

# Task Force on Harbourfront Developments on Hong Kong Island

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TFHK/03/2011

For discussion  
on 27 January 2011

## Exterior Design of West Ventilation Building (WVB) of the Central - Wan Chai Bypass and Island Eastern Corridor Link (the “CWB”)

### PURPOSE

This paper informs the Task Force on Harbourfront Developments on Hong Kong Island (the Task Force) of the follow-up actions taken by the Administration in respect of Members’ views on the reduction of visual, air and noise impacts of the WVB as expressed at the first meeting of the Task Force.

### BACKGROUND

2. At the first Task Force meeting held on 16 September 2010, we presented to Members the exterior designs of the WVB, amongst those of other tunnel buildings of the CWB project; and the results of the roving exhibition conducted between 29 July and 3 September 2010 for the proposed exterior designs for the tunnel buildings.

3. As far as the WVB is concerned, the poll on the options of the exterior buildings indicated that more than 80% of the respondents selected the “streamlined green roof” (see photomontage at **Annex 1**) as the preferred option. There were suggestions from some Members at the first Task Force meeting that the Government should consider integrating the WVB with the future landscaped deck in Central aesthetically; enhancing the air quality by means of air purification system; using ventilation system of variable speed to lower the noise level at non-peak hours; and reducing the size of the WVB as far as possible<sup>1</sup>.

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<sup>1</sup> Members of the Harbourfront Commission (HC) were advised at the Commission’s second meeting held on 25 October 2010 on the significance of targeted completion of the CWB and the inappropriateness of re-opening discussion on a different location for the WVB at such an advance stage. Members agreed that the Task Force should focus on the exterior design of the WVB. The Development Bureau informed the stakeholder concerned in writing on 8 November 2010 of this development.

# Task Force on Harbourfront Developments on Hong Kong Island

TFHK/03/2011

## **INTEGRATION OF WVB EXTERIOR DESIGN WITH PROPOSED LANDSCAPED DECK IN NEW CENTRAL HARBOURFRONT**

4. Since the Administration decided to pursue with the New Central Harbourfront project, the Highways Department (HyD) has been working closely with the Planning Department (PlanD) to reconcile the designs of the WVB and the proposed Landscaped Deck in the new Central harbourfront. The designs, as shown during the Roving Exhibition (see **Annex 1**), are in harmony with each other. Further studies for the enhancement of integration between the two structures were also carried out as per Task Force's suggestion. Two integration schemes, viz Landscaped Deck spanning over WVB and Landscaped Deck echoing WVB, were formulated.

### **Scheme 1: Landscaped Deck Spanning over WVB**

5. An integrated scheme with part of the Landscaped Deck branching off to span over the east roof of WVB has been formulated (see photomontage at **Annex 2**). The branched off side passage will be 6m wide whilst the main Deck will be at least 15m wide. Under this scheme, the Landscaped Deck and the WVB will be closely integrated in terms of physical connection with each other, thus resulting in a holistic development. Users of the Landscaped Deck can come close to the green roof and fully enjoy the scent of green grass if they so wish<sup>2</sup>. The key drawback of this scheme is that the floor finished level of the additional passage of the Landscaped Deck needs to be raised well above the Landscaped Deck (from +14mPD to +19.2mPD) to avoid clashing with WVB. The over 5m level difference would necessitate the use of steps to access the high point of the side passage.

### **Scheme 2: Landscaped Deck Echoing with WVB**

6. An alternative enhancement approach is to adopt similar language, materials and features at both the WVB and the Landscaped Deck (see photomontage at **Annex 3**). Similar to the centre of water ripples, the WVB's streamlined roof propagates contour lines to the peripheral Landscaped Deck, simulating dynamic flow. The deck edge profile echoes, reshapes and further interacts with elements in the vicinity such as the WVB, the harbourfront and other structures, resulting in a new wave pattern. These superimposed line

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<sup>2</sup> For the security and safety of the operation of the tunnel ventilation building, direct public access is prone to easy trespassing and is not permissible.

# **Task Force on Harbourfront Developments on Hong Kong Island**

TFHK/03/2011

patterns also create opportunity of interesting hard/soft and solid/void compositions which will further strengthen the lively and wavy waterfront characters. Such sharing of the same materials, architectural features and dynamic quality between the WVB and the Landscaped Deck will help promote their reconciliation and assimilation.

## **ENHANCEMENT OF AIR QUALITY BY AIR PURIFICATION SYSTEM**

7. According to the findings of the approved EIA Reports of the CWB and WDII projects, with the compliance of design parameters of ventilation buildings including minimum discharge height, exit velocity, exhaust direction and cross-sectional area of stack, the predicted air quality at the air sensitive receivers around the WVB (including the future Landscaped Deck) would comply with the current Air Quality Objectives (AQOs) and thus no mitigation measures are required.

8. To further improve the air quality of the exhaust emission from the CWB tunnel, we will introduce the latest technology of Air Purification System (APS) in this project. The APS is an electricity-compelled system comprising an electrostatic precipitator (ESP) and a de-nitrification system for removal of respirable suspended particulates (RSPs) and nitrogen dioxide (NO<sub>2</sub>) respectively in the exhaust air from vehicle emissions inside the tunnel. The proposed APS will be provided at all three tunnel ventilation buildings. With the introduction of the APS, about 80% of the RSPs and NO<sub>2</sub> in the exhaust air will be removed.

9. We have recently started the detailed design of the APS and we will seek to minimise the size of this new system and accommodate its plant and equipment underground as far as possible, as to avoid increasing the size of the WVB structure above the ground level.

## **UTILISATION OF VARIABLE SPEED VENTILATION SYSTEM FOR NOISE REDUCTION**

10. The noise impact due to operation of the WVB has been fully assessed and the EIA report stated that with the implementation of the mitigation measures, the noise impact will be acceptable. In particular, the ventilation fans are designed with silencers at both intake and outlet ends to attenuate the fan noise. The anticipated noise levels in the vicinity of the WVB due to plant operation are low (ranging from 40dB(A) to 48dB(A)).

# **Task Force on Harbourfront Developments on Hong Kong Island**

TFHK/03/2011

11. We note Member's suggestion of using variable speed tunnel ventilation system to reduce the noise level at non-peak hours. Indeed, to further reduce the noise level, our current design is that the ventilation fans will be operated on a need basis. Tunnel sensors on carbon monoxide (CO), NO<sub>2</sub> and visibility will be installed to control the fan operation to cater for different traffic conditions. Based on the pollutant concentration inside the tunnel, the exhaust fans will be turned on sequentially one by one to maintain the in-tunnel air quality within an acceptable level while keeping the number of exhaust fans in operation at any point in time to a minimum. This will ensure that the operation noise will be reduced for non-peak hour traffic.

## **REDUCTION OF SIZE OF WVB**

12. The WVB is a facility building with limited footprint at ground level and has a height restriction under the approved EIA Report. In the feasibility design stage, we have already given due consideration to the plant layout and optimise the use of room space to minimise the building bulk. The building is highly compact in terms of spatial requirement and there is no room to further reduce its size without jeopardizing the functional performance of tunnel operation and the aesthetic design. The streamlined green roof softens the tunnel entrance and minimises the visual impact of the building block. It also provides greenery for enjoyment of the users in the vicinity. However, we will endeavour to spend every effort, including the use of the most advance plants and further optimisation of structural design.

## **WAY FORWARD**

13. HyD will fully consider comments from the Task Force (in particular those on the two schemes of integration between the WVB and the Landscaped Deck set out in paragraphs 5 and 6 above), together with other views collected from the public during the roving exhibitions, in refining the exterior designs of the WVB. The department will also work further with PlanD regarding the integration of the WVB exterior design with the Landscaped Deck.

- Annex 1 Integration Scheme in Roving Exhibition
- Annex 2 Scheme 1 – Landscaped Deck Spanning over WVB
- Annex 3 Scheme 2 – Landscaped Deck Echoing WVB
- Annex 4 Noise Levels in the Vicinity of the WVB at its Operation Mode

# **Task Force on Harbourfront Developments on Hong Kong Island**

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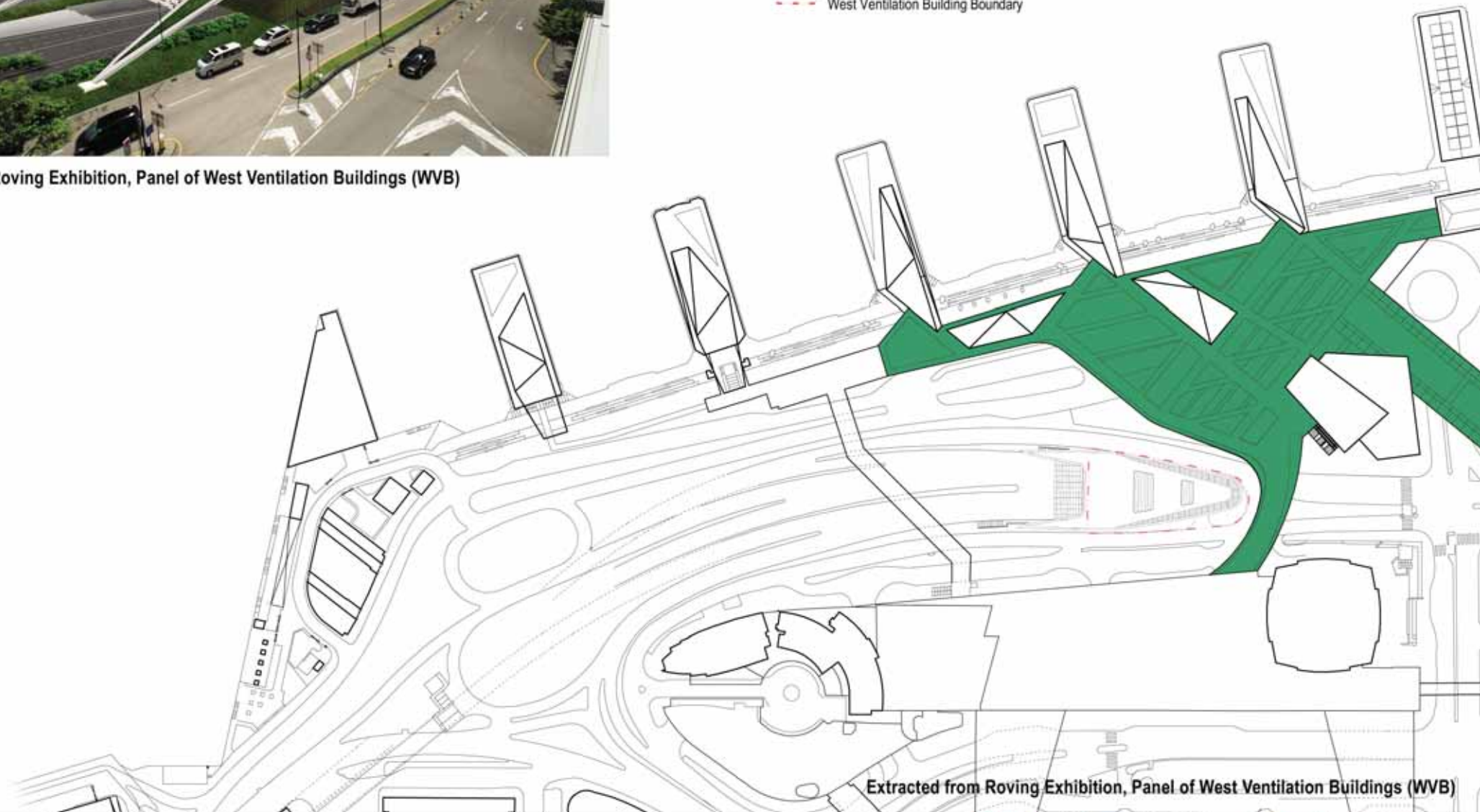
TFHK/03/2011

**Highways Department  
January 2011**



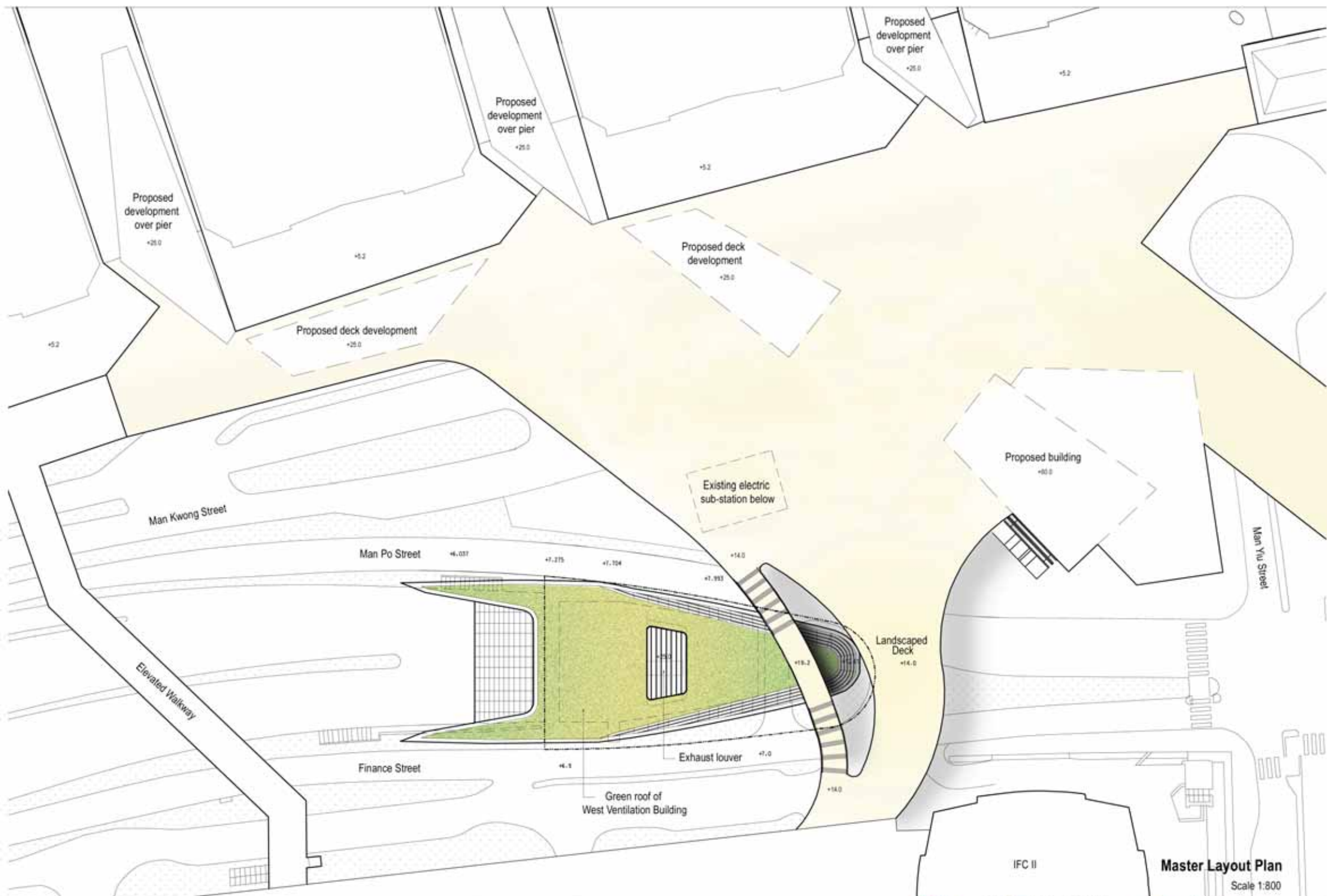
Extracted from Roving Exhibition, Panel of West Ventilation Buildings (WVB)

- 園景平台 - 規劃置於中環新海濱的城市設計研究中擬建, 用以締造一個高架的綠化消閒空間, 提供完善的行人網絡以連接商業中心區與新海濱。  
 Landscaped Deck - Proposed under the Urban Design Study for the New Central Harbourfront by the Planning Department to create a comprehensive pedestrian network in a greening and leisure environment at an elevated level to connect the Central Business District core to the new harbourfront.
- 西面通風大樓範圍  
 West Ventilation Building Boundary



Extracted from Roving Exhibition, Panel of West Ventilation Buildings (WVB)

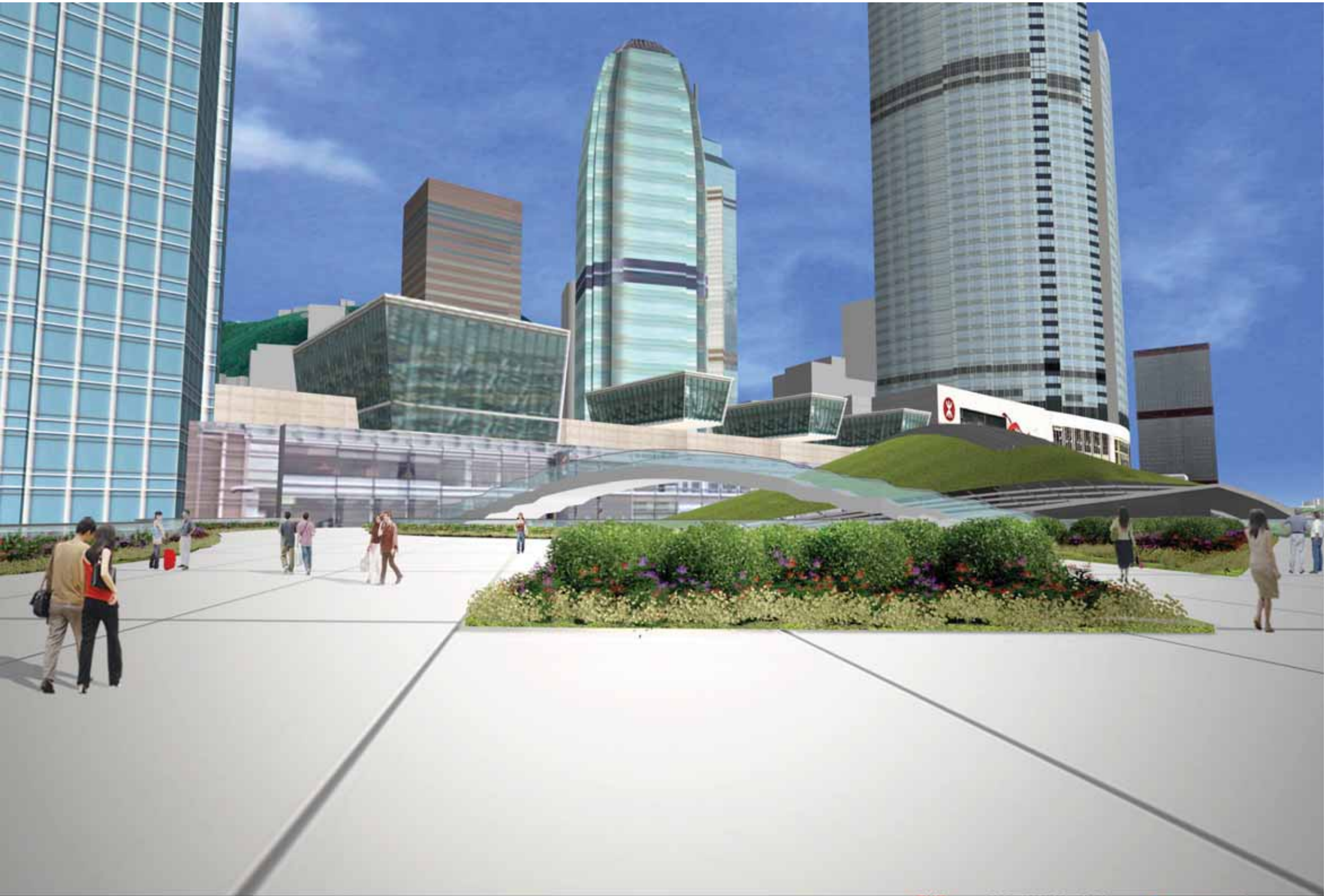


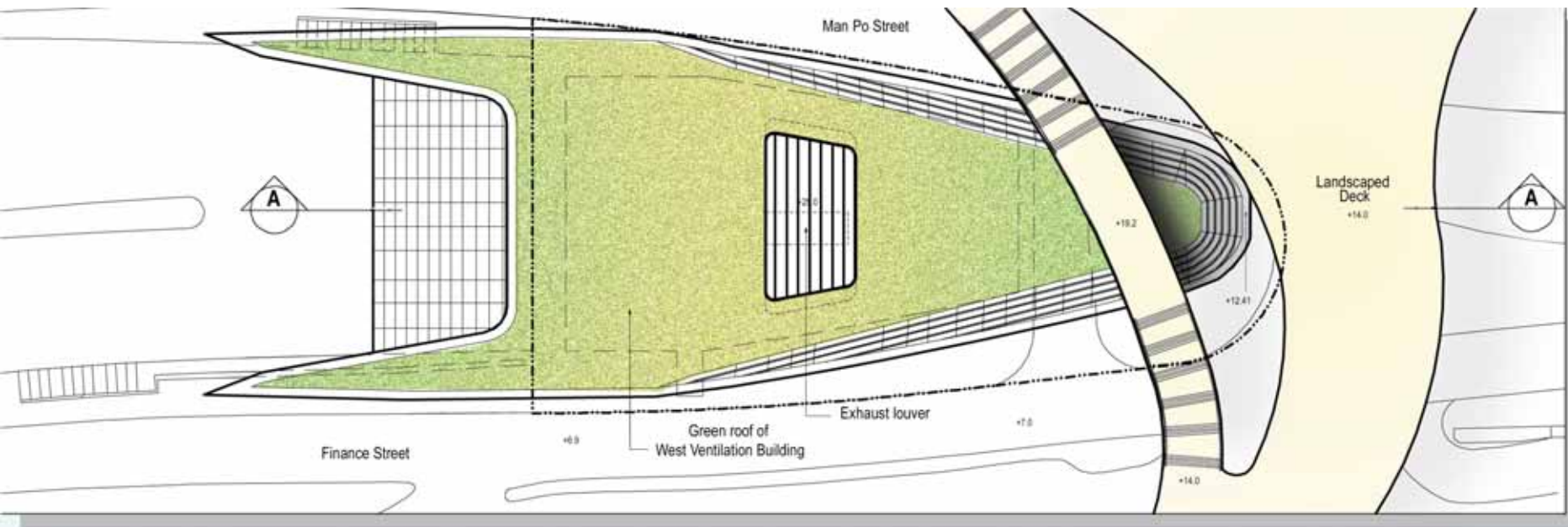


Master Layout Plan  
Scale 1:800

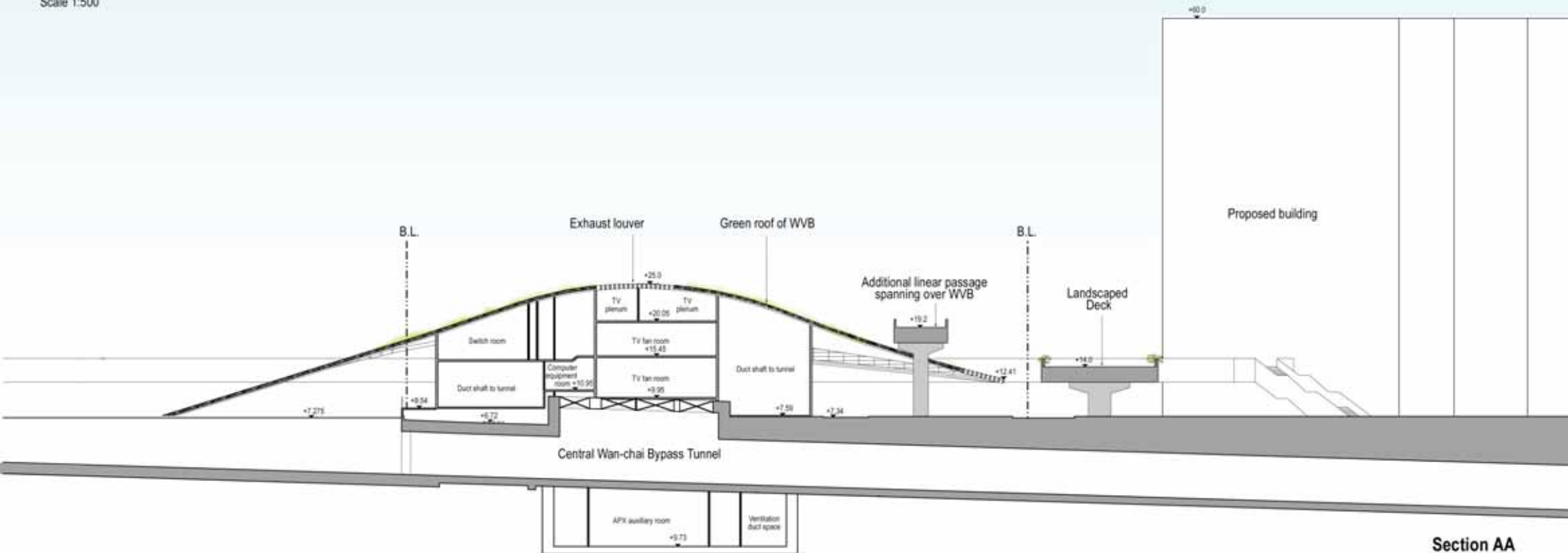








**Plan**  
Scale 1:500



**Section AA**  
Scale 1:500





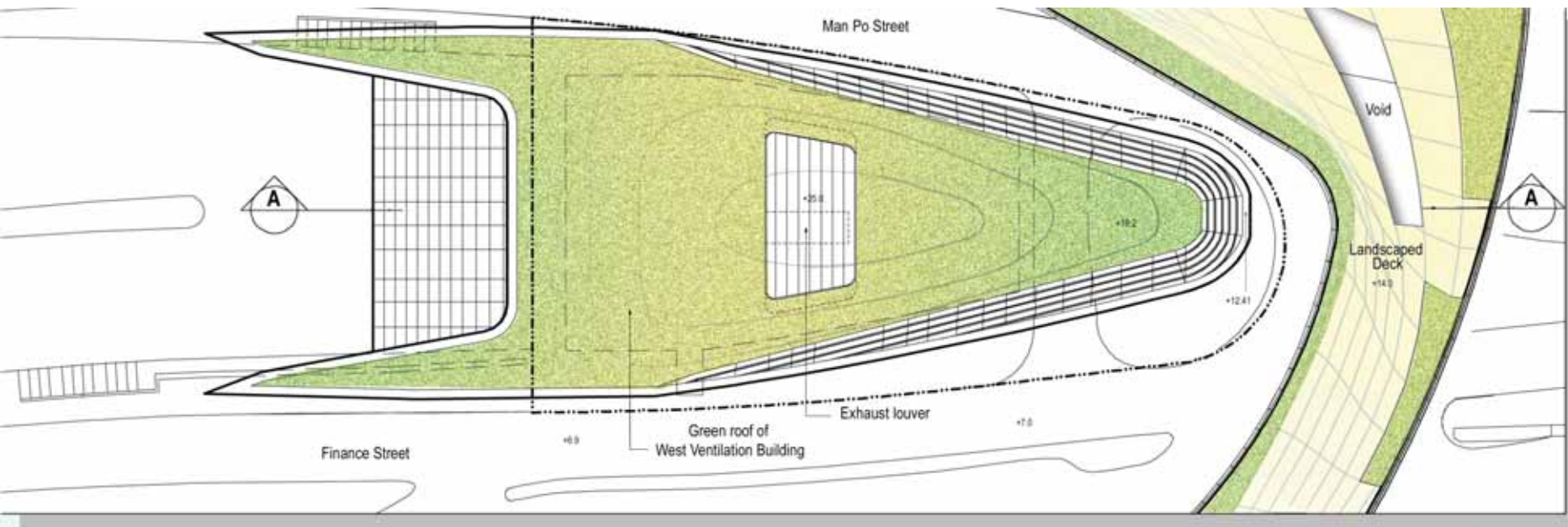
Conceptual image - Water ripples



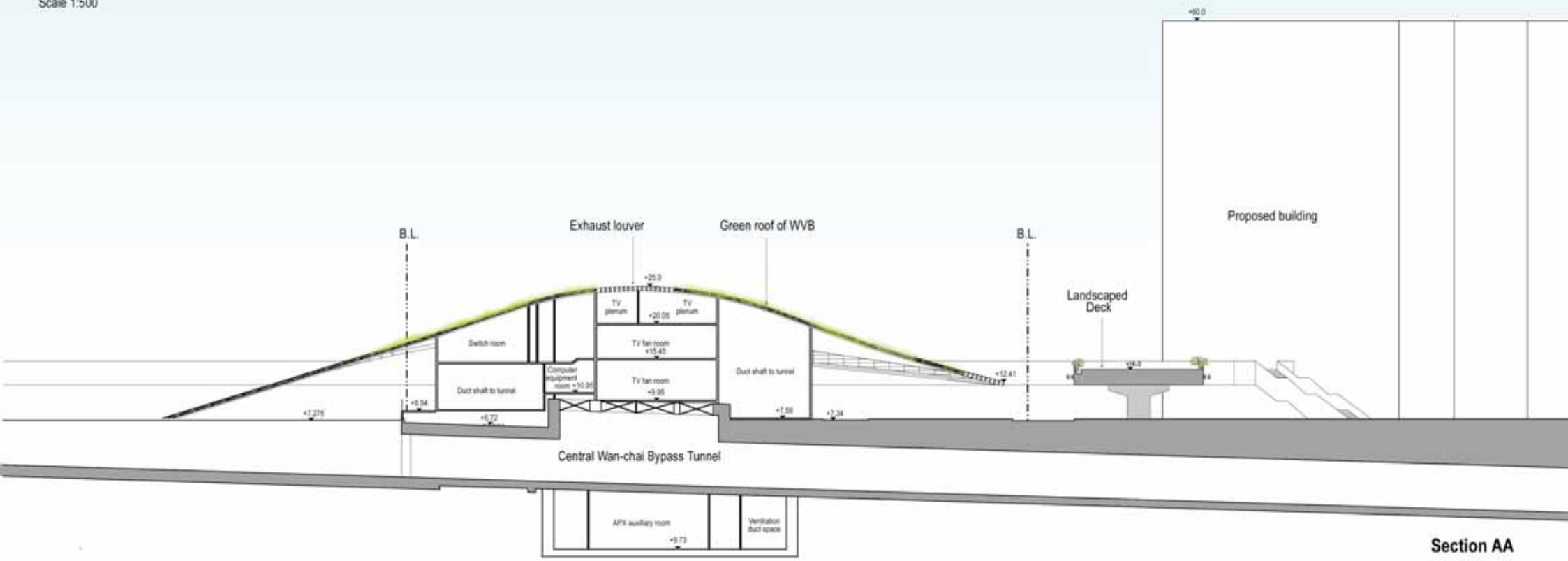
Conceptual image - Superimposed and Dynamic line pattern



Master Layout Plan  
Scale 1:800



**Plan**  
Scale 1:500



**Section AA**  
Scale 1:500













Annex 4 NOISE LEVELS IN THE VICINITY OF WVB AT ITS OPERATION MODE



AECOM



Aedas