Traffic Impact Assessment (TIA) Checklist for Development Project

TIA Report

1. Traffic Impact Assessment is a tool for engineers and planners to assess traffic and transport impacts arising from a development proposal and to identify mitigation measures.

2. In general, the following items should be covered by a TIA report for development project:

   (a) Development Parameters and Area of Influence (AOI)

   (b) Input Assumptions

   (c) Baseline Traffic Situation

   (d) Traffic Forecast and Assessment

   (e) Recommendations and Implementation

   (f) Associated Traffic and Transport Facilities

3. Engineers and planners should bear in mind that TIA report is a project specific submission. Hence, engineers and planners should exercise their professional judgment to review the local site traffic conditions and patterns, identify the local traffic issues, and assess the traffic impact imposed by the project, and recommend mitigation measures to suit the development need.

4. A review on the submitted TIA report should be conducted when there are substantial changes or variations in the planning parameters or network assumptions at a later stage.

5. Appended below is a table showing a general checklist of TIA submission. Please note that the checklist is not exclusive requirements.

6. To facilitate the communication between the applicant/project office and TD regarding the concerned TIA submission, the applicant/project office could contact the respective traffic engineering team as shown in **Annex A** – Traffic Engineering Divisional Boundary of Transport Department.

Study Aspects	**Items to be checked**
(a) Development parameters and AOI	• Check whether all project specific development parameters, including but not limited to proposed land use, population size, gross floor area, etc., have been listed out in the submission. • Check whether the AOI includes all roads and junctions adjacent to OR affected by the development and the nearby interchanges with trunk roads. *Remarks :* *In general, the AOI should cover the nearby strategic/trunk roads for cross-district movements, slip roads connected to the nearby strategic highways, and all junctions along the route to nearby rail stations, and major public transport interchanges (PTIs).*
(b) Input Assumptions	• Check whether the latest land use data and planning assumptions, such as gross domestic product (GDP), vehicular growth rate, etc. have been adopted in the submission. • Check whether all planned/committed developments within/adjacent to the AOI have been included in the assessment for the cumulative traffic impact at the design year. • Check OZP, ODP /LP to see whether there is any discrepancy between the development and Government's proposal in terms of land use, road widening, and pedestrian facilities e.g. any encroachment of the site on the future road reserve. • Check the assumed programme of the planned infrastructures/major development against the latest situation. The assumptions stipulated in the TIA may not be up-to-date. • Check the assumptions on the committed and planned transport infrastructure/major developments within the study area and assess the cumulative traffic impact when the development is completed.
(c) Baseline Traffic Situation	• The prevailing public transport facilities (railway, bus, GMB, taxi and ferry), road networks (district and local), and pedestrian facilities within the study area should be identified. • The prevailing performance of the local road network (and trunk roads, if needed) around the development would be assessed by a capacity analysis and, if appropriate, a queue length analysis on identified junctions. • The details are listed out below.
(i) Road Network	• Check the submitted road networks plans against the latest road network plans with particular reference to the proposed changes to be implemented by Government in respect of junctions, road layout, signal control systems and traffic management. • Identify existing junctions with critical reserve capacities (RC) and design flow/capacity ratios (DFC), and existing road links with critical volume/capacity (V/C) ratios. • Check whether a traffic survey is required to provide the latest traffic figures in order to establish a basis for ascertaining the existing problems and the future year traffic forecast.
(ii) Baseline Traffic Survey	• Check the methodology and the suitability of sites for carrying out traffic counts. • Check whether the traffic survey covers all of the junctions and road sections within the AOI for the model validation/calibration purpose, during the appropriate period (e.g. avoid the school summer vacation, long holidays, but arrange survey in festive period for columbarium sites, etc.) *Remarks :* *For those saturated junctions OR junctions approaching the capacity, site survey*

Study Aspects	Items to be checked
	at the peak hours for the average queue length or the junction delay time are prerequisite. • Depending on the Site Specific Issues, the review should consider whether pedestrian flow survey, i.e. the Level-of-Service (LOS), PT utilisation, parking survey, trip generation survey are required, in order to address the local traffic and transport issues. • Check whether the reported survey results of other published TIA reports for nearby developments can be referred to, whereas possible, and/or the available traffic data published in the Annual Traffic Census report
(iii) Baseline junction Assessment	• Compare with other similar TIA studies, if any, on the existing RC and DFC ratio for critical junctions and V/C ratio for road links. • Check calculations for the base year capacity assessment of junctions. *Remarks :* *For base year, the average junction delay and queue length analysis should be reflected in the RC and DFC calculation, for critical junctions, or if requested by TD.*
(iv) Baseline Public Transport Facilities	• Identify transport facilities e.g. railway stations, PTI, bus stops and bus lay-bys, GMB and taxi stands, and ferry piers, etc. that serve the development. • Check any operation problem and capacity deficiency on the existing transport facilities.
(d) Traffic forecast and Assessment	• TIA report should provide a set of traffic forecasts on: 1. traffic growth within the study area (if the growth factor method is adopted to estimate the future traffic based on the existing traffic flows); 2. traffic generated by the existing and other proposed major developments/infrastructures within the study area; 3. traffic generated from the development. • Check the planning horizon for traffic forecast, which should be set at the time when the development is completed or preferably at a design year within 5 years of the completion, or at least 3 years after the completion. For developments of considerable scale in close vicinity of a new development area (NDA) with prolonged implementation programme with rezoning exercise completed, the consultant shall assess the traffic performance at a design year when the NDA is fully developed, if requested by TD on a case by case basis. • The analysis should assess the traffic impact on the identified junctions/road links upon the completion of the development. The roads and junctions with unacceptable capacities should be identified and improvement measures should be proposed in the TIA report. • Check the future year traffic and public transport forecasts by comparing with existing flows and forecasts of other similar studies. • Check the assumptions on the distribution of the development traffic onto the road network, directional splits and the modal split taking into consideration the planned infrastructures and developments in the vicinity. *Remarks :* *I) The assessment should include the base year and future design year with comparison of the assessment results of BOTH the Reference Scenario and Design Scenario.* *II) For future year, queue length analysis are prerequisite for those critical junctions.* *III) Screenline/cordon flow comparison of reference /design scenario should be checked, if necessary.* • Check whether the TIA has provided reasonable additional trips (at both generation

Study Aspects	**Items to be checked**
	and attraction ends) by various land use development (i.e. types of development such as residential, retail, hotel, G/IC site, PTI, school sites, etc.) *Remarks :* *I) A summary table showing the number of additional trips generated by and attracted to the proposed development due to various land use type should be provided in the report.* *II) The trip rate for the proposed development should be checked against TPDM trip rate OR trip generation survey of the other similar development sites at the same district/nearby location. Additional trip generation survey may be required.* *III) For local model, if there are new PTIs to be proposed, additional PT trips from/to the PTI should be included in the Local Area Traffic Model (LATM).* *IV) Check if seasonal variation needs to be taken into account, especially for the school and industrial areas.*
(i) Modelling Methodology (for medium and large scale developments)	• Check whether the appropriate choice of Two-Tier Transport Model[1] or One-Tier Transport Model has been adopted. *Remarks:* *While the Two-Tier Transport Model will be able to provide more comprehensive traffic forecast, the One-Tier LATM could be adopted for TIA purpose, if the development has fulfilled all of the following criteria :* *I) The population intake is less than 10,000;* *II) The estimated traffic flows generated from/ attracted to the proposed development is less than 100 pcu (one-way) during peak hour;* *III) The road improvement proposals will not involve strategic roads or slip roads to strategic road network;* *IV) The proposed development will not substantially change the strategic planning intention of the zones within the Base District Traffic Model (BDTM) boundary; and* *V) There are no substantial changes (addition or cancellation) of public transport provisions associated with the proposed development.*
(ii) Modelling Methodology (for small scale developments, such as cluster houses/ New Territories Exempted Houses (NTEH) developments)	• Estimate the traffic generation and attraction rates with reference to trip rates listed in the TPDM. • Check the traffic growth factor with reference to the Annual Traffic Census reports and historical growth rate data. • Compare the provision of parking spaces, loading/unloading facilities, proposed pedestrian facilities, site accessibility and the proximity to railway stations / PTI between the proposed development and the trip rates listed in TPDM. • If the proposed trip rate is considered inapplicable, additional trip generation survey on similar type of developments with comparable traffic and transport characteristics for justification of the trip rate used is required. • Check the traffic forecast on critical links with reference to the existing traffic counts and the traffic forecast in other TIAs for the same links.
(iii) Reserve capacity (RC) and Queue Length assessment at critical junctions	• Check calculations for future year capacity assessment of critical junctions. • Compare with other similar TIA study for the same junctions, if any, to check the validity of the analysis. • Check that the cycle time of traffic signals should be limited to 90 seconds for design purpose. • Check that traffic will not tail back to affect the upstream junctions and the road width/lanes assumptions for the junctions are reasonable and achievable.

[1] Two-tier Transport Model refers to the application of both strategic transport model and local area traffic model, and One-tier Transport Model refers to the application of local area traffic model only.

Study Aspects	**Items to be checked**
(e) Recommendations & Implementation	• In order to mitigate the traffic impacts resulting from the development, improvement measures may include junction design, road widening, signal control proposal or modifications, and pedestrian schemes. Public transport facilities and other traffic management measures may also be included in the TIA report.
(i) Improvement Proposal	• Check whether the proposed measures are effective in resolving the problem. • Check the feasibility as well as tree felling and land requirements of the proposed measures.
(ii) Implementation	• For the proposed improvement measures, no matter by the applicant/subject office, the works agent should be clearly stated in the TIA. • In case the subject development would be adjacent to/near the roads and junctions that would be improved by the other parties, the TIA should also clearly indicate the related works agents. • For the road / junction improvement works which have been proposed to mitigate the capacity issues, these improvement works should be completed before the commissioning / population intake of the project, and should be committed to the implementation programme in the planning applications under the Town Planning Ordinance. *Remarks :* *I) For the junction improvement scheme, checking of the swept path analysis and sightline are needed.* *II) The applicants should check the correctness of the junction calculation.*
(iii) Traffic Impact during Construction	• Check any traffic implication during construction of the development and improvement schemes, and propose traffic management schemes if necessary. *Remarks :* *Construction Traffic Impact Assessment (CTIA), which involves the traffic impact assessment during the construction stage of a development project, could be separated from a TIA in the planning application. The application will be approved with conditions which requires the CTIA submission at a later stage, e.g. during construction stage, for approval.*
(f) Associated Traffic and Transport Facilities	• Check whether the associated traffic and transport facilities have been well documented in the submission. The details are listed below.
(i) Parking Provision	• Check whether Public Vehicle Park (PVP) is needed to be provided in the project based on the Policy of "Single Site, Multiple Use", with carrying out the parking demand/supply assessment by the applicant to substantiate the findings. • Check against HKPSG and the latest TD's requirements. • Check whether the proposed parking provisions are reasonable having regard to the accessibility of the site, the availability of PTI and railway stations in the vicinity, the land use, the development intensity, the flat size, the adjacent parking facilities and any special operational needs. • Check whether the parking provision for all vehicle types such as light goods vehicles (LGV), bicycles and motorcycles meet HKPSG and TD's requirements e.g. high rate of motorcycle provision i.e.10% of total private car parking spaces for non-residential developments may be required in areas with deficiency of motorcycle parking spaces. 25% more on top of the HKPSG required provision of motorcycle parking spaces for residential developments may be required based on the assessment of the local parking demand by the applicant. • Check adequacy of queuing and waiting space for car lifts if provided near the entrance of a development. • Check whether visitor parking at G/IC facility is provided based on local traffic need. *Remarks :* *Provision of visitor parking in G/IC facilities, such as wet market, town hall, sports*

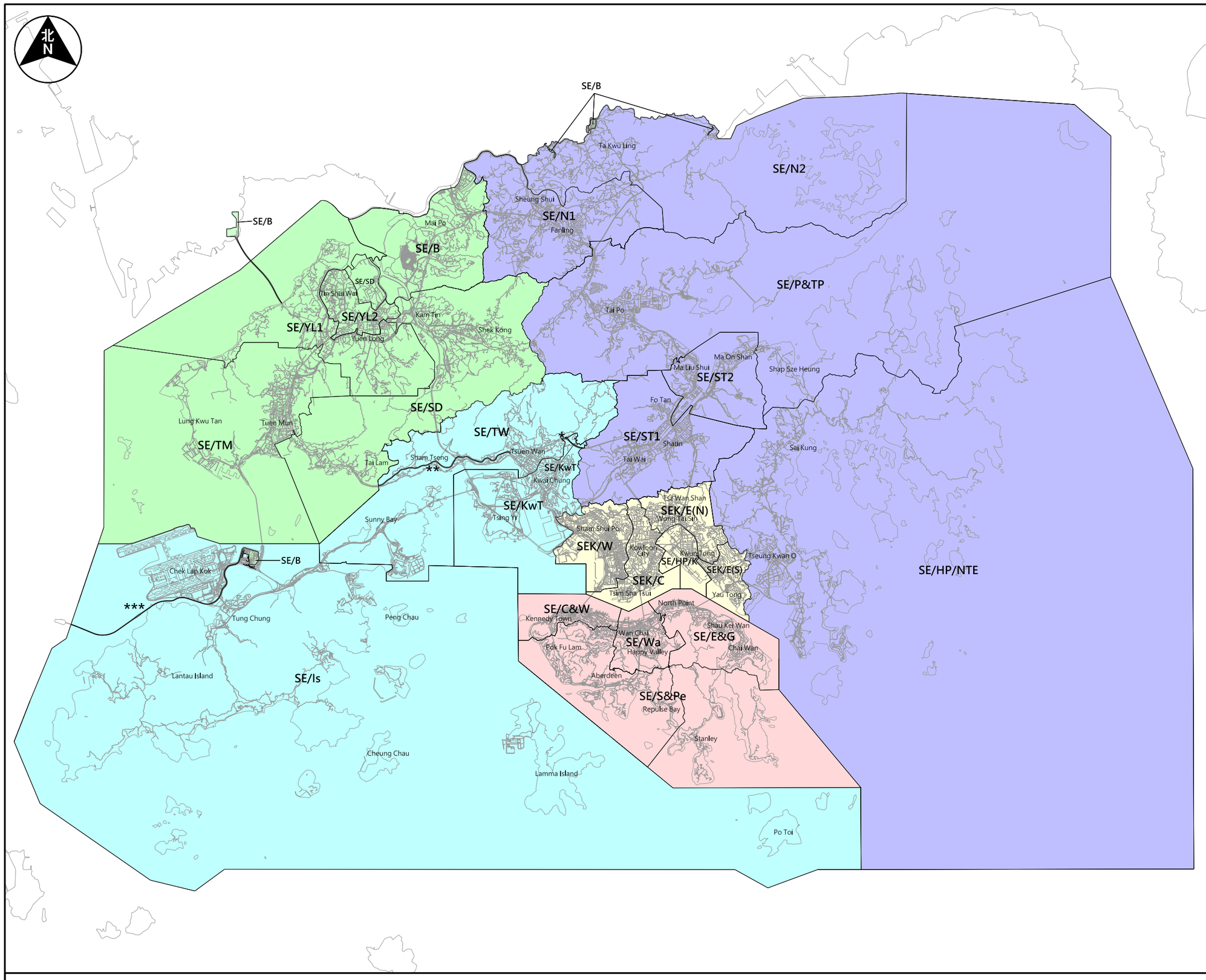
Study Aspects	**Items to be checked**
	facilities, etc. should be provided.
(ii) Loading / unloading Area	• Check against the HKPSG with reference to TD's latest requirements.
(iii) Public Transport Facilities / Interchange	• Check the forecasts on public transport trips generated from the development which form the basis for requirements of PTI. • Check the ingress/egress points from safety consideration and the internal traffic circulation near the entrance by swept path analysis. • Check whether bus bays (sufficient for three 12.8m buses*) provided are adequate for additional bus services on increased population. *The above requirement is for new PTI. For existing PTI, the designers should check with the relevant Transport Operations Divisions on whether improvements are required. • Check whether Public Light Bus (PLB) bays (at least sufficient for two 7.5m PLBs[2]) and taxi stands are provided at a convenient and safely accessible location. • Check whether adequate queuing area and appropriate pedestrian linkage are provided within the interchange. • Check whether facilities for the disabled are included and in compliance with the relevant standard. • Check whether the PTI design adopted the sawtooth or parallel bay arrangement and adequate space for passengers queuing and bus stacking, etc. are provided. *Remarks :* *Comments on the PT arrangements (e.g. Bus routes planning, PTI's technical schedules, ancillary facilities for PT operators, charging facilities for electric bus/GMB, etc.) from relevant Transport Operations Divisions should be sought.* • Check whether adequate boarding/alighting facilities at the rail stations have been provided, in particular the PT assessment concluded that feeder services to nearby rail stations are required to serve the development, and ensure the improvement works will be implemented to match with the programme of the development.
(iv) Pedestrian Facilities	• Check the locations and arrangement of pedestrian crossings from safety and convenience viewpoints. • Check the compatibility of the proposed pedestrian facilities with the adjacent pedestrian network. • Check the linkage on the existing/proposed public transport facilities e.g. a proposed footbridge may change the direction of pedestrian flow and would necessitate changes to the existing pedestrian crossing. • Check the sufficiency of remaining space on footpath after accommodating the landing of staircases and ramps of footbridges.
(v) Development Access	• Check whether the vehicular access is provided in accordance with TPDM standards • Check whether the ingress/egress points are acceptable in terms of safety and convenience. • Check whether there is adequate queuing space between the proposed drop gate and the main road. • Check whether the ingress/egress point have been properly designed, with the following assessment : 1. Conduct swept path analysis to demonstrate the safe and smooth manoeuvring of the vehicles assessing from/to the adjacent road at the concerned development sites;

[2] The maximum vehicle length of light bus is 7.5 meters in legislation. Nevertheless, the design should try to cater for the use of existing PLB models which have around 8.0 meters in length as far as possible.

Study Aspects	**Items to be checked**
	2. Check sightline distance and review whether corner splay design is required; 3. Review any safety measures for pedestrian crossing the ingress/egress point is required; 4. Review whether left-in/left-out arrangement at vehicular access is required; and 5. Check whether sufficient queuing spaces at car park entrance and waiting spaces for car lifts and turntables are provided.
(vi) Walkability	• For new development areas, the comprehensive PPF should be applied through the preparation of OPP as per TPDM Volume 6 Chapter 10 Appendix A. • For the existing built-up areas (constrained by existing developments), apply the concept and approach of the comprehensive PPF (i.e. (i) study on land use and urban design, (ii) the urban grid of mobility, (iii) the planned pedestrian network, (iv) the link and place typology of pedestrian ways and (v) required pedestrian improvement measures and footpath widths) as per TPDM Volume 6 Chapter 10. • To promote the walking environment, the applicant should assess the adjacent walking facilities, and check whether necessary pedestrian infrastructures (e.g. covered walkway, pedestrian crossing facilities, building canopy, footbridge system etc.) are required to be constructed by the applicant. • Check whether the adjacent walkway/footpath follows the requirement (including three-zone concept) in Chapter 8 of HKPSG and TPDM, and whether the through zone of footpath has achieved the LOS of at least upper end of Level C, whichever is higher.
(vii) Cycling	• Check whether the number of bicycle parking spaces due to the subject development has followed the related guidelines of HKPSG, and the listed quantity in **Annex B** of this checklist for NDAs. • Check whether proper pedestrian crossing at the adjacent cycle track is required. • Check whether the width of the cycle tracks follows the TPDM requirement (either by the minimum width requirements or by cycle flow assessment assuming the mode share by cycling of 3% to 5% of the total mechanised trips on a weekday). • Check whether the cycle track network is directly connected with the bicycle parking spaces of individual development sites/land parcels. • Check whether "arterial cycle tracks" and "local cycle tracks" are identified. Arterial cycle tracks should be the primary sections of a cycle track network that provide direct and efficient routes to facilitate intra-district travel, particularly from key transport nodes such as Transport Interchange Hubs (TIHs), railway stations and bicycle parking hubs, to other major destinations for commuting purposes. For arterial cycle tracks, interface with other modes should be minimised to enhance the continuity of the cycle tracks and the travelling efficiency of cycling. For junctions of arterial cycle tracks and other transport modes, grade-separated junction design for cycling (e.g. bridges and underpasses) or bicycle-friendly junction design should be adopted.
(viii) Other major issues	Subject to the local traffic concerns, the following assessments may be required in the TIA: • LOS of pedestrian walkway; • Need of wayfinding signage system for the area; • Spaces for passenger queuing, in particular whether the PTI or roadside bus terminus are adequate for the PT users/disable users; • Length of the loading bays, PT pick up/drop off at both generation and attraction ends; • Night-time illegal parking; • Illegal bicycle parking; • Merging/weaving issues on carriageway/merging lanes; • Pedestrian crossing facilities provision with sufficient waiting areas; • Provision of right-turn pocket to the development (if needed);

Study Aspects	**Items to be checked**
	• Any land-locked lots which require vehicular or pedestrian right of way; • Check the need for 24hr pedestrian access; and • Check the need for reserve of footbridge connections.
(g) Miscellaneous items	Misc. items which could be included in the TIA : • Provision of diagonal crossing, in particular for the sites with higher pedestrian flows (e.g. near the entrance of MTR stations); • Check whether TIH/Green Transport System (GTS) are required under the Traffic and Transport Strategy Study (TTSS) incentive; • Set back of the development site for provision of adequate space at the adjacent footpath, which could fulfill the requirements of through zone for the pedestrian flows, under the pedestrian planning framework; and • Nature of sites (e.g. fuel station, green fuel station, international school, venues for performing arts/events, etc.) which may generate a certain extent of vehicular queue.

Relevant Document	
Transport Planning and Design Manual	Volume 1 Transport Planning Volume 2 Highway Design Characteristics Volume 6 Traffic and Environmental Management



NOTES:

THE INFORMATION IS VALID AS AT SEP 2024

LEGEND:

Boundary Line

Traffic Engineering (Hong Kong) Division

SE/C&W	Sr Engr/Central and Western District
SE/S&Pe	Sr Engr/Southern District & Peak
SE/Wa	Sr Engr/Wan Chai District
SE/E&G	Sr Engr/Eastern District & General

Traffic Engineering (Kowloon) Division

SEK/C	Sr Engr/Kowloon Districts Central
SEK/E(N)	Sr Engr/Kowloon Districts East (North)
SE/HP/K	Sr Engr/Housing & Planning Kowloon
SEK/W	Sr Engr/Kowloon Districts West
SEK/E(S)	Sr Engr/Kowloon Districts East (South)
SEK/SD	Sr Engr/Kowloon Special Duties

Traffic Engineering (NTE) Division

SE/P&TP	Sr Engr/Project & Tai Po
SE/ST1	Sr Engr/Sha Tin 1
SE/ST2	Sr Engr/Sha Tin 2
SE/N1	Sr Engr/North 1
SE/N2	Sr Engr/North 2
SE/HP/NTE	Sr Engr/Housing & Planning New Territories East

Traffic Engineering (NTW) Division

SE/TM	Sr Engr/Tuen Mun
SE/SD	Sr Engr/Special Duties
SE/B	Sr Engr/Boundary
SE/YL1	Sr Engr/Yuen Long 1
SE/YL2	Sr Engr/Yuen Long 2

** Tuen Mun Road - Tai Lam to Tsuen Wan
Under SE/SD's Responsibility

*** Hong Kong-Zhuhai-Macao Bridge,
Hong Kong Link Road
Under SE/B's Responsibility

Traffic Survey and Support Division

SE/Is	Sr Engr/Islands
SE/TW	Sr Engr/Tsuen Wan
SE/KwT	Sr Engr/Kwai Tsing

* Cheung Pei Shan Road
Under SE/TW's Responsibility

ANNEX A TRAFFIC ENGINEERING DIVISIONAL BOUNDARY OF TRANSPORT DEPARTMENT

Annex B

Guidelines on Provision of Bicycle Parking Spaces

Type of Development	Recommended Bicycle Parking Spaces Provision Standard
Residential	1 bicycle parking space per 5 flats for residents; 1 bicycle parking space per 45 flats for visitors
Primary School	1 bicycle parking space per 4 classrooms
Secondary School	1 bicycle parking space per 0.5 – 1 classroom
Tertiary School	1 bicycle parking space per 15 – 17 students
Office	1 bicycle parking space per 500 – 600m^2 GFA
Enterprise and Technology Park	1 bicycle parking space per 300 – 400m^2 GFA
Industrial/ Logistic	1 bicycle parking space per 2,500 – 2,700m^2 GFA
Port Back-up, Storage and Workshop Uses	1 bicycle parking space per 4,100 – 4,200m^2 GFA
Hospital	1 bicycle parking space per 20 employees
Sports Ground	1 bicycle parking space per 30 – 35 seats
Social Welfare	1 bicycle parking space per 3 – 4 employees
Performance Venue	1 bicycle parking space per 30 – 35 seats
Sports Centre	1 bicycle parking space per 150 m^2 GFA
Retail	1 bicycle parking space per 200 – 300 m^2 GFA
Market	1 bicycle parking space per 20 – 30m^2 GFA
Park	1 bicycle parking space per 125m^2 (capped at 600) or 50 spaces per entrance, whichever is higher
Public Transport Interchange	30 bicycle parking spaces per bus bay given there is Environmental Friendly Transport Services (EFTS); 45 given there is no EFTS
Rail Station	45 – 50 bicycle parking spaces per 10,000 population within the 2-km radius of the station