Indicate location of facilities • Indicate cycle route network map • Indicate public cycle parking facilities and availability	TD has set up a comprehensive internet-based information system on cycling facilities during the course of the Study

Measures	Description	Location
Directional Signage	• Adequate directional signage at intersections of cycle track network • Use commonly known places or landmarks as destinations • Shared use of traffic sign posts and directional signs for pedestrians and cyclists as far as possible by locating in between footpaths and adjoining cycle tracks	Cycle track
Cycling Practising Area	• Consider providing a venue for learning/ practising of cycling in each new town if land resources allow	New towns with cycle track network
Cycle Accessibility in Leisure Venues	• Increase the flexibility of wheeling bicycles in leisure venues which are connected to/ located within 100m from the cycle track network • The actual site situation, accessibility need of the cyclists should be considered before applying the flexibility of wheeling bicycles in the venue so as to minimize the disturbance to the existing venue users	Leisure venues in the vicinity of cycle track network in new towns
Other Supporting Facilities	• Route maps showing cycle track network • Resting stations (e.g. refreshment kiosk, café and first aid facilities) • Sitting out area • Drinking fountain/ soft drinks vending machine • Public toilets	Trunk cycle track network subject to further study

Enhancement of Cycle Track Connectivity

3.3.10 To address the connectivity issues of cycle tracks, improvement measures have been proposed to enhance connectivity of cycle tracks taking account of various constraints. The identified constraints to connectivity and proposed enhancement are given in **Table 3.8**.

Table 3.8: Constraints and Enhancement to Cycle Track Connectivity

Constraints	Description	Enhancement
Land Availability	The typical cycle track width is 3.5m – 4.0m. The most direct way of provision is to convert part of footpath or adjacent empty areas to provide cycle track. However, there may not be enough space to provide additional cycle track in well-developed towns. Therefore, land availability along the existing footpath is a key constraint.	• Conversion of existing planter area (if available) into cycle track • Conversion of one traffic lane to provide cycle track if the road traffic on the concerned traffic lane is substantially low • Conversion of part of footpath to provide cycle track in case of low pedestrian flow • Consider choosing an alternative route • Consider local narrowing of cycle track at spatially constrained sections with not less than 2.5m for 2-way movement
Existing Terrain	The absolute maximum gradient is 8%. However, it is impractical to achieve such gradient at some sections, especially along existing pedestrian footbridges and subways.	• Consider choosing an alternative route • Provide appropriate warning signs and consider suitable speed reduction measures on cycle track
Conflict with Existing Infrastructure and utilities	The impact on existing infrastructure and utilities to accommodate the cycle tracks should be addressed. There are also other constraints such as removal of trees, intersection with major run-in/out, e.g. fire station, popular multi-storey car park, etc.	• Existing infrastructures and utilities including carriageways, central dividers, footpaths, elevated walkways, subways, U-channels, PTIs and various types of street furniture might need to be rearranged or reorganised for integrating a two-way cycle track in the missing section to enhance connectivity, subject to site specific conditions
Resources Availability	The cost-effectiveness should be addressed.	• Making use of existing available resources such as available land or existing crossing facilities to provide cycle tracks
Consideration of Other Road Users / Public Acceptance	The additional cycle tracks may affect other existing road users such as pedestrians. Therefore public consent is required on provision of cycle tracks.	• The design should cater for other road users rather than cyclists only, and minimize the impact to other road users, for example by maintaining the minimum width of the existing footpath
Environment	Tree felling or removal of greenery such as planters may be required for provision of cycle track.	• The design should minimise the removal of existing greenery if alternatives are available

3.3.11 Improvement measures have been studied for discontinued cycle track sections near bus/ Light Rail stops, cycle track intersections with carriageway or run-in/out, and pedestrian crossings on cycle track.

3.3.12 To enhance connectivity of the discontinued cycle tracks, the feasibility of introducing cycle crossing has been considered. It is recommended to widen existing pedestrian crossings to facilitate dismounted cyclists to cross signalized junctions with high volume of cycling traffic. Cycle signal crossing at signal-controlled junction is subject to further review with respect to legal implications for implementation.

3.3.13 The recommended measures for enhancing discontinued cycle tracks are summarized in **Table 3.9**.

Table 3.9: Recommended Measures for Discontinued Cycle Track

Measures	Comments
Enhancing continuity at bus stops and Light Rail stops	• Subject to the space availability, recommended to allow setback of the cycle track for the continuity of cycle tracks while maintaining the provision of passenger waiting area at kerbside and a continuous footpath for pedestrians • Recommended for implementation
Proposed cycle crossing at signal-controlled junctions	• Subject to amendment of law, cycle crossing at signal-controlled junctions is feasible in principle by providing a designated 2m wide cycle crossing in parallel with the pedestrian crossings • Require amendment of existing law • Recommended for further study
Proposed typical layout at intersections: • Dismount at Cycle Track – Carriageway Intersection • Give-way at Cycle Track – Carriageway Intersection • Give-way at Cycle Track – Vehicular Run-in/out Intersection • Dismount at Pedestrian Crossing on Cycle Track • Slow down at Pedestrian Crossing on Cycle Track • Alert at Pedestrian Crossing on Cycle Track • Cycle Track – Cycle Track Intersection	• Various layout to suit different situations of intersection by using appropriate road markings, traffic signs and bollards including “Dismount”, “Give-way”, ”Beware of Bicycle”, hatched markings, yellow surfacing, collapsible bollards and frangible bollards. • Recommended for trial
Proposed shared footpath in limited site-specific conditions	• For example, an alleyway with cycle tracks at both ends is possible in case of low pedestrian flow. To allow for shared use, it is considered that new legislation is required to define the shared zone such that cyclists are legally to ride on “shared use” path. And appropriate shared use symbol and traffic signs would be required to be installed on-site to inform the road users. • Require amendment of existing law • Recommended for further study

Measures	Comments
Proposed cycling on Emergency Vehicular Access (EVA) in limited site-specific conditions	• Delineation of cycle path by a thick white line road markings as well as installation of collapsible plastic bollards as physical barrier could be considered on EVA without significant impact on pedestrians • Require amendment of existing law • Recommended for further study
Designated cycle crossing at cautionary crossing	• Not recommended to avoid cyclists perceiving that they have the right to continue riding across the designated cycle crossing; while vehicular traffic may not stop to give way
On-carriageway cycle lanes	• Cycle lane is difficult to be practically implemented at locations with kerbside activities such as bus stops or on-street parking, due to potential conflicts with frequent road kerbside activities • The heavy road traffic demand on the existing carriageway would imply very constrained opportunities for conversion of traffic lane to cycle lane in Hong Kong, and in any case would only result in fragmented cycle lane • Not recommended for implementation
Shared footpath for general application	• The width for the majority of footpaths only just meets design standards but not generously provided due to land constraint • Regarding pedestrian safety, it is not favourable for introducing shared footpath in Hong Kong due to behaviour and attitude of cyclists in terms of the tolerance and willingness to give way for pedestrians • Not recommended for implementation
Proposed cycling on EVA for general application	• The presence of cycling activities would also induce safety concerns for the elderly and children • Not practically to provide a typically segregated cycle track on the EVA with proper drop kerbs and physical barriers • Not recommended for implementation

Modification to Design Standards and Guidelines on Cycle Track

3.3.14 Recommendations made, including the use of improvement measures under different usage criteria, have been proposed to the relevant departments for considerations. They would be regarded as useful references to future review or revision of TD's in-house design guidelines/ manuals for new cycle track design. It is noted that any new proposed arrangements should be put under trial with satisfactory results before they can be adopted as standard measures on cycle tracks.

Summary of Recommended Cycle Track Improvements

3.3.15 The recommended improvement measures for cycle track are summarized in **Table 3.10** and categorized as follows:

- Category 1: Recommended measures without further study required, subject to site constraints;
- Category 2 Recommended measures subject to pilot test and evaluation results as discussed in the following **Chapter 4**;
- Category 3: Recommended measures subject to further study; and
- Category 4: Measures reviewed and not recommended for implementation.

Table 3.10: Summary of Recommended Cycle Track Improvements

Approach	Measures	Category of Recommendations(1)
Design Perspective	Enhancement for steep ramp, sharp bend and visibility (Phase I): • Warning traffic signs • Warning road markings • Widening at curved section • Level section at the end of downhill ramps prior to turn	1
	Enhancement for steep ramp, sharp bend and visibility (Phase II): • Warning traffic signs • Road markings "Beware of Bicycle" • Transverse Yellow bars on straight steep ramp • Cushion protection / soft landing adjacent to sharp bends • Convex mirror • Yellow colour surface at potential hazard area	2
	Enhancement for traditional steel bollards: • Replacing with new collapsible plastic bollards where appropriate	1
	Enhancement for obstacles along cycle track: • Taper road marking at obstacles • Proper cover for U-channel	1
	Enhancement for substandard width for a long section: • Identify opportunities for local widening to standard width. If widening of full length is not feasible, widening section by section should also be explored	1
	Enhancement for insufficient lighting: • Ensure the lighting provision complies with Public Lighting Design Manual • Avoid planting tall trees which have potential blockage of lighting close to cycle track	1

Approach	Measures	Category of Recommendations(1)
Regulatory and Education Perspective	Enhancement for training: • Organise more courses related to basic cycling skill and knowledge of traffic regulation	1
	Enhancement for promotion activities: • Raise the awareness by displaying consequences of accidents to the public • Leverage the use of internet to promote cycling safety in particular for youngsters • Strengthen publicity measures, with emphasis on proper use of cycle tracks facilities	1
	Compulsory wearing safety helmet	4
	Cycling qualification (i.e. licensing for cyclists)	4
	Third party insurance	4
	Speed control	4
Management Perspective – Reducing Abuse of Cycle Track	Physical barriers: • Adopting "7" type railing or warning signs (to deter illegal cycle parking) at locations with serious illegal bicycle parking • Planter beds/ shrubs	2
	Paving materials: • Hot-mixed asphalt to provide distinctive appearance	3
	Cycle track colour: • Red for trunk route • Green for local route • Yellow at potential hazardous/ conflicting locations	2 (yellow at potential hazard locations) 1 (others)
	Road markings: • Boundary white line • Yellow at kerbs between cycle track and footpath without physical barrier • Centre lines • Bicycle symbol • Pedestrian symbol • Directional arrows	3 (yellow at kerbs) 1 (others)
	Enforcement: • Further review on the level of fine and relevant laws against abuse use of cycle track by pedestrians	3
Management Perspective – Maintenance of Cycle Tracks	Regular inspection: • Increase frequency of inspection to be conducted by riding bicycle • Contract out the inspection • Information signs indicating the presence of cycle track defects prior to completion of repairing works	1

Approach	Measures	Category of Recommendations(1)
Management Perspective – Upgrading Cycle Track Facilities	Traffic Sign Improvement: • Further study on legislation amendments for replacing the existing symbols of the two traffic signs TS227 and TS228 by words • Enlarge the plate size of TS179 / TS180 "Repeater" to the standard size of "Starter"	3 (Replace TS 227 and TS228) 1 (Enlarge TS179 and TS180 repeater)
	Street Lighting: • Regular inspection by means of cycling during night time along the cycle track to ensure the adequacy of street lighting and identify any potential sites shaded by overgrown trees	1
	Tree Shade: • Planting of suitable types of trees where spatially feasible to provide shades on cycle tracks and footpath and act as physical barrier to separate two road user groups	1
Management Perspective – Upgrading Supporting Facilities	Provide internet-based information system on cycling facilities	1
	Provide more directional signage subject to suitable sites	1
	Provide more cycling practicing area where space and resources available subject to land availability	1
	Allow dismounted cyclists accessibility in leisure venues where appropriate	1
	Provide supporting facilities along trunk cycle track network	3
Enhancing Connectivity of Cycle Track	Enhancing continuity at bus stops and Light Rail stops, subject to space availability.	1
	Proposed cycle crossing at signal-controlled junctions, subject to further review and study on legal aspect	3
	Proposed typical layout at intersections: • Dismount at cycle track – carriageway intersection • Give-way at cycle track – carriageway intersection • Give-way at cycle track – vehicular run-in/out intersection • Dismount at pedestrian crossing on cycle track • Slow down at pedestrian crossing on cycle track • Alert at pedestrian crossing on cycle track • Cycle track – cycle track intersection	2
	Proposed shared footpath in limited site-specific conditions, subject to further study and legislative amendment	3
	Proposed cycling on EVA in limited site-specific conditions, subject to further study and legislative amendment	3
	Designated cycle crossing at cautionary crossing	4
	On-carriageway cycle lanes	4
	General implementation of shared footpath	4
	General implementation of cycling on EVA	4

Note: (1) Category 1 refers to recommended measure without further study/ testing required subject to site constraints; Category 2 refers to recommended measure subject to pilot test and evaluation results; Category 3 refers to recommended measure subject to further study; and Category 4 refers to measure not recommended for implementation.

4. TAI PO PILOT SCHEME

4.1 Background

4.1.1 With key improvement measures recommended in **Chapter 3** on cycle parking and on cycle track, upon TD's instruction, we proceeded to identify a suitable area out of the 9 new towns to establish a pilot scheme to test and evaluate the effectiveness of these recommended improvement measures.

4.1.2 The effectiveness of each of the new improvement measures is subject to evaluation for its appropriateness of further implementation in the 9 new towns.

4.2 Pilot Scheme in Tai Po

4.2.1 Tai Po had been considered to be the suitable choice for implementation of the Pilot Scheme. Surveys were carried out on a typical weekend in August 2011 and a typical weekday in September 2011 to review the existing demand of cycling facilities.

4.2.2 The existing cycling trips, sorted by the 9 new towns are summarized in below **Table 4.1**.

Table 4.1: Existing Cycling Demand at Cycle Tracks

New Town	No. of Cyclists per Counting Station on Cycle Track per Peak Period(1)	
	Weekend	Weekday
Sha Tin	493	180
Tai Po	703	181
Sheung Shui & Fanling	102	254
Tseung Kwan O	124	65
Tsuen Wan(2)	-	-
Tung Chung	174	180
Yuen Long	263	103
Tin Shui Wai	128	83
Tuen Mun	237	147

Note: (1) The peak periods of weekday and weekend were between 16:00 – 18:00 hours and 07:30 – 09:30 hours, respectively.

(2) At present, there are no cycle tracks in the district of Tsuen Wan.

4.2.3 Tai Po has a relatively developed cycle track network compared with other new towns and has some deficiencies in cycle parking and cycle track facilities.

4.2.4 It is considered that the cycle parking problems in Tai Po are mainly due to oversubscription of existing parking spaces and the lack of provision at several major attraction ends. Considerable improvements could be made by provision of additional bicycle parking facilities.

4.2.5 Tai Po Plaza has been considered as one of the attraction ends in Tai Po without connection to cycle track network. With its vicinity being lightly trafficked and wide footpath being available for provision of cycle tracks, cycle track extension is considered relatively feasible.

4.2.6 Based on preliminary analysis on possible implementation of improvement measures in Tai Po, it is considered that Tai Po is the best candidate new town for the implementation of Pilot Scheme.

4.3 Improvement Plans in Tai Po Pilot Scheme

4.3.1 Detailed improvement layouts have been designed for improvement at 9 locations within the area of Tai Po Pilot Scheme, as shown in **Figure 4.1**, by identifying existing problems and proposing improvement measures. The identified problems and the proposed improvement measures are summarized in **Table 4.2**.

Table 4.2: Summary of Tai Po Pilot Scheme

Scheme No.	Location	Identified Problems	Proposed Improvement Measures
TP01	Near Tai Po Plaza	• No cycle tracks connecting Tai Po Plaza at present • Illegal parking observed	• Extension of cycle track along On Po Road connecting to Tai Po Plaza • Widening of existing signalized crossing at junction of On Po Road/ On Tai Road • Provision of 1-up 1-down parking spaces along On Tai Road footway and near Tai Po Plaza • Provision of inverted-U parking spaces near Tai Po Plaza
TP02	Tai Po Waterfront Park near Spiral Lookout Tower	• No segregations between pedestrians and cyclists • Cycle track and footway with same colour surfacing • Existing frangible bollards • No alerts for pedestrians on bewaring cyclists	• Railings on each side of staircase landing to be constructed • Yellow coloured surface and grey coloured surface to be paved • Plastic bollards to replace frangible bollards • Road markings to alert pedestrians on extent of cycle tracks
TP03	Tai Po Waterfront Park near Yuen Shin Road	• Cycle track width of 3.6m at bend with radius of 3.0m and visibility of 10m • No protection against trees at downramp • Cyclists observed to ride on existing dismounted section • Sharp bend	• Cycle track widened at bend with improved visibility • Tree guards with protective paddings to be installed • Yellow bars and plastic bollards to alert cyclists and re-activation of cycle track • Tartan material to be paved on footway as soft landing • Yellow coloured surface to be paved at bend

Scheme No.	Location	Identified Problems	Proposed Improvement Measures
TP04	Yuen Chau Tsai Park near Island House Lane	• No warning to cyclists of Island House Lane carriageway	• Give-way at junction of Island House Lane / cycle track with road markings
TP05	Nam Wan Road near Kwong Fuk Playground	• Cycle track width of 3.0m at bend • No segregation of 2-way cycle track at bend • Limited visibility of 5.0m	• Cycle track widened at bend • Segregation of cycle track by hatched marking and plastic bollards at bend and additional traffic signs to alert cyclists • Enhanced visibility by convex mirror with pole wrapped by protective padding • Padding to be installed along the inner wall of subway at bend
TP06	Kwong Fuk Playground	• No signage/ indicators to cycle parking areas • No covers over existing parking areas	• Provide signage to cycle parking areas along Kwong Fuk Road cycle track • Shelter to be provided
TP07	MTR Tai Po Market Station	• Illegal parking observed locked on type 2 railings and amenity railings	• Angled parking spaces to be provided along the existing type 2 railings • Existing type 2 railings/ amenity railings to be replaced by “7” type railings
TP08	Subway under Uptown Plaza	• Over-subscription of cycle parking observed • About 20 unauthorized parking along the railings across the existing parking racks	• Provision of double deck parking system to increase the parking provision, subject to pending result of trial in Fanling • Existing type 2 railings to be replaced by “7” type railings
TP09	Junction of Tat Wan Road / Fung Wan Road	• Dismount ahead of junction at present	• Facilitate cyclists to dismount prior to entering the junction

4.3.2 In view of the suggestions, TD and Highways Department have liaised for a detailed implementation programme. Relatively simple schemes, including TP02 and TP04, have been implemented and completed by 2012. All remaining schemes are tentatively targeted for completion by end 2013, subject to conditions of individual scheme, e.g. trial result of double deck parking system in Fanling.

4.3.3 After collecting data from various sources including counting surveys, interview surveys, site observations/ inspections, feedbacks from the maintenance departments and from the public via other platforms, all the data will be analysed and information will be compiled.

4.3.4 Recommendations will be made on the acceptance of each of the improvement measures based on the data collected.

4.3.5 Enhancement to the improvement measures evaluated, subject to the results of data analysis and feedbacks received, will be proposed for implementation in other new towns, if necessary.

4.3.6 Conventional improvement measures implemented in the Pilot Scheme will be reviewed by site observations during the evaluation period.

4.3.7 As the implementation of Pilot Scheme is still in progress, the evaluation results will be covered in a separate report but not in this Executive Summary.

5. IMPROVEMENT SCHEMES FOR ACCIDENT PRONE SITES AND PROBLEMATIC SITES

5.1 Review of Accident Prone Sites

5.1.1 In view of a series of cycling related accidents which happened, a set of accident records was analyzed. Those accident records were obtained from the Hong Kong Police Force via TD, covering around 1,600 bicycle accident cases occurred on Cycle Track in Sha Tin (including Ma On Shan) and Tai Po from 2008 to 2010. Criteria were established to identify and prioritise 20 numbers of accident prone sites for improvement, based on the findings recommended in the Study.

5.1.2 Each recorded accident data, assigned with its own ID number, consists of the location of accident, the cause of accident, severity of injuries, weather and cycle track conditions.

5.1.3 To identify accident prone sites for improvement, accident records were grouped by locations and sorted by number of accidents, severity of injuries and the cause of accidents.

5.1.4 The identified accident prone sites were then prioritized in accordance with the total number of accidents taken place, then by the number of serious injuries involved.

5.1.5 The accident prone sites, with their rank and injury statistics are shown in **Table 5.1**. The location plan of these accident prone sites area is shown in **Figures 5.1 and 5.2**.

Table 5.1: Summary of Prioritized Accident Prone Sites

Rank	ID	Accident Location	Accident Severity			
			Slight Injury	Serious Injury	Fatal	Total
1	AP01	Sha Tin Rural Committee Road / Yuen Wo Road	8	0	1	9
2	AP02	Shing Mun River near Banyan Bridge	23	0	0	23
3	AP03	Lion Rock Tunnel Road near Museum of Heritage	14	3	0	17
4	AP04	Ting Kok Road / Lo Fai Road	9	3	0	12
5	AP05	A Kung Kok Street near Mui Tsz Lam Road	9	2	0	11
6	AP06	Ting Kok Road near Wong Yue Tan	9	2	0	11
7	AP07	Shing Mun River Cycling Track near Hang Tai Road	9	1	0	10
8	AP08	Nam Wan Road / Tai Po Tai Wo Road	10	0	0	10
9	AP09	Yuen Wo Road / Fo Tan Road	7	2	0	9
10	AP10	Lok King Street near Jubilee Garden	7	1	0	8
11	AP11	Tate's Cairn Highway / Bridge across Shing Mun River	7	1	0	8
12	AP12	Kiu Ha Road near Vehicle Weighing Station	8	0	0	8
13	AP13	Footbridge near Ma On Shan Bypass, Heng On Estate	4	3	0	7
14	AP14	Tai Chung Kiu Road near Belair Gardens	6	1	0	7

Rank	ID	Accident Location	Accident Severity			
			Slight Injury	Serious Injury	Fatal	Total
15	AP15	Pak Shek Kok Promenade near Science Park	7	0	0	7
16	AP16	Lion Rock Tunnel Road (near MTR Che Kung Temple Station)	7	0	0	7
17	AP17	Che Kung Miu Road near Che Kung Miu	4	2	0	6
18	AP18	Lion Rock Tunnel Road (near Shing Mun River)	6	0	0	6
19	AP19	Lion Rock Tunnel Road (near Tai Chung Kiu Road)	6	0	0	6
20	AP20	Tolo Highway Cycle Track near Sui Cheung Street Roundabout	4	1	0	5

5.2 Improvement Plans for Accident Prone Sites

5.2.1 The improvement measures proposed for accident prone sites include conventional measures that have been implemented in enhancing existing cycle tracks, and also new measures subject to evaluation of Tai Po Pilot Scheme.

5.2.2 With consideration of public demand for safety improvement of cycle track, the improvement measures have been recommended to implement in 2 phases. In Phase 1, conventional measures have been proposed and will be implemented on site. The new measures will be implemented in Phase 2 subject to evaluation results of Tai Po Pilot Scheme.

5.2.3 Detailed improvement layouts have been designed for the 20 numbers of accident prone locations. The identified problems and the proposed improvement measures are summarized in **Table 5.2**.

5.2.4 At some locations, improvement schemes have been recently completed or scheduled for implementation in due course. To facilitate quick implementation of works and better allocation of resources, the accident statistics at those locations will be kept in view before any further proposals for improvement.

5.2.5 Detailed traffic engineering layout plans of the remaining locations will be issued to Highways Department for construction.

Table 5.2: Summary of Improvement Measures for Accident Prone Sites

Scheme No.	Location	Identified Problems	Proposed Improvement Measures
AP01	Sha Tin Rural Committee Road/ Yuen Wo Road	• Steep gradients	• Warning traffic signs and road markings • Transverse yellow bars along straight downhill section • Plastic bollards segregating 2-way traffic • Yellow coloured surface at footway/ cycle track conflict areas
AP02	Shing Mun River near Banyan Bridge	• Steep gradients • Sharp bend	• Warning traffic signs and road markings • Plastic bollards segregating 2-way traffic • Yellow coloured surface at potential hazardous sections
AP03	Lion Rock Tunnel Road near Museum of Heritage	• Pedestrians – cyclists conflicts • Steep gradient	• Warning traffic signs and road markings • Kerb painted in yellow to delineate cycle track and footway • Yellow coloured surface at potential hazardous sections • Wall-mounted cushion protection by protective padding
AP04	Ting Kok Road/ Lo Fai Road	• Steep gradient	• Warning traffic signs and road markings • Local reduction of width along the ramp to remind cyclists to slow down • Transverse yellow bars along straight downhill section
AP05	A Kung Kok Street near Mui Tsz Lam Road	• Steep gradient • Sharp bend	• Warning traffic signs and road markings • Yellow coloured surface at potential hazardous locations • Collapsible plastic bollards to segregate 2-way traffic
AP06	Ting Kok Road near Wong Yue Tan	• Steep gradient	• Widening and straightening of cycle track by setting back existing verge • Warning traffic signs and road markings • Collapsible plastic bollards to segregate 2-way traffic • Yellow coloured surface at bend
AP07	Shing Mun River Cycle Track near Hang Tai Road	• Pedestrians – cyclists conflicts • Cyclists – cyclists conflicts • Sharp bend	• Cycle track widened to 5.0m at bend with radius of 15.0m • Warning traffic signs and road markings • Yellow coloured surface at conflict point • Collapsible plastic bollards to segregate 2-way traffic
AP08	Nam Wan Road/ Tai Po Tai Wo Road	Improvement scheme to slow down cyclists at sharp bend completed in August 2011	

Scheme No.	Location	Identified Problems	Proposed Improvement Measures
AP09	Yuen Wo Road/ Fo Tan Road	• Pedestrian crossing steep downward cycle track with limited sightline	• Warning traffic signs and road markings • Transverse yellow bars along straight downhill section • Collapsible plastic bollards to segregate 2-way traffic • Yellow coloured surface at double bend
AP10	Lok King Street near Jubilee Garden	• Abuse of cycle track by pedestrians	• Road markings for better delineation
AP11	Tate's Cairn Highway Bridge across Shing Mun River	• Bicycle – bicycle and bicycle – pedestrian collision at junction	• Warning traffic sign and road markings • Yellow coloured surface at cycle track/ cycle track junction and footway/ cycle track junction
AP12	Kiu Ha Road near Vehicle Weighing Station	• Bicycle – bicycle collision while riding on opposite cycleway	• Existing traffic island to be converted to hatched marking • Collapsible bollards to segregate 2-way traffic
AP13	Footbridge near Ma On Shan Bypass, Heng On Estate	• Cyclists ramping into existing street lamp post	• Warning traffic sign and road markings • Yellow coloured surface at footway/ cycle track junction • Transverse yellow bars along straight downhill section • Frangible bollards to be replaced by collapsible bollards
AP14	Tai Chung Kiu Road near Belair Garden	Improvement scheme to improve cycle track / footway junction undertaken by Highways Department in February 2012	
AP15	Pak Shek Kok Promenade near Science Park	• Cyclists conflict waiting at junction to enter Science Park • Pedestrians / cyclists conflict at junction	• Warning road markings
AP16	Lion Rock Tunnel Road (near MTR Che Kung Temple Station)	• Steep gradient	• Warning traffic signs and road markings • Yellow coloured surface at footway – cycle track conflict point • Transverse yellow bars along straight downhill section
AP17	Che Kung Miu Road near Sha Tin Tau Road	Improvement scheme to improve cycle track / cycle track junction undertaken by Highways Department in July 2011	
AP18/ AP19	Lion Rock Tunnel Road (near Tai Chung Kiu Road)	• Steep gradient	• Warning traffic signs and road markings • Yellow coloured surface at footway – cycle track conflict point • Transverse yellow bars along straight downhill section • Plastic bollards segregating 2-way traffic

Scheme No.	Location	Identified Problems	Proposed Improvement Measures
AP20	Sui Cheung Street	• Narrow combined width of footpath and cycle track	• Setback of existing verge to shift cycle track and allow widening of existing footpath • Different pavement colours on cycleway and footway

5.3 Identification of Problematic Sites

5.3.1 15 locations have been identified as problematic sites, which have been subject to frequent public complaints or strong requests for improvement, within the 9 new towns. Those problematic sites are listed in **Table 5.3**.

Table 5.3: Problematic Sites

ID	District	Problematic Sites
PS01	Sha Tin	The section of cycle track outside Sha Tin Racecourse
PS02		Various sections of cycle track alongside Tolo Highway
PS03		Chung Ling Lane, Tai Wai
PS04		Hang Hong Street, Ma On Shan
PS05		Lion Bridge Subway, Sha Tin
PS06		Hang Tai Road, Ma On Shan
PS07	Tai Po	The section of cycle track at Ting Kok Road where the presence of a bus bay affects cycling activity
PS08		The cycle track at Tai Po Waterfront Park
PS09		Kwong Fuk Bridge
PS10		Ting Kok Road
PS11	Tseung Kwan O	Section of cycle track outside the Tseung Kwan O Swimming Pool
PS12	North	Wah Ming Road
PS13		Fan Kam Road
PS14		So Kwu Po Road
PS15	Tung Chung	Man Tung Road

5.3.2 Recommendations have been made for each of problematic sites for feasibility of implementing traffic improvement measures with justifications. Improvement measures have been proposed wherever justified and considered feasible.

5.4 Improvement Plans for Problematic Sites

5.4.1 Similar to accident prone sites, the improvement measures of problematic sites have been recommended to be carried out in 2 phases. In Phase 1, conventional measures have been proposed and will be implemented on site. Subject to evaluation results of new measures, those measures will be implemented on site in Phase 2. The identified problems and the proposed improvement measures are summarized in **Table 5.4**.

Table 5.4: Summary of Improvement Measures for Problematic Sites

Scheme No.	Location	Identified Problems/ Feasibility of Improvements	Proposed Improvement Measures
PS01	The section of cycle track outside Sha Tin Racecourse	• Narrow combined width of cycle track and footpath • Spatial constraint for substantial improvements, and quick traffic improvement measures to widen cycle track and footpath not available • Recommended for minor improvements in short-term	• Warning traffic signs and road markings • Plastic bollards segregating 2-way traffic at bend • Yellow coloured surface at double bend
PS02A	Sui Cheung Street Pick-up/ Drop-off Area	• Connectivity issue: missing link between Sui Cheung Street and Promenade • Feasible for provisioning of part of the missing link	• Extension of cycle track to near the entrance of pedestrian subway
PS02B	Bicycle Subway across Science Park Road	• Steep gradient • Cyclists waiting inside the subway • Feasible for improvement	• Warning traffic signs and road markings • Transverse yellow bars along straight downhill section • Collapsible bollards to segregate 2-way traffic • Erection of traffic signs to remind cyclists not to wait inside the subway
PS02C	Near Biotechnology Centre	• Visibility problem • Feasible for improvement	• Warning traffic signs and road markings • Installation of convex mirror • Collapsible bollards to segregate 2-way traffic
PS03	Chung Ling Lane	• Connectivity issue: cycle tracks terminating ahead of junctions • Feasible for improvement	• Cycle track give-way across vehicular access • Extension of cycle track to signalized pedestrian crossing

Scheme No.	Location	Identified Problems/ Feasibility of Improvements	Proposed Improvement Measures
PS04	Hang Hong Street, Ma On Shan	• Sharp bend	• Local widening of cycle track to 3.5m • Warning traffic signs and road markings • Transverse yellow bars along straight downhill section • Yellow coloured surface at bend
PS05	Lion Bridge Subway, Sha Tin	• Steep gradient • Sharp bend • Feasible for improvement	• Warning traffic signs and road markings • Yellow coloured surface at bend • Wall-mounted cushion protection by protective padding
PS06	Hang Tai Road, Ma On Shan	• Connectivity issue: extend cycle track to attraction point • Feasible for improvement	• Cycle track with 3.5m width extending for 350m • Footpath of 2.5m to be maintained
PS07	Ting Kok Road	• Connectivity issue: cycle track terminating at bus lay-bys • Spatial constraint and resumption of existing land required for provision of cycle track while maintaining the bus lay-bys	• Quick and practicable traffic improvement measures not available
PS08	Tai Po Waterfront Park	• Improvement scheme under Tai Po Pilot Scheme No. TP02	• Railings on each side of staircase landing to be constructed • Yellow coloured surface and grey coloured surface to be paved • Plastic bollards to replace frangible bollards • Road markings to alert pedestrians on extent of cycle tracks
PS09	Kwong Fuk Bridge	• Abuse of cycle tracks by pedestrians • Feasible for improvement	• Convert existing staircase to ramp • Warning traffic signs and road markings
PS10	Ting Kok Road Vehicular Accesses	• Connectivity issue: vehicular access conflicting with cycle track	• Cycle track give-way across vehicular access
PS11	Outside Tsueng Kwan O Swimming Pool	Improvement scheme to improve delineation of cycle track and footpath undertaken by Highways Department in February 2012	
PS12	Wah Ming Road	• Connectivity issue: missing link along Wah Ming Road • Transplantation of multiple number of existing trees required • Slope works required for provisioning	• Quick and practicable traffic improvement measures not available

Scheme No.	Location	Identified Problems/ Feasibility of Improvements	Proposed Improvement Measures
PS13	Fan Kam Road	• Transplantation of multiple number of existing trees required • No major attraction ends along Fan Kam Road, thus demand for cycle track not supported	• Quick and practicable traffic improvement measures not available
PS14	So Kwu Po Road	• Request for provisioning of footway adjacent to existing cycle track inside North District Park to minimize segregations • Transplantation of multiple number of existing trees required • Not recommended for additional provisioning of footway/ cycle track with existing connectivity	• Quick and practicable traffic improvement measures not available
PS15	Man Tung Road	• Request for provisioning of cycle track extension to Man Tung Road • Transplantation of multiple number of existing trees required • Substantial civil engineering works required to overcome existing level difference across Tung Chung East Interchange • Resumption of existing land required for provisioning	• Quick and practicable traffic improvement measures not available

6. SAFETY HELMET SURVEYS

6.1 Survey Methodology, Locations and Schedule

6.1.1 In July 2011, TD instructed to undertake a survey on the use of safety helmet for cycling.

6.1.2 The purpose of this survey is to identify the proportion of cyclists wearing safety helmet, hence manual counting survey was conducted within the 9 new towns, including major cycling corridor and in vicinity of major attraction points (e.g. MTR stations, markets, government municipal complex, schools, major residential areas).

6.1.3 Manual counting survey on the number of cyclists (both riding and wheeling a bicycle) with/ without safety helmets at selected locations within the 9 new towns was conducted, with cyclists classified into 3 user groups according to their appearance as shown in **Table 6.1**.

Table 6.1: Classification of User Group in Helmet Survey

User Group	Characteristics
Children	Kids, Primary School Students (Approximate Age < 12)
Adult	Teenagers, Adults, Non Children / Elderly user group (Age around 12-65)
Elderly	Oldest age group, White hair (Approximate Age > 65)

6.1.4 The survey was carried out on cycle tracks and carriageways in the 9 new towns and the cycle parks located in Ma On Shan, Tseung Kwan O, Tsuen Wan and Tai Po.

6.1.5 The summary of the survey locations by district is shown in **Table 6.2**.

Table 6.2: Summary of Helmet Survey Locations (by New Town)

New Town	Cycle Track	Carriageway	Others	Total
Sha Tin	10	10	1	21
Tai Po	10	6	1	17
Sheung Shui/ Fanling	4	3	0	7
Tseung Kwan O	2	1	1	4
Tsuen Wan	0	3	1	4
Tung Chung	2	2	0	4
Tuen Mun	2	3	0	5
Yuen Long	2	6	0	8
Tin Shui Wai	4	1	0	5
Total	**36**	**35**	**4**	**75**

6.1.6 The survey was conducted during the morning peak 07:30 – 09:30 hours on typical weekdays and 16:00 – 18:00 housr on typical weekends.

6.1.7 The weekend survey was conducted on 14 and 21 August 2011 and the weekday survey was conducted on 7 and 8 September 2011.

6.2 Survey Results

6.2.1 Major Findings of the Survey

6.2.2 16,555 and 7,016 cyclists were sampled in the weekend surveys and in weekday surveys, respectively.

6.2.3 Among the sampled cyclists, 1,335 and 236 cyclists were observed to be wearing safety helmets in weekend and on weekday, respectively. The survey result, sorted by survey dates, survey locations and age groups, is shown in **Table 6.3**.

Table 6.3: Summary of Helmet Survey Result

Surveyed Users	Weekend	Weekday	Weekend & Weekday
Total nos. of cyclists surveyed	16,555	7,016	23,571
Total nos. of cyclists with safety helmet (%)	1,335 (8%)	236 (3%)	1,571 (7%)
By Survey Location Type			
Total nos. of cyclists surveyed at cycle track	13,646	4,876	18,522
Total nos. of cyclists with safety helmet at cycle track (%)	1,085 (8%)	197 (4%)	1,282 (7%)
Total nos. of cyclists surveyed at carriageway	1,853	2,140	3,993
Total nos. of cyclists with safety helmet at carriageway (%)	152 (8%)	39 (2%)	191 (5%)
Total nos. of cyclists surveyed at cycle park	1,056	-	1,056
Total nos. of cyclists with safety helmet at cycle park (%)	98 (9%)	-	98 (9%)
By User Group			
Total nos. of children surveyed	1,278	194	1,472
Total nos. of children with safety helmet (%)	99 (8%)	4 (2%)	103 (7%)
Total nos. of adult surveyed	14,908	5,873	20,781
Total nos. of adult with safety helmet (%)	1,230 (8%)	215 (4%)	1,445 (7%)
Total nos. of elderly surveyed	369	949	1,318
Total nos. of elderly with safety helmet (%)	6 (2%)	17 (2%)	23 (2%)

7. CONCLUSIONS

7.1 Summary

7.1.1 General issues of cycle parking and cycle track in the 9 new towns have been identified and improvement measures have been recommended making reference to overseas practices. A Pilot Scheme for new improvement measures have been proposed to implement in Tai Po.

7.1.2 20 numbers of accident prone sites and 15 numbers of problematic sites have been investigated and improvement measures have been proposed wherever justified and feasible. A survey on the use of safety helmet for cycling was conducted to identify the proportion of cyclists wearing safety helmet.

7.2 Way Forward

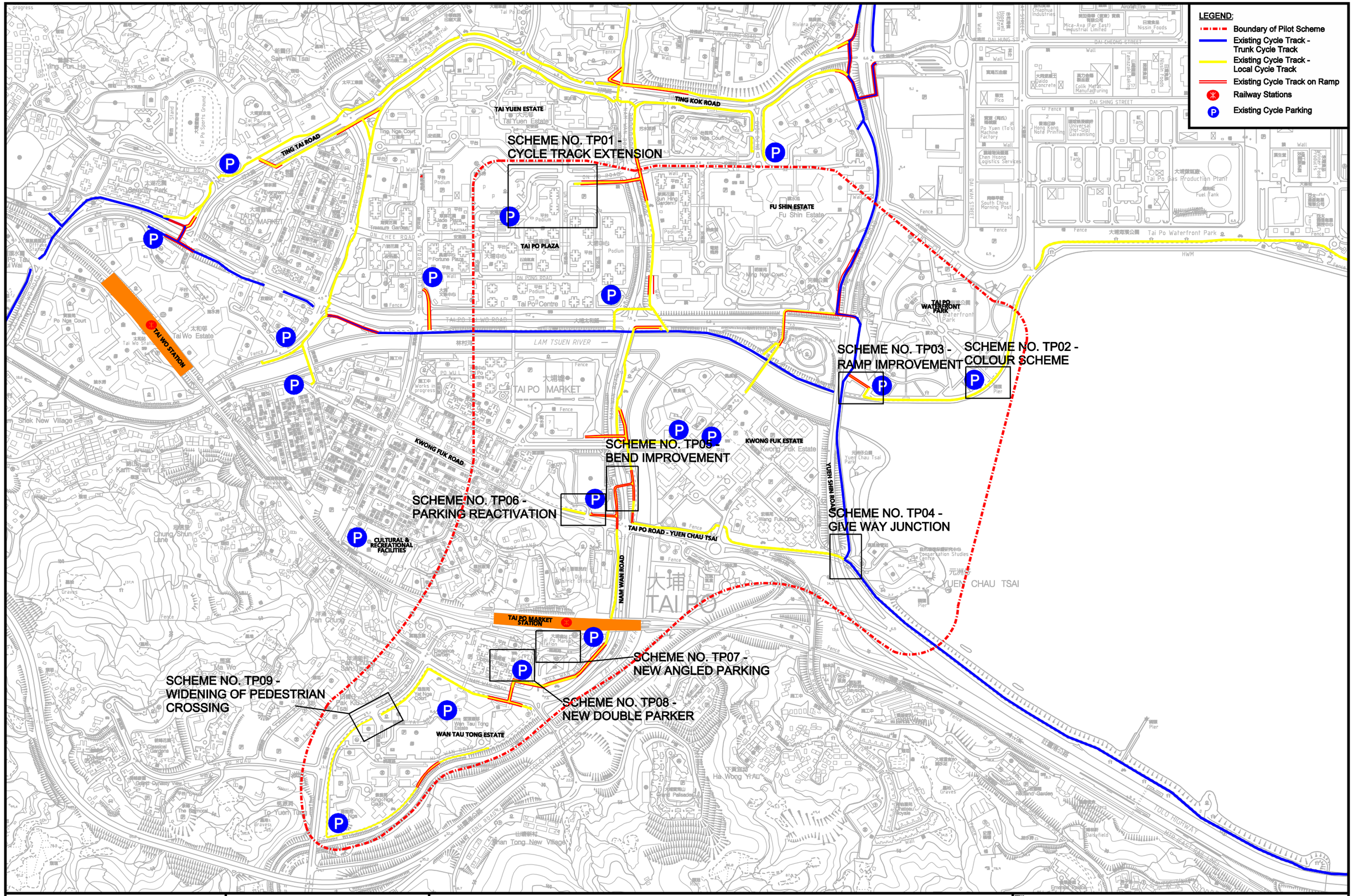
7.2.1 Some of the proposed cycling improvement measures are subject to further review and evaluation prior to general implementation. Those improvement measures to be followed up requiring further review and evaluation are listed in **Table 7.1**.

Table 7.1: Follow-up Improvement Measures

Category	Measures
Improvement of Parking Facilities	Angled parking
	1-Up-1-Down
	Double deck parking system
Measures to Increase or Reactivate Cycle Parking Spaces	Reactivating the underutilized parking spaces
Management Measures for Cycle Parking	Sign display for deterring overstayed/ abandoned bicycles
	Deterring illegal parking – replacing the kerbside amenity railings
Design Perspective – Cycle Track	Enhancement for steep ramp, sharp bend and visibility (Phase II): • Warning traffic signs • "Beware of Bicycle" road markings • Transverse Yellow bars on straight steep ramp • Cushion protection/ soft landing adjacent to sharp bends • Convex mirror • Yellow colour surface at potential hazard area
Management Perspective – Reducing Abuse of Cycle Track	Physical barriers: • Adopting "7" type railing or warning signs (to deter illegal cycle parking) at locations with serious illegal bicycle parking • Planter beds/ shrubs
	Cycle track colour: • Yellow at potential hazard / conflicting locations

Category	Measures
Enhancing Connectivity of Cycle Track	Proposed typical layout at intersections: • Dismount at cycle track – carriageway intersection • Give-way at cycle track – carriageway intersection • Give-way at cycle track – vehicular run-in/out intersection • Dismount at pedestrian crossing on cycle track • Slow down at pedestrian crossing on cycle track • Alert at pedestrian crossing on cycle track • Cycle track – cycle track intersection

FIGURES



運輸署
Transport Department

ATKINS

Agreement No. TD 194/2009
Traffic and Transport Consultancy Study on Cycling Networks and Parking Facilities in Existing New Towns in Hong Kong

Title: Pilot Scheme in Tai Po - Key Plan

Scale at A3	Date	Figure No.
1 : 8000	AUG 2012	4.1

User Workspace:\Program Files\Bentley\Workspace\users\USTN_PLTDRVL_
PLOT DRVR$PLTDRVL$
PLOT BY Stone1972 8/23/2012 5:32:44 PM
FILENAME: I:\Projects and Settings\Stone1972\Desktop\449U00_Tai Po Pilot Scheme\20120808\Figure 4.1.dgn
MODEL NAME: Default

SCIENCE PARK
AP 15
CHINESE UNIVERSITY
AP 10
AP 12
AP 20
FO TAN
TAI WAI
SHA TIN TOWN CENTRE
SHA TIN RACECOURSE
MA ON SHAN
AP 17
AP 03
AP 09
AP 01
AP 02
AP 11
AP 07
AP 13
AP 18
AP 16
AP 19
SHING MUN RIVER
AP 14
TAI CHUNG KIU ROAD
TAI SUI HANG
MA ON SHAN BYPASS
AP 05
SHA TIN WAI
CITY ONE SHA TIN
LION ROCK TUNNEL ROAD
SHEK MUN

LEGEND :
AP 01 ACCIDENT PRONE SITES

運輸署
Transport Department

ATKINS

Agreement No. TD 194/2009
Traffic and Transport Consultancy Study on Cycling Networks and Parking Facilities in Existing New Towns in Hong Kong

Title
Key Plan of Accident Prone Sites
(Sheet 1 of 2)

Scale at A3	Date	Figure No.
1:25000	AUG 2012	5.1

User:Workspace C:\Documents and Settings\All Users\Application Data\Bentley\Workspace\users\untitledu.c' User:Ref C:\Documents and Settings\All Users\Application Data\Bentley\WorkSpace\System\Plotdrv\PDF COLOUR.plt
PLOT DRV:C:\Documents and Settings\All Users\Application Data\Bentley\WorkSpace\System\Plotdrv\PDF COLOUR.plt
PRINTED: 8/8/2012 1:48:30 PM
FILENAME: T:\Transportation\Es\2\TRANS\Job\449 TD94_2009 Cycling Network & Parking in New Towns\Drawings\Accident Prone Site Updated Figure No\Figure 5.1.dgn
MODEL NAME:Default

運輸署
Transport Department

ATKINS

Agreement No. TD 194/2009
Traffic and Transport Consultancy Study on Cycling Networks and Parking Facilities in Existing New Towns in Hong Kong

Title
Key Plan of Accident Prone Sites
(Sheet 2 of 2)

Scale at A3	Date	Figure No.
1:25000	AUG 2012	5.2

User:Workspace C:\Documents and Settings\AllUsers\Application Data\Bentley\Workspace\users\untitledu.cf, UserRef C:\Documents and Settings\All
PLOT DRIVER:\Documents and Settings\AllUsers\Application Data\Bentley\WorkSpace\System\Plotdrv\PDF COLOUR.plt
PRINTED BY: sinwi912 8/8/2012 12:27:04 PM
FILE NAME: C:\Documents and Settings\AllUsers\Application Data\Bentley\WorkSpace\Projects\Esri\TRAMS\Job\449 TD94_2009 Cycling Network & Parking in New Towns\Drawings\Accident Prone Site Updated Figure\No\Figure 5.2.dgn
MODEL NAME: Default