Measurement and Analysis of Walkability in Hong Kong

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WPI

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ZRH006

Measurement and Analysis of Walkability in Hong Kong

An Interactive Qualifying Project Report

Submitted to the faculty of the

Worcester Polytechnic Institute

In partial fulfillment of the requirements for

Degree of Bachelor of Science

In cooperation with Designing Kong Hong, Ltd. and

The Harbour Business Forum

On March 4, 2010

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Abstract

Though Hong Kong's Victoria Harbour is world-renowned, the harbor front districts are far from walkable. The WPI team surveyed 16 waterfront districts, four in-depth, assessing their walkability using a tool created by the research team and conducted preference surveys to understand the perceptions of Hong Kong pedestrians. Because pedestrians value the shortest, safest, least-crowded, and easiest to navigate routes, this study found that confusing routes, unsafe or indirect connections, and a lack of amenities detract from the walkability in Hong Kong. This report provides new data concerning the walkability in harbor front districts and a tool to measure it, along with recommendations for potential improvements.

Acknowledgements

Our team would like to thank the many people that helped us over the course of this project.

First, we would like to thank our sponsors Paul Zimmerman, Dr. Sujata Govada, Margaret Brooke, and Roger Nissim for their help and dedication throughout our project and for providing all of the resources and contacts that we required.

We would like to thank the staff at Designing Hong Kong and The Harbour Business Forum for their support, insight, and assistance with the project.

We would also like to thank Brenda Fung for her time and effort spent organizing meetings, finding extra office space and collecting information.

In addition, the team would like to thank Eva Tam for her translation skills for our survey and Rita Fu, and Stone Zheng for volunteering their time to help administer the survey.

Finally, we would like to thank our Worcester Polytechnic Institute advisors, Zhikun Hou and Professors Robert Kinicki, for their generous advice and continuous support throughout this project.

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Executive Summary

Navigating by foot can be difficult, especially in a historic city lacking formal organization and planning. Historic urban areas are the products of settlements and sprawl that yield minimal pattern or structure for straightforward walking routes. Though urban neighborhoods appear to be unstructured, residents develop strategies to navigate them effectively.

Hong Kong is a historic and dynamic harbor city that is continuously growing in population. Hong Kong has many attractions to offer its residents and visitors, such as its expansive harbor front. A general understanding in Hong Kong is that people are only willing to walk approximately 400 meters (Paul Zimmerman, email communication, November 20, 2010). The dislike of walking longer distances partially arises from the city's confusing layout and infrastructure. Because an overwhelming majority of people in Hong Kong use public transportation daily, efficient and easy-to-navigate walking routes to and from these stops are extremely important.

The ease with which a person can walk throughout an area is often referred to as its walkability. Walkability of a city is important to its growth. Based on many walkability studies and applicable concepts from the urban planning of other cities, the team identified several factors important to walkability. The Interactive Qualifying Project for the Measurement and Analysis of Walkability in Hong Kong was established by Designing Hong Kong and the Harbour Business Forum to enhance the walking experience in Hong Kong.

The purpose of this project was to determine the pedestrian friendliness of Hong Kong's harbor front districts. We created the Hong Kong Route Walkability Analysis Tool (WAT) as a tool to measure the walkability of any given route from hinterland to harbor front in Hong Kong. The WAT provides recommendations in five distinct focus areas designed to improve the walkability of Hong Kong.

The study accomplished this goal using several methods. The pedestrian friendliness of Hong Kong was determined through preliminary site evaluations of 16 districts around Victoria Harbour and

an in-depth evaluation of four of those districts. The preliminary site evaluations provided the team with a better understanding of the harbor front and hinterland of each of the districts. Next, the team conducted a survey to determine the public's perception of walkability in Hong Kong. Finally, the team selected four districts for an in-depth study. To complete this in-depth study, the team created a walkability analysis tool to measure the walkability of a route from hinterland to harbor front. This tool generates focus areas of improvement for the walkability of the route. All of these methods helped our team to suggest improvements to enhance the walkability of Hong Kong.

The team evaluated all 16 districts based on our preliminary rubric. This preliminary rubric measured metrics such as signage and connections as well as the team's overall perception of pedestrian friendliness of each route. Each district was given a walkability score based on these rubrics. The districts' walkability scores ranged from Chai Wan (16.65) to Sai Wan Ho (33.96) where 40 represents the best walkability possible. The team selected the final four districts based on a combination of the following factors: the walkability scores, pedestrian traffic density, importance of the district to the city, and high potential for improvement. Then the team walked and evaluated four routes in each district, approximately evenly spaced and leading from popular destinations in the hinterland to the harbor front. The in-depth study indicates (assuming that these routes are representative of the whole district) that there are several general focus areas of improvement for each district. The general suggestions from WAT are shown in Table 1.

Table 1 - General Recommendations for the Improvement of Walkability by WAT

Yau Ma Tei	Yau Ma Tei needs more connections between the hinterland and harbor front, more signage, and a longer waterfront promenade.
Tsim Sha Tsui	Tsim Sha Tsui needs to reduce the number of pedestrian-vehicular conflicts and generally improve the quality of the routes.
Wan Chai	Wan Chai needs to improve the quality of the route due to the construction and reduce the number of modal conflicts.
Sai Ying Pun	Sai Ying Pun needs an extended waterfront promenade, fewer unmarked and informal connections, and the quality of the routes needs improvement.

The project included a survey, The Pedestrian Perception of Walkability Survey, to determine the public's perception of walkability in Hong Kong. The surveys asked general questions about basic route choices in different types of weather and the reasons behind those choices. The team completed the survey in two of the four final selected districts, Wan Chai and Tsim Sha Tsui. The results from the survey indicate that the shortest route is the most important factor when choosing a route as it ranks as either the most popular choice or the second most popular choice in all weather conditions. This is echoed by the results of the second question, which proposes that the three most important factors for route selection in Hong Kong are "shortest route", "feels safer" and "less crowded". The Pedestrian Perception of Walkability Survey also suggests that the most popular option to avoiding weather issues is the subway system. The information from these surveys and the focus areas of improvement is the basis behind all recommendation plans and conclusions drawn.

The team completed the in-depth study using a rubric in which the information is collected as the user walks a route. This information in the rubric is then entered into a computer program that produces a table of suggested focus areas of improvement specific to that route. Using the results generated by our walkability tool, we have made a series of recommendations for each of the routes. Though the majority of the recommendations are specific to the routes investigated, some general recommendations for all of harbor front Hong Kong are as follows:

- Replace informal crossings with either zebra or cautionary crossings, determined by the pedestrian and vehicular traffic levels.
- Reassess unmarked crossings to determine if a zebra crossing is needed or if a cautionary crossing will suffice.
- Increase the number of zebra crossings to increase the convenience and safety of crossing streets at grade-level.
- Make more direct routes to decrease frustration and encourage walking more often.
- Add more signs indicating handicap accessible routes to assist pedestrians in need, the elderly, and the many pedestrians with rolling carts or luggage.

- Increase signage in less popular areas to assist those unfamiliar with the region.
- Add more signage pointing to the harbor front, preferably using the new harbor logo, to make the harbor front easier to find.
- Add more seating areas, particularly at the harbor front, to give pedestrians visiting the waterfront a place to sit and enjoy it.
- Add more public toilets, especially at the harbor front, to increase the convenience of those visiting the waterfront.
- Expand and connect waterfront promenades to enhance the leisure experience at the waterfront.

Through the implementation of the recommendations in this report, the walkability of Hong Kong's harbor front districts can be greatly improved. Though Hong Kong is an urban metropolis with a world-renowned harbor, only through the improvement of walkability from hinterland to harbor front will residents and visitors be able to fully appreciate it.

1.0 Introduction

Mobility in an urban area is essential for two main reasons: business and tourism. Navigating by foot can be challenging, especially in a historic city lacking formal organization and planning. Historic urban areas are the products of settlements and sprawl that cause these areas to have minimal pattern or structure. Though urban neighborhoods appear to be unstructured, residents continually develop strategies to navigate them effectively.

Hong Kong is a historic urban area that is continuously growing in population. Like other metropolitan areas, Hong Kong has many attractions to offer its residents and visitors, such as its unique harbor front. However, Hong Kong's deep water harbor is the heart of the city, located between Hong Kong Island and Kowloon, making it a focal point for the entire city. The Mass Transit Railway (MTR) and the extensive bus system play a significant role in moving people around Hong Kong. The public transit system does not always provide the most effective means of transportation, but people in Hong Kong tend to rely on the MTR or other public transportation rather than walking the entire distance to their destination. A general understanding in Hong Kong is that people are only willing to walk approximately 400 meters (Paul Zimmerman, email communication, November 20, 2010). The dislike of walking longer distances arises from the city's confusing layout and infrastructure. Hong Kong is known for having subways and footbridges that are sometimes difficult to access. Additionally, multiple entrances and exits for MTR stations can easily lead a pedestrian in the wrong direction if signs and maps are not looked at closely. Navigating Hong Kong by foot is challenging, and people generally find public transportation more convenient than walking through the city.

According to the 2009 census (Census and Statistics Department of Hong Kong) , there are approximately seven million permanent residents and 584,000 registered motor vehicles in Hong Kong. The city of Hong Kong relies heavily on public transportation, taxis, and walking. With only 426 square miles of land for seven million residents, there is very little room for personal vehicular transportation; just over 6% of the population owns a private motor vehicle. This reliance on public transportation and

walking defines the life of Hong Kong residents and visitors. Tourism adds to the large population of Hong Kong as over 29 million people visited Hong Kong in just 2009 alone. Many businesses, markets, and attractions are located along the world-class Victoria Harbour. As these destinations are among the most popular locations, it is very important that both locals and visitors are able to reach them easily. It is also essential that these same people find their way from their place of residence to their destination and back again. They consider several different factors for an enjoyable and convenient walking route.

Though there has been separate research focused on the redevelopment of specific areas of Hong Kong as well as the development of the waterfront, little research has been done that focused explicitly on foot travel in urban Hong Kong to and from the waterfront (Chan, 2009; Sucre et al., 2006; Legislative Council Panel on Development, 2010; Berard et al., 2010; Tsai & Doyle, 2007). Hong Kong is considered a walking city, yet the needs and concerns of walkers traveling from hinterland to harbor front have not yet been subject to detailed field analysis. A study of the walkability in Hong Kong, between hinterland and harbor front, needs to be conducted to make urban Hong Kong more walking friendly. Designing Hong Kong and The Harbour Business Forum have the goal of making Hong Kong a better place to live thereby more enjoyable Hong Kong.

The goal of this project is to assess the walkability of urban Hong Kong, from hinterland to harbor front and vice versa, to create recommendations, and to develop walkability criteria that can be replicated by city planners and road engineers to aid in improvements to make Hong Kong more pedestrian friendly. The project included preliminary walks through 16 harbor districts to complete a preliminary walkability evaluation and assess the team's preliminary walkability metrics. The group then identified the public's perception of the walkability of Hong Kong by conducting a survey. From the preliminary evaluations and the survey, the WPI team refined and improved the assessment criteria to best measure walkability in Hong Kong. From the preliminary evaluation four districts were chosen for an in depth study. Within each district four routes were selected for evaluation using the Hong Kong Route Walkability Analysis Tool (WAT), created by the team for this investigation.

WAT generated focus areas for each of the 16 routes analyzed. From this analysis specific recommendations were made to Designing Hong Kong and The Harbour Business Forum for improvements and enhancements of the pedestrian experience on each route. In addition to these recommendations, this inquiry provided 16 detailed walking maps, four maps for each of the four districts, eight on Hong Kong Island and eight in Kowloon. Designing Hong Kong and The Harbour Business Forum promote an enjoyable pedestrian experience of Hong Kong and this investigation was completed to aide making Hong Kong a more pedestrian friendly city. This project is important to enhance the pedestrian experience from hinterland to harbor front in Hong Kong thereby encouraging pedestrians to walk more often.

2.0 Background

Walkability of a city is influenced by several different factors: culture, location, and time. For some locations, walking from home to work may not be feasible, while in other areas, this may be the only option. The history of the area under study and the local urban planning policies must also be considered. In many urban planning situations, such as this project, other walkability studies are used as references to aid in the selection of important walkability factors. This chapter covers background information to assist the reader in understanding the project.

2.1. Urban Planning

Urban planning is a combination of both transportation planning and land use planning to enhance the development of an area, community, or city (Farr, 2008). Urban planning is affected by a multitude of factors including geography, population density and politics. A city's layout and environment are defined both by design and urban planning, as well as the lifestyle of residents.

2.1.1. Government Policy on Urban Planning of the Harbor Front

Urban planning is greatly influenced by the geography of an area (Daniels and Daniels, 2003). The urban planning of a harbor front city is significantly different from that of a landlocked city. The terms harbor front and hinterland are commonly used in urban planning of waterfront cities. As defined by Hong Kong's Legislative Council (2010), harbor front refers to the area directly in contact with the water. Hinterland is the area after the closest main road parallel to the harbor front. In harbor front cities, as the population grows, there becomes a greater demand for the land between the harbor front and the hinterland because of the variety of potential uses for and the desirability of harbor front property.

A process called land reclamation can be used to make more land in the water. This is a highly regulated and controlled governmental process, especially in countries that have limited water or land. The legislature of Hong Kong passed the Protection of the Harbour Ordinance in 1996, one of its most influential pieces of environmental legislation (Wallis, 1996). The Ordinance stopped all further land reclamation without government approval. The country of Singapore has reclaimed over 33 square kilometers and has plans to reclaim upwards of 800 square kilometers (Guerin, 2003). An extensive amount of sand is required to create this land. The country purchases the majority of the sand from nearby Riau Island which is shrinking in size as Singapore grows. This rapid creation has inspired different political reactions all over neighboring Malaysia with regions even banning the sale of sand for reclamation purposes in Singapore. As countries with limited physical space grow to become urban centers, land becomes a valuable and limited resource. It must be used as efficiently as possible to accommodate the needs of its residents.

2.1.2. Vehicular Transportation

There are multiple means of transportation in urban environments (Daniels and Daniels, 2003). Urban planners attempt to create infrastructure that supports efficient private transportation systems. As the population density of an area increases, it quickly becomes much more difficult to support private transportation. Thus, the majority of vehicular transportation in older, more densely populated cities has become public transportation such as busses and rapid transit railway systems in addition to taxis and trucks.

2.1.3. Public Transit

In urban environments, public transit is the most frequently used and most desirable means of transportation (Daniels and Daniels, 2003). Mass transit systems become the dominant means of transportation for both residents and tourists. Rapid transit systems have the potential to move

thousands of people in short periods of time. To cause minimal impact, these systems are often built underground. The disadvantage of public transit systems is the fixed point to point destinations; this creates the need for multiple modes of transportation (e.g. walking to the final destination from a Mass Transit Railway (MTR) station).

2.1.4. Foot Travel

The oldest and most relied upon transportation system is walking. Especially in dense urban environments, it becomes a necessity to walk to destinations (Daniels and Daniels, 2003). Walking can have as large of an impact on urban design as private vehicles and public transportation do. In large cities, millions of people need to walk to work on a daily basis. The city must accommodate this need. Sidewalk widths, street crossings, signs and many other details are important in the urban design for pedestrians. The impact of walking in densely populated cities is one of the most important concepts in sustainable urban design. However, pedestrian infrastructure, amenities, and services are often neglected in municipal planning and budgets (Hung, Manandhar & Ranasinghe, 2010). Foot travel is one of the most important modes of transport in urban environments.

2.2. Walkability

The ease with which a person can walk throughout an area is referred to as the area's walkability (Abely, 2005). Walkability is one of many important considerations for sustainable urban design; it is important to both residents of and tourists to an area. The evaluation of walkability is a challenging task. The difficulty lies in the combination of objective and subjective factors affecting a person's perception of walkability. However, there are tools and processes available to estimate an area's walkability.

2.2.1. Definition of Walkability

Walkability is not defined by the Oxford English Dictionary, but it is readily used in urban planning and analysis (Abley, 2005). Walking spans several professional disciplines including engineering, planning, and health. These professionals refer to walking and the walkability of an area from their own disciplinary points of view. For example, health officials often focus on the safety of a route instead of its aesthetic merits. Abley attempts to find a more unified definition of walkability by using techniques and definitions from a multitude of diverse fields. He proposes that the general definition of walkability is "the extent to which the built environment is walking friendly" (p.3). Walking friendly is defined as easy, safe, and convenient to walk. This is a useful, universal definition based on data from Abley's other case studies. The use of Abley's proposed definition allows for the combination of subjective and objective criteria in the assessment of an area. Because this definition is broad and inclusive, this WPI team found it necessary to use a more specific definition. The more specific definition of walkability used for this project is as follows: "the walkability of a community may be conceptualized as the extent to which characteristics of the built environment and land use may or may not be conducive to residents [and visitors] in the area walking for leisure, exercise or recreation, to access services, or to travel to work (Hung, Manandhar & Ranasinghe, 2010)." Using this definition allows the team to narrow the scope of the project and focus specifically on how the built environment affects the walkability of residents and visitors.

2.2.2. Importance of Walking

Walking is very important, especially in urban environments. There are also several benefits to pedestrians and the environment that stem from walking (MVA Hong Kong Ltd., 2008). It reduces the pollution in urban areas. In addition, walking helps improve the overall health and quality of life of pedestrians.

Obesity is a growing problem around the world. The World Health Organization (2005) states that over 1.6 billion people worldwide are overweight and 400 million of these are obese. Obesity is on the rise in urban areas because of a change in diet and a lack of exercise. The change in diet is the result of trends towards westernization in both diet and culture. This lack of exercise is due to the increasingly sedentary nature of many forms of work, changing modes of transportation, and increased urbanization. Fewer people hold jobs that require manual labor and transportation networks have improved to allow people to walk a minimal distance to get to other forms of transportation. In addition, in urban, mixed-use neighborhoods, almost all amenities, such as food and shopping, are located very close by, eliminating the need to walk very far. Urbanization has led to a change in diet towards increased intake of foods that are high in fat and sugars but low in vitamins and minerals. It has also allowed many forms of entertainment and socialization to move indoors to the Internet and television. The World Health organization recommends at least 30 minutes of regular, moderate-intensity activity, such as walking or jogging, on most days. This regular physical activity provides a number of health benefits, including reduced risk of cardiovascular disease, type-II diabetes, obesity and certain types of cancers (Chan, 2010). Walking to and from work or even taking a walk everyday can improve people's health.

An increase in walking in place of driving decreases the amount of pollution; as walking does not involve any fossil fuels or electricity, it creates no pollution. According to the MVA Hong Kong Ltd. (2008), "walking is the most sustainable form of travel because it is consumes no power, improves health, causes no pollution, is equitable and free, and promotes social interaction and public transport usage". Aware of these benefits, many cities have started to enhance their walkability to encourage residents and visitors to walk to their destinations.

The 2002 Government's Travel Characteristics Survey estimated that, on an average weekday, Hong Kong residents made some 12.3 million mechanized trips and some 6.8 million walk-only trips (MVA Hong Kong Ltd., 2008). Considering that all trips involve walking at the beginning and end, this totals over 30 million walking trips daily. This enormous number of walking trips emphasizes the importance of a walkable city and precipitates a need for better pedestrian walkability.

2.2.3. Walkability Studies

Walkability is defined differently in every field. This section reviews several case studies to demonstrate the scope and importance of walkability studies. These demonstrate a wide range of methods and purposes for assessing the walkability of an area.

Many walkability analysis systems emphasize the importance of moderately intensive physical activities, such as walking, for at least thirty minutes per day (Chan, 2009; Hoedl, Titze &Oja, 2010; Millington et al., 2008). These studies focus on strategies that encourage people to walk more often and detail the health benefits of walking. These systems aim to increase walking by encouraging more pedestrian friendly urban planning.

The study conducted by Cervero and Radisch (1996) demonstrates how the distance traveled and the aesthetics such as scenery of the route affect whether or not people are willing to walk. This is based on the distances to retail and food stores from people's homes along with the population density and building types of each neighborhood. They show that, in mixed-use neighborhoods in California, where retail and food stores are within 300m, people are more likely to walk to those stores.

There are several simple, online techniques to measure the walkability of a neighborhood. One system that encourages anyone in a suburban setting to improve its walkability is the Walking Checklist published by Walkable America (2010). This checklist is a tool that anyone can use to assess a route for its walkability, though the focus is on suburban America. It focuses on the quality of pedestrian

facilities like street width and block length, safety from crime and crashes, and pedestrian-friendly community design. Walk Score (2011) is an online application that allows one to input one's address or city to determine the walkability score of their neighborhood. This can allow a person to choose a home or vacation location while keeping the walkability of the area. These applications are designed specifically to allow an average person to take an interest in the walkability of many of the cities in the United States.

Several studies focus closely on integrating a variety of methodologies to complement each other (Chan, 2009; Kelly et al., 2010). Chan uses both quantitative and qualitative methods to create a Geographic Information System (GIS) based audit of the walkability of Hong Kong. GIS is a tool used for displaying all forms of geographically related information. According to GIS.com (2010), "GIS allows us to view, understand, question, interpret, and visualize data in many ways that reveal relationships, patterns, and trends in the form of maps, globes, reports, and charts" (What is GIS, para. 2). Some of the topics that GIS can map are health, social, environment, and many other forms of attribute data. The factors that Chan (2009) measured include the built environment (infrastructure), dwelling density, connectivity, land use mix, traffic conditions, and the crime rate. Kelly *et al.* (2010) used three different methods to assess the walkability: a computer based tool, PERS, discussed in chapter 2.2.4; an on-the-street survey, measuring built environment; and an 'on-the-move' survey, interviewing participants as they walked a route. By combining these techniques and weighting their importance based on preference surveys, which rank the importance of each factor to the average walker, a thorough assessment can be made.

These studies show a variety of methods for assessing the walkability in different cities and situations. The methods can be combined together and irrelevant components can be removed to suit a specific location. These were adapted to this WPI study to create the walkability criteria.

2.2.4. How to Measure Walkability

Walkability is measured by both specific, objective criteria, or metrics, and subjective perceptions. The importance of different aspects of walkability varies from person to person. According to Suzanne LePage (personal communication, 11/29/2010), a former urban planner and a current professor at WPI, the two most important criteria for assessing walkability are convenience and safety.

Convenience assesses ease and enjoyment along the path to a destination, while safety encompasses concerns over the lighting, signage, crime rate, and state of the infrastructure of an area. When assessing the ease of a route, a few factors to consider are: the connectivity, the ease of finding a destination, and the ease of getting to the destination. The connectivity is how well connected separate areas are. The ease of finding a destination is how intuitive and well-directed the routes are to the destination while the ease of getting to the destination is how simple and convenient the route is. These factors are important in determining the convenience of a route.

One method for assessing walkability is by conducting a walking audit; a popular technique is the Pedestrian Environment Review System (PERS) (Transport Research Laboratory, 2010). This system uses both quantitative and qualitative data for the street environment. The PERS system looks at six distinct factors: crossings, public transport, waiting areas, public spaces, interchange spaces between different modes of transport and links such as footways, footbridges and subways. Another popular walkability assessment method is the Global Walkability Index (GWI). This system was developed to facilitate the comparison of different cities walkability (Krambeck, 2008). The GWI measures 11 factors of walkability: availability of crossings, pedestrian count, length of surveyed stretch, obstructions, maintenance and cleanliness, amenities, disability infrastructure and sidewalk width, motorist behavior, walking path modal conflict, security from crime, and crossing safely. Another system is the Scottish Walkability Assessment Tool (SWAT) (Millington et al., 2008). SWAT has three main themes: Functional, safety,

aesthetic, and destination. Under each theme are elements and items that are measured and counted. Some of the items are: type of path, pedestrian signage, and directness of path, type of pedestrian crossings, crossing aids, driveway crossovers, and many more. The Bikeability and Walkability Evaluation Table (BiWET) (Hoedl, Titze, &Oja, 2010) uses an evaluation form to count factors such as: green space, parks, historic buildings (i.e. attractive view), sidewalks, bicycle lanes, billboards, open space, residential and business areas. Each of these uses a different method to assess the walkability of a region. SWAT uses specific criteria similar to that of PERS, while BiWET uses a simple sampling of the key factors and other criteria at ten meter intervals.

There are other criteria that depend on the region and type of city that also influence walkability. Among the other major factors that influence walkability are: sidewalks and pedestrian rights-of-way, traffic and road conditions, air pollution and land use patterns such as city layouts, building accessibility, safety and pedestrian and traveler information (Victoria Transport Policy Institute, 2010).

The aforementioned criteria make up the majority of the factors to be considered when evaluating the walkability of an area. A variety of techniques can be applied to determine the level of walkability in an area, and multiple approaches should be used for a thorough study.

2.3. Walkability in Historic Cities

Most cities have distinctive approaches to walkability designs. These designs take into account factors such as waterfronts, infrastructure and population densities. In this section, the walkability of four, well-known, urban cities are reviewed. These discussions bring up important factors to consider when devising a walkability study specific to Hong Kong.

2.3.1. Boston, Massachusetts

Boston is both one of the most historic cities in the United States and the largest city in New England (Banner, 2010). Though many drive to Boston, once in Boston, walking is one of the main forms of transportation. Like Hong Kong, Boston has an underground public transit system, the Massachusetts Bay Transportation Authority (MBTA). However, the MBTA is much older Hong Kong's MTR system. Boston has made many improvements to make walking around the downtown area more convenient, such as widening sidewalks, blocking certain roads from vehicular traffic and installing more benches and crosswalks. However, Boston still lacks in adequate signage directed towards pedestrians. Boston also improved the city during the Big Dig, which put a central artery underground, reconnecting Boston to the water (MassDot, 2011). In addition, in the mid-1900s, the planning of the Freedom Trail began (Banner, 2011). The establishment of the Freedom Trail, a walking trail by definition, allowed all visitors to Boston to follow the trail past many of the historic sites that Boston has to offer. The waterfront of Boston is an attraction to many tourists. Boston Harbor has many historic attractions and numerous entertainment venues. This New England city offers many different attractions to pedestrians from its scenic harbor front to historic landmarks and sites. The large variety of attractions that Boston has to offer has played a large role in impacting the recent improvements to walkability in Boston.

2.3.2. Shanghai, China

Shanghai's transit system is similar to Hong Kong's transit system. Shanghai has a large metro-based system supported by many buses and trains. However, the bus system is more difficult for visitors to understand because not all buses are labeled or travel the same routes every day (Shanghai.gov, 2002). Though the bicycle industry is still strong in Shanghai, the number of personal cars has increased significantly over the last decade, threatening the bicycle industry. However, Shanghai's laws limit the number of new car registrations every year in an attempt to restrict the number of cars on the

road. The city itself is set up like a grid with a large harbor front. In addition to many deep-water seaports near the harbor front, Shanghai also has many river ports with easy access to the hinterland. Even with Shanghai's large focus on international trading using their many ports, the government has continued to increase the amount of green space in this large city, reaching 12.51 square meters per capita in 2008. Though Shanghai has made many advances towards better pedestrian friendliness, like many large cities, there is always room for improvement.

2.3.3. New York City, New York

New York City, specifically Manhattan, has a long history. Even within most of its oldest districts, the city layout is still a grid (NYC.gov, 2010). This structure immediately makes navigation throughout the city much easier than in many other cities. However, New York relies heavily on its subway system, having the largest system in the northern hemisphere. The combination of the expansive public transit system and pedestrian commuters makes New York City the most energy-efficient major city in the United States. Walkers and cyclists account for 21% of traffic throughout the entire city. The ease of navigation through New York City is aided by the frequent zebra crossings. There are zebra crosswalks at the corners of most major roads, allowing pedestrians to easily cross the street. In the past five years, New York has tried to increase the walkability of the city by making sections of the city, including Times Square, pedestrian only. Though the city is almost entirely surrounded by water, a large emphasis is not placed on the harbor front but rather the busy, expansive commercial and business districts. Though New York is easy to navigate due to its grid-like street structure, it is not necessarily pedestrian friendly. The crime rates, number of homeless people who line the streets and frequent the subway system, the lack of cleanliness and the crowds of people at rush hours are not pedestrian friendly.

2.3.4. Singapore

Singapore is an island country, dependent upon its ports for trade and revenue (Guide Me Singapore, 2010). Singapore is one of the youngest countries in the world. It was acquired by Britain in 1819. In 1959, it became a self-governing state of the British Empire and gained sovereignty in 1965. Overall, Singapore is considered very easy to traverse (Green Channel, 2010). Though Singapore has excellent urban planning, some claim that it is not actually walkable because of the high heat, humidity, and excessive amounts of rain. Singapore has a mass transit system easily accommodated by the design of the city. This was done by creating an underground network of throughways beneath the business and shopping districts connected to the Mass Rapid Transit of Singapore (MRTS) (Sanyal, 2010). Though Singapore is limited in space and is forced to build up, not across, it has increased its land area by over 100 square kilometers through land reclamation. The British instructed Singapore to designate each area based on its use (e.g. commercial vs. residential). With this instruction in mind, the city was set up in a grid configuration, similar to Manhattan, where the ethnic areas are still present today (Cheu, 2009). Singapore is pedestrian friendly because of the initial urban planning. It has remained as such because of the focus on the public transit system and how to better accommodate more walking within the city.

2.3.5. Similarities to Walkability in Hong Kong

There are similarities in the context of walkability between Hong Kong and the cities mentioned previously. Boston has a well-integrated waterfront along both the Charles River and Boston Harbor, just as the city of Hong Kong surrounds Victoria Harbour (Banner, 2010). Both cities incorporate the harbor and its attraction to pedestrians in their urban planning and design for walkability (Harbor Business Forum, 2008).

Like Hong Kong, the focal point of the city of Shanghai is its large harbor front (Shanghai.gov, 2002). As in Hong Kong, trading routes through the harbor are the reason that Shanghai is an economic power

today (MVA Hong Kong, 2008; Shanghai.gov, 2002). Therefore, Shanghai's urban planning was designed for efficiency and effectiveness around the harbor. Shanghai also uses a very similar mass transit system to Hong Kong's MTR (Shanghai.gov, 2002; MTR, 2010). This allows pedestrians to quickly and efficiently get within walking distance of their destinations. Similar to Hong Kong, New York City has the large, world-famous, commercial and business districts that influence the city. Commercial areas in both Hong Kong and New York City have become so overly congested with pedestrians that certain areas like Time Square New York and Tung Choi Street (Ladies Market) in Hong Kong are accessible only by pedestrians (NYC.gov, 2010, Reiber, 2009).

Singapore and Hong Kong have been similar throughout history; they were both British colonies and economic centers (Guide Me Singapore, 2010; Caroll, 2007). The two cities are built on islands full of hills and rocks, making urban expansion difficult. Yet because of their desirable deep sea harbors, both further developed to become two of the four Asian Tigers. This economic growth combined with geographical limitations has increased the population density significantly enough that both cities have run out of buildable land (Sanyal, 2010). They are forced to build up, not across, and have completed large land reclamation projects for extra land. Due to the extremely high population densities in Singapore and Hong Kong, measures have to be taken to accommodate the pedestrians and their walking experience.

New York City, Singapore, Boston and Shanghai have similarities with Hong Kong and how their walkability is designed and implemented within them. Research into walkability in other cities can help identify important aspects for the assessment of Hong Kong.

2.3.6. Uniqueness of Walkability in Hong Kong

Hong Kong is a unique city with world-famous attractions including landmarks, shopping districts, and historic sites. To fully analyze walkability and determine the unique needs of Hong Kong, the

recognition of the differences between Hong Kong and other cities are important. Hong Kong is a top economic power in the world, while only encompassing 426 square miles (Hong Kong Census and Statistics Department, 2010). With a population of over 7 million and over 30 million visitors per year, Hong Kong is one of the densest cities in the world. The small size yet high density makes it stands out among other cities of similar economic status.

Hong Kong is built around Victoria Harbour, making the harbor front the center of the city. This is a unique difference from other harbor front cities. Water front cities are typically built on the edge of the waterfront with the center of the city further inland, as in the cases of Boston, Shanghai, New York City and Singapore. Shanghai and Hong Kong rely heavily on trade routes to and from their deep water ports (Shanghai.gov, 2002; MVA Hong Kong Ltd., 2008). The difference is that Hong Kong has made strides to improve and encompass the waterfront into pedestrian lives, while still maintaining its industrial trade. Singapore has instead continued to use its harbor primarily for industrial trade with little emphasis placed on pedestrian friendliness (Green Channel, 2010). The improvements to encompass the waterfront into the pedestrian experience are similar to the efforts in Boston, yet Boston does not rely on its ports and the surrounding industry to sustain the city (Banner, 2010).

To help improve living conditions in the dense city of Hong Kong, the city has taken several initiatives to create public green space for its residents. These factors, along with safety, contribute to the reason that more pedestrians prefer to walk than to take a bicycle, opposite that of Shanghai (Shanghai.gov, 2002). Hong Kong is also different from cities like New York because the majority of Hong Kong's built environment is in the harbor front. New York sets its focus inland on its commercial and business districts (NYC.gov, 2010). Whereas in Hong Kong, Victoria Harbour is the center of the city and the commercial and business districts line the harbor front (MVA Hong Kong Ltd., 2008). Approximately 1,779,452 people crossed the harbor daily in 2009 by both public transportation and vehicles (Transport

Department of Hong Kong, 2009). Due to this, the congestion of pedestrians is often along the harbor front, forcing a need for improvement in the walkability patterns (MVA Hong Kong Ltd., 2008).

The history of the city of Singapore is strikingly similar to that of Hong Kong. However, Singapore and Hong Kong's urban planning designs are completely different (Green Channel, 2010). As opposed to the separated residential, industrial and commercial districts in Singapore (Cheu, 2009); Hong Kong's residential, commercial and even industrial districts are mixed together (Home Affairs Department, 2010). Singapore was designed in a grid-like style, similar to that of New York City. Due to both the geography and history of Hong Kong, the city structure of Hong Kong is unlike either of these two cities. With its deep water port and harbor on one side of the island and a mountain in the center of the island Hong Kong has very little room for the built environment, creating an unintuitive layout. This makes navigation of the city of Hong Kong increasingly difficult.

No other city has an urban environment quite like Hong Kong's. Hong Kong is a unique city with a long history and a distinctive geography as well as a world economic power. These differences outline the uniqueness of Hong Kong, illustrating why walkability in Hong Kong is important, and the need for walking in Hong Kong to be further analyzed.

2.4. Hong Kong

Hong Kong is a densely populated city unique from any other in the world. The history of Hong Kong, specifically the changes in foreign ruling over the past two hundred years, as well as the unique geography, has played a major role in the city's development (Carroll, 2007). The various attractions as well as the fact that over 90% of people use public transportation in Hong Kong illustrate the need for better walkability (Paul Zimmerman, personal communication, 2010).

2.4.1. History and City Development

Hong Kong was originally a small fishing village belonging to China. However, during the first Opium War, Britain obtained Hong Kong from China in the Treaty of Nanking in 1842 (Carroll, 2007). This treaty stated that Britain would have ownership of Hong Kong Island. In the second Opium War, Britain gained ownership of Kowloon through the Convention of Peking in 1861. In 1898, to avoid another war with Britain, China leased the New Territories of Hong Kong to Britain for 99 years. During World War II, the Japanese forcibly took over Hong Kong as they marched down the coastal region of China. This was initially welcomed but soon hated by the people of Hong Kong. Finally, in 1945, Britain regained rule over Hong Kong. Before the end of the 99 year lease in 1997, China and Britain signed the Sino-British Joint Declaration. This stated that the laws in Hong Kong must remain essentially unchanged for 50 years. This included the basic rights of the people and the free economic system. Currently, Hong Kong and China operate under the "One Country, Two Systems" motto. This will remain until 2047 when China will regain complete control over Hong Kong and will no longer be restricted by the Sino-British Joint Declaration.

Originally, Hong Kong was not urbanized; it was rural and underdeveloped for most of its history (Carroll, 2007). There were never plans for the city to grow as large as it has. Consequently, the original layout of the city was unplanned. As more people moved to Hong Kong throughout the years, the population of Hong Kong significantly increased. However, because of the turmoil in the years leading up to the 1950s, there was no settlement plan for the city (Wordie, 2002). Without such a plan, large squatter camps were established, and there was little organization to most of the city. This lack of organization has prompted recent studies and organizations such as Designing Hong Kong and The Harbour Business Forum have expressed interest in redevelopment efforts to make Hong Kong easier to traverse by foot.

2.4.2. Land Reclamation

Beginning in the late 1800s, the use of landfill for land reclamation has slowly shrunk the size of the Victoria Harbor in Hong Kong (Harbour Business Forum, 2006). Figure 2.4-1 shows the shrinking of the harbor since 1904. The constant reclamation has caused a negative change in the attitude towards parts of the harbor because it has become smaller and smaller over the years. Land reclamation created more real estate to be developed. However, organizations such as the Harbour Business Forum have criticized the practice of land reclamation. Due to the lack of available, buildable land, buildings are constructed vertically rather than horizontally. This causes walking through Hong Kong to be difficult to navigate and inconvenient because tall buildings yield low visibility.

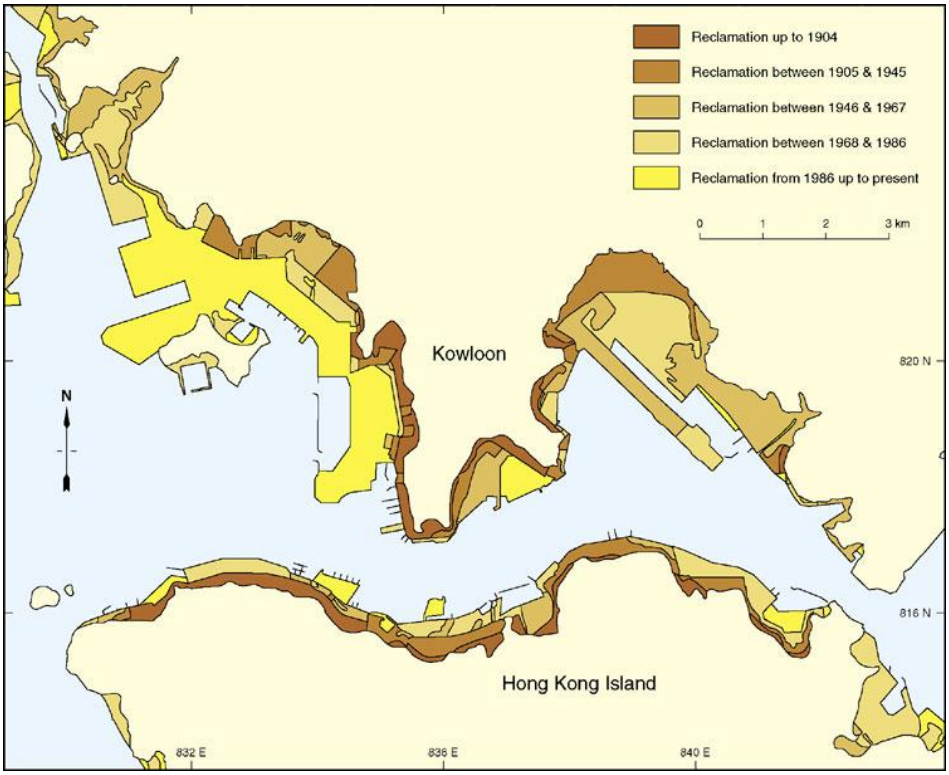


Figure 2.4-1: Harbor Reclamation of Hong Kong since 1904 (Harbour Business Forum, 2006)

Figure 2.4-1 shows the steadily decreasing distance between Hong Kong Island and Kowloon over time (Harbour Business Forum, 2006). This decrease in the width of the harbor has caused unrest

among many locals in Hong Kong due to the adverse effects of land filling on the environment, such as the destruction of marine habitats and problems with water pollution.

2.4.3. Geography

Urban Hong Kong is comprised of two parts Hong Kong Island and Kowloon. Hong Kong Island, the heart of the city of Hong Kong, is about 80 square kilometers (Census and Statistics Department of Hong Kong, 2010). Kowloon is a 47 square kilometer peninsula that juts south from the New Territories. These two areas are separated by Victoria Harbour making Hong Kong a truly unique city.

Hong Kong Island is located south of Victoria Harbour. There are four districts of Hong Kong Island: Central and Western, Eastern, Wan Chai and Southern (Home Affairs Department, 2010). Central and Western, Eastern, and Wan Chai, will be the main focus of this report. Figure 2.4-2 highlights the boundaries of each district.

Figure 2.4-2: Districts of Hong Kong Island (Home Affairs Department, 2010)

The Central and Western District is 1,240 hectares and extends from Kennedy Town to Central District (Home Affairs Department, 2010). This land includes both residential housing and commercial

building space and is considered one of Hong Kong's most historic areas. The area becomes more developed and populated as you approach Central. The western areas of Hong Kong Island are not very well connected to the central areas of the island. The MTR (2009) does not have a station in Kennedy Town, forcing people to use other forms of transportation to travel to and from that area of Hong Kong Island. However, the MTR does have plans to expand the Western Island Line to Kennedy Town. This district is less urban than the central districts and has many parks and playgrounds. These parks and playgrounds are located in the southern side of the Western District, while the harbor front areas are urbanized with high-rise buildings and industrial cargo ports.

The Wan Chai District is 976 hectares and consists of Admiralty, Wan Chai, and Causeway Bay. Wan Chai used to be a small fishermen's village but has expanded to become the center of Hong Kong Island (Home Affairs Department, 2010). In the 1920's, Wan Chai saw its first expansion into the harbor and, at the end of the land reclamation period, an additional 36.4 hectares of land was added to the original Wan Chai District. Today, Wan Chai is the "hub of transportation" for Hong Kong Island, connecting the island to Kowloon by means of the Cross Harbour Tunnel (Home Affairs Department, 2010). Many people visit Wan Chai for its world-class shopping and entertainment.

The Eastern District is 1,900 hectares and consists of North Point, Tin Hau, Quarry Bay, and Chai Wan (Home Affairs Department, 2010). Most of the eastern side of the island is urbanized, especially in North Point. The Eastern District is one of the most populous areas on the island. Over time, "Quarry Bay developed into one of the first industrial centers in Hong Kong" ("Eastern District"). The industrial business also developed the area "into a self-sufficient community with bungalows, shops of various kinds, a hospital and several reservoirs" ("Eastern District"). Today, the Eastern District is a very urban area; however, there are also many parks and green spaces in the southern part of this area including Tai Tam Country Park.

The Central and Western, Wan Chai, and Eastern District all run along Victoria Harbour. To the north of Victoria Harbour is Kowloon. Kowloon is comprised of fourteen action areas. Our team found it useful to cluster these action areas into the five administrative districts shown in Figure 2.4-3.

Figure 2.4-3: Map of Kowloon Administrative Districts

The Kwun Tong administrative district is comprised of four districts, Lei Yue Mun, To Kwa Wan, Yau Tong and Yau Tong Bay. Kwun Tong is one of the largest administrative districts in Hong Kong, housing more than eight percent of Hong Kong's population within its 1,130 hectares (Home Affairs Department, 2010). The district contains industrial, business, and residential sections and many new redevelopment projects are in progress. Recently, Kwun Tong has focused its efforts on the Lei Yue Mun Waterfront Enhancement Project. This project aims to provide "a public landing facility, a breakwater and a waterfront promenade" to enhance the attractiveness of the waterfront and draw in more visitors (Tourism Commission, 2010, Lei Yue Mun Waterfront Enhancement Project).

The Kowloon City administrative district is comprised of four districts, Hung Hom East, Hung Hom West, Tsim Sha Tsui East and Tsim Sha Tsui West. The retired Kai Tak airport is also a part of Kowloon City. Hung Hom is mainly residential while Tsim Sha Tsui is home to both businesses and residences (Home Affairs Department, 2010). Though mainly residential, the Kowloon City District is home to shopping malls and other tourist attractions. With over two hundred schools, Kowloon City has the highest density of schools in Hong Kong.

The Yau Tsim Mong administrative district is comprised of two districts, Yau Ma Tei, and the West Kowloon Cultural District. These two districts blend the old and the new together. Yau Ma Tei, which includes Mong Kok, and the West Kowloon Cultural District are some of the most popular districts in Kowloon for tourists. Mong Kok is also the most densely populated residential district in Hong Kong (Home Affairs Department, 2010).

The Sham Shui Po administrative district is comprised of three districts, Tsing Ye, Western Harbour, and Tsuen Wan. The Sham Shui Po District is mainly a residential area with industrial and commercial developments as well (Home Affairs Department, 2010). It is the home of the first public housing project in Hong Kong, Shek Kip Mei Estate. It is still one of the most densely populated districts in Hong Kong, retaining old tenement apartment buildings while building new public and private housing estates in the newly reclaimed section.

With the exception of To Kwa Wan and Kai Tak, all of these regions are close to MTR stations (MTR Corporation Limited, 2009, System Map). This means that, along with the use of busses and ferries, they are all accessible via public transportation. Over four billion trips are made each year using Hong Kong public transit (Census and Statistics Department of Hong Kong, 2010, Public Transport Passenger Journeys). It is unknown how many trips are made on foot.

2.4.4. Attractions

Hong Kong like many other cities offers a variety of attractions for residents and visitors. Hong Kong Island and Kowloon both offer harbor vistas along promenades, shopping centers and markets, museums, parks and many more attractions.

Every district on Hong Kong Island has attractions. In the Western and Central District, there are temples, shops, and dining areas as well as museums and parks. These attractions stretch from the Lo Pan Temple in Kennedy Town to the Flagstaff Museums of Tea Ware in Central. However, the Western District is mostly residential without any big attractions to draw visitors to the area (Hyde, et al., 2008). Wan Chai is one of the most popular districts in Hong Kong. "Each day, crowds of people come to the district to experience its vitality and fascinating diversity" (Home Affairs Department, 2010, Wan Chai District section, para. 5). Popular attractions in Wan Chai include the Hong Kong Convention & Exhibition Centre, Central Plaza, and Times Square. The Times Square shopping center is located near Causeway Bay. It is a very popular attraction, not only for shoppers, but also for restaurant enthusiasts because it contains many fine dining establishments. The Eastern District is home to the Museum of Coastal Defense, located in Shau Kei Wan, and has numerous shopping areas and recreational parks. While the main attractions in Eastern are spread throughout the area, they are all accessible via the MTR and various bus routes.

Similar to Hong Kong Island, Kowloon has many attractions spread out through each of the districts. The attractions in Kowloon range from temples, museums, and parks to shopping and dining areas. Some of Kowloon's major attractions include The Avenue of Stars on the Tsim Sha Tsui Promenade, A Symphony of Lights, the Ladies Market, and the Temple Street Night Market (Hong Kong Tourism Board, 2010, Attractions). Located on the Tsim Sha Tsui Promenade, The Avenue of Stars features "commemorative plaques, handprints of movie celebrities, descriptive milestones, kiosks with movie

memorabilia, a towering Hong Kong Film Awards statuette, and a life-size statue of the legendary kung-fu action star, Bruce Lee" (Avenue of Stars). This is a very popular tourist destination and is similar to Grauman's Chinese Theatre in Hollywood, USA. The Avenue of Stars is just as popular at night as a viewing point for A Symphony of Lights over Victoria Harbour, the world's largest permanent light and sound show (Symphony of Lights). This nightly display encompasses more than 40 buildings on both sides of the harbor and is able to be viewed from either side of the harbor or aboard a harbor cruise. The Kowloon City District hosts several cultural destinations such as Ko Shan Theatre, the Kowloon Central Library, and Kowloon Walled City (Home Affairs Department, 2010). Yau Tsim Mong is home to "The Temple Street [Market], Ladies Market, Yau Ma Tei Jade Bazaar and Mong Kok Flower Market" (Home Affairs Department, 2010, Yau Tsim Mong). These attractions both in Hong Kong Island and Kowloon increase the need for good walkability because of the number of people visiting each area is increased due to the attractions.

Though various organizations have focused their research on the redevelopment of specific areas of Hong Kong as well as the development of the waterfront, there has not been any research focused explicitly on foot travel in urban Hong Kong. Hong Kong is considered a walking city, yet the needs and concerns of walkers have not yet been fully researched. A study of the walkability of Hong Kong from hinterland to harbor front and vice versa must be conducted to better understand these needs. Further information is required regarding the needs and motivations for residents and visitors who walk in Hong Kong.

2.4.5. Studies on Walkability in Hong Kong

The need for new walkability studies for various cities comes from the differences in the regions themselves. Diverse cultures, incomes, regional structure (urban vs. rural), and neighborhood amenities change the values placed on specific criteria. The concept of walkability is not the same for a

resident of urban Hong Kong as for that of an American living in suburban California, even if they are at a similar income level, due to the cultural and structural variations.

A Walkability Survey in Hong Kong

Hung, Manandhar, and Ranassinghe (2010) of the Hong Kong Polytechnic University undertook a month-long walkability survey in 2010 in Hong Kong to aide city planners understand the extent of the existing conditions and problem areas for pedestrians. This study adapted The Global Walkability Index (GWI) and the Asian Development Bank/ Clean Air for Asian Cities' (CAI-Asia) walking survey for their methodology, including both pedestrian interviews and field surveys.

Like other walkability studies, this methodology included both subjective and objective measurements. The subjective measurements were included in pedestrian surveys which used a random sampling technique (Hung, Manandhar, and Ranassinghe, 2010). They surveyed approximately 1030 people comprised of students and workers at selected busy streets. Objective factors were measured by surveying the availability and quality of pedestrian infrastructure on selected pedestrian routes. The field survey consisted of nine variables: walking path modal conflict, availability of walking paths (with maintenance and cleanliness), availability of crossings, grade crossing safety, motorist behavior, amenities, disability infrastructure, obstructions, and security from crime. The pedestrian routes that were surveyed were in urban areas (e.g. housing estates, educational centers, and public transport terminals) because these locations were identified as the most popular place to commute.

From the pedestrian questionnaire, it was concluded that "the willingness of people to walk is largely dependent on travel distance and time" (Hung, Manandhar, and Ranassinghe, 2010). It was concluded that willingness to walk changes with age. The elderly (60 and older) are less willing to walk greater distances than 16 to 30 year olds. The pedestrian survey also noted that clean sidewalks, weather proofing, and more crossing points were the most wanted improvements regarding walking in Hong Kong. The field survey results surveyed areas of attractions and found that Fa Yuen Street, Tung

Choi and Temple Street have the highest pedestrian density. These three areas were also found to have amenities, such as public toilets, benches, trees, and flowers, but are less secure from crime due to the higher volume of people. These areas also showed that the frequent modal crossings, where vehicle and pedestrian routes intersect, made walking less convenient. The field survey also concluded that permanent obstructions were due to a lack of planning and design, however temporary obstructions, such as, vendors and cafes, should promote walkability and not hinder it as many do. A positive aspect in these areas was that the handicap infrastructure does not only support the disabled but can also serve all people.

From the results of this study, conclusions can be made about the perception of walkability in Hong Kong as well as the infrastructure that comprises the pedestrian experience. Most people are willing to walk long distances to reach transport stations (Hung, Manandhar, and Ranassinghe, 2010). The elderly, however, are not willing to do this and usually only commute around their home neighborhood. Depending on their location, walking to a transport station may be feasible for some people but not for others, due to the plethora of MTR stations, bus stops and taxi stands around the city. The study does not give a length for "long distances" thus making it hard to conclude the actual distance that people are willing to walk. The study also suggests that more street level crossings and reducing road traffic would be beneficial to everyone. People, especially the elderly, choose their path based on a variety of factors, including vehicular traffic and speed. The farther pedestrians walk from the side of the road, the safer pedestrians feel. Walking should be an enjoyable experience for all including the elderly and handicapped, studies like this one help city officials to better make decisions when planning for pedestrians.

Sustainable Transport Opportunities for the Harbourfront

A collaboration of the Harbour Business Forum and MVA Hong Kong Ltd. (2008) produced research on different methods of transport, including walking, for a sustainable harbor front. This study

focuses on why walking is important for people and how walking can improve people's daily experiences. According to the report, walking is the most sustainable mode of transportation. Walking has many benefits as it produces no pollution, is free of charge, has personal health benefits, and promotes social interactions. "In reality walking is the best way to live in and enjoy what great cities offer by changing experiences, vistas, and environments whilst walking along" (MVA Hong Kong Ltd., 2008).

Walking in Hong Kong is comprised of different pedestrian networks. There are four classifications of links for pedestrians: strategic, local, active, and passive/recreational (MVA Hong Kong Ltd., 2008). Strategic links include major areas of connections, such as public transport stations, or between two different, desirable destinations. Local networks are between neighborhoods, buildings, or social areas. Active links are pathways where the pedestrian can actively participate in on-going activities, such as a shopping market or an outdoor café. Passive/recreational networks are areas where a pedestrian can get away from the general flow of the other pedestrians. These areas include parks and sitting areas. In urban areas these networks overlap to form various mixed networks, in which only knowledgeable pedestrians of an area would know how to navigate around efficiently.

This research also demonstrates the recurring pedestrian reasons for preferring not to walk. Some include the following: route indirectness or unclear route, intimidation by road traffic, personal safety, air quality and poor infrastructure (MVA Hong Kong Ltd, 2008). For Hong Kong, climate and air quality were shown to effect pedestrians attitudes towards walking. The preferences are displayed below in Figure 2.4-4 by MVA Hong Kong Limited. These factors and network connections all contribute to the pedestrian experience in Hong Kong.

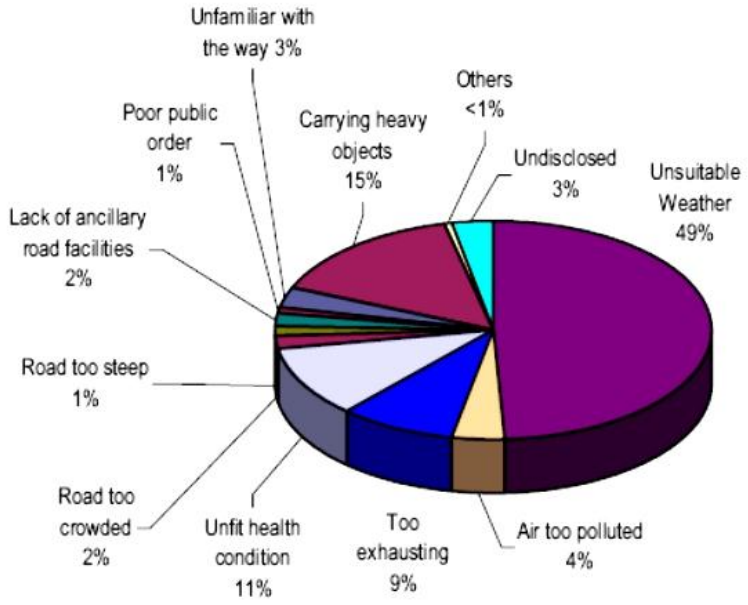


Figure 2.4-4: Stated reasons for not walking in Hong Kong (MVA Hong Kong Ltd., 2008)

In order to make walking the preferred mode of transportation in Hong Kong, the same level of consideration needs to be applied to designing pedestrian routes and networks as for designing road and railway traffic (MVA Hong Kong Ltd, 2008). Planners need to consider both the physical aspect and the perceptions of the pedestrians to plan for a more seamless network of walkable paths.

2.4.6. Walkability in Hong Kong

Convenience and safety are the most important criteria when considering walkability in urban planning (Suzanne LePage, personal communication, 2010). In Hong Kong, both factors influence the government's urban plans and the government strives to achieve a good balance between both. The government aims to ensure the safety of its residents and visitors from vehicles and other dangers to improve the pedestrian walking experience.

In Hong Kong, safety is an important factor in governmental urban planning. Railings line many sidewalks so that pedestrians and cars are separated and subways and footbridges allow pedestrians to cross away from vehicles (Zimmerman, 2011). The District Council has taken a stance promoting

subways and other non-street level crossings because there is no risk of pedestrian-vehicular accidents if the pedestrians are not allowed on the road at all (Ng & Yueng, 2010). The subways and footbridges enhance pedestrian safety at the busy junctions at the cost of convenience. The subways and covered footbridges also protect pedestrians from the rain. In addition, the subways allow people to travel underground in a reduced pollution environment. As they are underground, subways are cooler than the street in warm weather. Channeling people away from vehicles and pollution allows the government to enhance the pedestrians' safety. Another factor that affects safety is people's perception of their personal safety and the security of their belongings. According to a survey conducted by MVA Hong Kong Ltd. (2008), "personal safety and security is generally considered to be less of an issue in Hong Kong because of the presence of large numbers of people on the streets and the low crime rate" (pg. 23). The government's focus on pedestrian safety from vehicles through the use of railings and an increase in subways and footbridges along with the low crime rate in Hong Kong has allowed for the average pedestrian to focus more on the convenience of walking in Hong Kong.

Because of the steps already taken to increase the safety of pedestrians in Hong Kong, urban planners can focus on the convenience of walking. Hong Kong is a very tightly packed city, both in terms of population and buildings, in which public transportation plays an enormous role in people's travel (MVA Hong Kong Ltd., 2008). However, even with the reliance on public transportation, walking to and from public transportation hubs to destinations is still required. These trips should be convenient and reduce the navigating time. Inconvenient walking routes, such as the need to go up and down in a circuitous route to simply get to the other side of the street, lead to pedestrian's frustration and a decrease in walking. According to Paul Zimmerman, co-founder of Designing Hong Kong, "a crossing gives a higher quality of service to pedestrians. There is no need to go up and down the stairs, and the route is more intuitive, which means it is easier to find your way when wandering around" (Ng & Yueng, 2010). In Hong Kong,

> "The traditional approach to traffic engineering design is to minimize pedestrian crossing green time in favour of vehicular traffic green time. At locations where traffic is congested, frequently no pedestrian crossing is allowed, or is unprotected or there is provision of piecemeal footbridges, pedestrian subways and staggered crossings causing inconvenience to pedestrian movements in particular the elderly and the disabled" (MVA Hong Kong Ltd., 2008).

More convenience can be as simple as more street level crossings or as involved as a more continuous footbridge or subway systems with obvious and helpful directional signs, as well as frequent connections to the street level. Many of the current systems in Hong Kong are fragmented and involve transitions between different levels that lead to confusion. These routes also involve more walking, thus increasing the travel time. Many elderly residents are unable or unwilling to traverse these level changes and are therefore unable to enjoy parts of the city and waterfront. Hong Kong has focused more on the convenience of vehicle traffic than that of pedestrian traffic (MVA Hong Kong Ltd, 2008, p. 24).

Summary

Though various organizations have focused their research on the redevelopment of specific areas of Hong Kong as well as the development of the waterfront, there has not been any research focused explicitly on improving foot travel in urban Hong Kong. Hong Kong is considered a walking city, yet the needs and concerns of walkers traveling from hinterland to harbor front have not yet been thoroughly researched. A study of the walkability of Hong Kong from hinterland to harbor front and vice versa needs to be conducted to develop criteria specific to Hong Kong that can be used to evaluate the needs and concerns of pedestrians to make walking in Hong Kong more pedestrian friendly. Further information is required to assess the needs and motivations to encourage both residents and visitors to walk in Hong Kong, the main focus of the present study.

3.0 Methodology

To accomplish the project's goal, the team used a three-step process: preliminary walking evaluations of the 16 harbor front districts, a set of street surveys, and an in-depth study of four different districts in Hong Kong. From the 16 preliminary evaluations, the team selected four districts for an in-depth study. The in-depth study included surveying 16 routes across these four districts with criteria developed from the literature review and the preliminary evaluations. The criteria were reinforced by the results of the Pedestrian Perception of Walkability Survey. The Walkability Analysis Tool (WAT) used the data collected by the team during the route evaluations to create focus areas of improvement. The team used these focus areas to create recommendation plans to improve the connectivity, convenience, and pedestrian experience of walkers in Hong Kong.

3.1. Preliminary Walkability Analysis

The Harbourfront Commission's original 22 action areas were modified and reduced to better fit the scope of the study. A *district* is defined as the land from the harbor front to the hinterland. The *harbor front*, the dividing line shown in purple in Figure 3.1-1 below, as defined for this project, is the land from the edge of the water to the first, parallel main road. The *hinterland*, the dividing line shown in red in the figure, as defined for this project, is the land in between the first main, parallel road to the next (second) main, parallel road. The boundary between the hinterland and harbor front can be seen clearly in Figure 3.1-1.

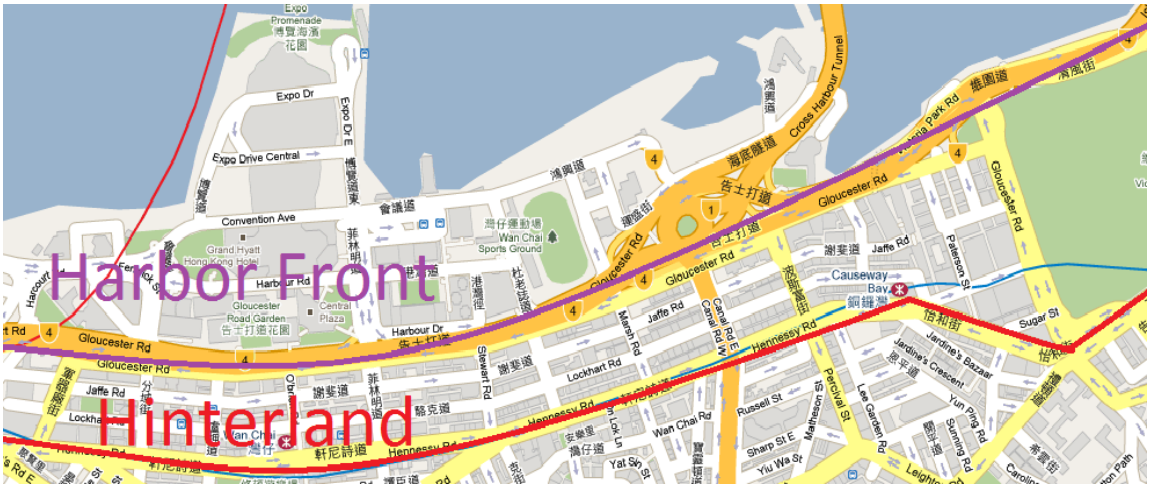


Figure 3.1-1 - Hinterland and Harbor Front Boundaries

The 22 action areas of the Harbourfront Commission were reduced and combined into 16 districts that contained harbor front and allowed pedestrian access; therefore, Kai Tak and Kwai Chung were eliminated. Hung Hom East and West were combined into Hung Hom; Yau Tong, Yau Tong Bay and Lei Yue Mun were combined into Yau Tong; and Tsim Sha Tsui East and Tsim Sha Tsui West were combined into Tsim Sha Tsui. This yielded the final smaller set of action areas or districts to evaluate (see Figure 3.1-2 or Table 3.1-1 for the complete list). The team examined the 16 action areas along the harbor to become more familiar with the different walking strategies and obstacles of urban Hong Kong.

Table 3.1-1 - Alphabetical List of Preliminary Districts

Preliminary Districts	Location
Central	Hong Kong Island
Chai Wan	Hong Kong Island
Hung Hom	Kowloon
Island East	Hong Kong Island
Kennedy Town	Hong Kong Island
Sai Wan Ho	Hong Kong Island
Sai Ying Pun	Hong Kong Island
Sheung Wan	Hong Kong Island
To Kwa Wan	Kowloon
Tsim Sha Tsui	Kowloon
Tsing Yi	Kowloon
Tsuen Wan	Kowloon
Wan Chai	Hong Kong Island
West Kowloon	Kowloon
Yau Ma Tei	Kowloon
Yau Tong	Kowloon

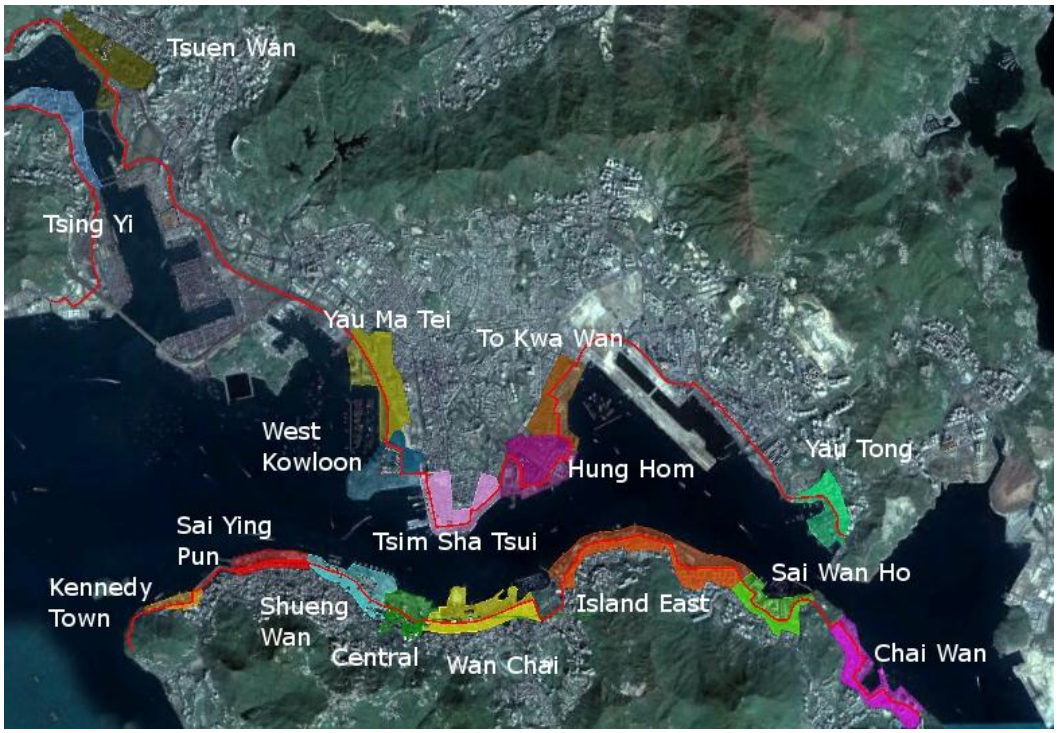


Figure 3.1-2 - 16 Districts of the Harbor Front

3.1.1. Preliminary Evaluation Rubric

To analyze the walkability in Hong Kong, the investigation focused on the connectivity and convenience of getting around the districts. For the preliminary evaluation, the team evaluated each district was evaluated based on four main factors: connections, choke points, breakdowns, and directional signs. The group based these four factors on research from other walking audits discussed in the background chapter, information given by the sponsors, and the team's initial perceptions of Hong Kong. The team created an easy-to-use rubric (shown below in Table 3.1-2 and Appendix E.1) to complete the preliminary evaluation of the 16 districts. To fill out the rubric, one member of the team tallied all the connections, choke points, breakdowns, and directional signs in a district. Then, the tallies produced an approximate number of each criterion, which was used for the analysis of all 16 districts.

Table 3.1-2 - Preliminary Evaluation Rubric

Preliminary Area Rubric		
Name of District		
Criteria	**Approximate Number**	**Score**
Number Of Connections		
Number Of Choke Points		
Number Of Directional Signs/Maps		
Number Of Breakdowns		
NOTES:		

3.1.2. Definitions of Preliminary Evaluation Rubric Metrics

A *connection*, shown in Figure 3.1-3, is a marked crosswalk, a footbridge, or subway, including MTR tunnels. If a tunnel exits to three different streets, this is considered three different connections. However, if there are two crosswalks, but the middle crosswalk is only an island, this is considered only one connection. A place where pedestrians cross and there is only a look left or look right sign or no markings on the road is not included as a connection.

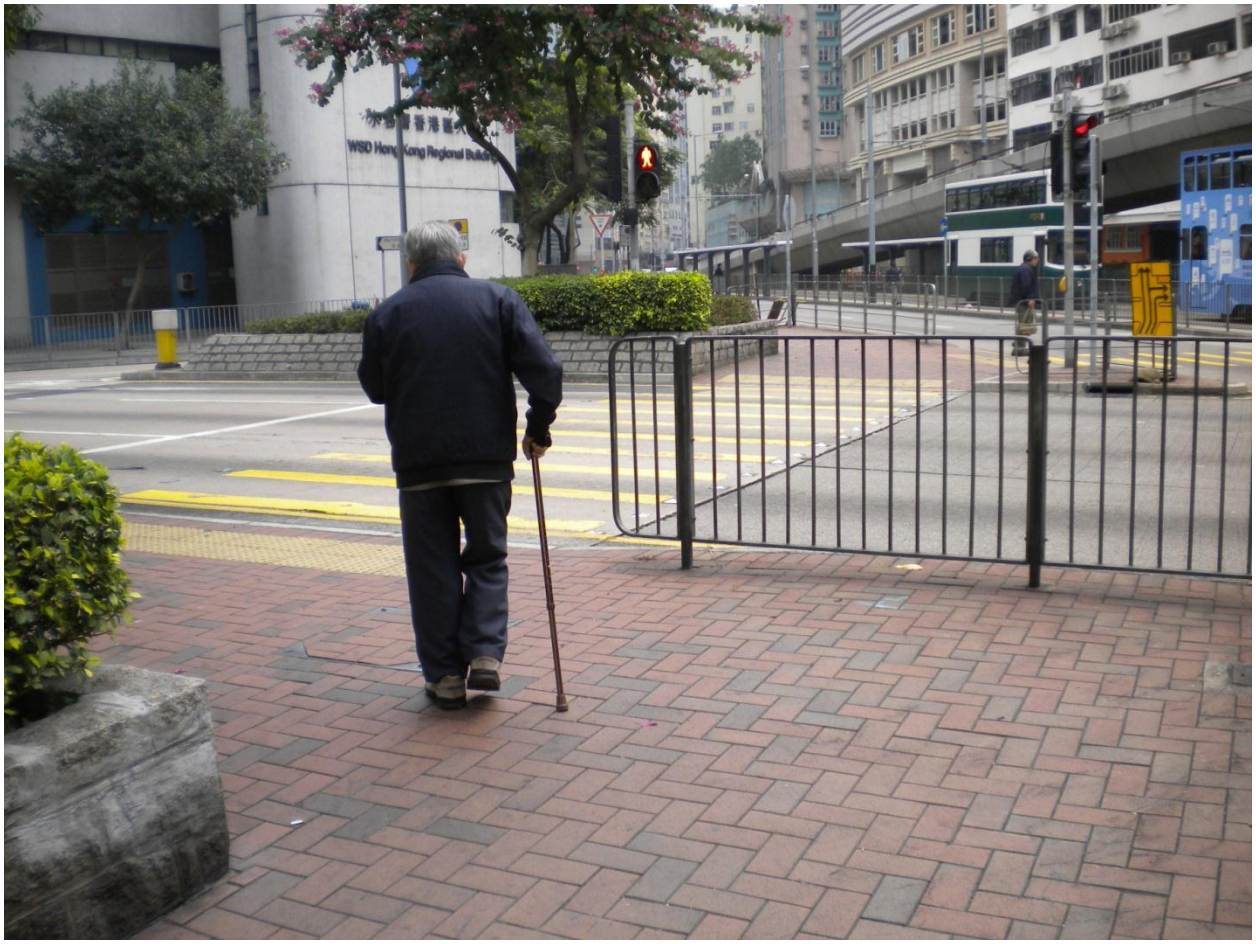


Figure 3.1-3 - Connection (Zebra Crossing)

A *choke point*, shown in Figure 3.1-4, is any place where a pedestrian is forced to slow down their walking due to either a structure or barrier in the walkway, not from the congestion of people. This can include construction areas, excessive displays from shops or restaurant seating. This also includes *informal crossings*, any time a street needs to be crossed and there is no connection between streets yet pedestrians continue to cross there. Anywhere that vehicles enter or exit, such as the entrance or exit to a parking garage, can be considered a choke point. A "look left, look right" crossing or an *unmarked crossing* is also considered a choke point. A choke point is not where there is an excessive amount of people or bags of waste (as on a garbage day).

Figure 3.1-4 - Choke Point

A *breakdown*, shown in Figure 3.1-5 is defined as a barrier on a path that completely obstructs a pedestrian route and forces the pedestrian to turn around and go back the way they came. A breakdown is when a street or sidewalk abruptly ends or when there is construction that blocks the path a pedestrian would like to take. A breakdown is not the end of a park or enclosure of a sitting area.

Figure 3.1-5 - Breakdown

A *directional sign*, shown in Figure 3.1-6, has a directional arrow, is written in both English and Chinese, and is targeted towards pedestrians. A directional sign is also a map or any commercial sign that would help walkers find a destination such as a restaurant or shopping area. For the purpose of the preliminary evaluation, this excluded street signs showing the direction of the street. A directional sign is not one that is meant for vehicular traffic or other commercial forms of traffic, such as signs pointing to parking garages.

Figure 3.1-6 - Directional Sign

3.1.3. Execution of Preliminary Evaluation

To ensure that each member's definitions of the preliminary criteria were consistent, the team first participated in a practice walk in Tsim Sha Tsui (TST). All four members of the research team walked

TST together and counted, discussed, and compared all connections, choke points, breakdowns, and directional signs. The purpose of this practice walk was to develop a level of consistency among all team members. Subsequently, the research team divided into pairs of two to complete the preliminary evaluation of each of the 16 districts, one pair, Kathryn and Michael, walked eight districts in Kowloon while the other pair, Alison and Suzanne, walked eight districts on Hong Kong Island. The WPI team divided themselves this way so that each pair would become familiar with one side of the harbor. One preliminary evaluation rubric was filled out per district by one team member while the other team member took photos and helped to point out the preliminary evaluation criteria. The roles of recorder and photographer alternated each day. Though the rubrics were not time-based, each pair visited an area between the hours of nine am and one pm on weekdays. The team took into consideration the Chinese New Year and did not to walk in any district on February 2nd, 3rd and 4th. To complete the preliminary evaluation, each two-person team counted the number of connections, choke points, breakdowns, and directional signs in each district. Additionally, each team member also took notes on the pedestrian congestion, construction, ease of navigation, the harbor front, and the quality of the district as part of their general perception. Both two-person pairs walked every street within the hinterland and harbor front boundaries of each district, beginning with the perimeter and then walking the interior. Each district is the entire area from hinterland to harbor mapped out in Appendix D.1 and the sizes of these districts can be found in Table 3.1-2. The team walked the entire district instead of spending a set amount time within it to eliminate any bias caused by teammates walking at different speeds. By walking an entire district, the team was able to identify the total number of connections, choke points, breakdowns, and directional signs. These totals were then used to compare the districts and rank the walkability of each though a data analysis system.

3.1.4. Data Analysis of Preliminary Walkability Observations

All 16 districts received quantitative scores and qualitative assessments after evaluation. To achieve consistent results, the team created a data processing method. The system took into account the quantitative measurements from each district, along with the team's perception and experiences. This was achieved by splitting the data into two groups, the objective data and the subjective data. The objective data is the total number of directional signs, connections, choke points, and breakdowns in each district. The subjective data is the team's perception of the foot travel, the harbor front and the ease of way finding within the district. The foot travel in a district is the perception of the amount of people who frequent the district and travel by foot while within the district. The harbor front data is the group's judgment of the accessible harbor front's size and quality in proportion to the district. Ease of way finding is how intuitive and simple it is to get from one place to another within the district. These different scoring groups comprise the system used to grade the 16 districts.

To grade each district's walkability evenly, the measured data had to be compared on an even scale. The team made the assumption that connections, choke points, breakdowns, and directional signs are all functions of the size of an area. Therefore, a larger district would have larger quantities of objective data. As each district was a different size (Figure 3.1-2), the team walked varying distances. To create comparable results, the measured data needed to be weighed based on the size of the district. The data were weighed by creating a size scale quantity and then multiplying that value with the measured data for each district. The size scale quantity was determined by taking the area of the largest district and dividing it by the area of the district being evaluated. The size scale quantities for each district are also shown in Table 3.1-3. The equation for weighing each measurement is shown in Equation 1 and an example in Equation 2.

Table 3.1-3 - District Sizes In the Order They Were Walked

Area	Size (m^2)	Size Scale (Largest District/Size)
Sai Wan Ho	636490	2.6704740059
Hung Hom	1473900	1.1532193500
Yau Tong	507070	3.3520618455
Wan Chai	774170	2.1955513647
West Kowloon	776590	2.1887096151
Central	387140	4.3904788965
Yau Ma Tei	1303810	1.3036638774
Sai Ying Pun	416370	4.0822585681
Kennedy Town	210730	8.0659137285
Tsing Yi	840320	2.0227175362
Island East	1699730	1.0000000000
Tsim Sha Tsui	897140	1.8946095370
Tsuen Wan	1130780	1.5031482693
Sheung Wan	758560	2.2407324404
To Kwa Wan	714280	2.3796410371
Chai Wan	745940	2.2786417138

$$Measured\ Number\ * \frac{Largest\ Area}{Current\ Area} = Measured\ Number * Size\ Scale = Weighted\ Number$$

Equation 1 - Size Weighing Equation

$$\boldsymbol{Number\ of\ Connections} * \frac{\boldsymbol{Largest\ Area}}{\boldsymbol{Current\ Area}} = \boldsymbol{Weighted\ Number\ of\ Connections}$$

$$\boldsymbol{Number\ of\ Connections} * \frac{\boldsymbol{Island\ East\ Area}}{\boldsymbol{Sai\ Wan\ Ho\ Area}} = \boldsymbol{Weighted\ Number\ of\ Connections}$$

$$\boldsymbol{87\ Connection\ s} * \frac{\boldsymbol{1699730\ m^2}}{\boldsymbol{636490\ m^2}} = \boldsymbol{232\ Connections}$$

Equation 2 - Sai Wan Ho Connection Weighing Example

Table 3.1-4 - Sai Wan Ho Measured Quantities and Scaled Output

Criteria	Approximate Number	Weighted Number
Area: Sai Wan Ho		
Number Of Connections	87	232
Number Of Choke Points	46	123
Number Of Breakdowns	0	0
Number Of Directional Signs/Maps	196	523

All four of the categories measured were weighed using this process. Table 3.1-4 shows the district Sai Wan Ho as an example and the rest of the districts can be found in Appendix E.2. After each district received weighted numbers for the four categories, the numbers were compared and sorted into five groups. The reason that the data was divided into five groups was for a process called binning. *Binning* is a quantization method used for the pre-processing of data (Alston & Mengersen, 2009). It is used to reduce the effect of minor observational errors from data collection. Binning works by creating groups with ranges for the data to be placed in. The group chose five bins because with 16 districts and five bins, there are approximately three districts per bin, if the data is evenly spaced out. The team determined the bin sizes by separating the range between the highest and lowest score (after weighting) into five equal groups. The five bins had values from one to five, where five is the best. These bins and their values are shown below in Table 3.1-5.

Table 3.1-5 - Bins for data processing

			Bins					
Categories	**Max**	**Min**	**1**		**2**	**3**	**4**	**5**
Connections	274	39	39-86		87-133	134-180	181-227	228-274
Choke Points	255	50	255-215		214-174	173-133	132-92	91-50
Breakdowns	48	0	41-50		31-40	21-30	10-20	0-10
Directional Signs	702	2	2-142		143-282	283-422	423-562	563-702

Once the bin sizes were determined, the weighted measurements were sorted into them and assigned the bins value of one to five. After each of the four categories received a value from one to five, a RAW score was created. The RAW score is the summation of the bin values for the four objective categories. Sai Wan Ho is used again in Table 3.1-6 as an example showing both the bin values assigned and the RAW score for the district.

Table 3.1-6 - Sai Wan Ho Metrics Data Processing Example

Area: Sai Wan Ho			
Criteria	Approximate Number	Weighted Number	Value (1-5)
Number Of Connections	87	232	5
Number Of Choke Points	46	123	4
Number Of Breakdowns	0	0	5
Number Of Directional Signs/Maps	196	523	4
Total Walkability (RAW)			18

The RAW score is half of the total walkability score. A value of the perception of walkability must be assigned to each district, in order to fully assigned walkability scores. The team took notes on their perception of walkability and their experiences while walking in each district. These notes became the basis for the perception scores assigned to each district. The team assigned scores based on their notes for each of the three categories: foot travel, harbor front, and ease of navigation. The team generated these categories as they walked each district and became familiar with what the most important factors to their walking experience are.

The investigation selected the three perception factors for a variety of reasons. *Foot travel* is the perception of how many people frequent a district, and how many of those people travel by foot within the district. The team chose this factor for two reasons. An area that is travelled on foot more frequently

has a higher demand for increased walkability. With more people walking, pedestrian routes need to be more convenient to keep the traffic flow moving. Secondly, if the walkability in a district is increased, the foot traffic will also increase to a certain extent. Therefore, improving walkability in a district with a really low foot traffic score is as critical as a district with high foot traffic. As the focus of this project is the walkability from hinterland to harbor front, the second factor is the perception of the harbor front. This category assesses both the size and the quality of the environment directly on the water for pedestrian access. Finally, the team chose *ease of way finding,* how simple it is to get from one place to another in the district. This is the perception of how many useful signs there are and how intuitive the route is to pedestrians.

Each of the three factors received a score from one to five for each district. This was to be used in conjunction with the RAW score to create a total walkability score for each district. They scored from one to five for the same binning reasons discussed earlier. The group assigned scores for the three factors by reviewing the notes taken, relying on their personal knowledge of the area, and then agreeing on a score. The team first agreed on which they considered to be the worst and best district for each factor. Then, through group discussion and by using the best and worst examples as basis, the group determined a score for each factor, where five is the best and one is the worst. For foot travel, a district that scored a five is one that consistently is full of people. This was because a district with good walkability and high foot travel needs less work than a district with good walkability and low foot travel because the latter needs more amenities and attractions. The quality of the harbor front received a five for a large beautiful promenade and ease of way finding received a five for being a simple and intuitive district to navigate. Table 3.1-7 shows all of the districts with the scores assigned for the subjective factors.

Table 3.1-7 - Perception Scores for 16 Districts

	Perception			
Area	**Foot Traffic (1 to 5)**	**Harbor front (1 to 5)**	**Ease of Way Finding (1 to 5)**	**Total**
Sai Wan Ho	3	5	4	12
Hung Hom	3	3	4	10
Yau Tong	2	3	3	8
Wan Chai	5	2	1	8
West Kowloon	4	5	2	11
Central	5	1	2	8
Yau Ma Tei	3	2	1	6
Sai Ying Pun	2	2	1	5
Kennedy Town	2	1	2	5
Tsing Yi	3	5	5	13
Island East	5	3	4	12
Tsim Sha Tsui	5	5	2	12
Tsuen Wan	3	3	3	9
Sheung Wan	5	4	4	13
To Kwa Wan	4	2	2	8
Chai Wan	1	2	2	5

To create a total walkability score for each district, the pedestrian perception score needed to be combined with the RAW score. The team decided that the objective and subjective aspects were equally important when measuring walkability. Therefore, when processing the data, the perception score is of equal consideration to the RAW score. As there are three categories to the perception score and four categories to the RAW score, the scores needed to be weighed. To create a total walkability score, the team summed the perception scores and then multiplied the result by a weight of four thirds. This was then added to the RAW score to create the total walkability score for each district, a perfect score indicated by a total of 40. The equation is shown in Equation 1 with an example using Sai Wan Ho in Equation 2.

$$\left((Foot\ Traffic + Harbor\ Front + Ease\ of\ Way\ Finding) * \frac{4}{3}\right) + Connections$$
$$+ Directional\ Signs + Choke\ Points + Breakdowns = Total\ Walkability\ Score$$

Equation 3 - Total Walkability Equation

$$(Foot\ Traffic + Harbor\ Front + Ease\ of\ Way\ Finding) * \frac{4}{3} = Perception\ Score$$
$$(3 + 5 + 4) * \frac{4}{3} = 16 = Sai\ Wan\ Ho\ Perception$$

$$Connections + Directional\ Signs + Choke\ Points + Breakdowns = RAW\ Score$$
$$5 + 4 + 4 + 5 = 18$$

$$Perception\ Score + Raw\ Score = Total\ Walkability\ Score$$
$$16 + 18 = 34$$

Equation 4 - Sai Wan Ho Total Walkability Example

The team applied this method to all 16 districts to score and rank them based on their walkability. The results of this preliminary walkability analysis were a factor in the selection of the four districts for in-depth analysis. The 16 districts are ranked from lowest to highest by their total walkability scores in Table 3.1-8. The full extent of the data processing for all 16 of the districts can be found in Appendices E.3, E.4, and E.5.

Table 3.1-8 - Total Walkability Scores for the 16 Districts

District	Objective (RAW Score)	Subjective (Perception Score)	Total Score
Chai Wan	10	6.65	16.65
Yau Ma Tei	9	7.98	16.98
Yau Tong	8	10.64	18.64
To Kwa Wan	9	10.64	19.64
Kennedy Town	13	6.65	19.65
Sai Ying Pun	14	6.65	20.65
Tsuen Wan	12	11.97	23.97
Wan Chai	14	10.64	24.64
Hung Hom	12	13.30	25.30
Central	16	10.64	26.64
West Kowloon	13	14.63	27.63
Island East	13	15.96	28.96
Tsing Yi	12	17.29	29.29
Sheung Wan	15	17.29	32.29
Tsim Sha Tsui	17	15.96	32.96
Sai Wan Ho	18	15.96	33.96

3.2. Survey

To better understand the perception of both tourists and residents in Hong Kong, the WPI team conducted two surveys. The first survey was the Pedestrian Route Selection at the Tsim Sha Tsui Harbor Front Survey. The group carried out this survey to test the effectiveness of the survey questions. The second survey was the Pedestrian Perception of Walkability Survey. The results from both surveys were used to guide and influence the creation of WAT for use in the detailed Hong Kong walkability evaluation process.

3.2.1. Pedestrian Route Selection at the Tsim Sha Tsui Harbor Front Survey

The team conducted the Pedestrian Route Selection at the Tsim Sha Tsui Harbor Front Survey on January 31 (also known in this paper as the Hong Kong Cultural Centre Survey) for the main purpose of a test run. This test run was to determine if using only English speakers to conduct the surveys would be

prohibitive and to find any issues with the survey itself. The critique of the first survey was used to finalize the second survey and to start the first draft of the WAT until the second survey could be conducted.

The WPI team created the survey (see Figure 3.2-1) after the majority of the preliminary walking evaluations had been completed. The survey was printed on A4 paper with different margin sizes, allowing the survey to fit on one page. The team took into account many suggestions from all sponsors as well as comments from the advisors and chose two main routes in Tsim Sha Tsui: the subway under Salisbury Street leading from the Tsim Sha Tsui MTR to the harbor front and a reinstated zebra crossing across Salisbury Street. The maps were intended to clarify the routes. The team also included a question that aimed to collect general preference choices. The group designed this question to provide many different options and placed the choices in two columns without labels: metrics and amenities. This was to encourage people to choose at least one option from each column. The last four questions of the survey were demographic and basic travel information questions. In addition to the demographics on the questionnaire, the team also noted the race of the participant. A native Cantonese speaker translated the survey into Chinese, and the team placed both the Chinese and English on the same side of the questionnaire to avoid asking the participant which language to choose.

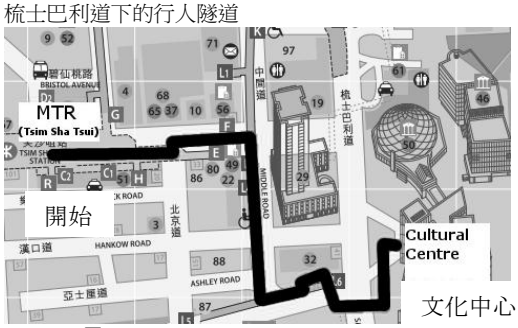
This survey was successful as a pilot test to finalize the second survey as it uncovered several problems with the survey and led to several improvements and changes when the group designed the second survey. The maps, intended to clarify the specific route, were confusing. The maps often made participants spend several minutes interpreting each map and trying to figure out the exact route. This caused the time it took to complete this survey to be much longer than originally expected. In addition, there were too many questions on the survey, thereby decreasing the font size and increasing the time to complete it.

Hong Kong Walkability Questionnaire 1 **香港步行問卷調查 1**

The purpose of this questionnaire is to determine which route you would prefer as a pedestrian. We will use the information we collect on our surveys to help better plan walking routes in Hong Kong. This survey is confidential and your demographic data will not be released
本問卷指在調查，當作為一個步行者的時候會怎樣決定行走路線
是次收集得到的資料將有助我們改善香港步行路線計劃的研究，調查收集的數據及個人資料絕對保密且不會公開，

1. **Which route would you choose to get to the TsimShaTsui harbour front?**
你會選擇那條路線到達尖沙咀海旁?

Subways under Salisbury Rd. to the harbour front
梳士巴利道下的行人隧道



Route A: ☐
路線 A

New zebra crossing on Salisbury Rd. in front of The Peninsula Hotel
橫過半島酒店前新的行人過路處

Route B:☐
路線 B

2. **Which route would you prefer if:**
如果有以下情況，你會選擇:

It's raining? ☐ A or ☐ B or ☐ Doesn't Matter
下雨 甲 乙 不重要

It's hot? ☐ A or ☐ B or ☐ Doesn't Matter
酷熱 甲 乙 不重要

It's cold? ☐ A or ☐ B or ☐ Doesn't Matter
寒冷 甲 乙 不重要

High air pollution? ☐ A or ☐ B or ☐ Doesn't Matter
嚴重空氣污染指數 甲 乙 不重要

Circle the three most important factors in making your route choice.
請選 3 個決定您選擇路線的最重要因素

a. Shortest route
最短的路程
b. Prefer subways
喜歡行人隧道
c. Prefer street-level crossings
喜歡路面的行人過路處
d. Prefer footbridges
喜歡天橋
e. Handicap accessible
傷健人仕的可達度
f. Ease of finding my way
容易找到我要的路線
g. Feel safer
安全性
h. Better air quality (pollution, air conditioning)
較階的空氣質數
i. Less crowded
較少人群擠湧
j. Less noise
較少噪音
k. Attractive route (e.g. greenery, harbour, shopping, view)
景觀的吸引度(如綠化地帶、海濱、購物)
l. Other _____
其他

3. **Where do you normally travel from before arriving in TsimShaTsui?**
到文化中心之前，您從那裏來

☐Hong Kong Island 香港島 ☐Kowloon 九龍 ☐New Territories 新界 ☐Not Applicable 不適用 ☐ Other_____ 其他

4. **Which modes of transport do you normally take to get to TsimShaTsui harbour front? Circle all that apply.**
您乘坐那一種交通工具到達這兒，可選一項或以上。

a. MTR 港鐵 b. Bus/Minibus 巴士 c. Ferry 船 d. Taxi 的士 f. Walking 步行 e. Car/Motorcycle 私家車/電單車 g. Other_____ 其他

5. **Are you a Hong Kong resident or visitor?**
您是香港的居民或是遊客
a. Resident 居民 b. Visitor 遊客

6. **What is your age?**
年齡
a. <16 c. 16-21 e. 22-35 g. 36-45
b. 46-55 d. 56-65 f. > 65

7. **What is your gender?**
姓別
☐Male 男性 ☐Female 女性

THANK YOU FOR YOUR PARTICIPATION
唔該晒

Figure 3.2-1- Pedestrian Route Selection at the Tsim Sha Tsui Harbor Front Survey

The survey participants included people near the harbor front of the Hong Kong Cultural Centre in Tsim Sha Tsui visiting the area or attending the event at the Cultural Centre. The event was "The Monkey King" and it started at 7:30 pm on January 28, 2011. The team selected this event and location based on the probability that there would be many English speakers going to this event and more pedestrians in the area would be taking leisure walks and not be in a hurry. For this survey in particular, the team needed more of an English speaking pool for two reasons. The first reason was that the team was testing the survey's clarity; the second reason was that the team could not speak Cantonese. The team arrived one hour before the show planning to collect data for one hour and 15 minutes. However, once there, the team decided to stay an extra 45 minutes to catch more pedestrians attending A Symphony of Lights, the light show on the harbor, which started at 8 pm. This changed the total survey time to two full hours, from 6:30 pm to 8:30 pm; that yielded a total of 39 surveys. The team planned to survey pedestrians near the Hong Kong Cultural Centre. Because they did not have permission to survey on the Cultural Centre property, the team changed locations. For the first 45 minutes, the team stood in front of the Star Ferry Pier; for the last one hour and 15 minutes, the team stood just outside the MTR L6 Exit in the public subway leading to the harbor front. For this survey, all four members of the team stood within eyesight of each other and asked, in English, for passing pedestrians to take the survey, though the survey was written in both English and Chinese. The time in the subway was longer because the team found that there were more pedestrians willing to answer the survey there than at the Star Ferry Pier.

3.2.2. Pedestrian Perception of Walkability Survey

In addition to the survey at the Cultural Centre, the WPI team conducted the Pedestrian Perception of Walkability Survey at two of the access points from hinterland to harbor front. These access points were two of the more well-traveled places in two of the final districts, Wan Chai and Tsim

Sha Tsui. This survey aimed to provide insight into pedestrian's views of walking and to support the specifics of WAT.

The team created this survey, shown in Figure 3.2-2, after the completion of all 16 preliminary evaluations and the survey at the Cultural Centre. Instead of focusing on a specific walking route, this survey focused on the walking experience and the pedestrian perceptions of walking in Hong Kong as a whole. The first question, though along the same lines, no longer included a map, but instead just asked route preference under several weather conditions. In addition, the team added the option of footbridges and shortest route to the previous choices of subway, street-level, and no preference to remove bias within the question. The second question remained the same, focusing on the route selection influences in the two main columns of metrics and amenities. Finally, the team eliminated two background questions about travel, leaving only the basic demographic questions and the team's notation of race. All of these changes both clarified and shortened the survey, giving the team the option to make the formatting easier to read and the font larger.

Hong Kong Walkability Questionnaire 2　香港步行問卷調查 1

The purpose of this questionnaire is to determine which route you would prefer as a pedestrian. The information collected will be used to better plan walking routes in Hong Kong. This survey is confidential and your demographic data will not be released
這個調查問卷的目的是去測定當你是一名行人的時候，會選擇哪一條路的. 这个调查是完全保密的, 我们不会透露关于您的数据.

1. Which route do you prefer?
您更喜歡哪一條道路？

☐ Street-level Crossings or ☐ Subways or ☐ Footbridges or ☐Shortest Route or ☐ Doesn't Matter
十字路口　隧道　天橋　最短的路程　不重要

Which route would you prefer to take if:
您更傾向於選擇哪一條道路，如果:

It's raining? ☐ Street-level Crossings or ☐ Subways or ☐ Footbridges or ☐Shortest Route or ☐ Doesn't Matter
下雨天　十字路口　隧道　天橋　最短的路程　不重要

It's hot? ☐ Street-level Crossings or ☐ Subways or ☐ Footbridges or ☐Shortest Route or ☐ Doesn't Matter
酷熱天　十字路口　隧道　天橋　最短的路程　不重要

It's cold? ☐ Street-level Crossings or ☐ Subways or ☐ Footbridges or ☐Shortest Route or ☐ Doesn't Matter
寒冷　十字路口　隧道　天橋　最短的路程　不重要

High air pollution? ☐ Street-level Crossings or ☐ Subways or ☐ Footbridges or ☐Shortest Route or ☐ Doesn't Matter
嚴重空氣污染指數　十字路口　隧道　天橋　最短的路程　不重要

2. Circle the THREE most important factors in making your route choice.
請圈出 3 個最重要的因素使您選擇上面的路徑。

a. Shortest route
最短的路程
b. Prefer subways
喜歡隧道
c. Prefer street-level crossings
喜歡十字路口
d. Prefer footbridges
喜歡天橋
e. Handicap accessible
有傷殘人士通道
f. Ease of finding my way
容易找到我需要的路線
g. Feel safer
安全性
h. Better air quality (pollution, air conditioning)
空氣質數較好地區
i. Less crowded
較少人群擠湧
j. Less noise
較少噪音
k. Attractive route (e.g. greenery, harbour, shopping)
景觀的吸引度(如綠化地帶、海濱、購物)
l. Other _____
其他(請說明

3. Hong Kong resident or visitor? **您是香港的居民還是遊客?**	**4. What is your age?** **年齡**	**5. What is your gender?** **姓別**
a. Resident 居民　b. Visitor 遊客	a. <16　c. 16-21　e. 22-35　g. 36-45 b. 46-55　d. 56-65　f. > 65	☐Male 男性　☐Female 女性

THANK YOU FOR YOUR PARTICIPATION
感謝您的配合!

Figure 3.2-2 - Pedestrian Perception of Walkability Survey

On January 31, 2011 the team conducted the survey in the two districts, starting at 1 pm and ending at 2:30 pm. The survey was completed by 100 people, 50 in each of the two final districts. In addition to the two WPI team members in each district conducting the survey, there was also a Cantonese speaking volunteer from Hong Kong City University. The locations selected were a tunnel under Salisbury Road near the Tsim Sha Tsui harbor front and along Convention Avenue, near the Wan Chai Ferry Pier. Members present stayed within eyesight of each other. Due to the locations and Cantonese speakers, the team encouraged more residents to participate. Many of the participants were on their lunch break, traveling from one place to another. The survey conducted in Wan Chai received more results from people of Asian descent because the area has fewer tourist attractions. While in Tsim Sha Tsui, there was more of a variety of responses in terms of race for area due to all the tourist attractions in the area. The purpose of this survey, like the Route Selection Survey, was to determine the perceptions of those that live and walk around Hong Kong. The results of the survey contributed to the final criteria choices and focus areas in the WAT.

3.2.3. Survey Data Processing

The two surveys are significantly different and had to be processed separately. The Pedestrian Route Selection at the Tsim Sha Tsui Harbor Front survey used maps to identify a specific route to the pedestrians (question one). The survey looked to identify pedestrians' preferences and reasons for selecting a specific route. The Pedestrian Perception of Walkability Survey consisted of questions about walkability in Hong Kong as a whole. The team designed this survey to better understand people's perception of walkability in Hong Kong. The two surveys included the same demographic questions and the same question about route selection reasons (question two). The survey near the Cultural Centre in Tsim Sha Tsui also included a few background questions about participant's modes of transport and where they traveled from. The surveys needed to be processed separately because of the different questions and because they each served distinct purposes in our methodology. There were fewer

‘Pedestrian Route Selection at the Tsim Sha Tsui Harbor Front’ surveys completed than the ‘Pedestrian Perception of Walkability’ surveys. The team collected 39 surveys in two hours but discarded four of the surveys due to errors in filling them out. This investigation recorded The Pedestrian Route Selection data using Microsoft Excel. Using a numerical representation for each answer, group members entered the data into Excel. The answers went in alphabetical order with a = 1, b=2, c=3 et cetera. After the group entered all of the data into an Excel spreadsheet (Appendix F.1), Excel totaled and plotted the answers for each question.

The Pedestrian Perception of Walkability surveys had a much higher completion rate. The team analyzed all of the data collected from the 100 surveys by entering the survey responses into Excel using the same format as the previous survey (a=1, b-2, c=3, etc.). They used this data to create charts showing the responses to the two general walkability questions by sorting and totaling the answers. To understand different pedestrian’s general perceptions of walking in Hong Kong, the team cross-correlated the survey answers. They correlated the answers to questions one and two with residency, age, gender, race, and the location of the survey. The group then correlated the responses of either “feel safer” or “less crowded” for question two with their route preference (question one) to determine if one specific type of path is safer or less crowded than another to a pedestrian in Hong Kong. This correlation used Excel to sort through the lists to find responses that fell into both categories. For example if the pedestrian was a female, she was entered into Excel as a two, whereas males received the number one. For this particular question, 1 is for street level, 2 is for subways, 3 is for footbridges, and 4 is for shortest route and 5 is for doesn’t matter. An example showing the percentage of males and females who answered question 1b is seen in Table 3.2-1.

Table 3.2-1 - Gender Answers to Question 1a

Female Rain Route	#	TOTAL	%
Street-Level	2	30	6.67%
Subways	20	30	66.67%
Footbridges	3	30	10.00%
Shortest Route	5	30	16.67%
Doesn't Matter	0	30	0.00%

Male Rain Route	#	TOTAL	%
Street-Level	2	70	2.86%
Subways	36	70	51.43%
Footbridges	20	70	28.57%
Shortest Route	11	70	15.71%
Doesn't Matter	1	70	1.43%

3.3. In-depth Walkability Methodology

Using the results from the preliminary analysis, the team further analyzed the four selected districts by creating and using WAT. In addition to discussing the selection process for WAT, this section outlines the creation of recommendation plans and walkability maps. The team used both to systematically perform walkability measurements in the four districts selected.

3.3.1. Final Walkability Criteria

The team created the final criteria based on several factors: past walkability studies, the teams' personal experiences during the preliminary evaluation, and the surveys of pedestrians along the harbor fronts. WAT is the Hong Kong Route Walkability Analysis Tool. This is a tool created by the WPI team to analyze routes in Hong Kong for their walkability. The tool consists of three parts: a rubric filled out with specific information while walking a route, an analysis of this rubric, and a table of focus areas.

The team derived the rubric information from a larger list of factors created by brainstorming, shown in table 3.3 - 1, and eliminating different factors based on level of importance, survey results, sponsor's opinions and the project team's experience from the preliminary walkability process.

Table 3.3 - 1 - List of Brainstormed Walkability Factors

Factor
Street Lighting
Number of People
Public Safety
Alleys
Physical State
Infrastructure
Number of Crossings
Crossings with or without Lights
Connectivity/Number of Connections between Streets
Sitting Areas
Public transit Stations
Toilets
Parks/Recreation
Number of Signs
Number of Languages on Signs
Visibility of Sings
Directional Signs
Maps
Information Areas (Customer Service)
Types of Crossings
Escalators vs. Stairs
Width of Sidewalks/Alleys
Rubbish/Garbage/Cleanliness
Handicap Accessibility
Weather Protection
Crossing Time/Length
Construction
Metal Fences

The team selected five final focus areas: connections, choke points, handicap accessibility, weather, and attractions and amenities. The rubric broke these focus areas down into smaller pieces (see Figure 3.3-1, Appendix G.1) to make them easier to understand and for clarity within the rubric.

Walkability Evaluation					
District:		**Route:**			
Connections					
Zebra	**Total**	**Subways**	**Total**	**Footbridges**	**Total**
Tallies:		Tallies:		Tallies:	
Unmarked Crossings	**Total**	**Subway Connection Signs**	**Total**	**Footbridge Connection Signs**	**Total**
Tallies:		Tallies:		Tallies:	
Informal Crossings	**Total**				
Tallies:					
Handicap Accessibility				**Weather**	
Handicap Connections	**Total**	**Signs for Handicap Accessibility**	**Total**	**Sheltered Path**	**Total**
Tallies:		Tallies:		Tallies:	
Choke Points					
Breakdowns	**Total**	**Parking Garages**	**Total**		
Tallies:		Tallies:			
Attractions & Amenities					
Parks/ Recreation	**Total**	**Public Transit Stops**	**Total**		**Yes/No**
Tallies:		Tallies:		**Access To Harbor Front**	
				Access To H.F Promenade	
	Percentage		**Beginning**	**Middle**	**End**
Quality of Route		**Public Toilets**			
Visual Aesthetics		**Signs for Public Toilets**			
Construction		**Seating Area**			
Directional Signs (H.F & P.T)					

Figure 3.3 - 1 - Hong Kong Walkability Evaluation Rubric

There are five different types of connections: footbridges, zebra crossings, subways, unmarked crossings and informal crossings. *Zebra crossings* are defined as those crossings that are marked by yellow lines and have a walk/don't walk signal. *Unmarked crossings* (also known as cautionary crossings) are crossings where there is a dip in the sidewalk, also known as a drop curve, or look left/look right painted on the road, but no yellow lines or signals. These are places where pedestrians are expected to cross yet there is no formal zebra crossing with signals. An *informal crossing* is where

there should be a crossing because many pedestrians cross there, but there is no indication of a crossing. In addition to noting the number of crossings, the WAT rubric notes signs associated with both subways and footbridges. If a sign is missing on either connection, then it is noted on the map, and at which end of the connection the sign is missing.

Though both handicap accessibility and weather are related to connections, each has their own category in the rubric. Under handicap accessibility, the walkability evaluator must note whether each connection is handicap accessible and whether there is signage indicating where the handicap accessible connection is. For weather, the evaluator must note whether the footbridge is sheltered or not.

Choke points, modified from the previous definition in the preliminary evaluation process, include only two main points: breakdowns and parking garages. Breakdowns are areas where the sidewalk ends abruptly or the path is completely blocked by some sort of obstruction. Another form of a choke point is a parking garage. These are modal conflicts, areas where the cars and the pedestrians are able to be in the same physical space with limited control. This includes both entrances and exits of the parking garages, regardless of whether there are warning lights, sounds, or attendants present.

The last section of the rubric takes into account the amenities present. This is broken down further into several criteria: parks, public transit stops, access to harbor front, quality of route, public toilets, visual aesthetics, seating areas and signage. This is a large category that contains many walkability characteristics to consider. The parks and public transit stations are counted. The access to the harbor front and the harbor front promenade are yes/no check boxes. *Harbor front access* is any point along the waterfront at which you can overlook the water without obstructions. A *harbor front promenade* is any area where there is a built environment meant for pedestrian enjoyment of the harbor front. The seating areas and public toilets are checkboxes labeled beginning, middle and end. A *seating area* is any place in which there are at least three benches or other forms of seating in one area. Checks are placed in the boxes depending on the location of the amenity along the route. Finally, visual

aesthetics, quality of route, directional signs, and construction are all graded as percentages based on team's perceptions of the route walked. The directional signage percentage depends 50% on the harbor front signage and 50% on the public transit signage. The percentages are in increments of 10 % to allow for more accurate results and to take into account differences of perception between surveyors. *Visual aesthetics* is the quality of the view along the route such as shopping areas, greenery, paintings, and anything else visually pleasing to the eye. *Construction* includes any areas where there were large construction projects that seemed to be semi-permanent. The *quality of route* is both the condition of the infrastructure along the route and the influence that the infrastructure has on the pedestrian. All of these factors create the amenities section of the rubric.

A hypothesis of this investigation is that WAT can effectively evaluate the walkability of one route, between hinterland and harbor front, in any district in Hong Kong along Victoria Harbour. After walking a route and completing the rubric, WAT provides focus areas of improvement for the specific route based on the information entered into the rubric. The user completes the rubric while walking a pre-planned route from hinterland to harbor front in one district. Based on the preliminary evaluations, the team selected four different districts to evaluate: Wan Chai, Sai Ying Pun, Yau Ma Tei and Tsim Sha Tsui. The team used these four districts to evaluate the quality and accuracy of the criteria as well as to determine recommendation plans for improvement. The team decided to test the rubric on 16 routes, four routes per final district. These four routes were approximately evenly spaced throughout the district with the ideal routes leading from main transit stations, large recreational areas, or residential blocks to the different areas along the harbor front. The following four maps (Figures 3.3-2 to 3.3-5) show the final districts, Wan Chai, Sai Ying Pun, Yau Ma Tei and Tsim Sha Tsui, and the four routes taken, noted in various colors, in each district.

Figure 3.3 - 2 - Routes in Yau Ma Tei

Figure 3.3 - 3 - Routes in Tsim Sha Tsui

Figure 3.3 - 4 - Routes in Wan Chai

Figure 3.3 - 5 - Routes in Sai Ying Pun

The team performed three main tasks when walking each of the 16 routes: completing one rubric, filling out two walking maps, and taking pictures of pedestrian congestion in each district. The first task was to fill out the rubric for the Walkability Analysis Tool, shown in Appendix G.2. The second task was to complete a map for each route walked. This map was a Google Map, indicating only the route to be taken. The team noted on the map the different types of connections made, choke points, signage or lack of signage and any amenities seen along the route. The group used these maps to make

final, digital walking maps in each district, detailed in a later section. The team compared the maps to the rubric to test the accuracy and make adjustments. The final task consisted of taking one picture around 1 pm along the most important route of each of the four final districts. These pictures were used to make a general pedestrian congestion assessment in each district. By completing all three tasks, the route is fully evaluated. The numbers from the rubric were then input into the analysis tool in Microsoft Excel. This tool is part of the WAT and takes all of the information in the rubric along with the length of the route and generates focus areas of improvement.

3.3.2. In-depth Data Processing

The second portion of the WAT tool is the analysis and processing of the rubric data collected for each route. The processing system yields focus areas in need of improvement along the route. The specific goal of the system is to have a single tool that, upon entering the necessary data, generates a list detailing which walking aspects of the route are in need of improvement.

The data processing system of the WAT tool is unique because it evaluates the walkability of a route based on both objective and subjective scores. The system receives all of the data recorded on the rubric as an input and separates the data into two different categories. The first category is called the metrics; it includes all type of connections, handicap accessibility, weather, and choke points. It also includes the length of the route in miles and a factor referred to as the minimum needed connections. The *minimum needed connections* are the number of connections that would need to be in place for a straight line route, infrastructure permitting, from the start to the finish of the route in evaluation. This factor allows a basic analysis of the directness of the route and connections to be completed. The second category in the WAT analysis system is pedestrian experience. This category includes all of the attractions and amenities on the rubric. The data for the entire analysis system is entered exactly the same as it is noted on the rubric.

The analysis system has multiple considerations for the two categories as shown in Table 3.3-1. These considerations are evaluated using a cutoff value system. For each consideration, the team determined the cutoff values. They tested and refined these values for effective data processing. The system works by comparing the rubric data to the each of the cutoff values to determine the appropriate output. All of the metrics data and the pedestrian experience data is analyzed as a rate based on the distance of the route. The WAT sums the number of connections to create a total connections value for use in determining the directness of the path. The cutoff values for each consideration are shown below in Table 3.3-1.

Table 3.3-1 - Cutoff Values for WAT System Considerations

Metrics Considerations	**Cutoff**
Connections Crossed	Total Conn./Min. Connections = 1; Total Connections/Min. Conn. = 2;
Unmarked Connections	Unmarked Conn./Route Length =< 0; Unmarked Conn./Route Length = 4;
Informal Connections	Informal Connections > 0;
Subway Signs	Subway Signs = 2*Subway Connections;
Footbridge Signs	Footbridge Signs = 2*Subway Connections;
Handicap Accessibility	Handicap Accessibility = Footbridge Connections + Subway Connections
Handicap Signs	Handicap Signs = 2*Handicap Accessibility
Sheltered Connections	Sheltered Connections = Footbridge Connections
Breakdowns	Breakdowns = 0
Parking Garages	Parking Garages/ Length of Route = 0; Parking Garages = 4;
Pedestrian Experience	**Cutoff**
Parks/Recreation	Parks/Recreation/Length of Route = 4;
Public Transit Stops	Public Transit Stops/Length of Route = 4;
Quality of Route	Quality of Route = 30%; Quality of Route = 50%; Quality of Route = 70%
Visual Aesthetics	Visual Aesthetic = 30%; Visual Aesthetic = 50%; Visual Aesthetic = 70%
Construction	Construction = 0%; Construction = 50%
Directional Signs (HF,PT)	Directional Signs = 50%; Directional Signs = 70%
Harbor Front Access	Harbor Front Access = Yes
Harbor Front Promenade	Harbor Front Promenade = Yes
Sitting Areas	Sitting Areas/Length of Route = 4
Promenade Seating	Promenade Seating = Yes
Public Toilets	Public Toilets/Length of Route = 4
Public Toilet Signs	Public Toilet Signs = Public Toilets

The team determined these cutoff values from their experiences walking in Hong Kong and research into pedestrian walking preferences (Hung, Manandhar & Ranasinghe, 2010; Paul Zimmerman, personal communication, 2010). A direct route would yield a value of 1, the first cutoff, if the minimum connections equaled the total connections taken. The team selected the second bound of 2 because they felt that if pedestrians must cross twice as many connections as needed, then the directness of the route needs improvement. The unmarked connections consideration uses a cutoff of zero and four per mile. The cutoff of zero indicates that all street level crossings are properly marked and the team selected the value of one per 400 meters because they felt that over four would be a significant enough hindrance to the pedestrian traffic and a safety concern. Fewer than four was acceptable to account for low traffic alleys and side streets. The informal connection cutoff is zero because pedestrians cross the street at that point enough that a connection needs to be installed for safety and pedestrian traffic flow. All subways' and footbridges' entrances and exits should be marked for ease of access; therefore, the cutoff for subway signs and footbridges signs is twice the number of subways or footbridges. Every footbridge and subway needs to be handicap accessible, so the cutoff for handicap accessibility is the summation of the number of footbridge connections and subway connections. The cutoff number of handicap accessibility signs is also twice that of the handicap accessible connections, because all handicap connections need a sign directing pedestrians in need. The cutoff for sheltered connections is the number of footbridges; every footbridge needs a cover to protect pedestrians from the elements. All breakdowns need to be addressed and a solution determined; therefore, the cutoff value of the breakdown consideration is zero. Parking garages are modal conflicts that are dangerous to both pedestrians and vehicles. All parking garages' safety should be addressed, and the team felt that more than four parking garages in a mile along a route is too unsafe. Therefore, another connection or route should be created for pedestrians. The common understanding, as mentioned before, is that pedestrians are only willing to walk 400 meters (Paul Zimmerman, personal communication, 2010).

Therefore, the amenities, parks and recreation, public transit stops, sitting areas and public toilets all have a cutoff value of four per mile. Because every public toilet should have a sign, the group noted public toilet signs. Therefore, the cutoff for public toilet signs was the number of public toilets. The team split the quality of route and the visual aesthetics considerations into three sections. The first section's cutoff was 30% and if a route only scored 30% or lower then it needed a lot of improvement. The second cutoff was 50% and if a route was between the 30% to 50% range it was adequate but had room for improvement. Finally, the team felt that any route with a score above 70% was in proper shape. Construction along a pedestrian route is unsafe and detracts from the pedestrian experience. Therefore, the team's cutoff values were 0% and 50%. If a route had any construction along it, pedestrian safety should be verified. If a route had more than 50% long-term construction, a detour or separate connection should be set up for pedestrian traffic flow. The directional signage consideration accounts for signs to harbor front attractions and public transit. The cutoffs for this consideration were determined to be 50% and 70%. The team felt that if less than 50% of route had proper signs, then it was in need of improvement. If the route had between 50% and 70% signage then this was satisfactory, but it could be improved. Finally if there was more than 70% signage along the path, then the area had a good number of directional signs. The final three considerations are specific to the harbor front because the tool was created to measure the walkability between the harbor front and the hinterland. The harbor front access, harbor front promenade, and the promenade seating area cutoff's are only if there is one or not. There should be a harbor front promenade with seating at the end of every route.

After the team determined all of the cutoff values, they implemented the Microsoft Excel data processing system. Appendix G.4 shows the table of IF statements used in Excel to automatically calculate the proper responses to the data input from a rubric. WAT produced focus areas in three different groups, identified by three key phrases, which outline the core improvements needed along the route. The key phrases are classified as: in need of a lot of improvement, could use improvements

and in satisfactory shape. This tool is useful because it enables anyone to survey a route and generate the areas in need of improvement; this output can then be used to recommend improvements along the route for pedestrian friendliness. The tool is available in Microsoft Excel format from Paul Zimmerman of Designing Hong Kong.

3.3.3. Walking Map

The team walked four routes in each of the final districts, filled out the WAT rubric, and created a walking map for each route. The walking maps are a detailed version of the path that the team walked to get from hinterland to harbor front. Before walking, each route was pre-determined using Google Maps. For each route, two members of the team made notations on the walking map. The team created a key (see Table 3.3-2) to ensure that the maps were consistent.

Table 3.3-2 - Legend for Walking Maps

Color Codes	
Pink	Street Level Connections
Blue	Footbridges and Subways
Orange	Handicap and Shelter
Green	Choke Points
Purple	Amenities
Letter Codes	
Connections	
Z	Zebra
S	Subway
F	Footbridge
CS	Connection Sign (only mark if missing)
U	Unmarked or Cautionary Connection
I	Informal Connection
Handicap	
H	Handicap Accessible (ramp or elevator)
HC	Handicap Connection Sign (only mark if missing)
Weather	
W	Sheltered Connection

Choke Points	
B	Breakdowns
P	Parking Garages
Amenities	
T	Public Toilets
R	Parks/Recreation
PTS	Public Transit Stations

Five colors and 15 letter codes indicated different types of criteria and made the maps easier to read for later reference. For example, whenever the team crossed a footbridge connection, a blue line was drawn on the map with the letter F next to it. Also written in blue was CS (connection sign) if the footbridge was missing a connection sign. As seen in the map in Figure 3.3-1, other connections and amenities were noted on the map as well. Additionally, team members noted and commented on areas under construction, confusing pathways, or any other characteristics that they encountered while walking each route. Adjustments to the route from the pre-determined path were noted on the map as well. Each walking map is a visual of the connectivity, convenience and amenities of the route. The purpose of the walking maps was to provide visuals for the team to use when creating recommendation plans for each route. Due to the time constraints of this study, the team did not have enough time to re-walk each route to verify the focus areas of the WAT. The maps gave a very simple visual of where problems occurred and where small changes can be implemented to improve walkability in Hong Kong. The results chapter shows and discusses all of the maps in further detail.

Figure 3.3-1- - Walking Map of Yau Ma Tei

3.3.4. Recommendations

Based on the focus areas generated by WAT, the team created recommendations for all 16 routes. In addition, a set of general recommendations to improve the walkability of Hong Kong were identified. The route recommendations were also a byproduct of the team's experiences while walking the route and the digital walking maps. The recommendation plans detail specific improvements for each of the 16 routes to enhance the walkability. By identifying common focus areas and issues between routes, the team created a set of general recommendations. These recommendations are improvements geared towards unifying and improving the walking experience of Hong Kong.

4.0 Results

This chapter presents the results of this investigation. Section 4.1 discusses the results of the preliminary walking evaluation and provides a summary of all 16 districts analyzed. The next section reports the results of the two surveys. The final part of this chapter depicts the results of the in-depth walking analysis of the four districts. This section includes four main segments: an overview of the route, a walkability map, a completed rubric and a table of focus areas of improvement. The overview of the route includes a detailed analysis of the four main walking routes in each of the four districts. The table of focus areas of improvement is produced by the walking tool developed by the team. There is one table per walking route. Each table is summarized to point out the main improvements necessary for each route.

4.1. Preliminary Walking Rubrics

The WPI research team completed preliminary walking surveys of the 16 districts listed in Table 3.1-1. A brief overview of each district is shown below in Tables 4.1-1 and 4.1-2. Using the data collected, the team determined the four districts to focus on for the in-depth study. A more detailed description and photos taken in each district are shown in Appendix E.2.

Table 4.1-1 - Preliminary Impressions of 8 Districts in Kowloon

Kowloon	
Tsing Yi	Tsing Yi is a residential district with a well-developed and continuous waterfront enjoyed by locals of all ages.
Tsuen Wan	Tsuen Wan is a residential district with a well-developed waterfront enjoyed by locals. The small industrial area is a hazardous place for pedestrians where there are no crossings and trucks block pedestrian paths.
Yau Ma Tei	Yau Ma Tei is a residential and industrial district with a short but enjoyable waterfront. The district has only two pedestrian connections to the waterfront.
West Kowloon	West Kowloon is a residential and commercial district with a well-developed waterfront that is difficult to access from the main buildings in the district. A large portion of West Kowloon is under construction.
Tsim Sha Tsui	Tsim Sha Tsui is a commercial district with a well-developed and popular waterfront. TST has many signs and an extensive pedestrian subway system.
Hung Hom	Hung Hom is a residential district with a well-connected waterfront enjoyed mostly by locals. It was difficult to navigate the hinterland but was easy in the harbor front.
To Kwa Wan	To Kwa Wan is a residential and commercial district with a disconnected waterfront and few signs.
Yau Tong	Yau Tong is a small residential district known for its seafood market. The waterfront in Lei Yue Mun is enjoyable but the waterfront in the rest of the district is inaccessible.

Table 4.1-2 - Preliminary Impressions of 8 Districts in Kowloon

Hong Kong Island	
Kennedy Town	Kennedy Town is a small residential district with a small, hard-to-access waterfront. The district has few signs making navigation difficult.
Sai Ying Pun	Sai Ying Pun is a small residential and commercial district with a nice but small waterfront. The harbor front is difficult to access due to a lack of connections.
Sheung Wan	Sheung Wan is a small, well-connected commercial district in which the only waterfront is at the ferry piers. It is easy to navigate due to abundant signage but is difficult to traverse due to the pedestrian congestion.
Central	Central is the financial hub of Hong Kong but does not currently have any waterfront due to long-term construction. Central is easiest to traverse using the well-integrated footbridge system.
Wan Chai	Wan Chai is a commercial district with a very popular waterfront by the Expo Centre, though much of the rest of the waterfront is under construction. Many connections in Wan Chai need to be connected to each other to improve the ease of navigation.
North Point	North Point is a residential and commercial district with much of the waterfront obstructed by construction. There are few signs and crossings, making navigation difficult.
Sai Wan Ho	Sai Wan Ho is a residential district with a well-developed waterfront that is used often by locals for a variety of purposes. The district is enjoyable with many signs and parks.
Chai Wan	Chai Wan is a small residential district with a beautiful promenade stretching part of the waterfront. The connectivity and signage are lacking in Chai Wan, making navigation difficult.

To conduct the in-depth study, the team selected four districts: Yau Ma Tei, Tsim Sha Tsui, Wan Chai, and Sai Ying Pun. The team selected these districts based on a combination of the following factors: the walkability scores, pedestrian traffic density, importance of the district to the city, and high potential for improvement.

Yau Ma Tei was selected because there are very few marked crossings in the district, causing it to have a low score of 16.98 in the preliminary evaluations. These unmarked crossings lead to a lot of choke points that could easily be fixed. In addition, the harbor front has a short, but pleasant, promenade near the Olympic MTR Station. However, the use of this promenade is limited by the lack of connections between the hinterland and harbor front. This district contains residential, commercial and industrial spaces that have a wide variety of walking needs. Yau Ma Tei has a high potential for improvement.

Tsim Sha Tsui received a high walkability score (32.96) compared to the other districts under study. However, it scored poorly in the "ease of way-finding" category. This is a difficult problem to address, especially in a popular, high-traffic district. Tsim Sha Tsui was selected because of its popularity with both tourists and locals as a commercial district, even though it scored well in walkability.

Sai Ying Pun was selected because it is primarily a residential district with a walkability score of 20.65; it ranked in the middle of the distribution. It has a beautiful waterfront promenade in Sun Yat Sin Park but the rest of the waterfront is undeveloped. The rest of the district is confusing to walk around. Sai Ying Pun has the potential for good walkability between the hinterland and the harbor front.

Wan Chai was selected because it is very confusing to navigate and handles a high amount of pedestrian traffic. The Expo Centre promenade is a very popular tourist destination while the Star Ferry draws both locals and tourists to the harbor. The district scored 24.64 in walkability, in the middle of the distribution, due to the magnitude and multitude of construction sites.

4.2. Pedestrian Route Selection at the Tsim Sha Tsui Harbor Front Survey

The first survey effort netted 39 respondents including both residents and visitors; however three surveys had to be eliminated because of bad entry data. The following results summarize the Hong Kong Cultural Centre Survey; however the sampling size is too small to draw any definitive conclusions.

Figure 4.2-1 shows the overall demographic data of the 36 participants. The number of males and females surveyed were about the same, varying only by three percent. The data collected also shows that more residents were surveyed than visitors and that more people of Asian descent were surveyed than those of any other race. The age of those surveyed varied; 61% were in the 22-35 age brackets, while all other age brackets were a much smaller percentage.

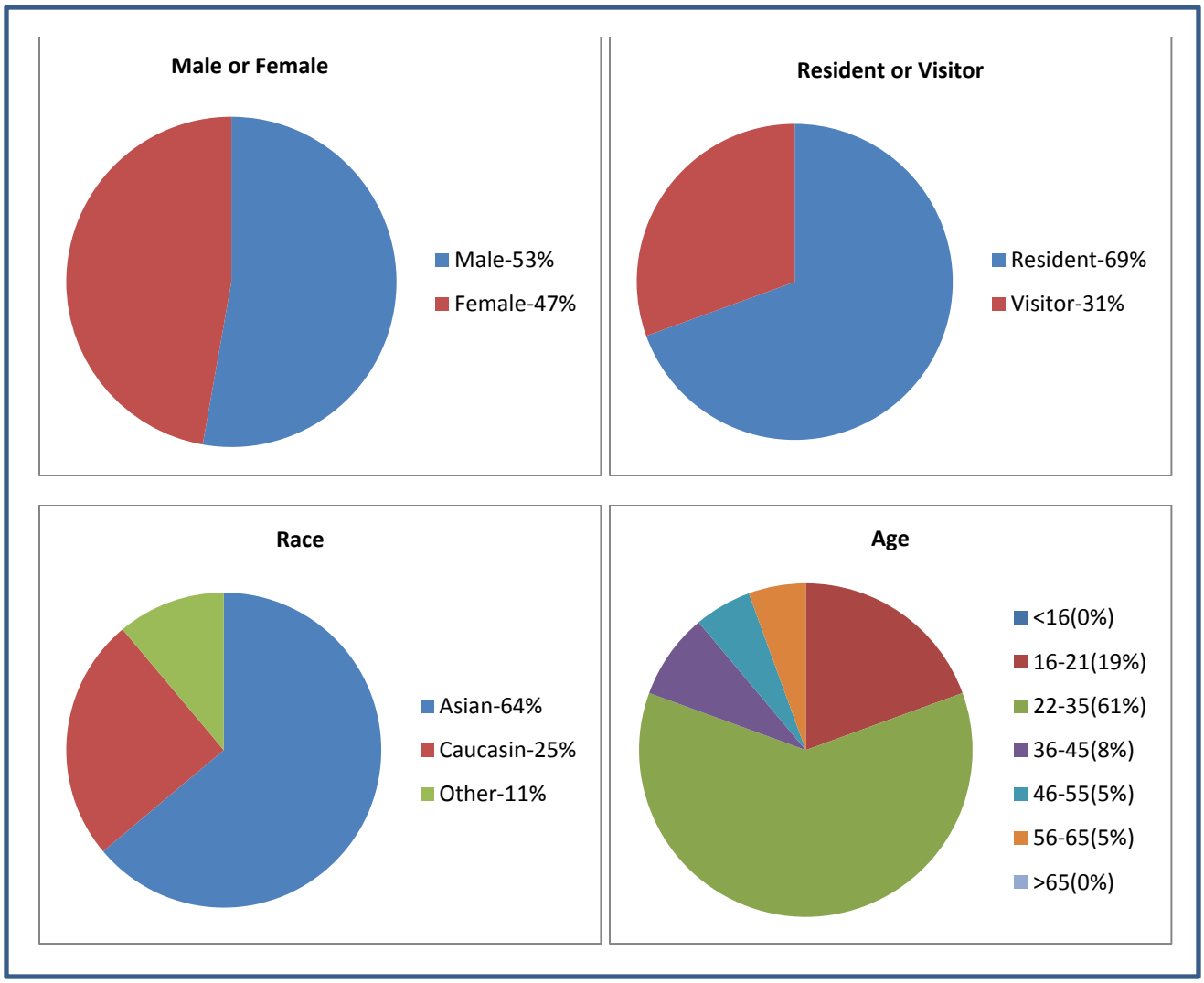


Figure 4.2-1 – Pedestrian Route Selection at Tsim Sha Tsui Harbor Front Survey Demographic Data

The survey sought pedestrians' preferences related to the type of route choice, given a specific route with only two options: the subway under Salisbury Road or a reinstated street-level zebra crossing across Salisbury Road. The first question asked participants to make a normal route choice, excluding weather conditions. Figure 4.2-2 depicts 69%of participants selecting the reinstated zebra crossing.

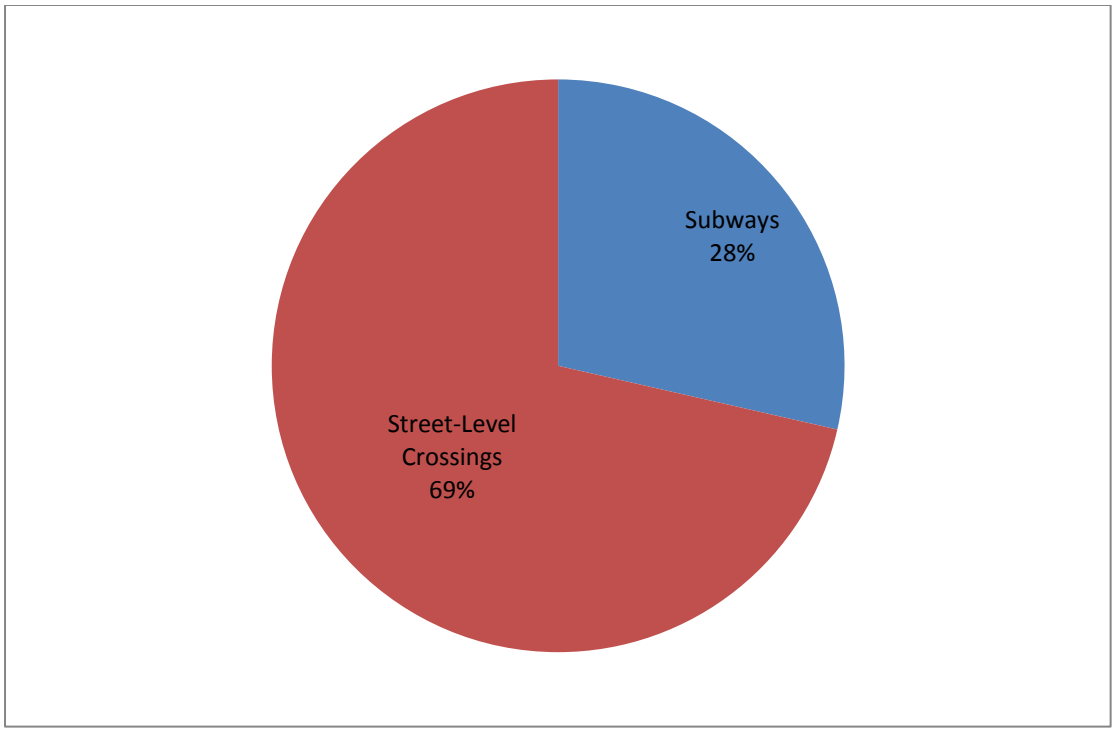


Figure 4.2-2 – Pedestrian Route Selection at Tsim Sha Tsui Harbor Front Survey Route Preference under Normal Conditions

The survey asked for preference dependent on the type of weather condition. The participants' options for selection were: street-level crossings, subways or no preference. Figure 4.2 -3 suggests that weather is not a big factor when selecting route with the exception of a slight preference for subways when the air pollution is bad or it is raining.

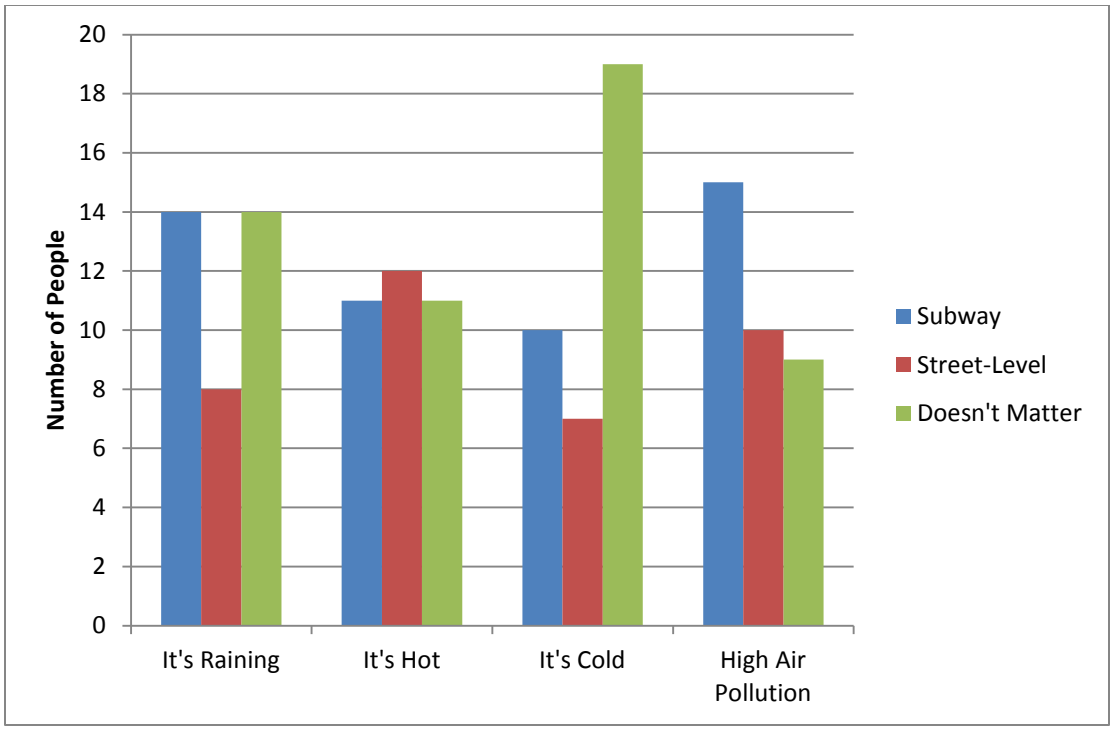


Figure 4.2-3 – Route Preference under Different Weather Conditions

Finally, the survey questioned the participants on the most important factors in their route decisions. Figure4.2-4 indicates the three dominant choices for route decisions were “shortest route”, “ease of way finding”, and “less crowded”.

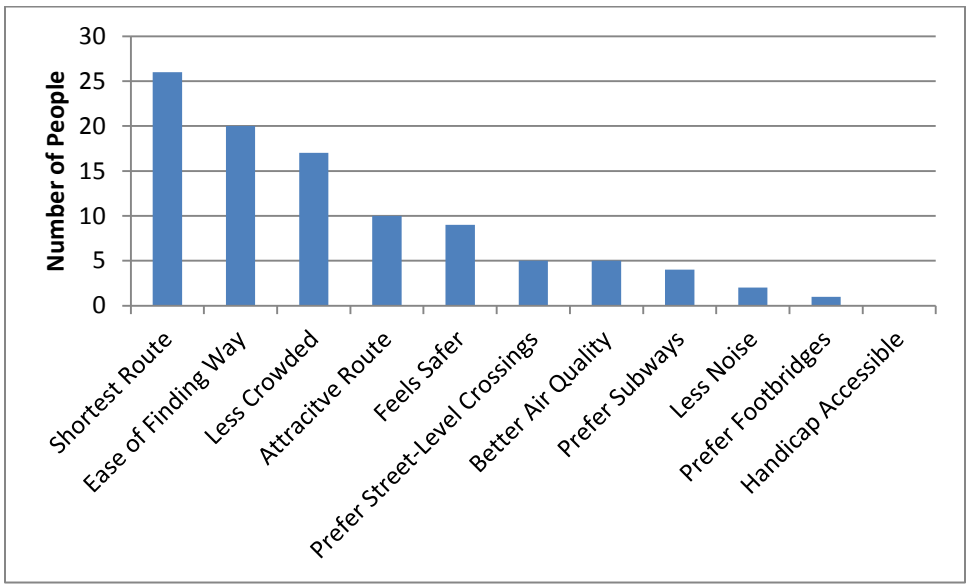


Figure 4.2-4 - Pedestrian Route Selection at Tsim Sha Tsui Harbor Front Survey Most Important Factors in Route Selection

4.3. Pedestrian Perception of Walkability Survey

The WPI team conducted the Pedestrian Perception of Walkability Survey at two connections from hinterland to harbor front. 50 people in Tsim Sha Tsui and 50 people in Wan Chai answered two questions about walkability and three basic demographic questions. The team also noted the race of the participant by appearance. The district in which the survey was conducted was noted for use in the data analysis. The results from the "street survey" in the two districts are detailed in this section.

District Results

As the team gathered 50 surveys from both Tsim Sha Tsui (TST) and Wan Chai, the results to the walkability questions were compared. The responses to the question about route preference (question 1) are shown below (Figure 4.3-1). Figure 4.3-2 displays pedestrians route selection reasons (question 2). The following sections use a combination of the two locations for a total 100 responses, yet a district bias should be noted. The difference seen between the two locations is with route selection during rain. Figure 4.3-3 shows that, in Wan Chai, more pedestrians preferred footbridges when it was raining than those surveyed in TST, while, in TST, more pedestrians preferred subways when it was raining than those in Wan Chai. This difference may be explained by the infrastructure in each district. Wan Chai is predominantly connected by footbridges while TST is almost entirely connected through the subway system. Therefore, pedestrians from Wan Chai may be more likely to select footbridges because of their familiarity with them and the opposite may be true for TST. This data indicates that the perception walkability is different between districts. Based on this, to properly measure walkability a wide range of aspects must be taken into consideration.

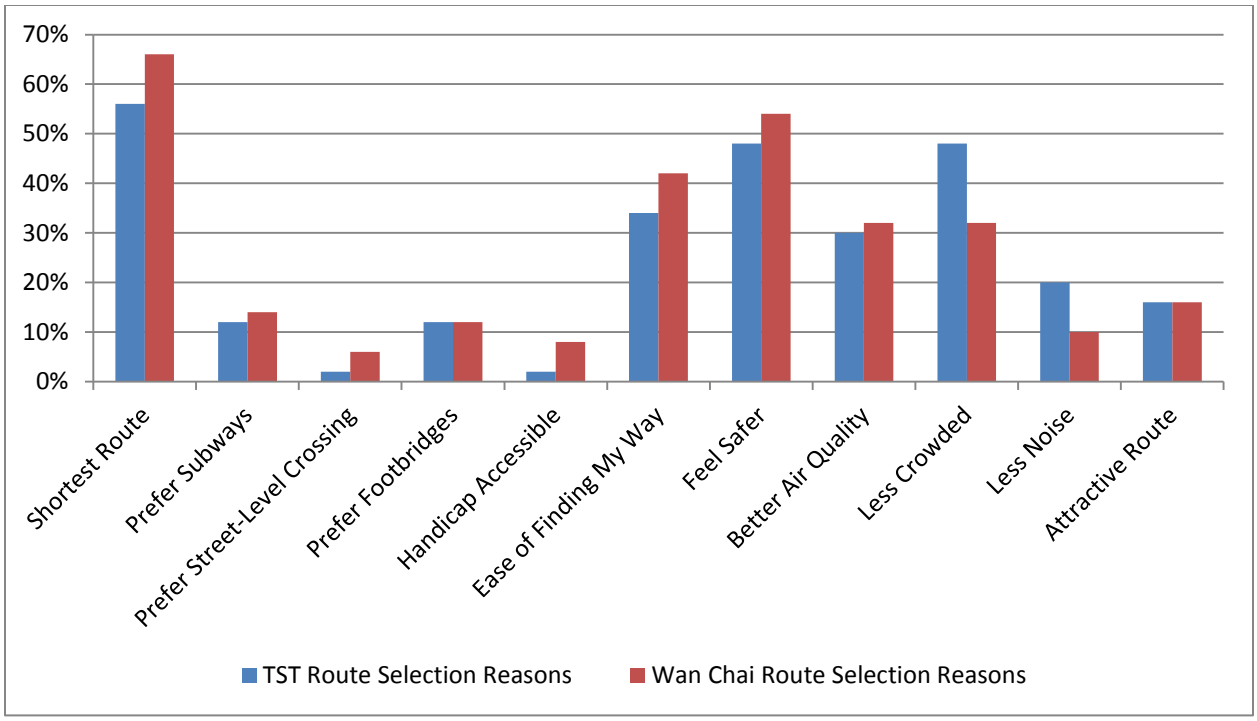


Figure 4.3-1 – Street Survey Correlation between District and Route Selection Reasons

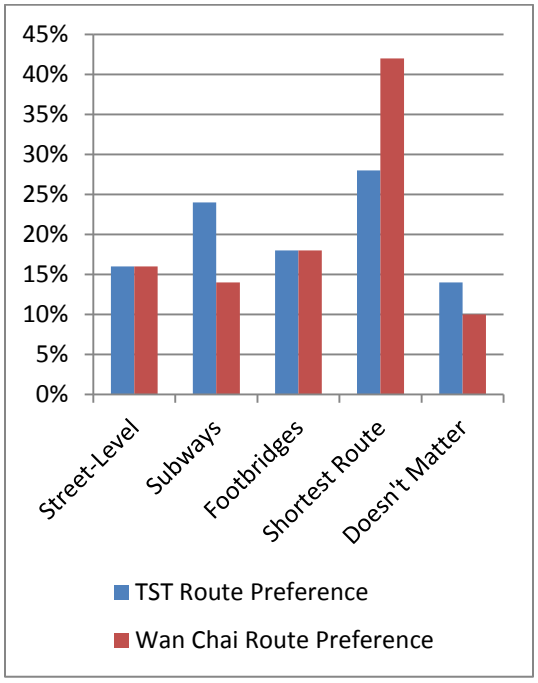


Figure 4.3-2 – Street Survey Correlation between District and Route Selection Reasons

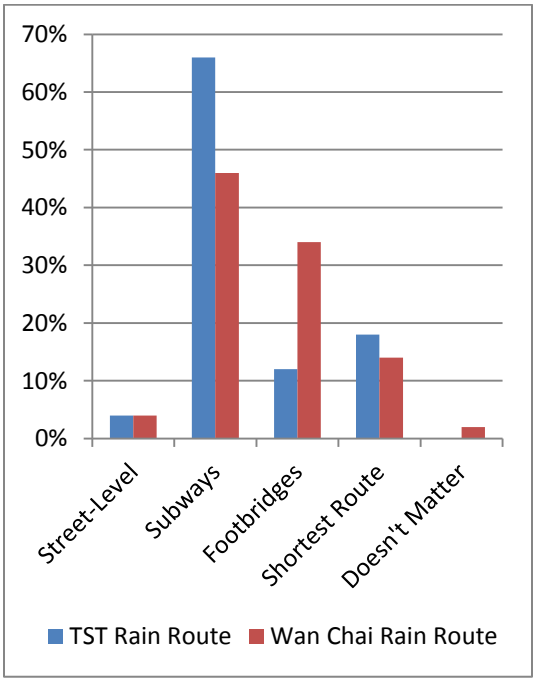


Figure 4.3-3 – Street Survey Correlation between District and Route Selection Reasons under Rain

Demographic Results

Figure 4.3-4 shows the results of the demographic data including race, age, gender and residency. The gender is split into Asian, Caucasian, and other. Due to a limited sample size, races such as Indian, African, and anything that we were unsure of was put in the "other" category. The majority of the respondents (74%) were residents and male (70%). The age group responses were more distributed, and the dominant age group (22-35 years) is the same as the preliminary survey. This suggests the age of the predominant walkers near Victoria Harbour. This also could indicate that people in the 22-35 years age group are more willing to answer surveys.

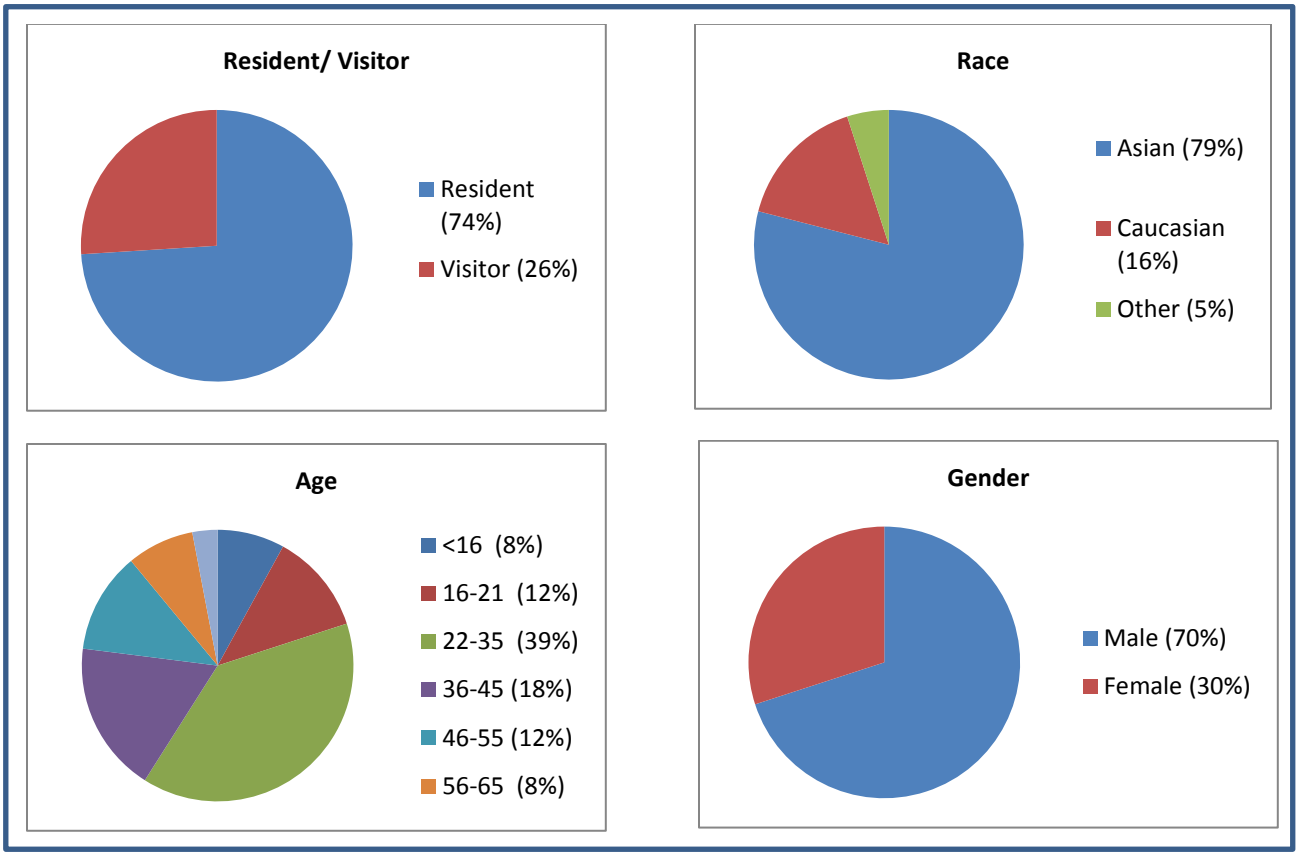


Figure 4.3-4 - Street Survey Demographic Data

Question 1: Which route do you prefer?

The results from question 1 (route preference excluding weather considerations) are shown in Figure 4.3-5. The top response is shortest route (35%) indicating that pedestrians prefer the shortest route, regardless of the connection type. The data in Figure 4.3-6 indicates that during rain, cold weather, and high air pollution, the most popular route selection is the subways. Throughout all of the different conditions, the choice of shortest route remains the most stable; it also repeatedly ranks either as the most popular choice or the second most popular choice in all conditions except rain. This data suggest that the most important walkability factor for pedestrians in Hong Kong is the shortest route during non-rainy conditions. The data implies that weather does impact pedestrian's route choices.

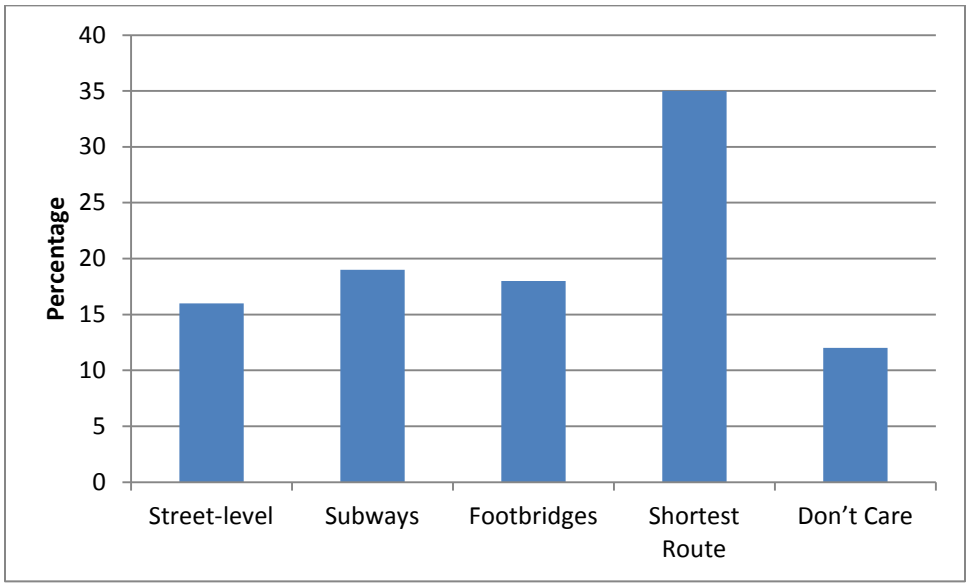


Figure 4.3-5 – Street Survey Answers for Route Preference (Weather Excluded)

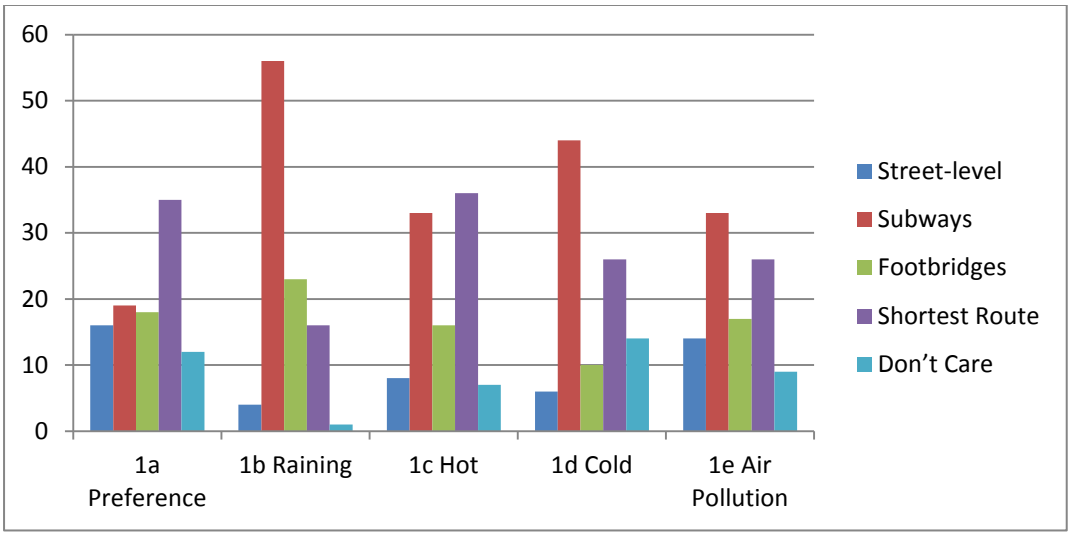


Figure 4.3-6 - Street Survey Answers To Question 1

Question 2: Circle the three most important factors in making your route choice.

Pedestrian route selection reasons are displayed in Figure 4.3-7. The data suggests that the three most important factors for route selection in Hong Kong are "shortest route" (61%), "feels safer" (51%) and "less crowded" (40%). The other two factors that ranked in the second strata of choices are "ease of finding my way" at 38% and "better air quality" at 31%. This indicates that these factors play a role in pedestrian route selection.

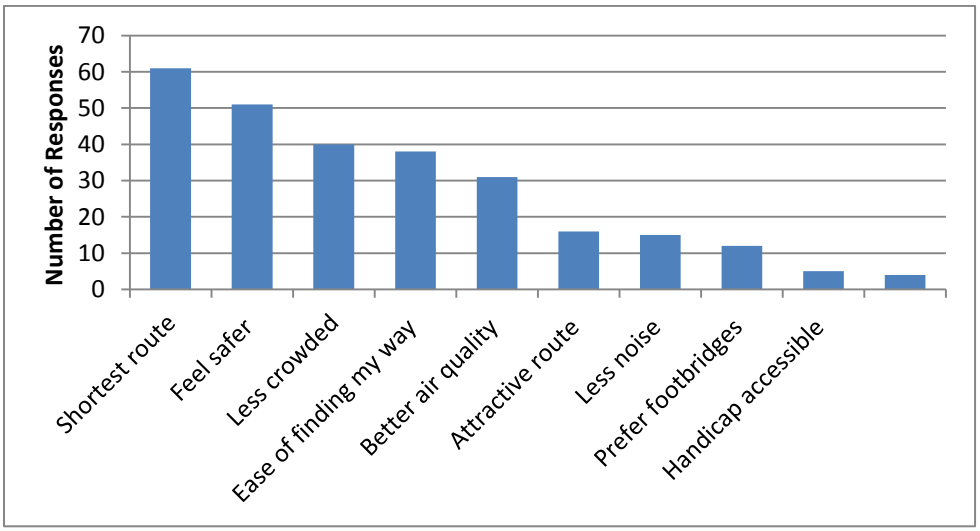


Figure 4.3-7 –Street Survey Route Selection Factors

Walkability Question (Question 1&2) Correlations

Figures 4.3-8 and 4.3-9 correlate 'feels safer" and "less crowded" with the respondent's route preference without regard to weather(from Question 2). The two pie charts show that the majority of the pedestrians still chose shortest route as their route preference, even when selecting feels safer or less crowded.

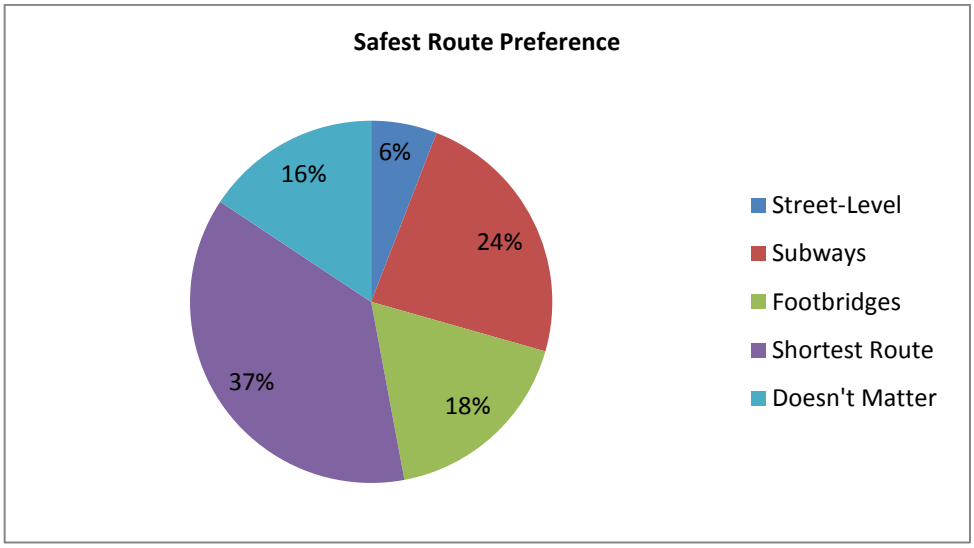


Figure 4.3-8 - Street Survey Correlation between Safest Route and Route Preference

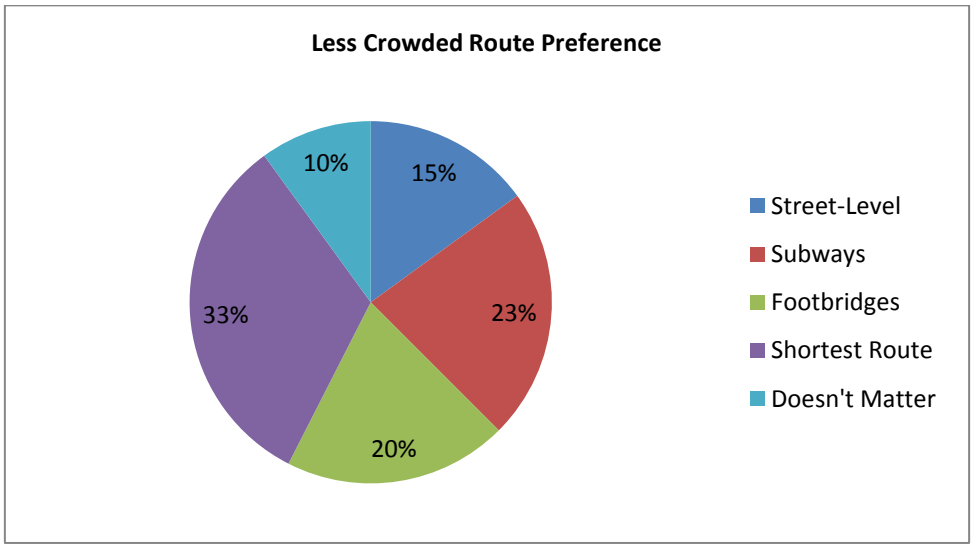


Figure 4.3-9 –Street Survey Correlation between Less Crowded Route and Route Preference

Walkability Questions Correlated With Demographics

The walkability questions about route preferences and reasons behind them were correlated with the demographic responses. Due to a limited sampling size (100 people), the data only suggests possible trends and areas that need follow up research.

When comparing the residents' route preferences to that of visitors there is only a slight difference in most choices. This suggests that for the most part, residents and visitors perceive walkability in Hong Kong similarly. 65% of visitors ranked "ease of finding my way" as one of their top route selection reasons compared to the 28% of residents. Visitors also placed a higher emphasis on both shortest route in general and subways when it is hot outside. However, 31% of residents choose shortest route as their preference during times of high air pollution compared to the 16% of visitors. Residents also selected less crowded as a top factor (47%) where it ranked fifth in visitors top choices (19%).

Hong Kong has a male to female ratio of .95/1 (CIA World Fact Book, 2010). However, for our survey we received responses from 70 males and 30 females. Analysis of these results indicates that men and women have similar route preferences and reasons for selecting them. The male responses indicated that weather had less of an impact on their route selections. In addition, the data suggests that males are more concerned with the shortest route and females with crowds. Though the results are limited, they indicate that gender may have a slight influence on the perception of walkability in Hong Kong.

The team noted the race of the individuals as they were filling out the surveys. The data was broken down into three main groups, Asian, Caucasian and other. Some of the data suggests that perception of walkability may be a function of race. This is indicated by the fact that the Caucasians surveyed preferred "ease of finding my way" and "air quality", while the Asians surveyed preferred "feel

safer" and "less crowded". To determine if walkability is a function of race, a larger more thorough survey needs to be completed.

The route preference survey was conducted to familiarize the team with the pedestrian's perceptions of walkability in Hong Kong, along with developing our final set of criteria. Including weathered paths in the final criteria was reinforced by the results indicating bad weather; specifically that rain affects pedestrian's route selections. The determination of the directness of a route was added to the WAT system because the top reason pedestrians selected their route was how short it was. The measurement of quality of route, stemmed from the importance of "ease of way finding" to pedestrians. In addition "feel safer" was echoed in our measurement of parking garages. It also influenced several recommendations, especially those dealing with modal conflicts. The survey was conducted only for the team to gain a basic understanding of Hong Kong's pedestrian's perceptions of walkability. The results of the survey did have an impact on the final criteria, WAT, and the recommendations generated.

4.4. In-depth District Analysis

The WPI research team completed in-depth walkability evaluations to determine the walkability of 16 routes, four routes in each of the four districts, Tsim Sha Tsui, Yau Ma Tei, Wan Chai and Sai Ying Pun, selected by the preliminary analysis. These evaluations were conducted using the Hong Kong Route Walkability Analysis Tool (WAT), which consists of the rubrics and the focus areas for each route, as described in the Methodology. All the routes began at points of interest and followed (perceived) popular routes from the hinterland to the harbor front. A reasonable effort was made to equally space the four starting points within each of the four districts. The 16 walking maps show the route and record all of the rubric criteria and their locations in the rubrics to aid in making the recommendations. All 16 routes can be seen in table 4.4-1. The following sections contain a description

of each route in the four districts detailing the exact route, the walking map, the rubric, and the focus areas.

Table 4.4-1 - Routes by District

District	Yau Ma Tei
	Route 1 - from Tung Chung Street Park to Marine Police Operational Base
	Route 2 - from Langham Place MTR Exit to Long Beach Waterfront
	Route 3 - from Yau Ma Tei MTR Station to Yau Ma Tei Typhoon Shelter
	Route 4 - from Cherry Street Park/ Hoi Fu Estates to Silversea Promenade
District	**Tsim Sha Tsui**
	Route 1 - from Kowloon Park to the Star Ferry Pier
	Route 2 - from MTR Exit C2 to the Symphony of Lights Waterfront
	Route 3 - from Knutsford Terrace to Avenue of Stars
	Route 4 - from Concordia Plaza to East Tsim Sha Tsui Promenade
District	**Wan Chai**
	Route 1 - from Library through Victoria Park to Harbor
	Route 2 - from Times Square to Harbor Front
	Route 3 - from Wan Chai MTR to Expo Center
	Route 4 - from Intersection of Lockhart and Fenwick to Harbor Front
District	**Sai Ying Pun**
	Route 1 - from Western Court Block to End of Hill Road
	Route 2 - from Hollywood Road Park to Fire Street Route
	Route 3 - from King George Park to Sun Yat Sin Park
	Route 4 - from Queens Road and Western Street to End of Fung Mat Road

4.4.1. Yau Ma Tei

On February 7, 2011, three members of the WPI research team walked four routes in Yau Ma Tei to assess the walkability of these routes from hinterland to harbor front. The following descriptions detail the routes and the team's perceptions. The walking maps, rubrics, and results of the data processing, the quantitative measurements, for each route are included below each description.

Route 1: From Tung Chung Street Park to Marine Police Operational Base

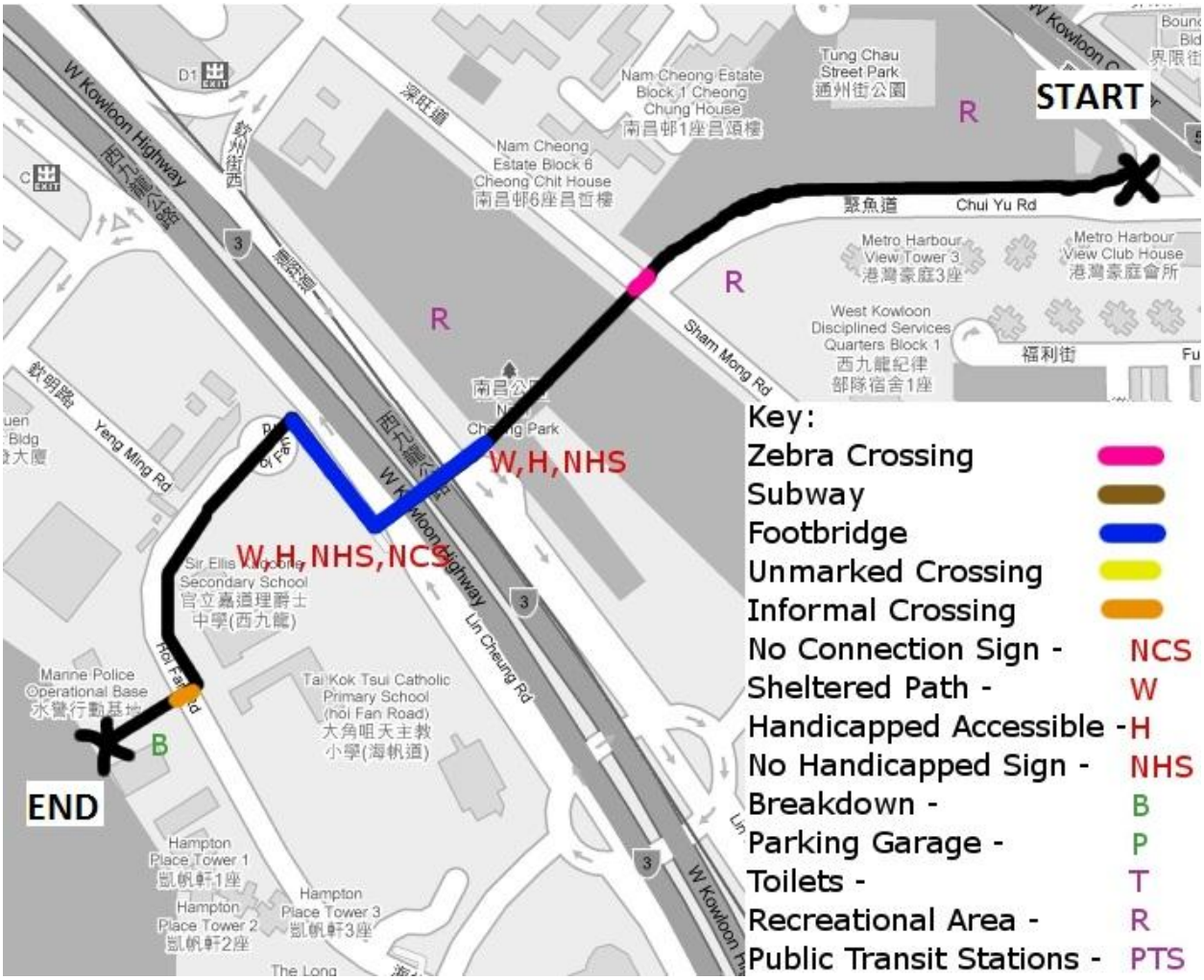


Figure 4.4-1 Route 1 Tung Chung Park to the Marine Police Operational Base Walking Map

This route (shown in Figure 4.4-1) began at the entrance to Tung Chung Street Park on Tai Kok Tsui Road and followed the edge of the park to its end at Sham Mong Road. This walk had a beautiful view of the park on the right but the entire left side of the sidewalk was blocked by a tall metal wall. This wall was permanent and completely obscured any views of the street and the sidewalk on the other side. The far side of Sham Mong Road was completely under construction and the route passed in between sections of the construction into Nam Cheong Park. The park was nicely landscaped and seemed to be used mainly for sitting, walking, and doing Tai Chi by elderly residents. The path led through the park to a footbridge crossing the West Kowloon Highway. The footbridge was very noisy as

it passed over several lanes of traffic. It emerged in an industrial neighborhood with several empty lots and a school. In front of the Marine Police Base there was no crossing in either direction for more than 50 feet; the crossing there was informal. There is no access to the waterfront next to the Marine Police Base. To access the water, the route would have to continue down Hoi Fan Rd. to the Long Beach and go through a seating area to the waterfront promenade.

Table 4.4-2 – Walkability Evaluation Rubric of Route 1 from Tung Chung Street Park to Marine Police Operational Base

District: Sai Ying Pun		Route: Tung Chau Street park to harbour			
Connections					
Zebra	Total	Subways	Total	Footbridges	Total
Tallies:	1	Tallies:	0	Tallies:	1
Unmarked Crossings	Total	Subway Connection Signs	Total	Footbridge Connection Signs	Total
Tallies:	0	Tallies:	0	Tallies:	1
Informal Crossings	Total				
Tallies:	1				
Handicap Accessibility				**Weather**	
Handicap Connections	Total	Signs for Handicap Accessibility	Total	Sheltered Path	Total
Tallies:	1	Tallies:	0	Tallies:	1
Choke Points					
Breakdowns	Total	Parking Garages	Total		
Tallies:	1	Tallies:	0		
Attractions & Amenities					
Parks/ Recreation	Total	Public Transit Stops	Total		Yes/No
Tallies:	3	Tallies:	0	Access To Harbor Front	No
				Access To H.F Promenade	No
	Percentage		Beginning	Middle	End
Quality of Route	70%	Public Toilets	0	0	0
Visual Aesthetics	80%	Signs for Public Toilets	0	0	0
Construction	10%	Seating Area	0	1	0
Directional Signs (H.F & P.T)	0%				

Table 4.4-3 – Focus Areas of Route 1 from Tung Chung Street Park to Marine Police Operational Base

Route Focus Areas	
Metrics Considerations	**Focus Areas**
Connections Crossed	Direct Route
Unmarked Connections	All Street Level Connections Are Marked
Informal Connections	Informal Connection Needs To Be Addressed
Subway Signs	No Subways
Footbridge Signs	Footbridges Are Missing Signs
Handicap Accesibility	All Connections Have Handicap Access
Handicap Signs	Handicap Access Missing Signs
Sheltered Connections	All Footbridges Are Covered
Breakdowns	Breakdowns Need To Be Addressed
Parking Garages	No Parking Garages
Pedestrian Experience	**Focus Areas**
Parks/Recreation	Satisfactory Amount Of Parks/Recreation
Public Tansit Stops	Not Enough Public Transit Stops Along Route
Quality of Route	Quality Of Route Is Satisfactory
Visual Aesthetics	Route Is Aesthetically Pleasing
Construction	Check Safety And Route Obstructions
Directional Signs (HF,PT)	Route Needs Critical Signage Improvements
Harbor Front Access	Needs Harbor Front Access
Harbor Front Promenade	Needs A Harbor Front Promenade
Sitting Areas	Needs More Seating Areas
Promenade Seating	No Promenade
Public Toilets	Not Enough Public Toilets
Public Toliet Signs	No PublicToilet Signs Needed

The Yau Ma Tei Route 1 table suggests that the route needs harbor front access and a promenade. The informal crossing and the breakdown at the end of the route need to be addressed. There is also a need for amenities such as a public transit station and public toilets, and signs for the harbor front, public transit stations, the footbridges and the handicapped accessibility of the footbridge. With the exception of these issues, the route was enjoyable due to the several parks along the route and the directness of the route.

Route2: From Langham Place MTR Exit to Long Beach Waterfront

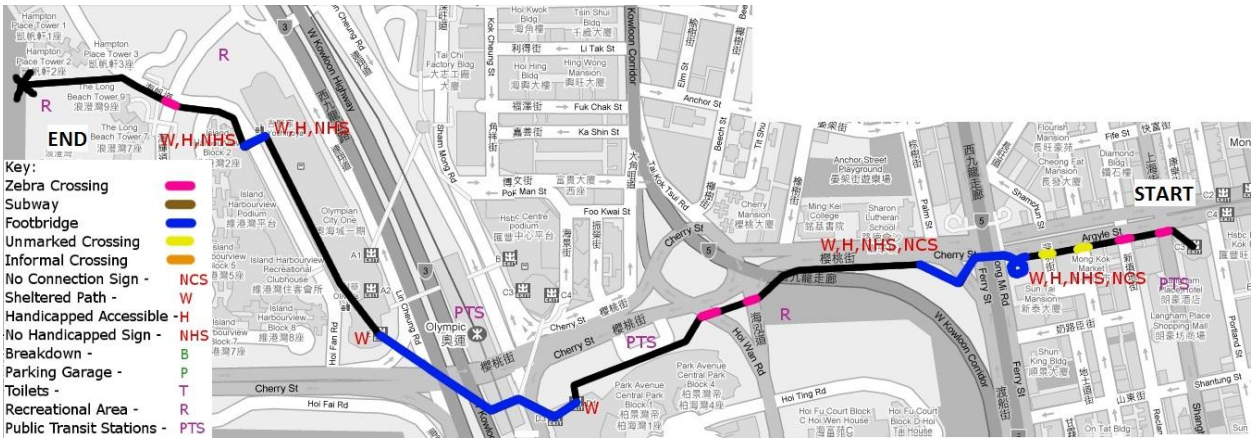


Figure 4.4-2 Route 2 Langham Place/Mong Kok MTR to Long Beach Waterfront Walking Map

This route (shown in Figure 4.4-2) started at exit C3 of Mong Kok Station, exiting through Langham Place. The beginning of the route along Argyle Street was very crowded with pedestrians shopping at the open-air markets. The team then crossed Tong Mi Road via a footbridge. There was an option to follow another footbridge through The Heritage to Olympian City II but, as this was through private property, the team went down the footbridge on the other side of the street. The route then led past Cherry Street Park and across Hoi Wan Road. It continued across a pavilion in front of Olympian City II and led up a staircase to exit D1 of the Olympic MTR Station. This exit was not handicapped accessible. From there, the route led out of the mall across a footbridge and into the station briefly before exiting through exit E. This leads across a footbridge to Olympian City I. The malls have many places to eat and shop and were crowded with people. The path then exits the mall across a footbridge to the other side of Hoi Fan Road. It leads across a zebra crossing on Hoi Fai Road, which is located directly below a footbridge. Most people seemed to use the zebra crossing instead of the footbridge. The route ends at the Long Beach waterfront promenade, a nice, but short, promenade with a seating area and greenery.

Table 4.4-4 Walkability Evaluation Rubric of Route 2 from Langham Place MTR Exit to Long Beach Waterfront

District: Yau Ma Tei		Route: Mong Kok MTR/Langham to Harbor			
Connections					
Zebra	Total	Subways	Total	Footbridges	Total
Tallies:	5	Tallies:	0	Tallies:	4
Unmarked Crossings	Total	Subway Connection Signs	Total	Footbridge Connection Signs	Total
Tallies:	2	Tallies:	0	Tallies:	5
Informal Crossings	Total				
Tallies:	0				
Handicap Accessibility				**Weather**	
Handicap Connections	Total	Signs for Handicap Accessibility	Total	Sheltered Path	Total
Tallies:	3	Tallies:	0	Tallies:	4
Choke Points					
Breakdowns	Total	Parking Garages	Total		
Tallies:	0	Tallies:	1		
Attractions & Amenities					
Parks/ Recreation	Total	Public Transit Stops	Total		Yes/No
Tallies:	4	Tallies:	3	Access To Harbor Front	Yes
				Access To H.F Promenade	Yes
	Percentage		Beginning	Middle	End
Quality of Route	90%	Public Toilets	0	1	0
Visual Aesthetics	90%	Signs for Public Toilets	0	1	0
Construction	0%	Seating Area	1	0	1
Directional Signs (H.F & P.T)	50%				

Table 4.4-5 – Focus Areas of Route 2 from Langham Place MTR Exit to Long Beach Waterfront

Metrics Considerations	Focus Areas
Connections Crossed	Directness Of Route Is Satisfactory
Unmarked Connections	Amount Of Unmarked Connections Is Satisfactory
Informal Connections	No Informal Crossings
Subway Signs	No Subways
Footbridge Signs	Footbridges Are Missing Signs
Handicap Accesibility	Connections Missing Handicap Accessibility
Handicap Signs	Handicap Access Missing Signs
Sheltered Connections	All Footbridges Are Covered
Breakdowns	No Breakdowns
Parking Garages	Check Pedestrian Safety
Pedestrian Experience	**Focus Areas**
Parks/Recreation	Not Enough Parks/Recreation
Public Tansit Stops	Not Enough Public Transit Stops Along Route
Quality of Route	Quality Of Route Is Excellent
Visual Aesthetics	Route Is Aesthetically Pleasing
Construction	No Construction
Directional Signs (HF,PT)	Route Needs Critical Signage Improvements
Harbor Front Access	Satisfactory Harbor Front Access
Harbor Front Promenade	Satisfactory Harbor Front Promenade
Sitting Areas	Needs More Seating Areas
Promenade Seating	Satisfactory Amount Of Promenade Seating
Public Toilets	Not Enough Public Toilets
Public Toliet Signs	Proper Amount Of Public Toilet Signs

The Yau Ma Tei Route 2 table suggests that the route needs handicapped access on one of the footbridges and the footbridges all need signs for both their location and whether they are handicapped or not. There is also a need for amenities such as public toilets, more public transit stations and more sitting areas. Despite these issues, the promenade was enjoyable and the route was in excellent condition.

Route 3: From Yau Ma Tei MTR Station to Yau Ma Tei Typhoon Shelter

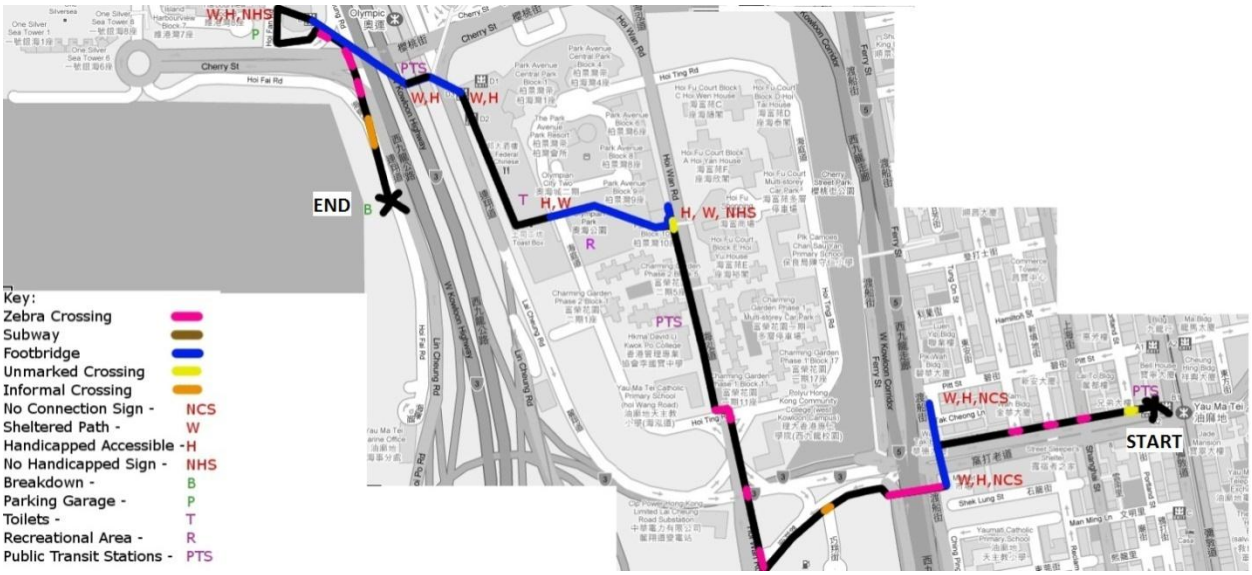


Figure 4.4-3 Route 3 Yau Ma Tei MTR Station to Yau Ma Tei Typhoon Shelter Walking Map

At 1.44 miles, this route (shown in Figure 4.4-3) is by far the longest route walked in the in-depth study. It starts at the Yau Ma Tei MTR exit B2 and continues down Waterloo Rd. to Ferry St., where it crosses the footbridge to the other side of Waterloo Road and crosses Ferry Street via a very long, segmented zebra crossing. Under the West Kowloon Corridor, many homeless people's piles of belongings can be seen and the area is very dirty. The route then continues to Hoi Wan Rd. where it heads north across several zebra crossings. This area is mainly residential and commercial. The team climbed up a footbridge to Olympian Park, a small but enjoyable park with seating and a playground located on the roof of the Park Avenue Housing Blocks. The route then leads through the Olympian City II mall where there are shops and restaurants before entering the Olympic MTR Station through exit D3. From there, the route led out of the mall, across a footbridge, and into the station briefly before exiting through exit E, which leads across a footbridge to Olympian City I. The route then exits the mall and takes a left onto Cherry St. before crossing three unmarked crosswalks and an informal one to reach the harbor front. Though the waterfront is not accessible here due to a rusty chain-link fence, people clearly use it, shown by a large hole made in the fence.

Table 4.4-6 Walking Evaluation Rubric of Route 3 from Yau Ma Tei MTR Station to Yau Ma Tei Typhoon Shelter

District: Yau Ma Tei		Route: Yau Ma Tei MTR to harbor Front			
Connections					
Zebra	Total	Subways	Total	Footbridges	Total
Tallies:	8	Tallies:	0	Tallies:	4
Unmarked Crossings	Total	Subway Connection Signs	Total	Footbridge Connection Signs	Total
Tallies:	5	Tallies:	0	Tallies:	2
Informal Crossings	Total				
Tallies:	1				
Handicap Accessibility				**Weather**	
Handicap Connections	Total	Signs for Handicap Accessibility	Total	Sheltered Path	Total
Tallies:	4	Tallies:	6	Tallies:	4
Choke Points					
Breakdowns	Total	Parking Garages	Total		
Tallies:	1	Tallies:	1		
Attractions & Amenities					
Parks/ Recreation	Total	Public Transit Stops	Total		Yes/No
Tallies:	2	Tallies:	3	Access To Harbor Front	Yes
				Access To H.F Promenade	No
	Percentage		Beginning	Middle	End
Quality of Route	70%	Public Toilets	0	1	0
Visual Aesthetics	60%	Signs for Public Toilets	0	1	0
Construction	0%	Seating Area	1	2	0
Directional Signs (H.F & P.T)	50%				

Table 4.4-7 Focus Areas of Route 3 from Yau Ma Tei MTR Station to Yau Ma Tei Typhoon Shelter

Metrics Considerations	Focus Areas
Connections Crossed	Directness Of Route Is Unsatisfactory
Unmarked Connections	Amount Of Unmarked Connections Is Satisfactory
Informal Connections	Informal Connection Needs To Be Addressed
Subway Signs	No Subways
Footbridge Signs	Footbridges Are Missing Signs
Handicap Accesibility	All Connections Have Handicap Access
Handicap Signs	Handicap Access Missing Signs
Sheltered Connections	All Footbridges Are Covered
Breakdowns	Breakdowns Need To Be Addressed
Parking Garages	Check Pedestrian Safety
Pedestrian Experience	**Focus Areas**
Parks/Recreation	Not Enough Parks/Recreation
Public Tansit Stops	Not Enough Public Transit Stops Along Route
Quality of Route	Quality Of Route Is Satisfactory
Visual Aesthetics	Visual Aesthetics Are Satisfactory
Construction	No Construction
Directional Signs (HF,PT)	Route Needs Critical Signage Improvements
Harbor Front Access	Satisfactory Harbor Front Access
Harbor Front Promenade	Needs A Harbor Front Promenade
Sitting Areas	Needs More Seating Areas
Promenade Seating	No Promenade
Public Toilets	Not Enough Public Toilets
Public Toliet Signs	Proper Amount Of Public Toilet Signs

The Yau Ma Tei Route 3 table suggests that, most importantly, this route needs to be more direct and that the breakdown and informal crossing at the end of the route need to be addressed. Most of the pedestrian experiences also need improvement. Overall, this route needs improvement in all areas of the rubric.

Route 4: From Cherry Street Park/ Hoi Fu Estates to Silversea Promenade

Figure 4.4-4 Route 4 Cherry Street Park to Silversea Promenade Walking Map

The route (shown in Figure 4.4-4) led from Hoi Fu Estates, a housing complex in the southern section of Yau Ma Tei, through the Hoi Fu Shopping Centre and across the footbridge to Olympian Park. It then leads through the Olympian City II mall where there are shops and restaurants before entering the Olympic MTR Station through exit D3. From there, the route led out of the mall across a footbridge and into the station briefly before exiting through exit E, which leads across a footbridge to Olympian City I. The team then exited the mall and took a right onto Cherry Street where they crossed a footbridge and followed the sidewalk around the rotary. The sidewalk leads to a beautiful but short promenade that is connected to the Long Beach promenade during the day. This route was either inside or covered for the majority of the route.

Table 4.4-8 – Walking Evaluation Rubric of Route 4 from Cherry Street Park/ Hoi Fu Estates to Silversea Promenade

District:Yau Ma Tei		Route:Cherry Street park to Silversea Promenade			
Connections					
Zebra	Total	Subways	Total	Footbridges	Total
Tallies:	0	Tallies:	0	Tallies:	5
Unmarked Crossings	Total	Subway Connection Signs	Total	Footbridge Connection Signs	Total
Tallies:	2	Tallies:	0	Tallies:	6
Informal Crossings	Total				
Tallies:	0				
Handicap Accessibility				**Weather**	
Handicap Connections	Total	Signs for Handicap Accessibility	Total	Sheltered Path	Total
Tallies:	5	Tallies:	0	Tallies:	5
Choke Points					
Breakdowns	Total	Parking Garages	Total		
Tallies:	0	Tallies:	2		
Attractions & Amenities					
Parks/ Recreation	Total	Public Transit Stops	Total		Yes/No
Tallies:	2	Tallies:	1	Access To Harbor Front	Yes
				Access To H.F Promenade	Yes
	Percentage		Beginning	Middle	End
Quality of Route	90%	Public Toilets	0	2	0
Visual Aesthetics	90%	Signs for Public Toilets	0	2	0
Construction	0%	Seating Area	0	0	1
Directional Signs (H.F & P.T)	50%				

Table 4.4-9 - Focus Areas of Route 4 from Cherry Street Park/ Hoi Fu Estates to Silversea Promenade

Metrics Considerations	Focus Areas
Connections Crossed	Directness Of Route Is Satisfactory
Unmarked Connections	Amount Of Unmarked Connections Is Satisfactory
Informal Connections	No Informal Crossings
Subway Signs	No Subways
Footbridge Signs	Footbridges Are Missing Signs
Handicap Accesibility	All Connections Have Handicap Access
Handicap Signs	Handicap Access Missing Signs
Sheltered Connections	All Footbridges Are Covered
Breakdowns	No Breakdowns
Parking Garages	Check Pedestrian Safety
Pedestrian Experience	**Focus Areas**
Parks/Recreation	Not Enough Parks/Recreation
Public Tansit Stops	Not Enough Public Transit Stops Along Route
Quality of Route	Quality Of Route Is Excellent
Visual Aesthetics	Route Is Aesthetically Pleasing
Construction	No Construction
Directional Signs (HF,PT)	Route Needs Critical Signage Improvements
Harbor Front Access	Satisfactory Harbor Front Access
Harbor Front Promenade	Satisfactory Harbor Front Promenade
Sitting Areas	Needs More Seating Areas
Promenade Seating	Satisfactory Amount Of Promenade Seating
Public Toilets	Satisfactory Amount Of Public Toilets
Public Toliet Signs	Proper Amount Of Public Toilet Signs

The Yau Ma Tei Route 4 table suggests that the footbridges on this route need signs for both their location and whether they are handicapped accessible or not. There is also a need for amenities such as more public transit stations and sitting areas as well as signs for the harbor front. Despite these issues, the promenade was pleasant and the route was enjoyable because of the walk through the park and shopping areas. The connections are also satisfactory, with no major issues.

Pedestrian Congestion in Yau Ma Tei

Overall, this district has few direct routes to the waterfront and needs more accessible, developed waterfronts. In addition, signage is needed for everything except public transit stations. The picture below (Figure 4.4-5) shows the pedestrian congestion at lunchtime, around 1:00pm. This picture was taken in the MTR Exit E footbridge that connects Olympian Station to Olympian City I. As three of the four routes pass through this footbridge, it is the main connection between the harbor front and the hinterland in Yau Ma Tei. The congestion at lunchtime is high because this is one of the few connections, forcing people to use it rather than spread out.

Figure 4.4-5 - MTR Exit E Footbridge in Yau Ma Tei

4.4.2. Tsim Sha Tsui

On February 10, 2011, three members of the WPI research team walked four routes in Tsim Sha Tsui to assess the walkability of these routes from hinterland to harbor front. The following descriptions detail the routes and the team's perceptions. The walking maps, rubrics, and results of the data processing, the quantitative measurements, for each route are included below each description.

Route 1: From Kowloon Park to the Star Ferry Pier

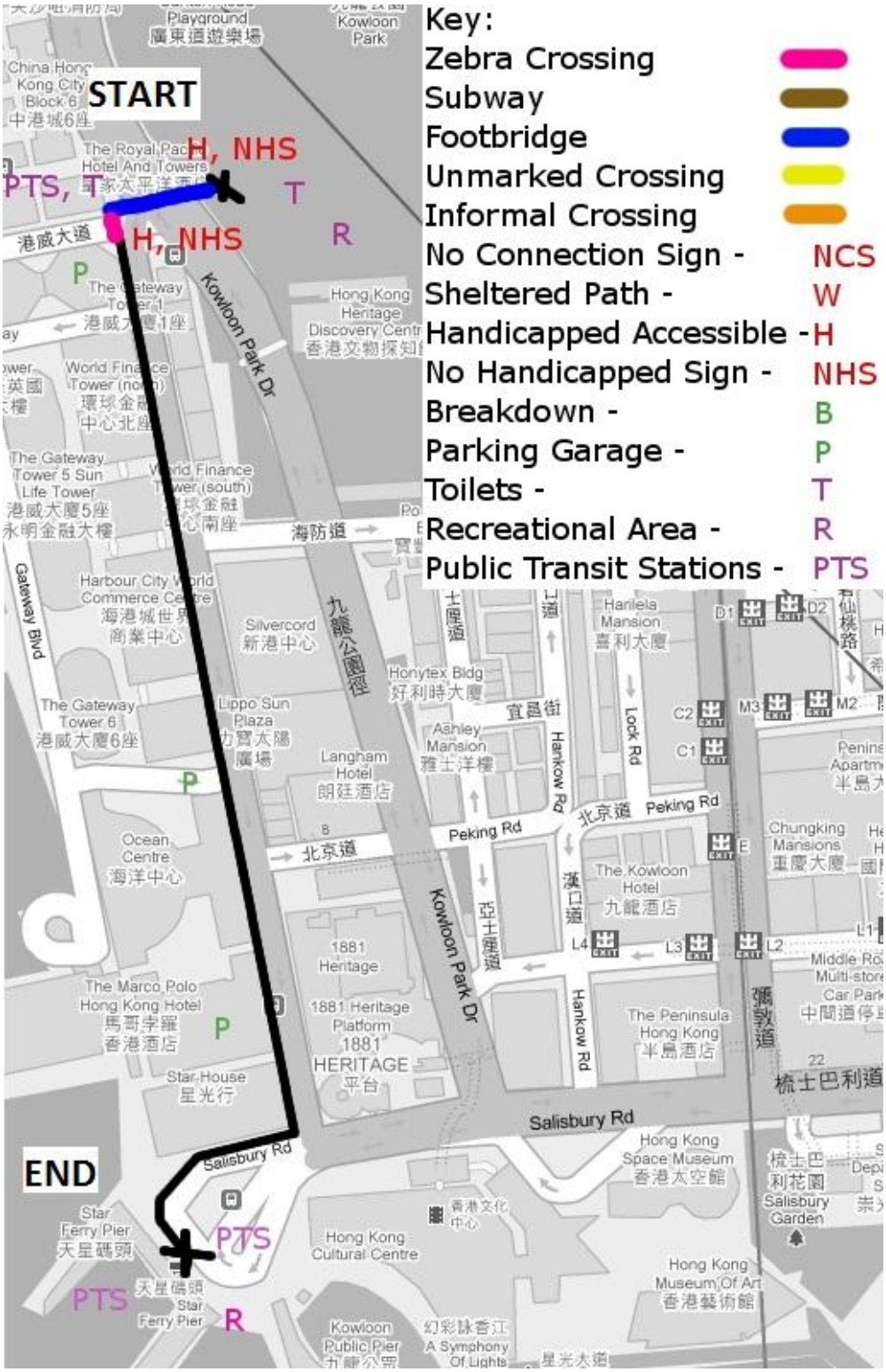


Figure 4.4-6 Route 1 Kowloon Park to Star Ferry Pier Walking Map

This route (shown in Figure 4.4-6) exits Kowloon Park near the flamingos and crosses an uncovered footbridge to the top of the Royal Pacific Hotel building. The path then leads down through the mall and the China Ferry Terminal to the street. This mall has shopping and food within as well as several transportation hubs located close by. After exiting the building, the route continues south on Canton Rd. past many dangerous entrances to construction sites and parking garages. Many of these entrances have guards to stop people from crossing. The view on Canton Road is very pleasing, with high end shops lining the street; however, the sidewalk is often crowded and the vehicles are loud. At the end of Canton Road the route leads right along the sidewalk to the Star Ferry Pier. The Star Ferry Pier is flanked by two stretches of waterfront, one in front of the Ocean Centre and the other in front of the Hong Kong Cultural Centre and the Clock Tower.

Table 4.4-10 Walkability Evaluation Rubric of Route 1 from Kowloon Park to the Star Ferry Pier

District:Tsim Sha Tsui		Route:Kowloon Park to Star Ferry			
Connections					
Zebra	Total	Subways	Total	Footbridges	Total
Tallies:	1	Tallies:	0	Tallies:	1
Unmarked Crossings	Total	Subway Connection Signs	Total	Footbridge Connection Signs	Total
Tallies:	1	Tallies:	0	Tallies:	2
Informal Crossings	Total				
Tallies:	0				
Handicap Accessibility				**Weather**	
Handicap Connections	Total	Signs for Handicap Accessibility	Total	Sheltered Path	Total
Tallies:	1	Tallies:	0	Tallies:	0
Choke Points					
Breakdowns	Total	Parking Garages	Total		
Tallies:	0	Tallies:	3		
Attractions & Amenities					
Parks/ Recreation	Total	Public Transit Stops	Total		Yes/No
Tallies:	2	Tallies:	3	Access To Harbor Front	Yes
				Access To H.F Promenade	Yes
	Percentage		Beginning	Middle	End
Quality of Route	80%	Public Toilets	1	0	0
Visual Aesthetics	90%	Signs for Public Toilets	1	0	0
Construction	0%	Seating Area	1	0	1
Directional Signs (H.F & P.T)	100%				

Table 4.4-11 – Focus Areas of Route 1 from Kowloon Park to the Star Ferry Pier Focus Areas

Metrics Considerations	Focus Areas
Connections Crossed	Directness Of Route Is Satisfactory
Unmarked Connections	Amount Of Unmarked Connections Is Satisfactory
Informal Connections	No Informal Crossings
Subway Signs	No Subways
Footbridge Signs	All Footbridges Have Minimum Proper Signage
Handicap Accesibility	All Connections Have Handicap Access
Handicap Signs	Handicap Access Missing Signs
Sheltered Connections	Footbridges Missing Covers
Breakdowns	No Breakdowns
Parking Garages	Too Many Parking Garages, Look Into Connection Adjustments
Pedestrian Experience	**Focus Areas**
Parks/Recreation	Not Enough Parks/Recreation
Public Tansit Stops	Enough Public Tranist Stops
Quality of Route	Quality Of Route Is Excellent
Visual Aesthetics	Route Is Aesthetically Pleasing
Construction	No Construction
Directional Signs (HF,PT)	Route Signage Is Excellent
Harbor Front Access	Satisfactory Harbor Front Access
Harbor Front Promenade	Satisfactory Harbor Front Promenade
Sitting Areas	Needs More Seating Areas
Promenade Seating	Satisfactory Amount Of Promenade Seating
Public Toilets	Not Enough Public Toilets
Public Toliet Signs	Proper Amount Of Public Toilet Signs

The Tsim Sha Tsui Route 1 table suggests that the route has too many parking garages and the promenade needs seating. The footbridge needs signs that it is handicapped accessible and a cover to protect it from the weather. With the exception of these issues, the route was aesthetically pleasing and direct with excellent signage.

Route 2: From MTR Exit C2 to the Symphony of Lights Waterfront

Figure 4.4-7 Route 2 Tsim Sha Tsui MTR exit C2 to Symphony of Lights Waterfront Walking Map

This route (shown in Figure 4.4-7) leads south down Nathan Road towards the harbor. Both the pedestrian and vehicular traffic on Nathan Road is very loud and busy. Next to the Peninsula Hotel, the route leads down a subway into the SOGO underground mall and exits near Salisbury Garden, a small park with some seating. Though the mall area has shopping and food, it is almost impossible for a first-time visitor to find their way through as the signage is either nonexistent or confusing. From Salisbury Gardens, the route turns right down the promenade towards the Hong Kong Art Museum and the Hong Kong Cultural Centre. This promenade and plaza are very large and beautiful and both are popular with tourists.

Table 4.4-12 – Walkability Evaluation Rubric of Route 2 from MTR Exit C2 to the Symphony of Lights Waterfront

District:Tsim Sha Tsui		Route:Tsim Sha Tsui MTR to Avenue of Stars			
Connections					
Zebra	Total	Subways	Total	Footbridges	Total
Tallies:	1	Tallies:	1	Tallies:	0
Unmarked Crossings	Total	Subway Connection Signs	Total	Footbridge Connection Signs	Total
Tallies:	1	Tallies:	2	Tallies:	0
Informal Crossings	Total				
Tallies:	0				
Handicap Accessibility				**Weather**	
Handicap Connections	Total	Signs for Handicap Accessibility	Total	Sheltered Path	Total
Tallies:	1	Tallies:	2	Tallies:	1
Choke Points					
Breakdowns	Total	Parking Garages	Total		
Tallies:	0	Tallies:	0		
Attractions & Amenities					
Parks/ Recreation	Total	Public Transit Stops	Total		Yes/No
Tallies:	2	Tallies:	2	Access To Harbor Front	Yes
				Access To H.F Promenade	Yes
	Percentage		Beginning	Middle	End
Quality of Route	40%	Public Toilets	0	0	1
Visual Aesthetics	90%	Signs for Public Toilets	0	1	0
Construction	0%	Seating Area	0	0	0
Directional Signs (H.F & P.T)	100%				

Table 4.4-13 – Focus Areas of Route 2 from MTR Exit C2 to the Symphony of Lights Waterfront

Metrics Considerations	Focus Areas
Connections Crossed	Direct Route
Unmarked Connections	Amount Of Unmarked Connections Is Satisfactory
Informal Connections	No Informal Crossings
Subway Signs	All Subways Have Minimum Proper Signage
Footbridge Signs	No Footbridges
Handicap Accesibility	All Connections Have Handicap Access
Handicap Signs	All Handicap Accesses Have Proper Signage
Sheltered Connections	No Footbridges
Breakdowns	No Breakdowns
Parking Garages	No Parking Garages
Pedestrian Experience	**Focus Areas**
Parks/Recreation	Satisfactory Amount Of Parks/Recreation
Public Tansit Stops	Enough Public Tranist Stops
Quality of Route	Quality Of Route Could Use Improvements
Visual Aesthetics	Route Is Aesthetically Pleasing
Construction	No Construction
Directional Signs (HF,PT)	Route Signage Is Excellent
Harbor Front Access	Satisfactory Harbor Front Access
Harbor Front Promenade	Satisfactory Harbor Front Promenade
Sitting Areas	Needs More Seating Areas
Promenade Seating	Needs Seating At Promenade
Public Toilets	Satisfactory Amount Of Public Toilets
Public Toliet Signs	Proper Amount Of Public Toilet Signs

The Tsim Sha Tsui Route 2 table suggests that the quality of the route and the visual aesthetics need to be improved. The number of seating areas and the unmarked crossings could also be improved. Overall, the route had excellent signage and was completely handicapped accessible.

Route 3: From Knutsford Terrace to Avenue of Stars

Figure 4.4-8 Route 3 Knutsford Terrace to Avenue of Stars Promenade Walking Map

This route (shown in Figure 4.4-8) led from Knutsford Terrace, a popular eating destination, south on Chathum Road South crossing several marked and unmarked crosswalks until it reached Salisbury Road. The sidewalk turned at the end of Chathum Road and passed a café seating area and a children's playground. The path then enters the subway through the SOGO underground mall and exits near Salisbury Garden, a small park with some seating. Though the mall area has shopping and food, it is almost impossible for a first-time visitor to find their way through as the signage is either nonexistent or confusing. From Salisbury Gardens, it is easy to find the entrance to the Avenue of Stars, the beginning of a popular promenade always crowded with tourists. This promenade is very pleasant and well-maintained with seating areas and concession stands open at night.

Table 4.4-14 –Walkability Evaluation Rubric of Route 3 from Knutsford Terrace to Avenue of Stars

District:Tsim Sha Tsui		Route: Knutsford Terrace to Avenue of Stars			
Connections					
Zebra	Total	Subways	Total	Footbridges	Total
Tallies:	3	Tallies:	1	Tallies:	0
Unmarked Crossings	Total	Subway Connection Signs	Total	Footbridge Connection Signs	Total
Tallies:	4	Tallies:	2	Tallies:	0
Informal Crossings	Total				
Tallies:	0				
Handicap Accessibility				**Weather**	
Handicap Connections	Total	Signs for Handicap Accessibility	Total	Sheltered Path	Total
Tallies:	1	Tallies:	1	Tallies:	1
Choke Points					
Breakdowns	Total	Parking Garages	Total		
Tallies:	0	Tallies:	0		
Attractions & Amenities					
Parks/ Recreation	Total	Public Transit Stops	Total		Yes/No
Tallies:	3	Tallies:	4	Access To Harbor Front	Yes
				Access To H.F Promenade	Yes
	Percentage		Beginning	Middle	End
Quality of Route	50%	Public Toilets	0	1	1
Visual Aesthetics	60%	Signs for Public Toilets	0	1	0
Construction	30%	Seating Area	0	1	0
Directional Signs (H.F & P.T)	100%				

Table 4.4-15 – Focus Areas of Route 3 from Knutsford Terrace to Avenue of Stars

Metrics Considerations	Focus Areas
Connections Crossed	Direct Route
Unmarked Connections	Amount Of Unmarked Connections Is Unsatisfactory
Informal Connections	No Informal Crossings
Subway Signs	All Subways Have Minimum Proper Signage
Footbridge Signs	No Footbridges
Handicap Accesibility	All Connections Have Handicap Access
Handicap Signs	Handicap Access Missing Signs
Sheltered Connections	No Footbridges
Breakdowns	No Breakdowns
Parking Garages	No Parking Garages
Pedestrian Experience	**Focus Areas**
Parks/Recreation	Not Enough Parks/Recreation
Public Tansit Stops	Enough Public Tranist Stops
Quality of Route	Quality Of Route Could Use Improvements
Visual Aesthetics	Visual Aesthetics Are Satisfactory
Construction	Check Safety And Route Obstructions
Directional Signs (HF,PT)	Route Signage Is Excellent
Harbor Front Access	Satisfactory Harbor Front Access
Harbor Front Promenade	Satisfactory Harbor Front Promenade
Sitting Areas	Needs More Seating Areas
Promenade Seating	Needs Seating At Promenade
Public Toilets	Satisfactory Amount Of Public Toilets
Public Toliet Signs	Missing Public Toilet Signs

The Tsim Sha Tsui Route 3 table suggests that the quality of the route and the number of unmarked crossings need to be improved. The route could also benefit from a public toilet and more parks/ recreational areas. Overall, the route had excellent signage and was completely handicapped accessible.

Route 4: From Concordia Plaza to East Tsim Sha Tsui Promenade

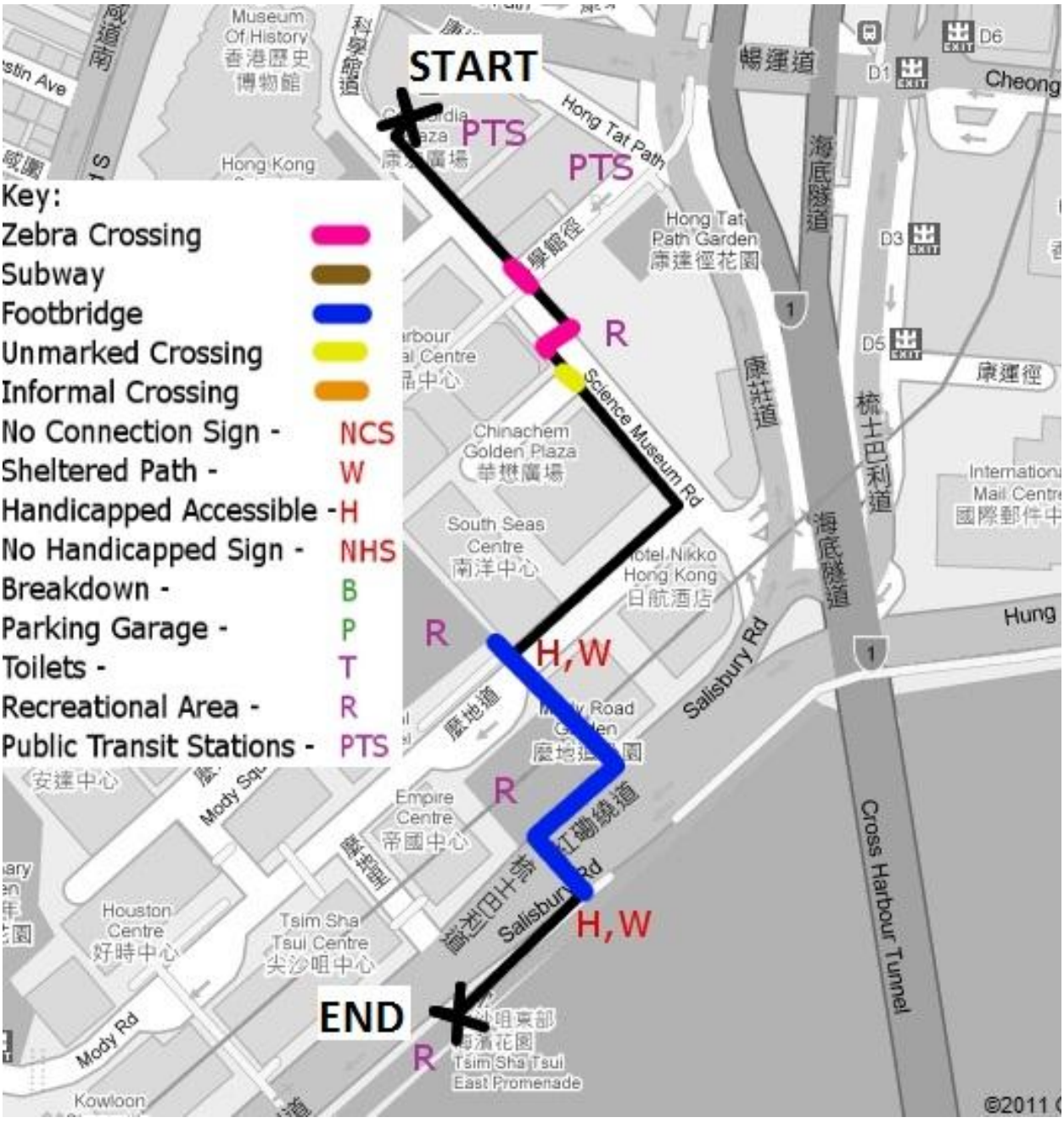


Figure 4.4-9 Route 4 Concordia Plaza to East TST Promenade Walking Map

This route (shown in Figure 4.4-9) starts at the Concordia Plaza, across from the Hong Kong Science Museum, and continues down Science Museum Road towards Victoria Harbour. The unmarked crossing across Science Museum Park was very dangerous; trucks, cars, and taxis were double- and triple-parked across the road and, as there was no zebra crosswalk, the intended pedestrian path. The

route then turns down Mody Road and crosses Mody Road, Mody Road Garden, Salisbury Road and the Hung Hom Bypass. On the other side of the footbridge is the East Tsim Sha Tsui waterfront which is equipped with both smoking and non-smoking seating under well-kept trees overlooking Victoria Harbour.

Table 4.4-16 – Walkability Evaluation Rubric of Route 4 from Concordia Plaza to East Tsim Sha Tsui Promenade

District:Tsim Sha Tsui		Route: Bus Concord/Science Museum to East Tsim Sha Tsui Promenade			
Connections					
Zebra	Total	Subways	Total	Footbridges	Total
Tallies:	2	Tallies:	0	Tallies:	1
Unmarked Crossings	Total	Subway Connection Signs	Total	Footbridge Connection Signs	Total
Tallies:	1	Tallies:	0	Tallies:	2
Informal Crossings	Total				
Tallies:	0				
Handicap Accessibility				**Weather**	
Handicap Connections	Total	Signs for Handicap Accessibility	Total	Sheltered Path	Total
Tallies:	1	Tallies:	2	Tallies:	1
Choke Points					
Breakdowns	Total	Parking Garages	Total		
Tallies:	0	Tallies:	0		
Attractions & Amenities					
Parks/ Recreation	Total	Public Transit Stops	Total		Yes/No
Tallies:	4	Tallies:	2	Access To Harbor Front	Yes
				Access To H.F Promenade	Yes
	Percentage		Beginning	Middle	End
Quality of Route	80%	Public Toilets	0	0	0
Visual Aesthetics	80%	Signs for Public Toilets	0	0	0
Construction	10%	Seating Area	1	0	1
Directional Signs (H.F & P.T)	100%				

Table 4.4-17 – Focus Areas of Route 4 from Concordia Plaza to East Tsim Sha Tsui Promenade

Metrics Considerations	Focus Areas
Connections Crossed	Directness Of Route Is Unsatisfactory
Unmarked Connections	Amount Of Unmarked Connections Is Satisfactory
Informal Connections	No Informal Crossings
Subway Signs	No Subways
Footbridge Signs	All Footbridges Have Minimum Proper Signage
Handicap Accesibility	All Connections Have Handicap Access
Handicap Signs	All Handicap Accesses Have Proper Signage
Sheltered Connections	All Footbridges Are Covered
Breakdowns	No Breakdowns
Parking Garages	No Parking Garages
Pedestrian Experience	**Focus Areas**
Parks/Recreation	Satisfactory Amount Of Parks/Recreation
Public Tansit Stops	Enough Public Tranist Stops
Quality of Route	Quality Of Route Is Excellent
Visual Aesthetics	Route Is Aesthetically Pleasing
Construction	Check Safety And Route Obstructions
Directional Signs (HF,PT)	Route Signage Is Excellent
Harbor Front Access	Satisfactory Harbor Front Access
Harbor Front Promenade	Satisfactory Harbor Front Promenade
Sitting Areas	Satisfactory Amount Of Seating Areas
Promenade Seating	Satisfactory Amount Of Promenade Seating
Public Toilets	Not Enough Public Toilets
Public Toliet Signs	No PublicToilet Signs Needed

The Tsim Sha Tsui Route 4 table suggests that the route is not direct enough and the promenade needs seating. The footbridge needs signs that it is handicapped accessible, a cover to protect it from the weather, and signs indicating its location. With the exception of these issues, the route was aesthetically pleasing and ended in a beautiful promenade.

Pedestrian Congestion in Tsim Sha Tsui

Overall, this district has too many modal conflicts such as parking garages and unmarked crosswalks. In addition, the quality of the route generally needs to be improved. The picture below (Figure 4.4-10) shows the pedestrian congestion at lunchtime, around 1:00pm. This picture was taken at the zebra crossing across Canton Road at the corner of Canton Road and Salisbury Road. As this is on the route from the exit to the MTR subways and the waterfront, it is one of the main connections between the harbor front and the hinterland in Tsim Sha Tsui. The congestion at lunchtime is high because this is a very high traffic district that is always crowded with pedestrians, busses and cars.

Figure 4.4-10 - Zebra Crossing at the End of Canton Road

4.4.3. Wan Chai

On February 9, 2011, the four members of the WPI research team walked four routes in Wan Chai to assess the walkability of these routes from hinterland to harbor front. The following descriptions detail the routes and the team's perceptions. The walking maps, rubrics, and results of the data processing, the quantitative measurements, for each route are included below each description.

Route 1: From Hong Kong Central Library through Victoria Park to Harbor Front

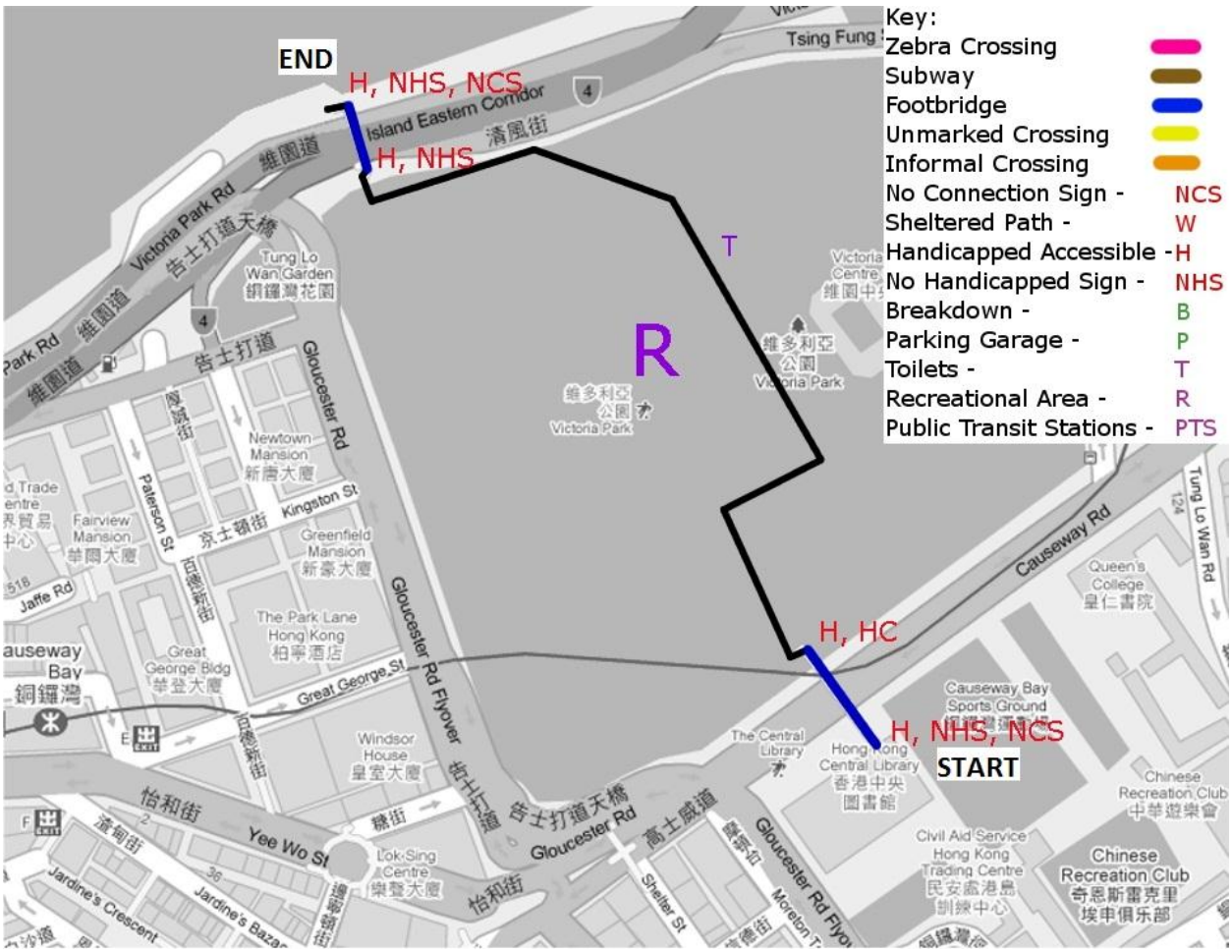


Figure 4.4-11 Route 1 Central Library through Victoria Park to Harbor Front Walking Map

This route (shown in Figure 4.4-11) was a very leisurely walk. It started at the Hong Kong Central Library, above grade, on the pavilion connected to the library. The team walked across the footbridge and into the park. There was not a straight path through the park; instead the path meandered slightly.

There were many signs throughout the park that helped with navigation. The park was full of people but the park paths were sufficient to handle all of them without being crowded. The team took the footbridge located in the northwest region of the park. The uncovered footbridge was handicapped accessible but lacked signage that told pedestrians where the elevator was located. Across the footbridge was a promenade that over looked a marine of yachts and sailboats. The promenade only contained a few seating areas and potted plants. Overall, the walk was short, well connected, and provided interesting visual aesthetics for anyone walking to and from the harbor front. The walking map, depicted above in Figure 4.4-10, shows the route with all of the rubric criteria and their locations.

Table 4.4-18 – Walkability Evaluation Rubric of Route 1 from Library through Victoria Park to Harbor

District:Wan Chai		Route: Hong Kong Central Library to Harbor through Victoria Park			
Connections					
Zebra	Total	Subways	Total	Footbridges	Total
Tallies:	0	Tallies:	0	Tallies:	2
Unmarked Crossings	Total	Subway Connection Signs	Total	Footbridge Connection Signs	Total
Tallies:	0	Tallies:	0	Tallies:	2
Informal Crossings	Total				
Tallies:	0				
Handicap Accessibility				**Weather**	
Handicap Connections	Total	Signs for Handicap Accessibility	Total	Sheltered Path	Total
Tallies:	2	Tallies:	0	Tallies:	2
Choke Points					
Breakdowns	Total	Parking Garages	Total		
Tallies:	0	Tallies:	0		
Attractions & Amenities					
Parks/ Recreation	Total	Public Transit Stops	Total		Yes/No
Tallies:	1	Tallies:	0	Access To Harbor Front	Yes
				Access To H.F Promenade	Yes
	Percentage		Beginning	Middle	End
Quality of Route	100%	Public Toilets	0	1	0
Visual Aesthetics	90%	Signs for Public Toilets	0	1	0
Construction	0%	Seating Area	2	2	1
Directional Signs (H.F & P.T)	60%				

Table 4.4-19 – Focus Areas of Route 1 from the Library through Victoria Park to Harbor

Metrics Considerations	Focus Areas
Connections Crossed	Direct Route
Unmarked Connections	All Street Level Connections Are Marked
Informal Connections	No Informal Crossings
Subway Signs	No Subways
Footbridge Signs	Footbridges Are Missing Signs
Handicap Accesibility	All Connections Have Handicap Access
Handicap Signs	Handicap Access Missing Signs
Sheltered Connections	All Footbridges Are Covered
Breakdowns	No Breakdowns
Parking Garages	No Parking Garages
Pedestrian Experience	**Focus Areas**
Parks/Recreation	Not Enough Parks/Recreation
Public Tansit Stops	Not Enough Public Transit Stops Along Route
Quality of Route	Quality Of Route Is Excellent
Visual Aesthetics	Route Is Aesthetically Pleasing
Construction	No Construction
Directional Signs (HF,PT)	Route Signage Is Satisfactory
Harbor Front Access	Satisfactory Harbor Front Access
Harbor Front Promenade	Satisfactory Harbor Front Promenade
Sitting Areas	Satisfactory Amount Of Seating Areas
Promenade Seating	Satisfactory Amount Of Promenade Seating
Public Toilets	Not Enough Public Toilets
Public Toliet Signs	Proper Amount Of Public Toilet Signs

The Wan Chai Route 1 table suggests that the route is fairly well connected and has handicap access for anyone who may need it. The quality of the route is excellent and visually pleasing. However, this route could use more signage for footbridges and handicap access. To improve the pedestrian experience more parks and recreation areas, public transit stops, public toilets, and seating areas are needed.

Route 2: From Times Square Shopping Area to Harbor Front

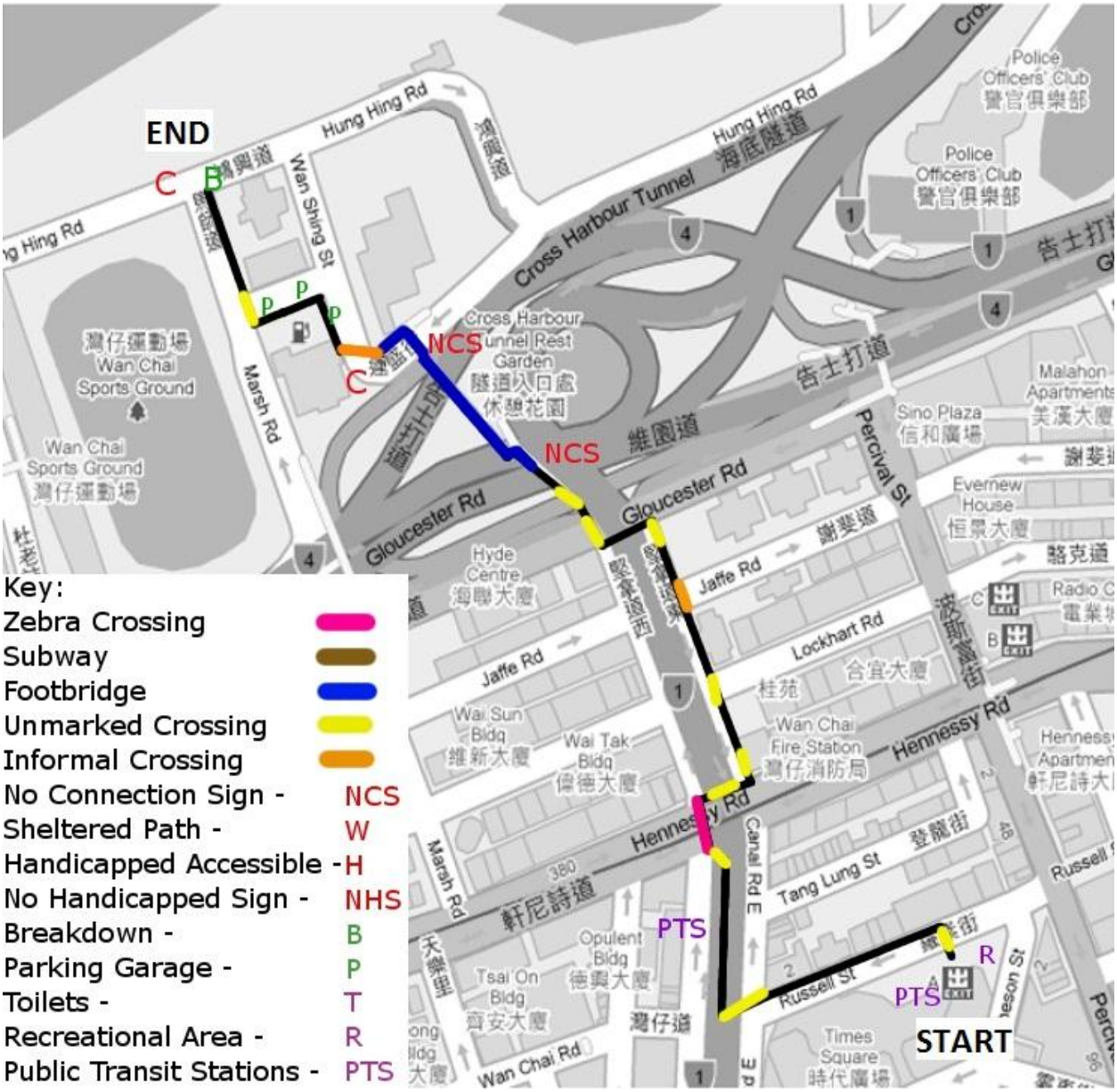


Figure 4.4-12 Route 2 Times Square Shopping Area to Hung Hing Road Waterfront Walking Map

This route (shown in Figure 4.4-12) was made mostly at grade level and started at the Time Square Shopping Mall. There were many unmarked crossings and the route was not visually pleasing due to all the crossing under highways and bridges. Canal Road East had many unmarked crossings and the sidewalks were full of people and very congested. There was one footbridge towards the end of the route that crossed Gloucester Road. The footbridge had no connections signs saying where it went. It

also was not handicapped accessible and the only option was to climb up and down a set of stairs to cross over to the harbor front. After crossing the footbridge, the team discovered the harbor could not be seen due to a large wall in place due to the construction that was being done in that area. The route was very direct and easy to navigate but did not lead to a harbor front promenade or viewing area.

Table 4.4-20 – Walkability Evaluation Rubric of Route 2 from Times Square to Harbor Front

District: Wan Chai		Route: Time Square to Harbor			
Connections					
Zebra	Total	Subways	Total	Footbridges	Total
Tallies:	1	Tallies:	0	Tallies:	1
Unmarked Crossings	Total	Subway Connection Signs	Total	Footbridge Connection Signs	Total
Tallies:	10	Tallies:	0	Tallies:	0
Informal Crossings	Total				
Tallies:	2				
Handicap Accessibility				**Weather**	
Handicap Connections	Total	Signs for Handicap Accessibility	Total	Sheltered Path	Total
Tallies:	0	Tallies:	0	Tallies:	0
Choke Points					
Breakdowns	Total	Parking Garages	Total		
Tallies:	1	Tallies:	3		
Attractions & Amenities					
Parks/ Recreation	Total	Public Transit Stops	Total		Yes/No
Tallies:	0	Tallies:	2	Access To Harbor Front	No
				Access To H.F Promenade	No
	Percentage		Beginning	Middle	End
Quality of Route	40%	Public Toilets	0	1	0
Visual Aesthetics	20%	Signs for Public Toilets	0	0	0
Construction	30%	Seating Area	1	0	0
Directional Signs (H.F & P.T)	20%				

Table 4.4-21 – Focus Areas of Route 2 from Times Square Shopping Area to Harbor

Metrics Considerations	Focus Areas
Connections Crossed	Directness Of Route Is Unsatisfactory
Unmarked Connections	Amount Of Unmarked Connections Is Unsatisfactory
Informal Connections	Informal Connection Needs To Be Addressed
Subway Signs	No Subways
Footbridge Signs	Footbridges Are Missing Signs
Handicap Accesibility	Connections Missing Handicap Accessibility
Handicap Signs	All Handicap Accesses Have Proper Signage
Sheltered Connections	Footbridges Missing Covers
Breakdowns	Breakdowns Need To Be Addressed
Parking Garages	Too Many Parking Garages, Look Into Connection Adjustments
Pedestrian Experience	**Focus Areas**
Parks/Recreation	Not Enough Parks/Recreation
Public Tansit Stops	Not Enough Public Transit Stops Along Route
Quality of Route	Quality Of Route Could Use Improvements
Visual Aesthetics	Visual Aesthetics Along Route Needs Critical Attention
Construction	Check Safety And Route Obstructions
Directional Signs (HF,PT)	Route Needs Critical Signage Improvements
Harbor Front Access	Needs Harbor Front Access
Harbor Front Promenade	Needs A Harbor Front Promenade
Sitting Areas	Needs More Seating Areas
Promenade Seating	No Promenade
Public Toilets	Not Enough Public Toilets
Public Toliet Signs	No PublicToilet Signs Needed

The Wan Chai Route 2 table suggests that the route unmarked connections and informal connections need improvement. The footbridges are missing proper signage and lack covers. Choke points such as breakdowns and parking garages are in need of further evaluation. The pedestrian experience could use improvements in almost every category.

Route 3: From Wan Chai MTR to Expo Promenade

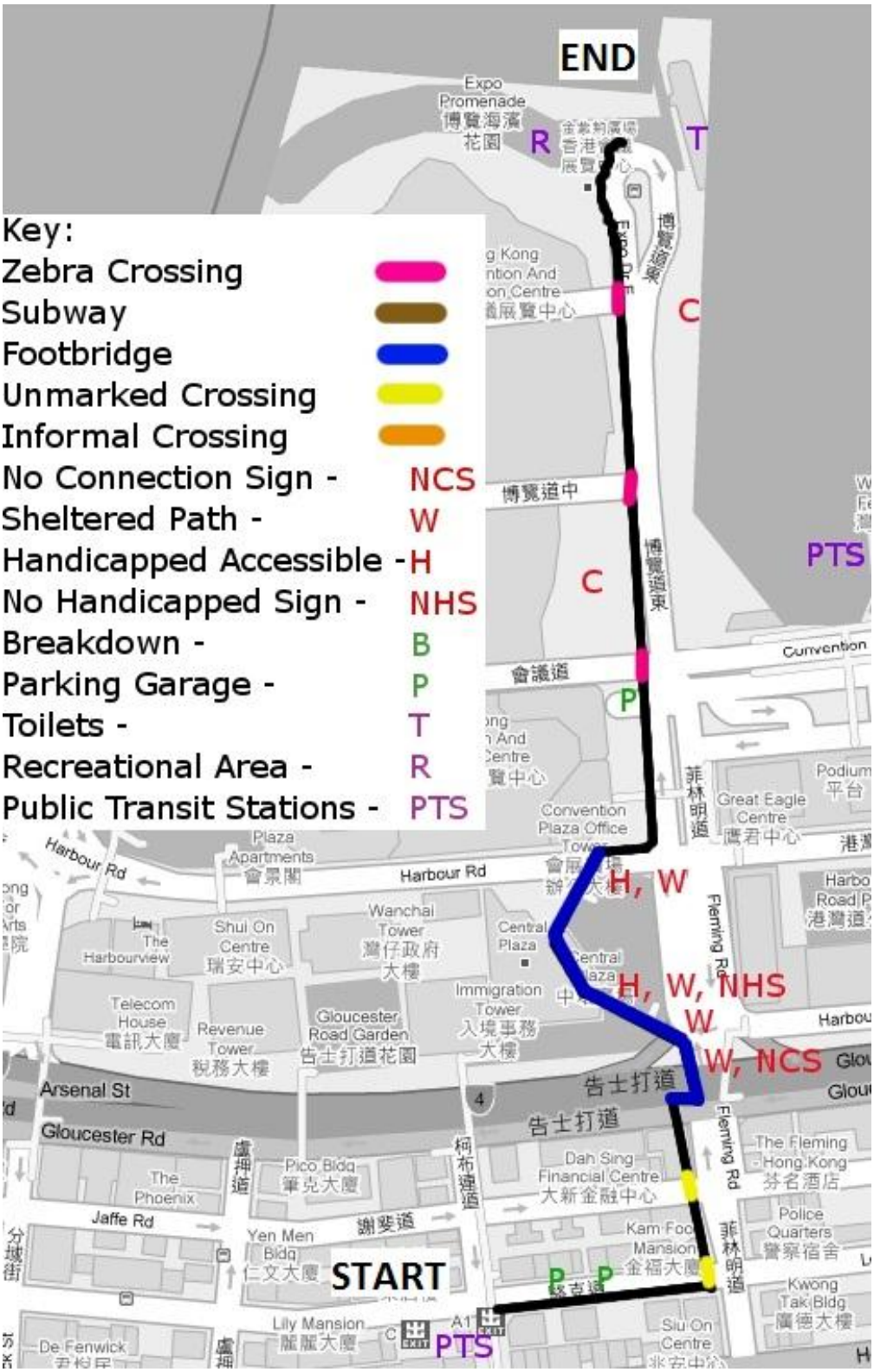


Figure 4.4-13 Route 3 Wan Chai MTR to Expo Promenade Walking Map

The route (shown in Figure 4.4-13) was fairly direct and followed a straight path with the exception of two footbridges. The route started at exit A1 of the Wan Chai MTR stop along the Island Line. The route followed west on Lockhart Road then turned left on Fleming Road. The team then took the covered footbridge that lead into the Central Plaza. The footbridge was full of people but the pedestrian flow was steady. The team stayed above grade level and walked out of Central Plaza onto another covered footbridge that lead to Convention Plaza Office Tower. The first footbridge was not handicapped accessible whereas the second footbridge was. The team exited the Convention Plaza Office Tower at grade and walked to the intersection of Fleming and Convention Avenue. They crossed Convention Avenue via the zebra crossing and followed Expo Drive East to the Expo Promenade. There was some construction along the harbor front and one part of the promenade was completely under construction. Overall, route and promenade were very congested with people.

Table 4.4-22 – Walkability Evaluation Rubric of Route 3 from Wan Chai MTR to Expo Center

District:Wan Chai		Route:Wan Chai MTR to Expo Promenade			
Connections					
Zebra	Total	Subways	Total	Footbridges	Total
Tallies:	3	Tallies:	0	Tallies:	2
Unmarked Crossings	Total	Subway Connection Signs	Total	Footbridge Connection Signs	Total
Tallies:	2	Tallies:	0	Tallies:	3
Informal Crossings	Total				
Tallies:	0				
Handicap Accessibility				**Weather**	
Handicap Connections	Total	Signs for Handicap Accessibility	Total	Sheltered Path	Total
Tallies:	1	Tallies:	1	Tallies:	2
Choke Points					
Breakdowns	Total	Parking Garages	Total		
Tallies:	0	Tallies:	3		
Attractions & Amenities					
Parks/ Recreation	Total	Public Transit Stops	Total		Yes/No
Tallies:	1	Tallies:	2	Access To Harbor Front	Yes
				Access To H.F Promenade	Yes
	Percentage		Beginning	Middle	End
Quality of Route	90%	Public Toilets	0	0	1
Visual Aesthetics	80%	Signs for Public Toilets	0	0	1
Construction	10%	Seating Area	0	0	1
Directional Signs (H.F & P.T)	80%				

Table 4.4-23 – Focus Areas of Route 3 from Wan Chai MTR to Expo Center

Metrics Considerations	Focus Areas
Connections Crossed	Direct Route
Unmarked Connections	Amount Of Unmarked Connections Is Satisfactory
Informal Connections	No Informal Crossings
Subway Signs	No Subways
Footbridge Signs	Footbridges Are Missing Signs
Handicap Accesibility	Connections Missing Handicap Accessibility
Handicap Signs	Handicap Access Missing Signs
Sheltered Connections	All Footbridges Are Covered
Breakdowns	No Breakdowns
Parking Garages	Too Many Parking Garages, Look Into Connection Adjustments
Pedestrian Experience	**Focus Areas**
Parks/Recreation	Not Enough Parks/Recreation
Public Tansit Stops	Not Enough Public Transit Stops Along Route
Quality of Route	Quality Of Route Is Excellent
Visual Aesthetics	Route Is Aesthetically Pleasing
Construction	Check Safety And Route Obstructions
Directional Signs (HF,PT)	Route Signage Is Excellent
Harbor Front Access	Satisfactory Harbor Front Access
Harbor Front Promenade	Satisfactory Harbor Front Promenade
Sitting Areas	Needs More Seating Areas
Promenade Seating	Satisfactory Amount Of Promenade Seating
Public Toilets	Not Enough Public Toilets
Public Toliet Signs	Proper Amount Of Public Toilet Signs

The Wan Chai Route 3 table suggests that the footbridge's signage, handicap accessibility, and handicapped signage are missing and need improvement. It also calls for more public transit stops, seating areas and public toilets as well as a safety evaluation around the construction zones. Because the path crosses too many parking garages, the connection flow should be adjusted to increase safety. However, the route is direct and is in excellent condition with pleasant visuals.

Route 4: From Intersection of Lockhart and Fenwick to Harbor Front

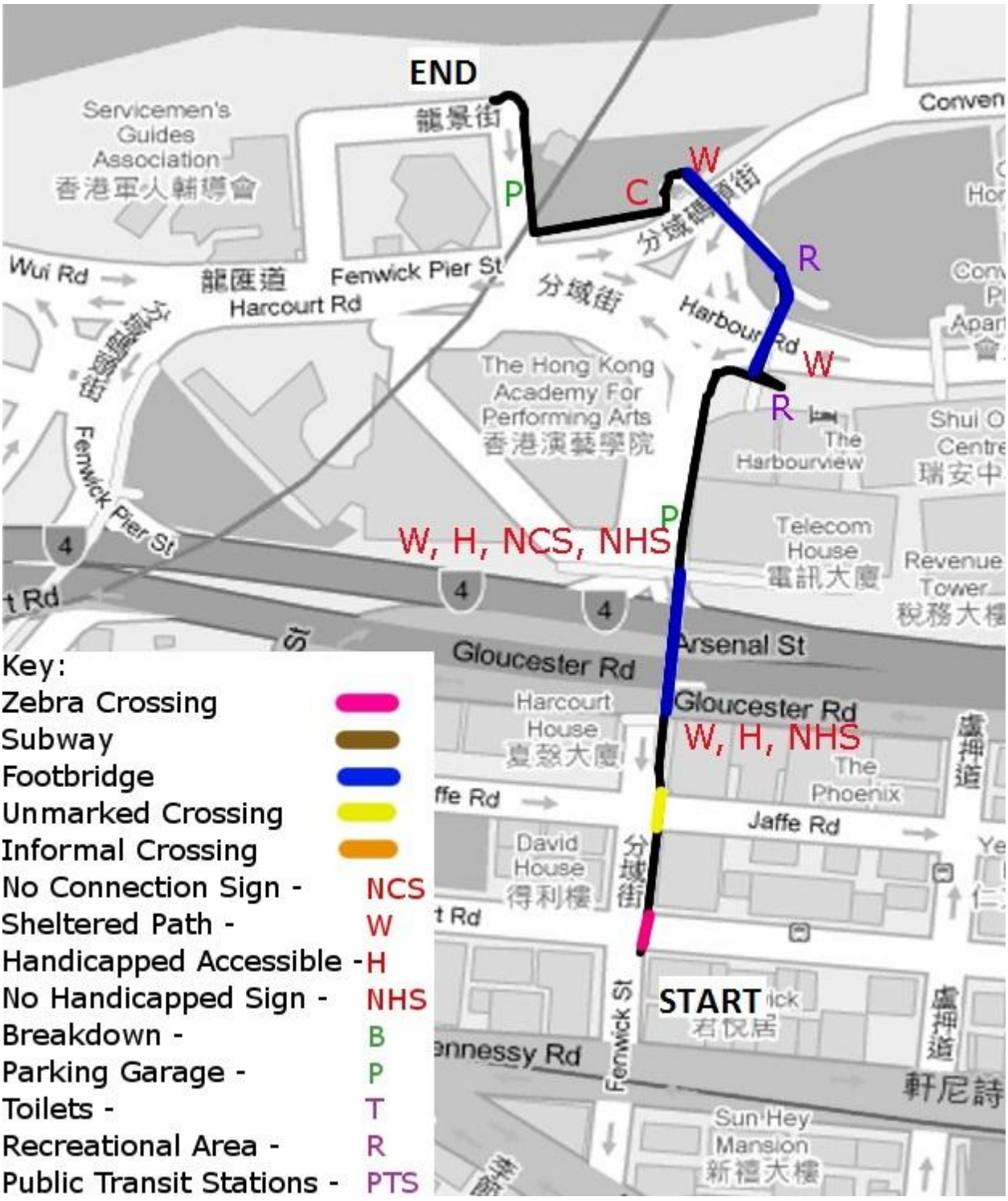


Figure 4.4-14 Route 4 Intersection of Lockhart and Fenwick to Lung King Street Waterfront Walking Map

The route (shown in Figure 4.4-14) started on the corner of Lockhart Road and Fenwick Street. The team walked north towards Gloucester Road and used the covered footbridge to cross the street. The footbridge was handicap accessible but had no handicap signage. The team continued to walk north towards the harbor but had to cross another footbridge. This footbridge was covered but not handicapped accessible. The route followed Fenwick Pier Street and turned on to Lung King Street, which led to the harbor. There was a lot of construction towards the end of the route but it did not completely obstruct the harbor view. The harbor could be viewed from a covered sidewalk along the water. Overall, the route was not badly congested and was easy to navigate. The walking map, depicted above in Figure 4.4-13, shows the route with all of the rubric criteria and their locations.

Table 4.4-24 – Walkability Evaluation Rubric of Route 4 from Intersection of Lockhart and Fenwick to Harbor Front Route

District:Wan Chai		Route:Intersection of Lockhart and Fenwick to harbor front			
Connections					
Zebra	Total	Subways	Total	Footbridges	Total
Tallies:	1	Tallies:	0	Tallies:	2
Unmarked Crossings	Total	Subway Connection Signs	Total	Footbridge Connection Signs	Total
Tallies:	1	Tallies:	0	Tallies:	3
Informal Crossings	Total				
Tallies:	0				
Handicap Accessibility				**Weather**	
Handicap Connections	Total	Signs for Handicap Accessibility	Total	Sheltered Path	Total
Tallies:	1	Tallies:	0	Tallies:	2
Choke Points					
Breakdowns	Total	Parking Garages	Total		
Tallies:	0	Tallies:	2		
Attractions & Amenities					
Parks/ Recreation	Total	Public Transit Stops	Total		Yes/No
Tallies:	2	Tallies:	0	Access To Harbor Front	Yes
				Access To H.F Promenade	No
	Percentage		Beginning	Middle	End
Quality of Route	80%	Public Toilets	0	0	0
Visual Aesthetics	60%	Signs for Public Toilets	0	0	0
Construction	30%	Seating Area	2	0	0
Directional Signs (H.F & P.T)	90%				

Table 4.4-25 – Focus Areas of Route 4 from Intersection of Lockhart and Fenwick to Harbor Front

Metrics Considerations	Focus Areas
Connections Crossed	Direct Route
Unmarked Connections	Amount Of Unmarked Connections Is Satisfactory
Informal Connections	No Informal Crossings
Subway Signs	No Subways
Footbridge Signs	Footbridges Are Missing Signs
Handicap Accesibility	Connections Missing Handicap Accessibility
Handicap Signs	Handicap Access Missing Signs
Sheltered Connections	All Footbridges Are Covered
Breakdowns	No Breakdowns
Parking Garages	Too Many Parking Garages, Look Into Connection Adjustments
Pedestrian Experience	**Focus Areas**
Parks/Recreation	Satisfactory Amount Of Parks/Recreation
Public Tansit Stops	Not Enough Public Transit Stops Along Route
Quality of Route	Quality Of Route Is Excellent
Visual Aesthetics	Visual Aesthetics Are Satisfactory
Construction	Check Safety And Route Obstructions
Directional Signs (HF,PT)	Route Signage Is Excellent
Harbor Front Access	Satisfactory Harbor Front Access
Harbor Front Promenade	Needs A Harbor Front Promenade
Sitting Areas	Satisfactory Amount Of Seating Areas
Promenade Seating	No Promenade
Public Toilets	Not Enough Public Toilets
Public Toliet Signs	No PublicToilet Signs Needed

The Wan Chai Route 4 table suggests that the route could improve both footbridge and handicap signage. It calls for more public transit stations and public toilets as well as the evaluation of safety around construction zones. The path crosses too many parking garages; therefore, the connections should be adjusted to avoid the modal conflict. The overall pedestrian experience is satisfactory and could use improvements in all categories except for the quality of route.

Pedestrian Congestion in Wan Chai

Overall, this district has too many modal conflicts such as parking garages and unmarked or informal connections. In addition, the quality of the route generally needs to be improved because of the multitude of construction sites. The picture below (Figure 4.4-15) shows the pedestrian congestion at lunchtime, around 1:00pm. This picture was taken at the zebra crossing across Convention Avenue near the Hong Kong Convention and Expo Centre. As this crossing is on the route from the MTR to the Expo Centre promenade, it is one of the main connections between the harbor front and the hinterland in Wan Chai. The congestion at lunchtime is moderate because, though this is a very high traffic area, many tourists arrive to the Expo Centre via tour bus while locals can arrive via the Star Ferry.

4.4-15 - Zebra Crossing at Convention Ave near the Expo Centre

4.4.4. ai Ying Pun

On February 8, 2011, three members of the WPI research team walked four routes in Sai Ying Pun to assess the walkability of these routes from hinterland to harbor front. The following descriptions detail the routes and the team's perceptions. The walking maps, rubrics, and results of the data processing, the quantitative measurements, for each route are included below each description.

Route 1: From Western Court Block to End of Hill Road

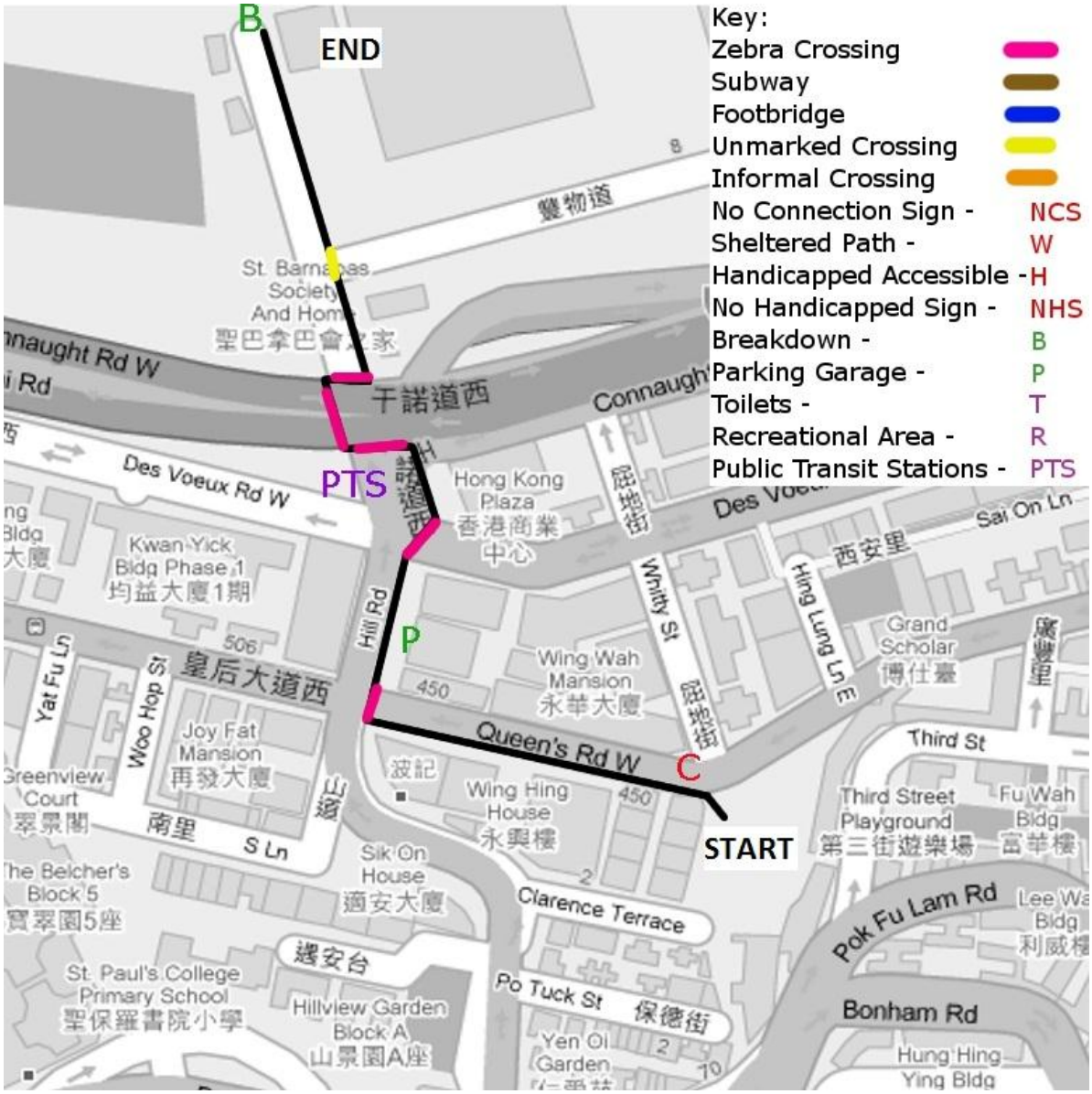


Figure 4.4-16 Route 1 Western Court Block to End of Hill Road Walking Map

This route (shown in Figure 4.4-16) started at the intersection of Whitty Street and Queen's Road West. At the start of the route there were many tall residential buildings with little shops at street level. The route was short and simple to follow. There were six crossings; all were zebra crossings except for one unmarked crossing. However, at the intersection of Hill Road and Connaught Road West there were only three zebra crossings at a four way intersection. This forced the team to cross Hill Road, then Connaught Road, then Hill Road again to simply cross the street. The end of Hill Road was a breakpoint as there was a wall obstructing pedestrians from viewing or experiencing the harbor.

Table 4.4-26 – Walkability Evaluation Rubric of Route 1 from Western Court Block to End of Hill Road

District:Sai Ying Pun		Route:Western Court Block 4 to Hill Rd End			
Connections					
Zebra	Total	Subways	Total	Footbridges	Total
Tallies:	5	Tallies:	0	Tallies:	0
Unmarked Crossings	Total	Subway Connection Signs	Total	Footbridge Connection Signs	Total
Tallies:	1	Tallies:	0	Tallies:	0
Informal Crossings	Total				
Tallies:	0				
Handicap Accessibility				**Weather**	
Handicap Connections	Total	Signs for Handicap Accessibility	Total	Sheltered Path	Total
Tallies:	0	Tallies:	0	Tallies:	0
Choke Points					
Breakdowns	Total	Parking Garages	Total		
Tallies:	1	Tallies:	1		
Attractions & Amenities					
Parks/ Recreation	Total	Public Transit Stops	Total		Yes/No
Tallies:	0	Tallies:	1	Access To Harbor Front	No
				Access To H.F Promenade	No
	Percentage		Beginning	Middle	End
Quality of Route	70%	Public Toilets	0	0	0
Visual Aesthetics	10%	Signs for Public Toilets	0	0	0
Construction	20%	Seating Area	0	0	1
Directional Signs (H.F & P.T)	0%				

Table 4.4-27 – Focus Areas of Route 1 from Western Court Block to End of Hill Road

Metrics Considerations	Focus Areas
Connections Crossed	Directness Of Route Is Satisfactory
Unmarked Connections	Amount Of Unmarked Connections Is Satisfactory
Informal Connections	No Informal Crossings
Subway Signs	No Subways
Footbridge Signs	No Footbridges
Handicap Accesibility	No Handicap Access Needed
Handicap Signs	No Handicap Access Signage Needed
Sheltered Connections	No Footbridges
Breakdowns	Breakdowns Need To Be Addressed
Parking Garages	Check Pedestrian Safety
Pedestrian Experience	**Focus Areas**
Parks/Recreation	Not Enough Parks/Recreation
Public Tansit Stops	Not Enough Public Transit Stops Along Route
Quality of Route	Quality Of Route Is Satisfactory
Visual Aesthetics	Visual Aesthetics Along Route Needs Critical Attention
Construction	Check Safety And Route Obstructions
Directional Signs (HF,PT)	Route Needs Critical Signage Improvements
Harbor Front Access	Needs Harbor Front Access
Harbor Front Promenade	Needs A Harbor Front Promenade
Sitting Areas	Needs More Seating Areas
Promenade Seating	No Promenade
Public Toilets	Not Enough Public Toilets
Public Toliet Signs	No PublicToilet Signs Needed

The Sai Ying Pun Route 1 table suggests that, with the exception of choke points, the other metrics are satisfactory or good. The choke points will need further evaluation to improve them. The whole pedestrian experience was less than satisfactory and needs considerable improvement in every category.

Route 2: From Hollywood Road Park to Fire Street

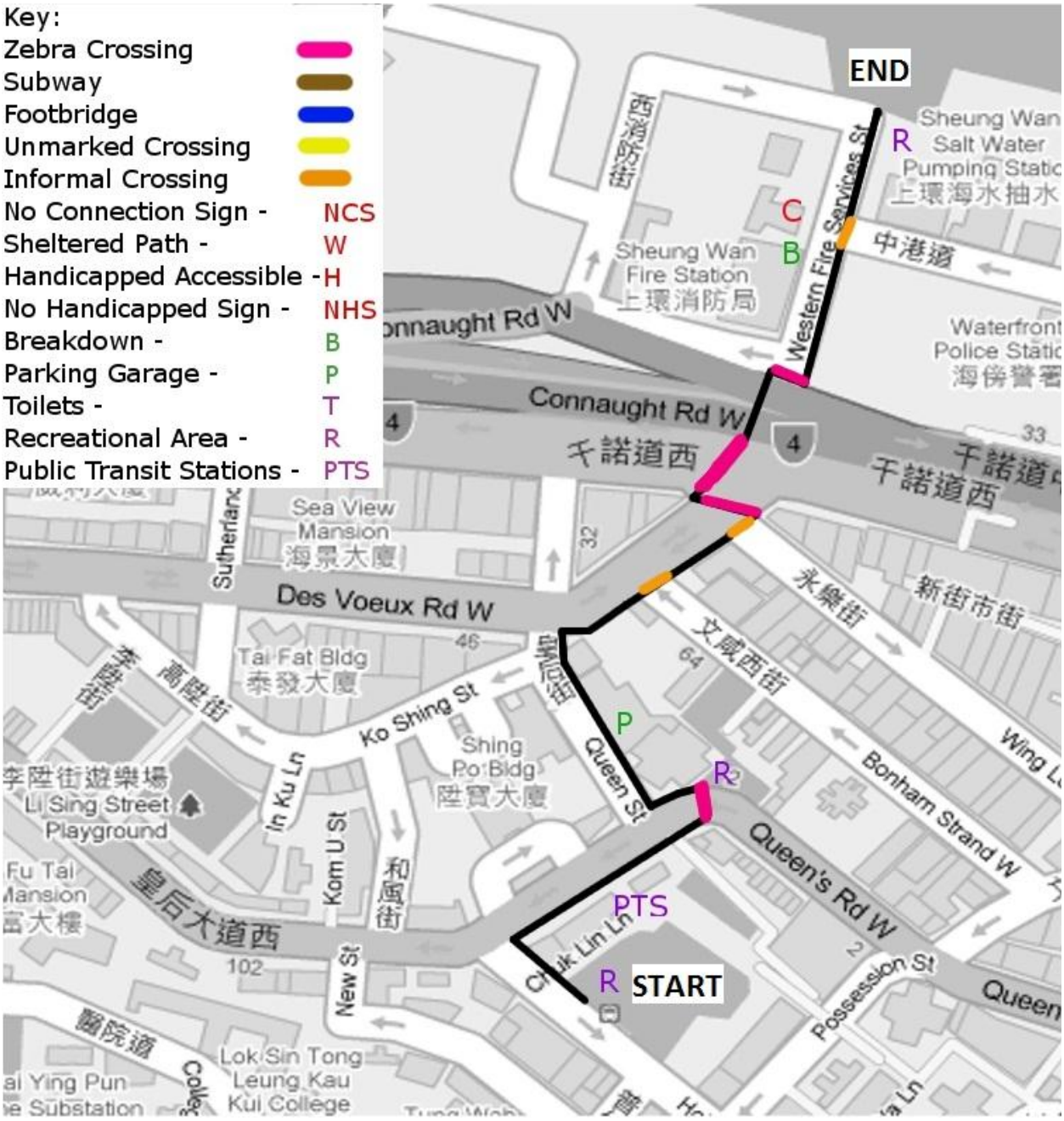


Figure 4.4-17 Route 2 Hollywood Road Park to Western Fire Services Street Walking Map

This route (shown in Figure 4.4-17) started at the south east entrance of Hollywood Road Park. The path from the park to Queen's Road West was a hill that was not handicapped accessible because there were a few stairs built into the sidewalk. Continuing at grade, the team walked along Queen's Road West to Queen Street but had to walk a little past Queen Street in order to cross the road. The

path then followed Des Voeux Road West and crossed Connaught Road West at grade via one large zebra crossing that was split into sections. There was also construction around Connaught Road but as it was mostly road work it did not interfere with pedestrians walking. The team then continued down Western Fire Services Street. At the end of Western Fire Services Street was a small promenade with a few benches. However, this promenade did lead to Sun Yat Sin Park. The route in the hinterland was congested with people and the sidewalks were small. On the harbor front side of Connaught Road, the sidewalks were bigger and fewer people made it much easier to walk around the harbor front area.

Table 4.4-28 – Walkability Evaluation Rubric of Route 2 from Hollywood Road Park to Fire Street Route

District:Sai Ying Pun		Route:Bus Terminal/Park to Western Fire Service Street			
Connections					
Zebra	Total	Subways	Total	Footbridges	Total
Tallies:	4	Tallies:	0	Tallies:	0
Unmarked Crossings	Total	Subway Connection Signs	Total	Footbridge Connection Signs	Total
Tallies:	3	Tallies:	0	Tallies:	0
Informal Crossings	Total				
Tallies:	0				
Handicap Accessibility				**Weather**	
Handicap Connections	Total	Signs for Handicap Accessibility	Total	Sheltered Path	Total
Tallies:	0	Tallies:	0	Tallies:	0
Choke Points					
Breakdowns	Total	Parking Garages	Total		
Tallies:	1	Tallies:	1		
Attractions & Amenities					
Parks/ Recreation	Total	Public Transit Stops	Total		Yes/No
Tallies:	3	Tallies:	1	Access To Harbor Front	Yes
				Access To H.F Promenade	Yes
	Percentage		Beginning	Middle	End
Quality of Route	60%	Public Toilets	0	0	0
Visual Aesthetics	30%	Signs for Public Toilets	0	0	0
Construction	30%	Seating Area	1	0	1
Directional Signs (H.F & P.T)	0%				

Table 4.4-29 – Focus Areas of Route 2 from Hollywood Road Park to Fire Street

Metrics Considerations	Focus Areas
Connections Crossed	Directness Of Route Is Satisfactory
Unmarked Connections	Amount Of Unmarked Connections Is Unsatisfactory
Informal Connections	No Informal Crossings
Subway Signs	No Subways
Footbridge Signs	No Footbridges
Handicap Accesibility	No Handicap Access Needed
Handicap Signs	No Handicap Access Signage Needed
Sheltered Connections	No Footbridges
Breakdowns	Breakdowns Need To Be Addressed
Parking Garages	Check Pedestrian Safety
Pedestrian Experience	**Focus Areas**
Parks/Recreation	Satisfactory Amount Of Parks/Recreation
Public Tansit Stops	Not Enough Public Transit Stops Along Route
Quality of Route	Quality Of Route Is Satisfactory
Visual Aesthetics	Visual Aesthetics Along Route Needs Critical Attention
Construction	Check Safety And Route Obstructions
Directional Signs (HF,PT)	Route Needs Critical Signage Improvements
Harbor Front Access	Satisfactory Harbor Front Access
Harbor Front Promenade	Satisfactory Harbor Front Promenade
Sitting Areas	Satisfactory Amount Of Seating Areas
Promenade Seating	Satisfactory Amount Of Promenade Seating
Public Toilets	Not Enough Public Toilets
Public Toliet Signs	No PublicToilet Signs Needed

The Sai Ying Pun Route 2 table shows that footbridge signage, handicap accessibility, breakdowns and parking garages need improvement. It calls for more public transit stops, signage and public toilets as well as safety evaluations in construction zones. The quality and directness of route are satisfactory but there is still room for improvement.

Route 3: From King George Park to Sun Yat Sin Park

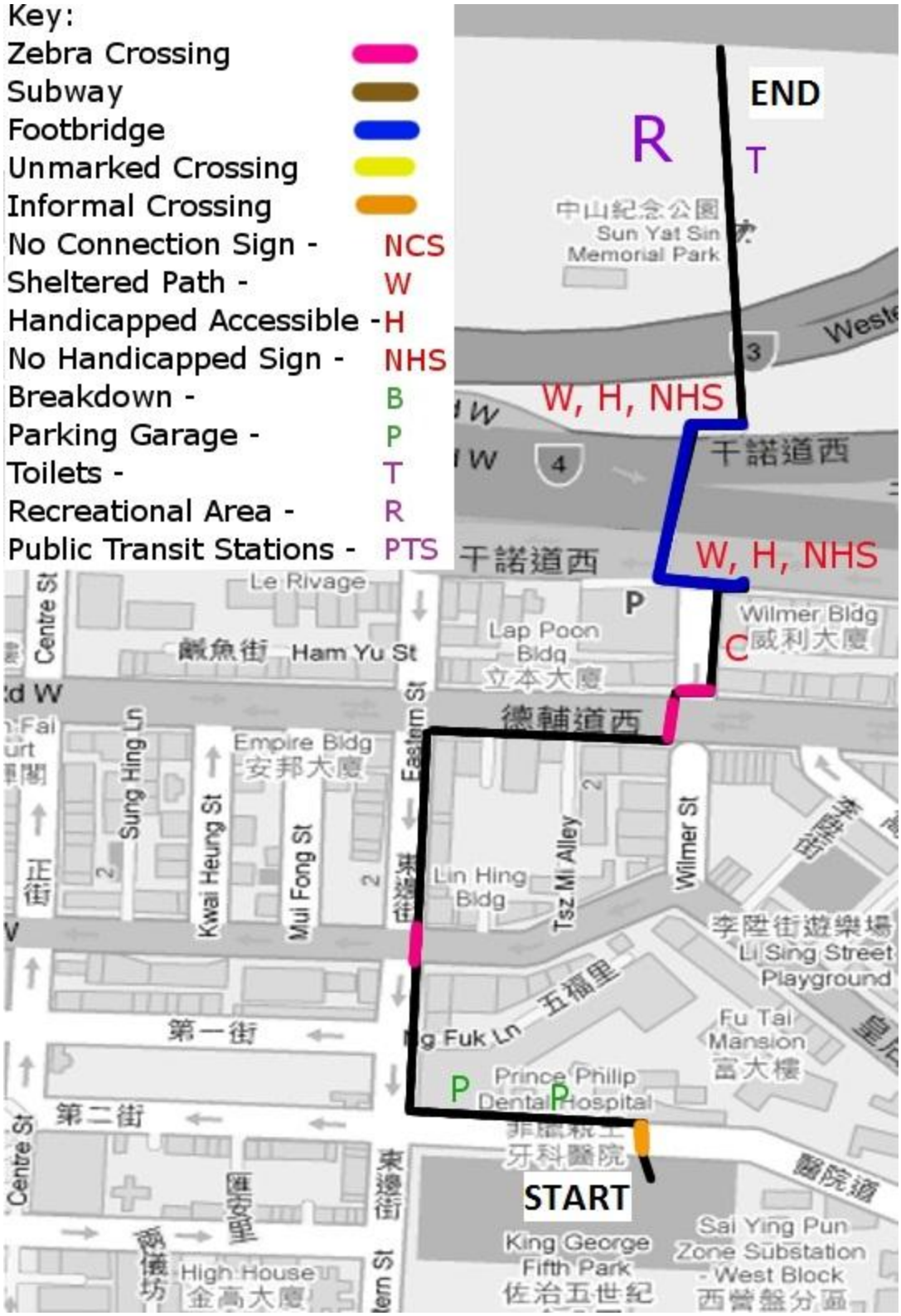


Figure 4.4-18 Route 3 King George Park to Sun Yat Sin Park Walking Map

This route (shown in Figure 4.4-18) started at the north entrance of King George Fifth Park along Hospital Road. The team started at grade and both sides of the road were not very visually pleasing. On the park side of the street was a plain concrete wall and across the street were two parking garages. There was also an informal crossing from the park to the other side of the street. The route then followed Hospital Road to Eastern Street and then it was a direct route north on Eastern Street passing shops and markets to Des Voeux Road West. Des Voeux Road West was crowded with people and dried fish markets that were overflowing onto the sidewalks, making it hard to walk around people. The team crossed Wilmer Street and took the covered footbridge into the park. There were no signs that the footbridge was handicapped but there were signs that stated where the footbridge went. The footbridge led into Sun Yat Sin Memorial Park. The park lead directly to the harbor front and included a promenade with seating. There were only a few construction projects along the entire route and they did not interfere with pedestrian pathways.

Table 4.4-30 – Walkability Evaluation Rubric of Route 3 from King George Park to Sun Yat Sin Park

District:Sai Ying Pun		Route:King George Park to Sun Yat Sin			
Connections					
Zebra	Total	Subways	Total	Footbridges	Total
Tallies:	3	Tallies:	0	Tallies:	1
Unmarked Crossings	Total	Subway Connection Signs	Total	Footbridge Connection Signs	Total
Tallies:	0	Tallies:	0	Tallies:	2
Informal Crossings	Total				
Tallies:	1				
Handicap Accessibility				**Weather**	
Handicap Connections	Total	Signs for Handicap Accessibility	Total	Sheltered Path	Total
Tallies:	1	Tallies:	0	Tallies:	1
Choke Points					
Breakdowns	Total	Parking Garages	Total		
Tallies:	0	Tallies:	2		
Attractions & Amenities					
Parks/ Recreation	Total	Public Transit Stops	Total		Yes/No
Tallies:	2	Tallies:	0	Access To Harbor Front	Yes
				Access To H.F Promenade	Yes
	Percentage		Beginning	Middle	End
Quality of Route	40%	Public Toilets	0	0	1
Visual Aesthetics	40%	Signs for Public Toilets	0	0	1
Construction	70%	Seating Area	0	0	1
Directional Signs (H.F & P.T)	60%				

Table 4.4-31 – Focus Areas of Route 3 from King George Park to Sun Yat Sin

Metrics Considerations	Focus Areas
Connections Crossed	Directness Of Route Is Satisfactory
Unmarked Connections	All Street Level Connections Are Marked
Informal Connections	Informal Connection Needs To Be Addressed
Subway Signs	No Subways
Footbridge Signs	All Footbridges Have Minimum Proper Signage
Handicap Accesibility	All Connections Have Handicap Access
Handicap Signs	Handicap Access Missing Signs
Sheltered Connections	All Footbridges Are Covered
Breakdowns	No Breakdowns
Parking Garages	Check Pedestrian Safety
Pedestrian Experience	**Focus Areas**
Parks/Recreation	Not Enough Parks/Recreation
Public Tansit Stops	Not Enough Public Transit Stops Along Route
Quality of Route	Quality Of Route Could Use Improvements
Visual Aesthetics	Visual Aesthetics Could Use Improvemts
Construction	Need To Setup A Detour And Check Safety
Directional Signs (HF,PT)	Route Signage Is Satisfactory
Harbor Front Access	Satisfactory Harbor Front Access
Harbor Front Promenade	Satisfactory Harbor Front Promenade
Sitting Areas	Needs More Seating Areas
Promenade Seating	Satisfactory Amount Of Promenade Seating
Public Toilets	Not Enough Public Toilets
Public Toliet Signs	Proper Amount Of Public Toilet Signs

The Sai Ying Pun Route 3 table suggests that this route is satisfactory with the exception of unmarked connections and choke points. These two areas need to be addressed and improved. Improvements to the pedestrian experience can be made by adding more public transit stops, signage, seating areas, and public toilets. The table also shows that the route has poor visual aesthetics that need improvement.

Route 4: From Queens Road and Western Street to End of Fung Mat Road

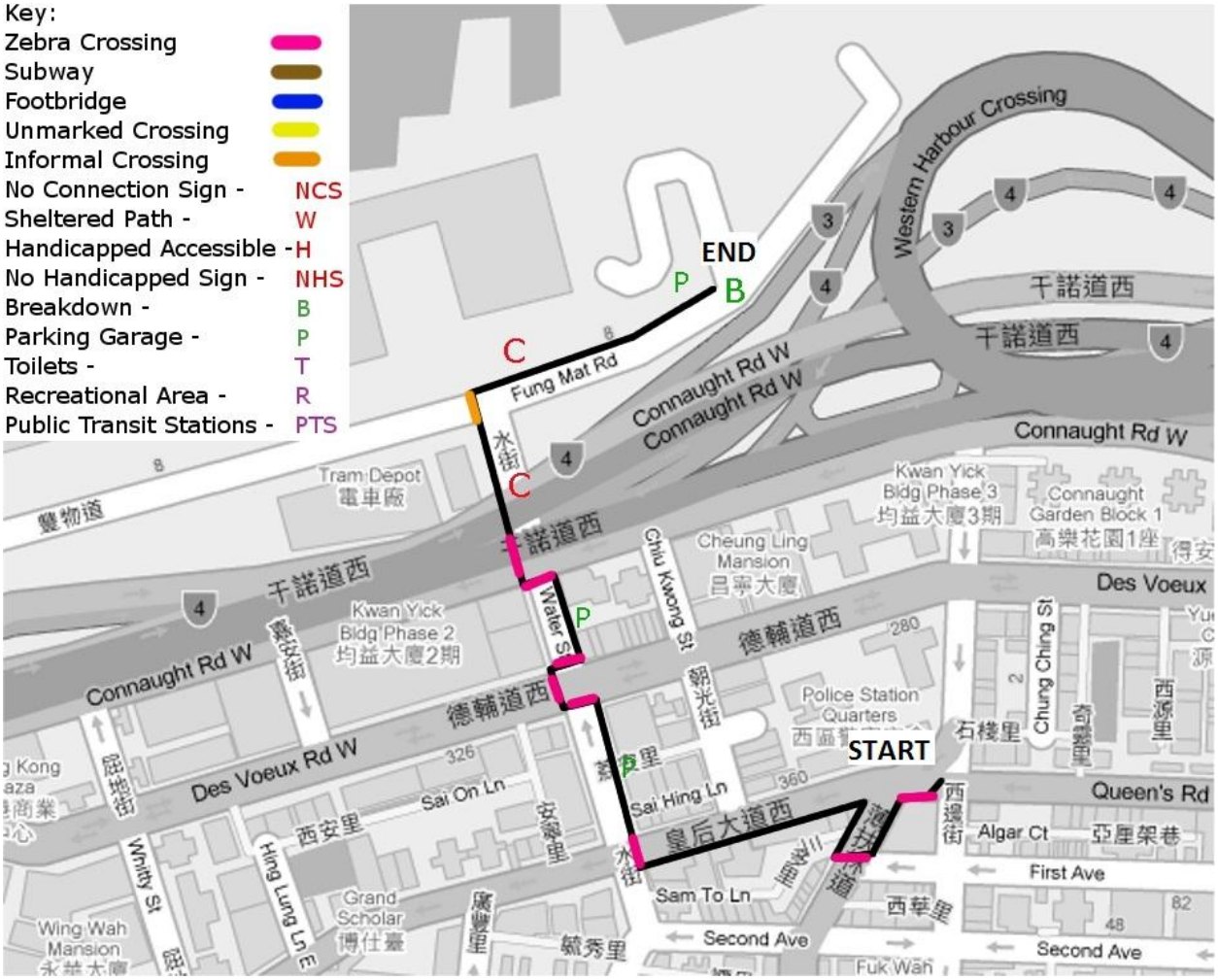


Figure 4.4-19 Route 4 Queens Road and Western Street to End of Fung Mat Road Walking Map

The beginning of this route (shown in Figure 4.4-19) is at the intersection of Queen's Road West and Western Street. The team started at on the East side of the road and had to cross Western Street and Pok Fu Lam Road. There was a zebra crossing on Western Street but in order to cross Pok Fu Lam Road the team had to walk south to the nearest zebra crossing. They crossed and continued down Queen's Road West to Water Street via the zebra crossing at the intersection of the streets. The crossing of Des Voeux Road West was very roundabout because instead of a four-way intersection of pedestrian pathways, there were only three zebra crossings. The team then had to cross Water Street again to cross Connaught Road West via another zebra crossing to continue on Water Street. There was an informal

crossing at the intersection of Water Street and Fung Mat Road. Fung Mat Road had a lot of construction and led to a breakdown at the end. There was no harbor front or promenade. The end of the route was very unpleasant to walk and had no visual aesthetics.

Table 4.4-32 – Walkability Evaluation Rubric of Route 4 from Queens Road and Western Street to End of Fung Mat Road

District:Sai Ying Pun		Route: Queens Rd and Western St. to end of Fung Mat Rd.			
Connections					
Zebra	Total	Subways	Total	Footbridges	Total
Tallies:	8	Tallies:	0	Tallies:	0
Unmarked Crossings	Total	Subway Connection Signs	Total	Footbridge Connection Signs	Total
Tallies:	0	Tallies:	0	Tallies:	0
Informal Crossings	Total				
Tallies:	1				
Handicap Accessibility				**Weather**	
Handicap Connections	Total	Signs for Handicap Accessibility	Total	Sheltered Path	Total
Tallies:	0	Tallies:	0	Tallies:	0
Choke Points					
Breakdowns	Total	Parking Garages	Total		
Tallies:	1	Tallies:	3		
Attractions & Amenities					
Parks/ Recreation	Total	Public Transit Stops	Total		Yes/No
Tallies:	0	Tallies:	0	Access To Harbor Front	No
				Access To H.F Promenade	No
	Percentage		Beginning	Middle	End
Quality of Route	50%	Public Toilets	0	0	0
Visual Aesthetics	10%	Signs for Public Toilets	0	0	0
Construction	40%	Seating Area	0	0	1
Directional Signs (H.F & P.T)	0%				

Table 4.4-33 – Focus Areas of Route 4 from Queens Road and Western Street to End of Fung Mat Road

Metrics Considerations	Focus Areas
Connections Crossed	Directness Of Route Is Satisfactory
Unmarked Connections	All Street Level Connections Are Marked
Informal Connections	Informal Connection Needs To Be Addressed
Subway Signs	No Subways
Footbridge Signs	No Footbridges
Handicap Accesibility	No Handicap Access Needed
Handicap Signs	No Handicap Access Signage Needed
Sheltered Connections	No Footbridges
Breakdowns	Breakdowns Need To Be Addressed
Parking Garages	Too Many Parking Garages, Look Into Connection Adjustments
Pedestrian Experience	**Focus Areas**
Parks/Recreation	Not Enough Parks/Recreation
Public Tansit Stops	Not Enough Public Transit Stops Along Route
Quality of Route	Quality Of Route Could Use Improvements
Visual Aesthetics	Visual Aesthetics Along Route Needs Critical Attention
Construction	Check Safety And Route Obstructions
Directional Signs (HF,PT)	Route Needs Critical Signage Improvements
Harbor Front Access	Needs Harbor Front Access
Harbor Front Promenade	Needs A Harbor Front Promenade
Sitting Areas	Needs More Seating Areas
Promenade Seating	No Promenade
Public Toilets	Not Enough Public Toilets
Public Toliet Signs	No PublicToilet Signs Needed

The Sai Ying Pun Route 4 table suggests that this route is not direct and footbridge signage and sheltered paths need further evaluation. Also the choke points need to be addressed improved. The whole pedestrian experience needs re-evaluation and improvement because it scored less than satisfactory in every category.

Pedestrian Congestion in Sai Ying Pun

This district has too many modal conflicts such as unmarked or informal connections. In addition, the quality of the routes generally need to be improved and the waterfront promenade extended. The picture below (Figure 4.4- 18) shows the pedestrian congestion at lunchtime, around

1:00pm. This picture was taken at the footbridge leading to Sun Yat Sin Park. As this park is the main waterfront promenade in the district, it is one of the main connections between the harbor front and the hinterland in Sai Ying Pun. The congestion at lunchtime is low because this is a low traffic district in which fewer people seem to visit the waterfront.

Figure 4.4-20 - Footbridge to Sun Yat Sin Park in Sai Ying Pun

This section detailed all of the data collected for the in-depth walkability analysis and processed by the WPI team. The information is the basis behind all recommendation plans and conclusions drawn. The different types of data were processed for use in improving walkability in Hong Kong. After processing the data collected, the team generated recommendation plans for the four routes in the four districts. From development of the recommendation plans, along with the analysis of the results, the team drew conclusions about walkability in Hong Kong.

5.0 Recommendations

From these results, the team created specific recommendation plans for each of the 16 routes walked and produced general recommendations that can be applied to all of Hong Kong's harbor front districts. The team analyzed the focus areas generated by WAT and used the walking maps to create specific recommendations for each route. From these specific recommendations, the team used the most frequent focus areas to produce general recommendations for all of Hong Kong. The team also provided recommendations to improve the Walkability Analysis Tool for future use.

5.1. Route Recommendations

By using detailed, WAT-generated focus area information, this chapter provides Designing Hong Kong, the Harbour Business Forum, and other interested parties a detailed recommendation plan that covers each of the four traveled routes in each of the four districts. Each section discusses one of the 16 routes, detailing the exact improvements needed and their locations along the route. When put into practice, these recommendations will improve the walkability of the routes in the four focus districts of this investigation.

5.1.1. Yau Ma Tei

Yau Ma Tei was one of the least walkable districts in the preliminary examinations. This was confirmed during the in-depth phase of this project. General improvements are needed in the areas of footbridge and handicap accessibility signage. More development of the harbor front is required with the existing promenades being extended concurrently.

Route 1: Tung Chung Park to the Marine Police Operational Base

This route ended in a breakdown in front of the Marine Police Operational Base. There was nowhere to reach the waterfront within 100 m. A solution is to extend the promenade in front of the Long Beach north to in front of Hampton Place and create another access point to the waterfront on the northern side of Hampton Place. To reach this access point from the other side of the street, a connection is needed. Because this is a low traffic street, a street-level connection such as a zebra or at least an unmarked crossing is sufficient. This promenade needs seating areas and nice landscaping to mesh with the Long Beach promenade. The general attractiveness and aesthetics of the route also needs to be improved as there are several empty lots and parking lots. More trees or planters should be placed along the sidewalk and the empty lots should either be developed or cleaned up.

Figure 5.1-1 Empty Lot near Waterfront in Yau Ma Tei

The other main issue along this route is the lack of signage. The one footbridge crossed did not have signage on either side indicating that there was a footbridge or where it led. It also did not have

signage showing that it was handicapped accessible on both sides. This could easily be remedied by adding signs on each side for both. In addition to a lack of footbridge signs, this route also lacked any signs for the harbor front and public transit. Nam Cheong MTR Station is relatively close to the middle of the route and more signs directing pedestrians there would be useful. In addition, there is no way that anyone but a resident of this area would know that there is waterfront in this area because there are no signs and the waterfront is only popular with locals. There needs to be signs directing pedestrians to the harbor on both sides of the footbridge and near either the schools or Hampton Place to reduce the confusion in finding the waterfront.

Route 2: Langham Place/Mong Kok MTR to Long Beach Waterfront

The main issue with this route is signage. The footbridges over Tong Mi Road and Hoi Fan Road both need signs for their location and to indicate whether they are handicapped or not. The D1 Exit from the MTR station is not handicapped accessible but there is another route through Olympian City II that is handicapped accessible. However, this route is not labeled nor is it indicated that Exit D1 is not handicapped accessible. It is simple for either the MTR or Olympian City to post a sign for the elevator near the exit from the MTR Exit D footbridge.

Figure 5.1-2 MTR Exit D1 Sign

Another issue is the need for amenities along the route. A public toilet is needed at the end of the route, preferably near the waterfront promenade, and a sign indicating its location. There also should be more sitting areas and recreational spaces. One suggestion is to make the piazza outside of Olympian City II on Cherry Street more of a park. Adding benches and more greenery makes the route nicer to walk. In addition, the safety at the entrance/exit to the Island Harbour View parking area should be examined to ensure that the pedestrian traffic is not in danger from vehicles entering and exiting the parking lot.

Route 3: Yau Ma Tei MTR Station to Yau Ma Tei Typhoon Shelter

This is the route that needs the most improvement in Yau Ma Tei. First and foremost, this route needs to be more direct. One solution is to extend harbor front access further south along the typhoon shelter and build well connected infrastructure to reach it. In addition, the footbridge over Waterloo Road needs signs for its location on both sides. The footbridge through Olympian Park needs a sign at the edge of Hoi Wan Road and the MTR Exit E footbridge on the inside of the mall needs a sign indicating that they are handicapped accessible. There are no signs for the harbor front anywhere along the route. A suggestion is to place one inside the Olympian City I mall and another just outside the exit pointing towards the waterfront.

This route ended in a breakdown on Hoi Fai Road. There was no access to the waterfront for over 200 m in either direction. A solution is to extend the promenade that is in front of the Silversea east and south around the Typhoon Shelter and create access points to the waterfront along Hoi Fai Road. To reach these access points from the other side of the street, a connection is needed. Because this is a low traffic street, a street-level connection such as a zebra or at least an unmarked crossing would suffice. This promenade would need seating areas and nice landscaping to mesh with the Silversea promenade. The current solution to this lack of waterfront is to simply cut through a hole in the fence, pictured below in Figure 5.1-3.

Figure 5.1-3 Hole in Fence for Waterfront Access

Another issue is with unmarked and informal connections. The unmarked crossing on Portland Street at the exit to the MTR Station needs to have a zebra crossing because of the high pedestrian and vehicular traffic at that intersection. In addition, the informal crossing across Hau Cheung Street needs a connection. Because this is mainly the entrance/exit to a gas station, a street-level crossing such as a zebra or unmarked crossing is sufficient. The safety at the entrance/exit to the Bank of China parking area needs to be checked to ensure that the pedestrian traffic is not in danger from vehicles entering and exiting the parking lot.

Route 4: Cherry Street Park to Silversea Promenade

The main issue along this route is the signage. The footbridge through Olympian Park needs a sign at the edge of Hoi Wan Road showing its location and that it is handicapped accessible. The MTR Exit E footbridge on the inside of the mall needs a sign indicating that it is handicap accessible. The footbridge across Hoi Fai Road needs signs on both ends showing the location of the footbridge and

indicating that it is handicap accessible. In addition, there are no signs for the harbor front anywhere along the route. A suggestion is to place one inside the Olympian City I mall and another just outside the exit pointing towards the Silversea Promenade.

Figure 5.1-4 MTR Exit E Footbridge

Finally, the safety at the entrance/exit to the Bank of China parking area needs to be checked to ensure that the pedestrian traffic is not in danger from vehicles entering and exiting the parking lot.

5.1.2. Tsim Sha Tsui

Overall, Tsim Sha Tsui has good walkability. This is mainly because of the large number of connections throughout the area. The majority of the walkability issues in Tsim Sha Tsui stem from the confusion in navigating the area. Though the district is well connected, many of the connections are subways that wind underneath the district in counter-intuitive paths or footbridges out of the way from the normal path. In addition, there are often choke points such as parking garages that hinder the pedestrian flow. Many of the routes in Tsim Sha Tsui have unmarked crossings in areas with high

vehicular and pedestrian traffic, slowing down the pedestrian traffic and decreasing the safety. The following paragraphs detail specific recommendations for four main routes between hinterland and harbor front within Tsim Sha Tsui.

Route 1: Kowloon Park to Star Ferry Pier

Overall, the route is direct and simple to follow, but there are a few areas in need of improvements. The footbridge connecting Kowloon Park to the China Ferry Terminal needs a cover installed to protect pedestrians from bad weather. The footbridge is also missing handicap accessibility signs. These are important because at first glance the bridge does not appear to have a handicap option. The recommendation would be to add a handicap symbol to the signs already in existence that direct pedestrians across the bridge. The only main public transit stops are at each end of the route. Canton Road is one of the most popular streets in Tsim Sha Tsui because of the upscale shopping and hotels. A large bus stop would be useful on Canton Road for ease of access. The route also lacks seating, specifically at the promenade. The promenade has seating to the east of the Star Ferry Pier, but the west side does not have a seating area even though there is a nice viewing area and an entrance to the Ocean Centre and Terminal. Several benches should be installed looking out into the harbor.

The main concern when walking down Canton Road from Kowloon Park to the Star Ferry is choke points. There are a few areas where the path changes widths, thereby restricting pedestrian flow. However, the main issue is the parking garages (see Figure 5.1-5). The parking garages are modal conflict areas; this is dangerous to both pedestrians and vehicles. The parking garages have guards directing traffic because Tsim Sha Tsui is a high traffic area. This increases the safety of these garages, but the pedestrian traffic flow is significantly diminished. To increase both the safety and traffic flow rate of pedestrians and vehicles, a separate connection should be placed along Canton Road. Canton Road is lined with upscale shopping centers so the installation of a subway would detract from the shopping

experience. However, if a footbridge was installed, every shop would need a second floor access point. There is not an easy solution for this problem, yet this needs to be addressed. The recommendation proposed is to use Gateway Boulevard as an access road for the parking garages, therefore removing the entrances on Canton Road. This would significantly improve the pedestrian flow and the safety along Canton Road, a famous shopping area.

Figure 5.1-5 Parking Garage on Canton Road

Route 2: Tsim Sha Tsui MTR exit C2 to Symphony of Lights Waterfront

This is one of the most popular routes in Tsim Sha Tsui, especially around 8pm when the Symphony of Lights starts. The number of marked connections along this route is satisfactory, however due to the size of the pedestrian traffic; the unmarked connection should be replaced by a zebra crossing. The unmarked connection is on the corner of Middle Road and Nathan Road, two very heavily traveled roads in the district.

The route's quality scored low because of the confusion involved with navigating the SOGO mall (see Figure 5.1-6). The connection is used often by both residents and visitors because there are only a few connections across Salisbury Road. The connection winds through the mall to connect both sides of the street; this causes the route to be far from intuitive. To solve this problem, there are several options, each with varying results. The first option would be to install more useful directional signage in the subway. One solution would be to lay colored paths or a very frequent series of signs within the subway system for people to follow. While this would be an easier solution to the problem, the impact would be limited. The path already has very good signage in one section so it would only be a small improvement. Also, these signs would have less of an effect on the quality of the route because people tend to follow signs after becoming lost or confused rather than before. The second option would be to add a secondary path in the tunnel, a direct path for pedestrians who prefer not to walk through the SOGO mall. This option increases intuitive navigation by having a single straight line path, yet the creation of one is an expensive, time-consuming project. The final option would be to install a zebra crossing on Salisbury Road connecting Nathan Road to the harbor front. This direct path is the most intuitive path and therefore the easiest to navigate. Pedestrians can see their destination and are allowed to walk straight to it. This would greatly increase the pedestrian flow rates for minimal costs; however, doing so would disrupt vehicular traffic flow and place priority on pedestrian flow. The quality of this route needs to be addressed because it is a highly traveled path that involves too much confusion.

Figure 5.1-6 Entrance to SOGO Underground Mall

Route 3: Knutsford Terrace to Avenue of Stars Promenade

This is a very popular route that needs a lot of improvement. Both endpoints are two of the most popular destination in Tsim Sha Tsui and Hong Kong. This route also goes through SOGO and has the same problem as the route Tsim Sha Tsui MTR Exit C2 to Symphony of Lights Waterfront route. This route would benefit from any of the improvements mentioned earlier to the SOGO subway navigation system.

This route has too many unmarked connections; this is unacceptable because of the number of pedestrians that travel between these destinations. The intersection of Hart Avenue and Chatham Road and the intersection of Prat Avenue and Chatham Road needs to be addressed immediately. These roads have high vehicular and pedestrian traffic. They are dangerous and difficult to cross; therefore, zebra crossings should be installed immediately. Doing so would increase the safety and flow rate of

pedestrians. The unmarked crossings at the intersections of Kimberly Street and Kimberly Road with are of slightly lower importance because the traffic rates are lower but they still need to be addressed.

There is proper signage for the subway and it is handicap accessible, but it is missing handicap accessibility signs. The recommendation is to install these signs on the signs for the subway that indicate its location. There is very little along the route in terms of parks and recreation and visual aesthetics because the traffic along the road blocks the view of the park on the other side. The route needs to have art, plants, and greenery along it to make it a more pleasing walk. Because the route is over a mile long there needs to be more seating along it. Because of the large amount of pedestrians who visit there, there needs to be more public seating in Knutsford Terrace and at the harbor front. There is seating access to the east for people who are going to the Avenue of Stars; therefore, installing more seating on the promenade is of limited importance. The public toilet near the promenade is missing a visible sign; one needs to be installed to account for the high pedestrian traffic through the area.

Finally, there was a large section of construction through the middle of the path. The construction zone had a detour for safety but the detour put the pedestrians in the road, very close to the vehicular traffic, with minimal safety barriers (see Figure 5.1-7 below). This needs to be reinforced and the safety double-checked to make sure that no one will be injured. This route, as popular as it is, could use significant improvements to enhance its walkability.

Figure 5.1-7 Construction Detour on Chatham Road South

Route 4: Concordia Plaza to East TST Promenade

The Concordia Plaza is a major bus terminal in East Tsim Sha Tsui so the route from the station to the water front is popular and heavily traveled. However, the directness of this route is unsatisfactory; the pedestrian must cross several more streets than necessary to get to their destination and follow a counter-intuitive path. The ideal path would be to follow Science Museum Road to the intersection with Salisbury Road and then proceed to cross a connection across Salisbury Road. Building a connection here would help with the ease of navigation and the pedestrian flow as well as maximize the full usage of the promenade.

The footbridge that must be used to traverse Salisbury Road needs signs directing pedestrians to it and it also needs a cover to protect them from the elements. The unmarked connection on the map needs to be addressed because there is too much vehicular traffic for good pedestrian flow and safety. The construction along the path must be checked to make sure that it is safe for pedestrians to walk

alongside. There is not enough seating along the route, specifically at the end. The Tsim Sha Tsui promenade is one of the best in Hong Kong and is popular all times of the day; therefore, it needs more seating on the east Tsim Sha Tsui side where this route ends. The seating at the East Tsim Sha Tsui Promenade, Figure 5.1-8, has to be extended further along the promenade. Because of the number of people traveling this route, there needs to be at least one if not two toilets installed along the route. An improvement to these aspects will improve the pedestrian convenience and comfort, which will inevitably increase the number of people who walk this already popular route.

Figure 5.1-8 East Tsim Sha Tsui Promenade and Seating Area Under Trees

5.1.3. Wan Chai

Wan Chai is a commercial district that is presently under a lot of construction. There are many aspects in need of improvement, but a lot of improvements will need to take place after the construction is complete. Based on the routes walked, Wan Chai is in need of better handicap signage and an improved and continuous harbor front promenade.

Route 1: Central Library through Victoria Park to Harbor Front

The connections along this route are excellent. However, the signage for the connections is not good. There needs to be signage near the Hong Kong Central Library pointing to the footbridge and on the harbor front pointing to the footbridge. In addition to direction, these signs and the existing footbridge signs inside of Victoria Park also need to note that these footbridges are handicap accessible. Though the aesthetics, shown in the figure below and the route's seating areas are great, having great greenery and several areas to sit. The signage along the route needs improvement. The signs within Victoria Park were smaller and not spread out. Signs need to be placed more often in the park, making navigation towards the harbor front much easier. There should also be a public toilet along the harbor with signage pointing to it. The final improvement is to place a bus stop in front of the starting point, the Hong Kong Central Library, making the route easier to access.

Figure 5.1-9 - Victoria Park Entrance

Route 2: Times Square Shopping Area to Hung Hing Road Waterfront

This route has a lot of potential but there are too many unmarked connections on this route that can easily be changed to zebra crossings. The connections across Gloucester Road are very dangerous to pedestrians and need to have a zebra crossing to aid pedestrian connectivity. This connection is important because it leads to the footbridge connecting the hinterland to the harbor front. The informal crossings should both be changed to at least a cautionary crossing and a drop curb. The crossing across Jaffe Road is important and should be a zebra crossing. The route can also be changed to turn before the gas station; therefore, a small pedestrian throughway should be created directly after the footbridge, connecting it to Marsh Road. The gas station attracts many taxis from the area, causing a long waiting line to form, preventing pedestrians from crossing safely. This increases the danger and risks to those walking in that area. Changing this path would avoid all parking garage areas along the route. After the construction is completed, this route will increase in popularity. For this reason, the footbridge needs to be modified to be handicap accessible and weather protected. This would allow all visitors to get from hinterland to harbor front.

The pedestrian experience of this route is very low. Beginning in the hinterland, the area from Russell Street to Hennessey Road is not aesthetically pleasing. A pedestrian must walk under the overpass near the bus terminal. This can be fixed by adding potted plants or colorful murals along the route. Lighting in this area would also improve the visual aesthetics. In addition, there are several small construction projects in this area that can be cleaned up much better. Seating areas can be added along the route after the bus station near Jaffe Road. In addition, once construction at the harbor front is completed, there needs to be a zebra crossing across Hung Hing Road. This harbor front will be a popular destination and the zebra crossing will increase pedestrian safety. Before construction is completed, a public toilet should be added near the harbor front along this route, increasing pedestrian convenience.

Until the construction is completed, signage needs to be added indicating no harbor front access. In addition, a detour should be set up directing pedestrians to the nearest harbor front. This construction, shown in the breakdown in the figure below, will be going on for years; therefore, this detour can be used for regular visitors as well as for tourists.

Figure 5.1-10 - Construction Breakdown Point in Wan Chai

Route 3: Wan Chai MTR to Expo Promenade

This route is the most important route in Wan Chai because the Expo Centre is a popular destination. Connections along this route need some improvement. The footbridge across Gloucester Street needs to be handicap accessible. Both footbridges also need connection signs before the entrances. To avoid the parking garage areas, one of the exits of the MTR station should be changed to exit on the opposite side of Lockhart Road as there are two exits directly next to each other, thereby eliminating one of the two unmarked crossings on the route as well. If this is not feasible, the unmarked crossing across Lockhart Road can be changed to a zebra crossing. The last unmarked crossing across Jaffe Road should be turned into a zebra crossing to increase pedestrian safety. The

signage between the two footbridges needs improvement. There are several signs that point directly at walls, while others have the same destination, but with different directions on the arrows. These signs on the footbridge need to be adjusted and one path needs to be chosen, with all arrows pointing in the same direction.

The visual aesthetics along the route are minimal, as seen in the figure below. A seating area with some plants needs to be placed along Fleming Road to increase the aesthetics. The seating at the Expo Centre, before the waterfront, needs improvement. More benches need to be added because of the high volume of visitors to this area. Finally, the completion of the construction will allow pedestrians to cross the road. This means that a zebra crossing will be necessary to cross Expo Drive East. This zebra crossing will increase pedestrian safety as well as reduce problems with tour busses.

Figure 5.1-11 - Poor Aesthetics along Route in Wan Chai

Route 4: Intersection of Lockhart and Fenwick to Lung King Street Waterfront

The connections along this route are good. The footbridge across Convention Avenue and Harbour Road needs to be handicap accessible and signage indicating this should be added to both sides of the footbridge. Connection and handicap accessibility signage need to be added to both sides of the footbridge over Gloucester Road. This route is direct and has good connectivity, but lacks in the pedestrian experience section. There need to be several amenities added to the route. A public toilet needs to be added in the middle of the route, near the Harbourview. A bus stop in this same area will increase the convenience of the route. Once construction is finished, more seating should be added and a larger promenade added to the waterfront. The overhanging shelter overlooking the water, seen in the figure below, should remain because it provides weather and sun protection; however, more benches can be added in this area until the construction is completed.

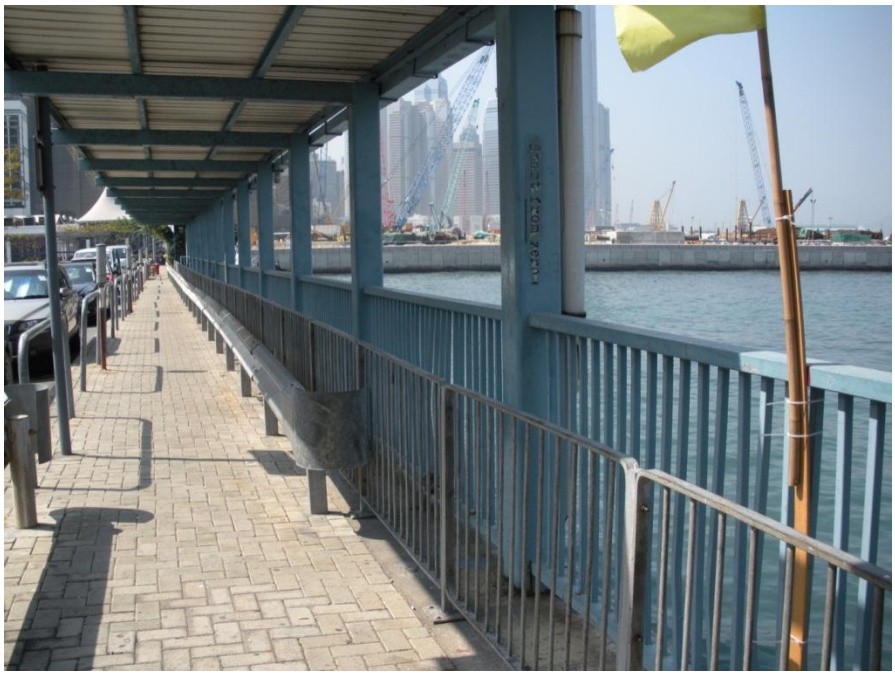


Figure 5.1-12 - Waterfront near Fenwick Pier

5.1.4. Sai Ying Pun

Sai Ying Pun is well-known for its “Dried Seafood Street” and is a residential area in need of a lot of improvements. Some general recommendations for this area include better signage, more zebra crossings, more public transit stations, and more public toilets. The harbor also needs serious attention; the harbor front promenade should be continuous throughout the whole district.

Route 1: Western Court Block to End of Hill Road

The three-way crossing at Connaught Road should be made into a four-way zebra crossing for convenience and directness of route. To ensure pedestrian safety, the parking garage should have lights, sounds, or an attendant to warn pedestrians if a vehicle is exiting. The route was fairly short and the infrastructure of the route is satisfactory.

The pedestrian experience needs some improving. More recreational areas can be added, especially at the end of route, because there is a breakdown and no access to the waterfront as seen Figure 5.1-13 below. Harbor front access can be made available at the end of Hill Road. If this is not possible, there needs to be signs showing where the harbor can be accessed. Signage for the harbor front and public transit stations needs to be increased along the whole route. This route also needs more seating areas and public toilets. These can be placed near the middle of route for convenience and cost. Instead of placing three along the route (beginning, middle, end) the route is short enough for just one in the middle. These can also be added to the suggested harbor front promenade.

Figure 5.1-13 Breakdown at the End of Hill Road

Route 2: Hollywood Road Park to Western Fire Services Street

The directness of the route needs improvement by adding another zebra crossing across Connaught Road; currently a pedestrian has to cross Des Voeux Road West to get to the zebra crossing across Connaught Road and then cross Western Fire Services Street to reach the harbor front. There are too many unmarked crossings in the area; the unmarked crossings at Bonham Strand West and Wing Lok Street need to be changed to zebra crossings because there is a high level of vehicular traffic on Des Voeux Road. The informal connection on Chug Kong Road is acceptable because the street did not seem to be well traveled. A cautionary crossing should be implemented but it does not have to be changed to a zebra crossing. There is a breakdown across from Chug Kong Road because of the infrastructure of the fire station. The wall was built too far onto the sidewalk, cutting the width significantly down that the pathway can no longer be used. To fix this problem, the sidewalk can be removed completely on that side of the street, forcing pedestrians to use the other side. The other option is to widen the sidewalk where the wall starts; however, this option would be more costly. The pedestrian safety needs to be

checked at the one parking garage along the route. There needs to be lights, sounds, or an attendant to let pedestrians know that a car is coming.

Overall, the pedestrian experience can use improvements. To improve mobility around the area, a suggestion is to place a public transit stop at the intersection of Connaught Road West and Sutherland Street. This location will be convenient because there is a bus station at the beginning of the route and a MTR and Ferry Terminal to the east of the harbor front. This new location will provide another way of getting closer to the harbor but also will be conveniently located near Sun Yat Sin Memorial Park. To improve visual aesthetics along the route, small planters or greenery can be placed on the sidewalks. The streets are already overflowing with dried seafood shops and some color added to the streets will improve the aesthetics. There are a lot of small construction projects around which the safety and signage needs be checked. The signage for public transit stations and harbor front is lacking and installing signs at the intersections of roads will be very beneficial to the pedestrian. The seating areas along the route and harbor front promenade need to be increased. Figure 5.1-14 below shows the existing harbor front access with no seating areas. The harbor front promenade also needs to be built up more to include seating areas, greenery and a public toilet.

Figure 5.1-14 Existing Harbor Front at the End of Western Fire Services Street

Route 3: King George Park to Sun Yat Sin Park

The directness of the route is satisfactory and does not need much improving. The one informal connection can be either made into a zebra crossing or unmarked connection. The one footbridge along this path is missing the proper handicap accessibility signage and a sign needs to be placed near the entrance of the footbridge on Connaught Road West. At the beginning of the route there are parking garages; these should have lights, sounds, or an attendant to ensure pedestrian safety.

The pedestrian experience needs a lot of improvements. Even though one of the focus areas is parks and recreation, the beginning and end points along the route are parks and there really isn't a need for another one. However, there are no public transit stops. This needs to be remedied because Sun Yat Sin Memorial Park, shown in Figure 5.1-15, is a popular destination in this district. If a public

transit station was placed at the intersection of Connaught Road West and Sutherland Street, it would be convenient for two of the surveyed routes and within 400 meters of both destinations. To improve the visual aesthetics, more greenery and plants need to be placed along the route, in addition to a seating area near the middle of route. The seating area will provide a resting point for pedestrians who are unable to walk the whole route at once. Another public toilet can be placed along the route. One located in the beginning or middle is the most convenient because there is already one located at the end.

Figure 5.1-15 Sun Yat Sin Memorial Park

Route 4: Queens Road and Western Street to End of Fung Mat Road

The intersection of Des Voeux Road West and Water Street must be made into a four way zebra crossing to increase the directness of route. There is an informal crossing across Fung Mat Road at the end of Water Street, which can be made into a zebra or cautionary crossing. There is also a breakdown, shown below in Figure 5.1-16, at the end of the route with no access to the harbor front. Instead, there needs be a harbor front promenade connected to Sun Yat Sin Park. This will promote a connected harbor front and increase walkability of the harbor front. The pathway should be changed to avoid the

parking garage to remedy the breakdown and meet up with the connected harbor front. The addition of a public toilet in the middle of the route, near around Des Voeux Road West, will be convenient and improve the pedestrian experience.

Figure 5.1-16 Breakdown at the End of Fung Mat Road

5.2. General Recommendations

Based on the 16 routes covered in the in-depth district analysis, along with the survey results, several general recommendations are presented about the four final districts: Tsim Sha Tsui, Yau Ma Tei, Wan Chai, and Sai Ying Pun. The connections in these districts need to have more zebra crossings and fewer unmarked or informal crossings. This will increase the pedestrian safety when crossing streets. Currently, many of the routes could be more direct than they are. More direct routes will decrease the time it takes to travel from hinterland to harbor front. The distances of the current route and the straight line distance, as shown in Appendix G.6, vary. Most current routes are much longer than the straight line distance. "Shortest route" is the most important preference in choosing a route for

pedestrians in Hong Kong. Creating more crossings will decrease the time and increase the directness of the route.

One of the other highly selected route choices was “ease of way finding”. An increase in signage will aid in the ease of way finding. The signage indicating handicap accessible connections needs the most improvement in these routes. In addition to handicap signage, signage pointing to the harbor front, especially in less popular areas, will increase the ease of navigating the districts. These signs can easily be incorporated when the new Harbour Logo is introduced. These signs need to be placed in popular areas, along routes leading from more popular locations, and well-traveled but less popular routes.

Pedestrian friendliness is a large component of walkability. The pedestrian friendliness of these four districts is better than expected, but can still use improvements. Along many of the routes there is a lack of access to public toilets. An increased number of public toilets, especially at the harbor front, will increase pedestrian convenience. In addition to toilets, more seating areas will increase pedestrian friendliness; even among the shorter routes, a seating area in the middle between hinterland and harbor front is helpful. Finally, an expanded harbor front promenade is needed in most districts. This expanded promenade allows for many more route choices options, which in turn will reduce pedestrian congestion in many areas.

Though data was collected from only four districts, the data suggests that these recommendations will be highly applicable to Hong Kong as a whole.

5.3. WAT Recommendations for Future Improvements

WAT was created to analyze the walkability of a route in Hong Kong from hinterland to harbor front. It was created as a result of the team’s results and data collection. The version included in this

report can be considered a prototype. It demonstrates the usefulness and applicability of the system, but there are several improvements than can be made to increase its capabilities. Some improvements were made to the system after the initial testing of the system with the routes. These improvements were as follows: a simplified user interface, the addition of the approximate length of the route, and the focus area prompts were adjusted to better convey the needs of the route. The group also suggests several improvements to the criteria measured for the tool along with improvements for the data processing and the focus areas that are produced.

The improvements to the criteria should not only help clarify the route aspects being graded, but also increase the functionality of the system. The current unmarked connections category includes both cautionary connections (connections that say look left, look right) and those with only a “drop” sidewalk. The group recommends separating this criterion into two sections because there are areas where an unmarked connection is appropriate, yet they should always have a warning saying look left and look right. The criteria parking garages should also be changed to modal conflicts (excluding street level connections). This covers not only parking garages but all high traffic entrances such as gas stations which were marked as parking garages during our analysis. Also a secondary category should be added to differentiate between safety aspects of modal conflicts. Some areas have lights or guards to indicate when to walk, whereas others do not have any warning of danger.

The amenities section is based primarily off of pedestrian perception. To better measure these criteria a few factors should be added. The first recommendation would be to separate the criterion quality of route into ease of navigation and route infrastructure condition. The new criteria would still be measured as a percentage of the route and both criteria would have their own individual considerations in the output. The criterion called route classification should be added with the input options being: residential, commercial, industrial, or a mixture. The visual aesthetics criterion can also

be separated into categories such as greenery, shopping, art or a mixture. The construction category can be separated into the three categories of beginning, middle and end. Finally, the size of several criteria should be added to the rubric for increased functionality. These criteria are: parks/recreation, construction, harbor front promenade and seating areas. The improvements outlined can be used to increase the data processing ability of the system. This will generate more useful focus area outputs and increase the functionality of WAT.

6.0 Conclusion

Hong Kong is considered a walking city, yet the needs and concerns of pedestrians traveling from hinterland to harbor front need to be addressed to make walking in Hong Kong more enjoyable. The team created the Walkability Analysis Tool (WAT) to help address these needs and to make Hong Kong more walkable. The team used the methods outlined in Chapter 3 and the results of study presented in Chapter 4 to make recommendations in Chapter 5 to enhance the pedestrian experience in Hong Kong.

The background information displayed in Chapter 2 gave the team a better understanding of what walkability is and how to measure it. Other walkability studies aided the team in developing their own measurement system. Along with a review of literature on walkability, the team also compared and contrasted the urban planning of other historic cities with Hong Kong's.

The methods used to create WAT and make recommendations were a three-step process. The process consisted of conducting a preliminary evaluation to become more familiar with the 16 harbor front districts and the problems that arise when walking in Hong Kong, conducting pedestrian perception surveys to identify the public's perception of walkability in Hong Kong, and conducting an in-depth evaluation using WAT to evaluate the walkability of 16 routes and create recommendation plans. The team created the criteria used in WAT from the researched background information, preliminary evaluations, and results of the surveys. This study tested WAT on 16 routes in four districts selected by the preliminary evaluations. WAT generated focus areas for each route and the team used these focus areas to create specific recommendations for each route walked.

The results of WAT allowed the team to make recommendations for each of the 16 routes as well as provide general recommendations for harbor front districts in Hong Kong. Several of the general

recommendations were as follows: increase the number of signaled zebra crossings, implement better safety standards for parking garages, increase directional signage for the harbor, and expand and connect harbor front promenades.

Both Designing Hong Kong and the Harbour Business Forum are invested in making Hong Kong more enjoyable for everyone; therefore, creating a better pedestrian experience is significant to both organizations. This project is also important to the WPI team. The team gained valuable knowledge and experience while working with both professional organizations. The team developed WAT to aid in enhancing Hong Kong's pedestrian friendliness. WAT, with improvements for future use, can be used to assess all Hong Kong districts with harbor front access. WAT is a valuable instrument that helps interested parties create a better pedestrian experience and a more pleasing Hong Kong.

Although the team was able to draw conclusions and make recommendations from the data that they collected, further research should be done to improve the pedestrian experience. This study was limited by time and only allowed the researchers to gather information for two months. This significantly hindered the number of people that the team surveyed. The team recommends surveying a larger population in more, if not all, harbor front districts. This would encompass a larger sample of people and would allow for more correlations in the data. The team suggests surveying people at different times of the day and different days of the week. Another recommendation for future research is to walk more routes in each harbor front district. Future researchers should walk at different times of the day and different days of the week because it will provide more data on the pedestrian congestion; this will assist the creation of more detailed recommendations for each district. In conclusion, the team recommends a larger sample size for a pedestrian survey and a more detailed in-depth study of each district, with more routes walked, to enhance the pedestrian experience in Hong Kong.

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