

2. STUDY PROCESS AND TASKS

2.1 Introduction

2.1.1 The Study process consists of several major inter-related tasks as shown below:

- Data collection;
- Update and enhancement of parking inventory;
- Development and enhancement of PDM;
- Review of HKPSG;
- Assessment of existing and future parking situations; and
- Development and evaluation of remedial measure.

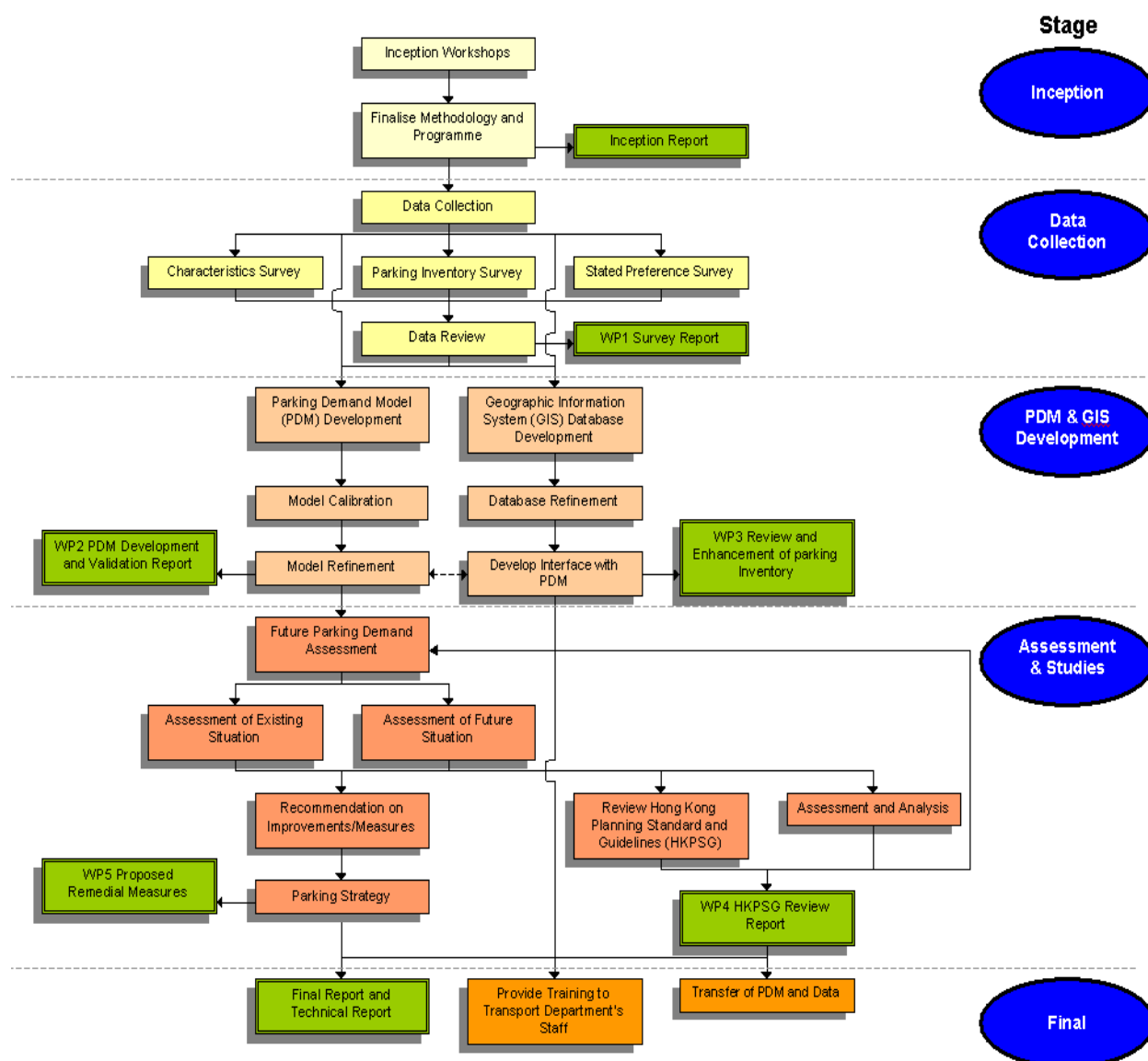


Figure 2.1 : Study Process

2.2 Data Collection

2.2.1 Data collection, a key task of PDS-2, provided vital information based on which findings and recommendations were made. In addition to collecting information on parking facilities and all relevant information related to parking from relevant Government and concerned parties, interview surveys, telephone surveys, questionnaire surveys, field observations and field count surveys were also conducted. The results were used to quantify the existing parking facilities and to characterise parking demand for modelling and analysis.

2.2.2 The following data collection and surveys were carried out for the update of TD's parking inventory and provision of inputs to the development and calibration of PDM.

Inventory Survey

2.2.3 The inventory of parking and loading/unloading facilities maintained by TD was obtained at the commencement of the Study. This was updated and enhanced by the Consultants through detailed site observations and surveys, checking against publications and confirmation with car park operators and/or relevant authorities.

2.2.4 The facilities as listed in the inventory when developed under PDS-1 and after update and enhancement by PDS-2 are summarised in Table 2.1:

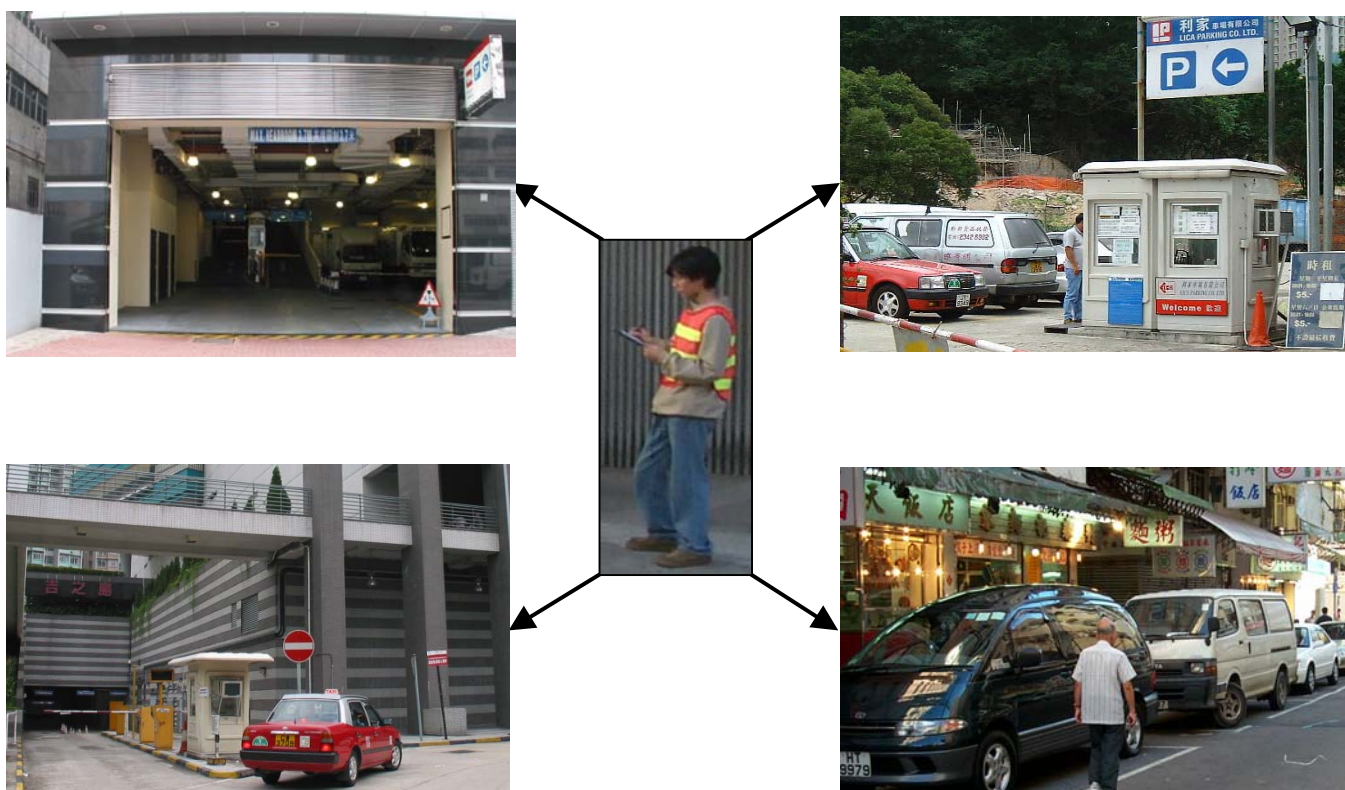
Table 2.1 : Inventory Facilities

	PDS-1 Inventory	PDS-2 Inventory
Format	Relational database	Geo-referenced database in GIS format
Zoning System	CTS 274 zones	PVS 338 Zones / BDTM Zones
Number of Record	~471,000 spaces (First Quarter 1994)	~609,000 spaces (Third Quarter 2001)
Interface	Text	Graphic User Interface (GUI)

Parking Characteristics Survey

2.2.5 The Parking Characteristics Survey (PCS) was carried out on both the on-street and off-street usage-related parking and loading/unloading facilities for different types of vehicles. The data was used to calibrate and validate PDM and for reviewing the adequacy of the provision of parking and loading/unloading facilities under the current HKPSG.

2.2.6 PCS established the relationship between total trips to/from a particular type of development and the maximum parking demand



Data Collection at Car Parking Facilities

generated. The information covered the number of vehicular trips into and out of the various premises for various types of development and the corresponding parking accumulation over the day.

2.2.7 A comprehensive parking characteristics survey on parking and loading/unloading facilities throughout the Territory was carried out in PDS-1. The data was critically reviewed and found appropriate to be used in PDS-2. Hence, the sample size requirements for updating the characteristics of these parameters in the Study were considerably reduced.

2.2.8 The following surveys were undertaken to collect the PCS data for PDS-2 :

- 10% of the off-street parking sites surveyed during PDS-1 were re-surveyed to confirm the appropriateness of the data;
- Questionnaires were sent to all the operators and/or management office of the usage-related car parks with at least 30 parking spaces. A response rate of about 30% was achieved;
- On-street sampling license plate or snapshot surveys were carried out at 180 sites; and
- Off-street and on-street loading/unloading facilities were surveyed.





Stated Preference Survey

2.2.9 A Stated Preference Survey (SPS) was undertaken to determine the factors that influenced a motorist's decision to drive and his/her parking behaviour. SPS is a technique that presents two or more transport options and the respondent is asked to state the preferred option. The model parcels contained a variety of elements, such as cost, journey time, access time, walk time and convenience. The survey was designed to obtain the model characteristics of interest, combined in such a way that the respondent was guided to trade off some benefits derived from some elements against the disbenefits associated with others. The investigated attributes included destination land-use, trip purpose, parking availability and parking charges. The results provided useful information for the calibration of parking choice model.





2.2.10 The results of SPS were used to examine :

- The driver's evaluations of intangible elements that may influence parking choice, such as walking distance and search time; and
- The effect of behavioural or policy changes that have not been directly experienced by the driver, for example, the impact of park and ride facilities in their area.

泊車轉乘調查表

泊車轉乘	搭車到公共交通轉車站 等車及步行到目的地時間  10 分鐘	公共交通行程時間  5 分鐘	公共交通車費及泊車費 \$ 100	1. 搭車 2. 或者會搭車 3. 行所需 4. 或者會搭車再轉乘公共交通 5. 一定搭車再轉乘公共交通
	至停車位及停車位至目的地步行時間  5 分鐘	私家車行車時間  20 分鐘	泊車費、電油費、過橋/過路費 \$ 200	

PnR Survey Form

Park & Ride	You drive to & from public transport station and wait for public transport, and walk to / from your destination.  10 mins	Ride Time - Public Transport  5 mins	Fare on Public Transport & Parking Cost \$ 100	1. Definitely choose car 2. Probably choose car 3. No Preference 4. Probably car & public transport (Park & Ride) 5. Definitely car & public transport (Park & Ride)
	You walk to and from car park  5 mins	Ride Time - Car  20 mins	Parking Cost, Petrol & Toll \$ 200	

SPS Sample Survey Forms

2.2.11 SPS established useful information for parking choice model for private cars, light vans (LV), light goods vehicles (LGV) and medium and heavy goods vehicles (M/HGV).

2.2.12 SPS found that search time for parking space, walking time between car park and destination, and parking cost are significant factors in determining the choice of parking. A greater weight was put on the walking time than the search time.

2.2.13 For private car, it was found that the drivers in the low household income group were more concerned with parking cost than those in the high household income group. Those drivers in the latter group, as expected, were more concerned with the search/walking time for parking space.

2.2.14 In addition, SPS also examined private car driver's behaviour towards Park and Ride (PnR) facilities. It showed that there was a strong modal bias towards the private car mode,

indicating that private car drivers would be prepared to pay a premium to use the car. There was also an indication that the respondents put a greater weight on the access time difference than the in-vehicle travel time difference.

Survey on Overnight Parking Demand and Non-designated Supply

2.2.15 For PDS-2, a new approach was used to generate a more detailed night-time parking model. Interviews were undertaken at TD's Licensing Offices to determine the overnight parking demand and supply of non-designated parking spaces. This provided the basis for the development of the ownership-related parking demand models. It was useful to monitor the behavioural change in overnight parking.

Survey for the Construction of Parking Supply Inventory

2.2.16 Information on parking area identification, site location, physical characteristics, available facilities and usage patterns was collected. The parking inventory established in PDS-1, which was maintained and updated by TD, was enhanced to include items such as newly built car parks, change of land use, and composition of parking types.

Survey on Overnight Illegal Parking

2.2.17 Survey on overnight illegal parking is undertaken by TD on a regular basis throughout the territory. These surveys provide useful data in the validation of ownership-related PDM.

2.3 Updating and Enhancement of Parking Inventory

2.3.1 Since the completion of PDS-1, TD has regularly updated the parking and loading/unloading facilities inventory, using the format and procedure established in PDS-1. The format and procedure were revised in PDS-2, incorporating the advanced information technology. The enhancement of the inventory has allowed:

- More efficient updating of the inventory;
- Input of parking spaces, by vehicle type and land use, into PDM for calibration and forecast;

- Conversion of parking inventory into an open GIS format to enable easy integration with the planned data structure of the Transport Information System (TIS); and
- Construction of a GIS-based system - Geographic Information System for Parking (GIS-P) - for spatial analysis and result presentation.

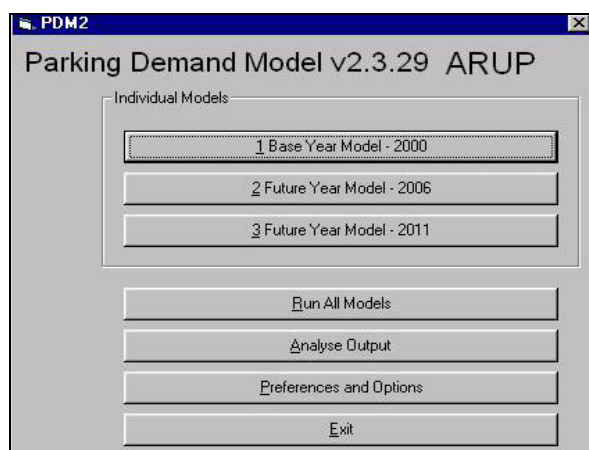


Use of GIS for Spatial Analysis

2.3.2 GIS-P could be further enhanced to become a suitable tool for a number of recommended remedial measures through the use of advanced technology solutions.

2.4 Development and Enhancement of Parking Demand Model (PDM)

2.4.1 PDM developed in PDS-1 was further developed and enhanced to improve its capability of forecasting future demand and characteristics for parking and loading/unloading facilities. The enhanced PDM (PDM-2) adopted the latest planning data and trip demand forecasts from the model developed in the Third Comprehensive Transport Study (CTS-3). The characteristics of different trip functions in respect of different times of day and the turnover of parking spaces throughout the day were considered in the PDM-2 forecasting process. PDM-2 was used to forecast peak parking accumulations by district, as defined by District Council boundaries. It is also capable of forecasting future parking demand by activity and by vehicle type.



Parking Demand Model Interface

2.5 Review of Hong Kong Planning Standards and Guidelines

2.5.1 PDS-2 reviewed the parking and loading/unloading requirements for the types of development covered by HKPSG. The review examined the appropriateness and adequacy of existing standards and recommended revisions, where appropriate. A wide-ranging consultation with major stakeholders was also undertaken.

2.5.2 The recommended revisions encompass a fundamental change to the establishment of parking standards using new criteria, particularly for private car parking in residential developments. The recommended revisions have taken account of current Government policies, identified parking and loading/unloading situations and changes in parking demand of various types of development. The recommended revisions to HKPSG are discussed in Section 3 of this report.



Provision of Car Parking Facilities under HKPSG

2.6 Assessment of Base Year and Future Parking Situations

2.6.1 All vehicles have two basic parking requirements: ownership-related and usage-related. Parking supply refers to the number of spaces available to accommodate vehicle parking and loading/unloading activities, whereas demand indicates the requirement of vehicles for space to carry out the activities of parking and loading/unloading.

2.6.2 Ownership-related parking occurs at the home end, i.e. when the vehicle is not in use. This is sometimes referred to as night-time parking.

2.6.3 In contrast, usage-related parking occurs at the places drivers want to visit and is associated with operational needs. This is sometimes referred to as day-time parking.

2.6.4 The Study investigated the parking and loading/unloading situations of base year 2000 and design years 2006 and 2011.

2.6.5 The ownership-related and usage-related on-street and off-street parking and loading/unloading situations for various vehicle types were assessed, using the Ownership-related Parking Demand Model and Usage-related Parking Demand Model. The vehicle types assessed were:

- Private cars, which included taxis and light vans, a major departure from PDS-1 and an important improvement;
- Goods vehicles, including light goods vehicles, medium/heavy goods vehicles and container vehicles;
- Coaches; and
- Motorcycles.

2.6.6 The findings of existing and future parking situations are discussed in detail in Section 3 of this report. Due to the relatively small and constant fleet size, Public Light Bus (PLB) was not assessed by PDM-2.

2.7 Development and Evaluation of Remedial Measures

2.7.1 As a strategic study that covered the whole of HKSAR, PDS-2 concentrated on

strategic issues related to parking and loading/unloading activities. The formulated parking strategies/measures would set the direction or way forward to develop specific measures to improve local parking situations.

2.7.2 The proposed remedial measures from PDS-1 were reviewed and the impact of their implementation and the applicability to the current situation were considered in the development of PDS-2 remedial measures. Other significant factors considered were:

- Revised vehicle fleet growth forecast;
- Revised economic outlook;
- Increasing concerns over the environment;
- Advances in Intelligent Transport Systems (ITS); and
- Advances in parking technology.



Use of Advanced Parking Technology

2.7.3 It is recognised that expanding the parking capacity to address parking situations would induce not only financial costs to Government, but also costs to businesses and customers, environmental impact, increased road traffic and hence impact on the transport and land use planning. PDS-2 focused on complementing HKSAR's transport strategy and striking a balance in providing sufficient supply to fulfil social needs while minimising its impact on the overall planning concept and policies.

2.7.4 Goods vehicles are vital to the general economy of Hong Kong. While the economic activities of Hong Kong have transformed largely from manufacturing to the service and transport sectors, fulfilling the operational needs of goods vehicles is considered vital to the overall competitiveness of Hong Kong as a major international trade centre. Any deficiency in goods vehicle parking would have adverse impact on commercial activities and would be detrimental to the overall economy of Hong Kong.



Insufficient Space for On-street GV Loading/Unloading

2.8 Consultations

2.8.1 The proposed remedial measures were discussed at working level with relevant departments and stakeholders as well as at high level consultations such as Steering Group Meetings, Commissioner's Meetings, Transport Senior Directorate Meetings, Traffic Advisory Committee Meetings, Legislative Council Panel on Transport and Chief Secretary's Committee Meeting. The recommended measures were endorsed for further actions by the relevant authorities.