Task Force on Harbourfront Developments on Hong Kong Island

For discussion on 7 May 2018

TFHK/06/2018

Enhancing the Design of Cycle Track within Waterfront Promenades

PURPOSE

This paper briefs Members on the progress of a "*Feasibility Study for Enhancing the Design of Cycle Track within Waterfront Promenades*" and seeks comments on one of the required deliverables, i.e. the proposed evaluation mechanism on identifying suitable design options for a shared-use cycle track in the developed area along the waterfront in Hong Kong.

BACKGROUND

2. In general, the Harbourfront Commission (HC) recognizes cycling as an environmentally friendly transport means and that cycle tracks could bring vibrancy to the waterfront. Different cycle track proposals have been made in the various district-based planning studies, including the "*Urban Design Study for the New Central Harbourfront*", the "*Hong Kong Island East Harbour-front Study*" and the "*Urban Design Study for the Wan Chai North and North Point Harbourfront Areas*". These proposed cycle tracks run along the waterfront from Central to North Point, and then towards Quarry Bay through the proposed boardwalk underneath the Island Eastern Corridor.

3. On the other hand, the Hong Kong Cycling Alliance has been proposing a continuous cycle track along the northern shore of the Hong Kong Island (NHK) since 2011. Such a proposal received general support from some District Councils looking after harbourfront areas.

4. In view of the above, the Development Bureau (DEVB) engaged Consultants to commence in 2017 a feasibility study to recommend an evaluation mechanism on identifying suitable design options for a shared-use cycle track along the waterfront in Hong Kong, as well as to put forward specific proposals for providing a continuous shared-use cycle track along the waterfront from Sheung Wan to Sai Wan Ho. The Consultants have completed their overseas researches and have come up with a draft evaluation mechanism for Hong Kong. More details are set out in the ensuing paragraphs.

PROGRESS OF THE STUDY

5. According to the Consultants' researches, the shared-use approach (i.e. same space to serve as both footway and cycle track) has been widely adopted in many cities, including Hangzhou, Taipei, Singapore, London, Paris, New York City, etc. More details are at **Annex A**. Based on these examples, it is observed that six design options are commonly used to respond to different site conditions / constraints (e.g. available space, physical constraints and opportunities for connections and views) when constructing a shared-use cycle track in developed areas. Different design options could be used at different sections of the same cycle track.

6. The six design options are -

(a)&(b) Elevated and Tunnel options: these options will be considered when the cycle track reaches conflict zones or is at constrained locations. The construction cost of these options will be relatively higher. Users experience under the tunnel option would also be less pleasant;

(c) Edge option: this option will allow users to enjoy the scenic views of the city and the harbour. It could also preserve the existing seawall;

(d) Stacked option: this option is usually used when there is a high volume pedestrian / cycle flow and two levels of space are needed for the various activities;

(e) Inland option: with more inland space, this option provides the best connectivity to the public. However, it is disconnected from the waterfront, with relatively less pleasant noise level and air quality; and

(f) Boardwalk option: with its relatively higher construction cost, this option is usually used as the last resort. In Hong Kong, it is necessary to consider the implications of the Protection of the Harbour Ordinance (PHO) as well.

Some typologies of the above design options are at **Annex B**.

The Evaluation Mechanism

7. Taking into account relevant experiences in other cities, the Consultants have devised a draft evaluation mechanism for assessing which of the six design options should be adopted for individual sections of a proposed shared-use cycle track in Hong Kong. In gist, the draft evaluation mechanism consists of three components (see **Annex C**) –

(a) Qualitative Analysis: a three-tiered model is proposed for assessing the merits and suitability of the respective design options for specific section of the cycle track. The assessment variables are –

(i) Tier 1 – Responsible Test: Is the design option a responsible proposal for the section concerned?

Variables include: safety related to user conflicts, user experience, connectivity, natural environment;

(ii) Tier 2 – Balanced Test: Could the design option strike a good balance on relevant aspects?

Variables include: order of magnitude cost, ease of being approved by relevant authorities;

(iii) Tier 3 – Bold Test: Is the design option a law compliant yet visionary proposal?

Variables include: impact on the PHO, is it a world-class project;

(b) Quantitative Analysis: design options that passed through the "Qualitative Analysis" will be put forward for "Quantitative Analysis", which will focus mainly on preliminary engineering issues. These include detailed studies of the ground conditions, utilities and infrastructure, regulatory constraints, existing land uses, and stakeholder considerations. It would also study whether and how constraints or concerns could be overcome through creative designs and engineering solutions; and

(c) Level of Service (LOS): LOS evaluation would be performed to ensure that the proposed design options could accommodate both the current and projected user demands without causing necessary congestion nor over provision of road space. The LOS model currently proposed for this Study is formulated by the Consultants after testing three different LOS evaluation methods, including the 2000 edition of the Highway Capacity Manual, United States Federal Highway Administration Shared-Use Path Level of Service Calculator and Alta's Path Level of Comfort Tool.

8. The above evaluation mechanism would help to identify suitable design options for individual sections of the proposed shared-use cycle track. During the subsequent design stage, public comments would be sought and the proposed options could be further fine-tuned.

WAY FORWARD

9. Members are invited to offer views on the draft evaluation mechanism set out in paragraphs 7 and 8 above. Subject to Members' comments, the Consultants will proceed to applying the evaluation mechanism in identifying suitable options for building a continuous shared-use cycle track from Sheung Wan to Sai Wan Ho and consult the Task Force again when there are more concrete proposals.

Annex A Examples of Shared-Use Approach in other Cities
Annex B Typologies and Examples of Design Options
Annex C Variables under the Evaluation Mechanism

Development Bureau
Atkins China Limited
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Examples of Shared-Use Approach in Other Cities

Example 1: Hangzhou

There are many scenic spots close to West Lake in Hangzhou. West Lake was added to the UNESCO World Heritage list in 2011, shores and causeways are relatively flat and perfect for cycling.

West Lake, Hangzhou

- Round Lake Route (12 km) with cycle width ranges 6 m – 10 m connecting the famous ten scenes of West Lake including causeway, temples, lakes, bridge, pagoda and ponds.

Features

- Shared path running through various classic scenic hotspots and historical landscapes.

Example 2: Taipei

Cycling is a common activity in Taiwan for leisure and recreation purposes in the past decade. Cycling facilities are continuously improved to enhance the connectivity and accessibility to point of attractions for cyclists. The Taipei area has about 250 km of bike paths.

Golden Riverside Cycling Path, Tamsui

- 10 km long, ranges 2 m – 6 m shared use path linking Guandu Bridge and Fisherman's Wharf. The bike path passes through natural, cultural sceneries and attractions.

Features

- Various scenic spots along the path (e.g. Fisherman's Wharf, Guandu Bridge).

Example 3: Singapore

Park Connector Network (PCN) is an island-wide shared use network linking major parks, nature sites and housing estates in Singapore. By 2016, it marked over 25 years of PCN and completion of about 300 kilometres (km) of path. Its main function is to improve connectivity between parks and provide accessible leisure options such as exercise areas and playgrounds.

Central Urban Loop

- 36 km long, ranges 4 metres (m) – 6 m wide, shared use loop linking 3 different parks and Housing & Development Board housing estates.

Features

- Food and beverage choices along the network.

Example 4: London

The Royal Parks were originally crown land, and gradually opened to the public in 19th century. The parks soon became popular places for relaxation, leisure and entertainment. Cycling is welcomed in designated areas in all the Royal Parks. Pedestrians have priority within the Parks. There are around 45km cycle paths within the parks where cycling is permitted, covering both shared use and segregated path for pedestrians and cyclists.

Tamsin Trail, Richmond Park

- 12 km long, average width of 3m shared path connecting park entrances at the park parameter, allow exploration of Isabella Plantation and Pembroke Lodge.

Features

- Shared paths running through 8 parks across London covering about 5,000 acres of historical landscapes.

Example 5: Paris

As of 2016, there are about 700 km of cycling routes in Paris including segregated bike paths, delineated bike lanes on carriageway and shared paths.

Seine Bike Path, Paris

- 15 km long, ranges 6 m – 10 m, shared use cycle track for pedestrians and cyclists along River Seine from Eiffel Tower to the Cathedral de Notre Dame.

Features

- Shared use cycle track running through scenic views along Seine River path and historical architecture.

Example 6: New York City

New York has the country's first bike path in 19th century. The City of New York has laid down more than 400 km of bike lanes, connecting various tourists spots such as Sixth Avenue, Central Park, Harlem and Brooklyn.

Central Park, New York City

- 10 km long Park Drive, average width of 6 m – 10 m around the park shared use by runners, joggers, pedestrians, cyclists and inline skaters.

Features

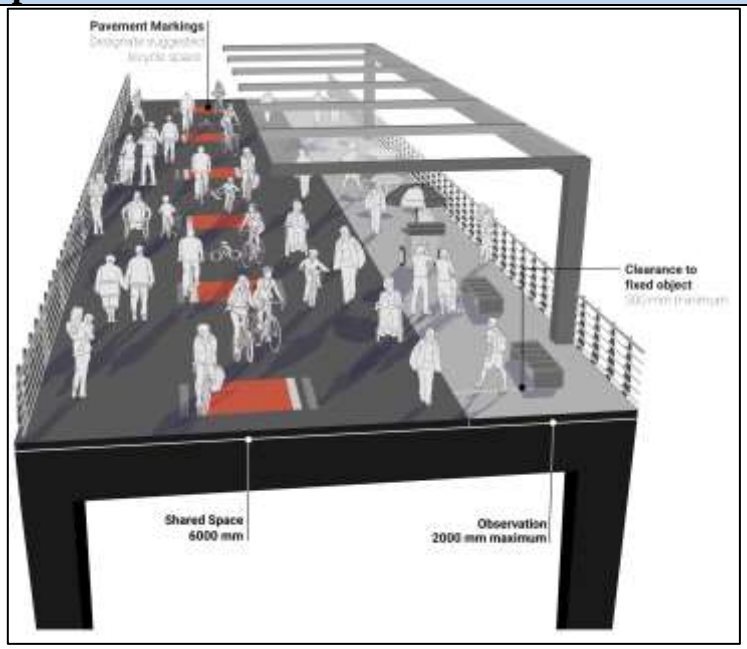
- Shared use path amongst cyclist and pedestrians with scenic views and attractions running along the park.

Annex B

Enhancing the Design of Cycle Track within Waterfront Promenades

Typologies and Examples of Design Options

Elevated Option



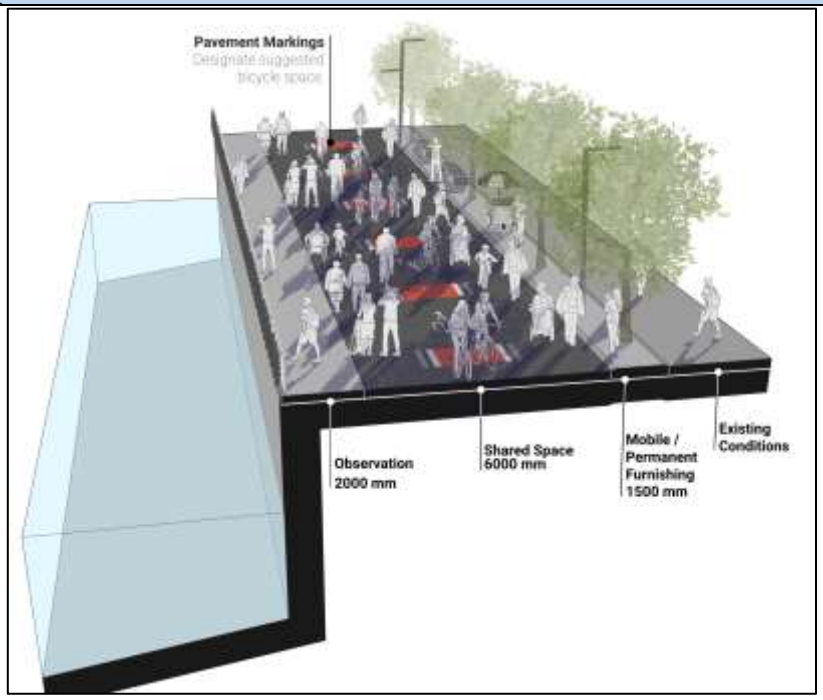
Typology of Elevated Option

Example of Elevated Option in Eastbank Esplanade, USA

Tunnel Option

Example of Tunnel Option in Rotterdam, Netherlands

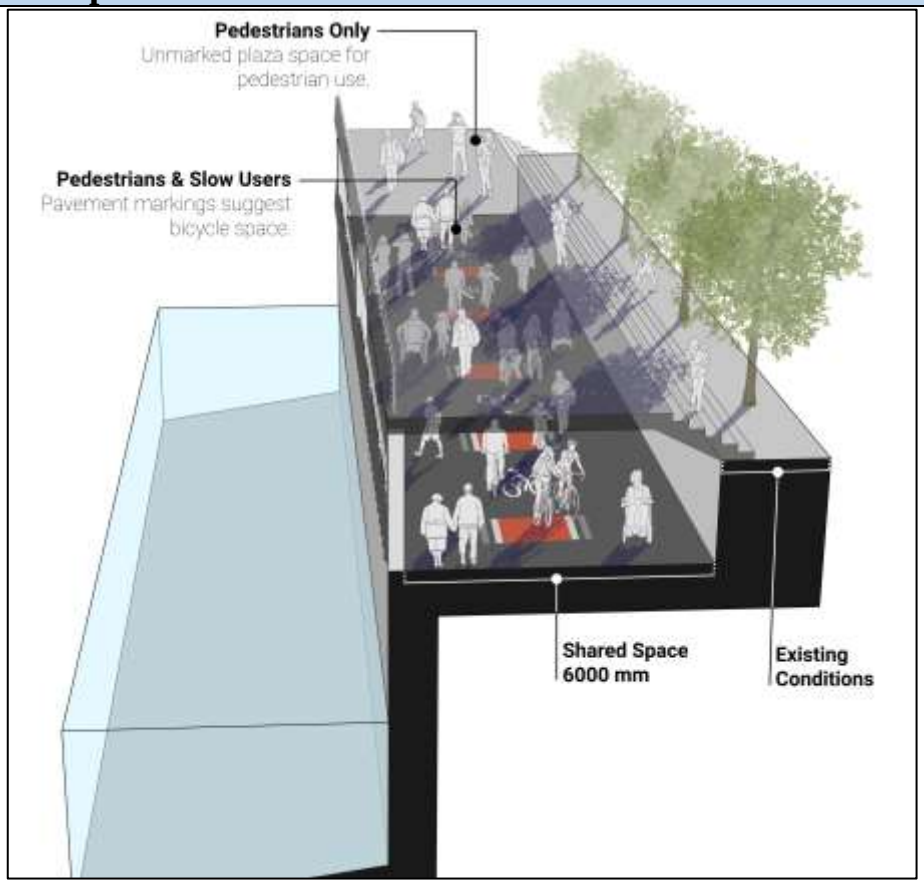
Edge Option



Typology of Edge Option

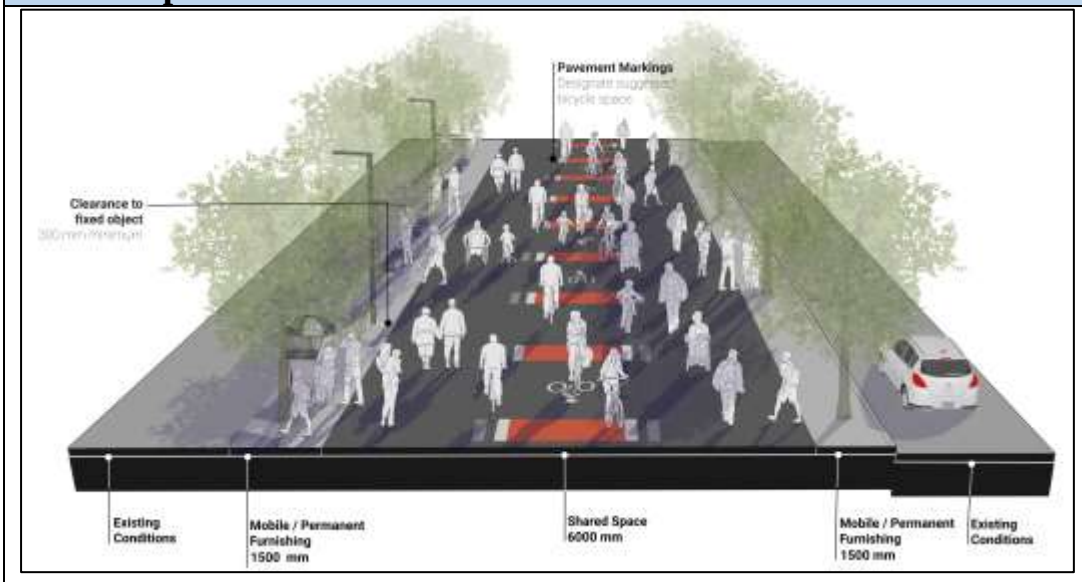
Example of Edge Option in Taipei, Taiwan

Stacked Option



Typology of Stacked Option

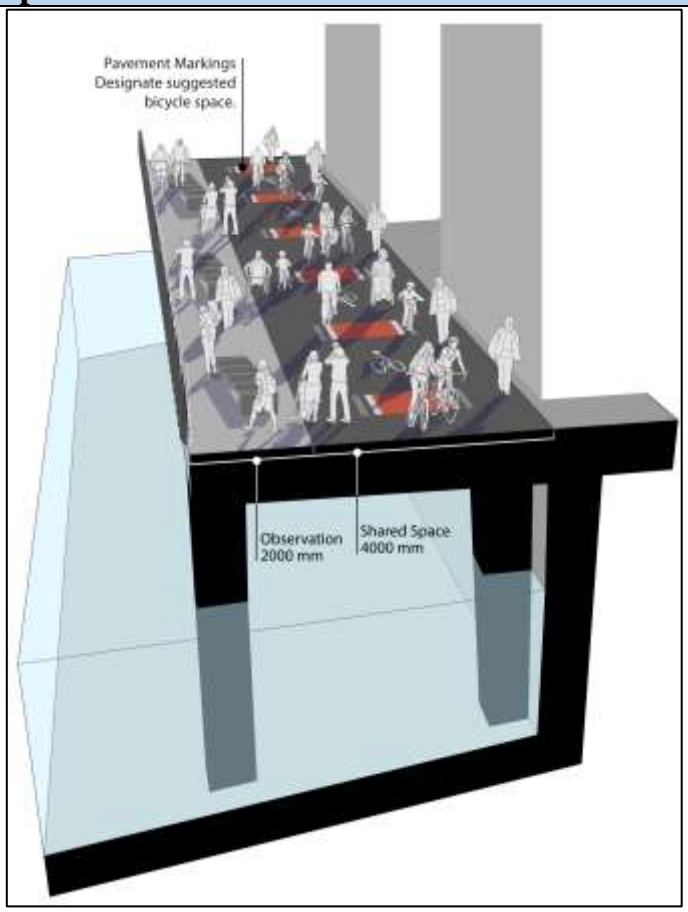
Inland Option



Typology of Inland Option

Example of Inland Option in London, UK

Boardwalk Option



Typology of Boardwalk Option

Example of Boardwalk Option in Eastbank Esplanade, USA

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The Evaluation Mechanism

Three-tiered Qualitative Analysis

- The qualitative evaluation was rooted in the experience, knowledge, and professional judgement of the consultant. The consultant applied three tiers of evaluation criteria to each segment along the waterfront promenades. Rather than subjecting each segment to a single set of evaluation criteria, this tiered approach highlights options that best meet multiple criteria.

Quantitative Analysis

- The quantitative evaluation represents a shift from high level planning to Preliminary Engineering. This careful level of analysis includes detailed studies of the ground conditions, utilities and infrastructure, regulatory constraints, existing land uses, and stakeholder considerations and identifies how constraints or concerns can be overcome through creative design thinking and engineering solutions.

Level of Service (LOS) Evaluation

- LOS evaluation is used to ensure that the proposed designs will accommodate current and projected user demand without being over-built. Three different LOS evaluation methods have been tested to find the method that best fits the unique characteristics of this project. The LOS evaluation methods include 2000 edition of the Highway Capacity Manual (HCM), United States Federal Highway Administration (FHWA) Shared-Use Path Level of Service Calculator and Alta's Path Level of Comfort (LOC) Tool.

Annex C

Variables under the Evaluation Mechanism to evaluate the proposed Cycle Track within Waterfront Promenades		
Items	**Variable**	**Definition**
1. Three-tiered Qualitative Analysis		
Tier 1	**Safety Related to User Conflicts**	**Some physical constraints of the corridor may prove challenging for the Harbourfront path concept. Paths require sufficient space, otherwise conflicts arise between user groups**
	User Experience	**The quality of the proposed path, from the perspective of the user, will affect how people value the path as part of the community. This criterion identifies the ability of the segment option to accommodate groups of people traveling together and to provide opportunities for enjoyment and interpretation of the surroundings. It considers potential views as well as characteristics of the alignment context such as noise and air quality.**
	Connectivity	**The location of the segment, combined with access points, determines whether the path will serve the leisure needs of the project.**
	Natural Environment	**Paths provide an opportunity to address the human need to experience nature in order to have a physically and mentally healthy life. Even small encounters with water and street trees are an asset to the health of a community.**
Tier 2	**Order of Magnitude Cost**	**Even before beginning design, planners can identify elements of a harbour path that will be more expensive to construct. Reconstructing walkways, constructing piles, or cantilevered structures may prove to be more costly than those designed along level grades.**
	Ease of Permitting Leisure and Cultural Services Department (LCSD)	**Balancing the needs of each agency is important. In many instances a segment may be favourable to one agency but put strain on another. Based on level of service, user demand, and spatial constraints, these criteria evaluate the impact of a proposed alignment on LCSD controlled facilities.**
	Ease of Permitting Transportation Department (TD)	**Balancing the needs of each agency is important. In many instances, an alignment may be favourable to one agency but put strain on another. Based on level of service, user demand, and spatial constraints, these criteria evaluate the impact a proposed segment may have on TD controlled facilities.**
Tier 3	**Does the segment impact the PHO? (Protection of the Harbour Ordinance)**	**The Protection of the Harbour Ordinance is an overriding constraint for construction on or over the Harbour. While the overarching rationale for the PHO is appropriate, it may restrict a big and bold long-term vision for the Harbour path project. The purpose of this criterion is to evaluate the level of impact the proposed segment may have on the PHO and whether an overriding public need may be established to justify the proposal.**
	Does the segment provide a bold vision for a world-class harbour path in Hong Kong?	**Does the segment provide an iconic vision for shared use on the harbourfront? Does it provide a vision that promotes economic development, community pride and active recreation?**

Annex C

Variables under the Evaluation Mechanism to evaluate the proposed Cycle Track within Waterfront Promenades		
Items	**Variable**	**Definition**
2. Quantitative Analysis		
Constraints	**Planned Development Constraints**	**Assume all planned projects (i.e. all Urban Design Study and future development) are implemented and the proposed cycle track network is built with those planned facilities. Provide solutions for proposed cycle track network to overcome those planned development constraints.**
	Existing Condition Constraints	**Assume the proposed cycle track network is built with those existing facilities. Provide solutions for proposed cycle track network to overcome those existing condition constraints.**
3. Level of Service (LOS) Evaluation		
Evaluation Tools	**HK Level of Service Tool**	**Hong Kong currently uses the 2000 edition of the Highway Capacity Manual (HCM) for its LOS analysis tool, which analyses assuming a 3m wide facility. However, Hong Kong uses the Transport Planning and Design Manual (TPDM) for its cycling design standards, which specifies a minimum width of 4m for exclusive cycling facilities. The discrepancy between the HCM and the TPDM standards shows a limitation to the analysis.**
	FHWA Level of Service Calculator	**In 2006, FHWA developed the "Shared-Use Path Level of Service Calculator". The LOS Calculator provides an estimation for shared use paths and a LOS based on a set of factors and inputs. Their research included synthesizing data on path operations and a visual preference survey. The FHWA LOS Calculator requires four inputs from the user: 1) one-way user volume per hour, 2) mode split percentages, 3) path width, and 4) the presence or absence of a centreline. Factors involved in the estimation of an LOS for a path include the number of times a typical bicyclist meets or passes another path user and the number of those passes that are delayed.**
	ALTA Level of Comfort Tool	**Building upon the FHWA LOS Calculator's path-width to user-demand relationship, Alta's tool adds a set of quantitative and qualitative factors, supported by the literature, that relate to a broader Level of Comfort framework:** **Alta LOC Quantitative Measures** **• Surface Condition** **• Path Slope** **• Curve Frequency** **• Crossing Frequency** **Alta LOC Qualitative Measures** **• Environmental Quality and Views** **• Adjacent Public Facilities** **• Feels Safe (from crime)** **• Feels Safe (from vehicles)**