

## **COUNTRY AND MARINE PARKS BOARD**

### **Proposed Eco-adventure Zipline Tour at Ngong Ping, Lantau North Country Park**

#### **1. Purpose**

To seek members' view on the proposal submitted by Flying Fox to run an eco-adventure zipline tour on Government land near Ngong Ping 360 within the Lantau North Country Park.

#### **2. Background**

2.1 Zipline tour is an aerial adventure experience in which participants soar by gravity-assisted flights along a series of parallel ziplines made of galvanized steel posts and cables. Flying Fox is the proponent of the proposed zipline tour and Ngong Ping 360 would be the commercial partner of this project. The project has the preliminary support of the Tourism Commission because it forms a tourism attraction in Hong Kong.

2.2 This Department, together with the District Lands Office/Islands (DLO/Is), the Electrical and Mechanical Services Department (EMSD) and the Civil Engineering and Development Department (CEDD), were invited by the Tourism Commission to attend a briefing session in mid August 2012, in which Flying Fox presented the project and sought the preliminary views from the respective departments regarding the proposal.

#### **3. The Zipline Tour**

3.1 The Zipline tour starts and finishes near the Ngong Ping 360 Cable Car Terminal at Ngong Ping. The tour comprises two sets of cross-valley parallel ziplines each of 300m in length, linked by around 1km of connected hiking trails and a 50m long suspension bridge over the Sham Wat Gorge. Of the 1km hiking trails, 430m will be newly formed. The start and finish platforms for the ziplines are four cloudstations

which serve as anchor points between the ziplines as well as the launching and landing points for the participants. Each cloudstation is of 10m diameter and 2-3m in height.

3.2 The cloudstations will have a footprint of 0.07 hectare and the airspace taken by the ziplines and suspension bridge is 0.19 hectare. The land area occupied by the Flying Fox infrastructure (i.e. 4 cloudstations and 2 sets of parallel ziplines) is approximately 0.26 hectare. Although the actual land use is 0.26 hectare, the total land area bounded by the Flying Fox infrastructure and components including the suspension bridge and hiking trails in the Lantau North Country Park is approximately 380m long by 160m wide, or roughly 60,000 m<sup>2</sup> (i.e. 6 hectares). Plans showing the location and the layout of the zipline tour are attached at Annexes 1 and 2 respectively. The proposal prepared by Flying Fox is attached at Annex 3.

#### **4. Country Park Considerations**

4.1 The project is still at an early stage. In pursuit of the project, impacts on the ecology and country park visitors, landscape and visual impact, user safety, potential risk to country park visitors, noise, etc. would need to be further assessed. EMSD will assess the safety and installation of the system while CEDD will focus on the geotechnical aspects on installation of the infrastructure. Besides, the project is likely a designated project under the Environmental Impact Assessment Ordinance as it involves earthworks and building works in a country park.

4.2 In addition, members should note the following particulars of the project that are of implications/concerns on the use of land in country parks:

- (a) The subject site of the project falls wholly on Government land within the Lantau North Country Park. If the project were approved, the site will have to be granted to the proponent under a Short Term Tenancy as advised by DLO/Is.
- (b) It is a fee charging activity. There is no precedent case of allowing use of Government land within country parks for commercial purpose.
- (c) Public access to the Flying Fox Zipline will be limited by gating off the four cloudstations which provide access to the ziplines and also the suspension bridge. The right-of-way for the general public to access the trails as well as the project area is yet to be decided. It will be

controversial if the access is confined to fee-paying visitors only.

- (d) Although the proposal is for tourism and recreation purpose, there is no precedent case of setting up such an adventure-based activity in country parks. Arguably, it is fundamentally different from the conventional recreational use of country parks for picnicking and hiking, etc.
- (e) Green/hiking groups would likely object to the proposal as the operation would deprive the general public of a large area of natural habitats (mainly shrubland and grassland), create a blight on the landscape and make profit on Government land which is intended for passive recreation of the masses. The potential benefits of the proposal in terms of tourism promotion might be offset by the impact on the environment and the need to handle the foreseeable objections from the general public and green/hiking groups.

## **5. Advice Sought**

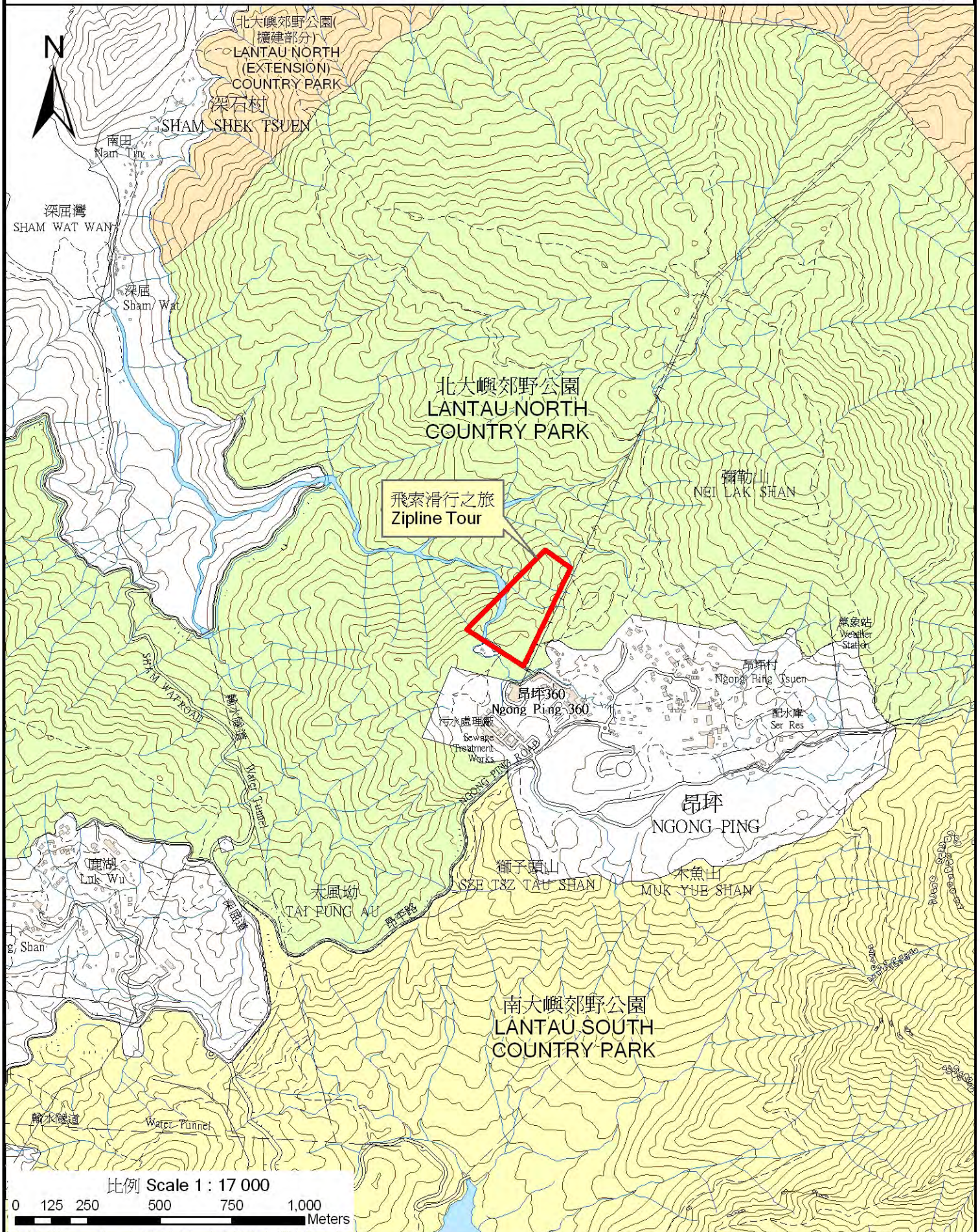
Members are invited to offer their views and comments on the proposal.

Country and Marine Parks Authority  
October 2012



# 位置圖 LOCATION PLAN

Annex 1  
附件一

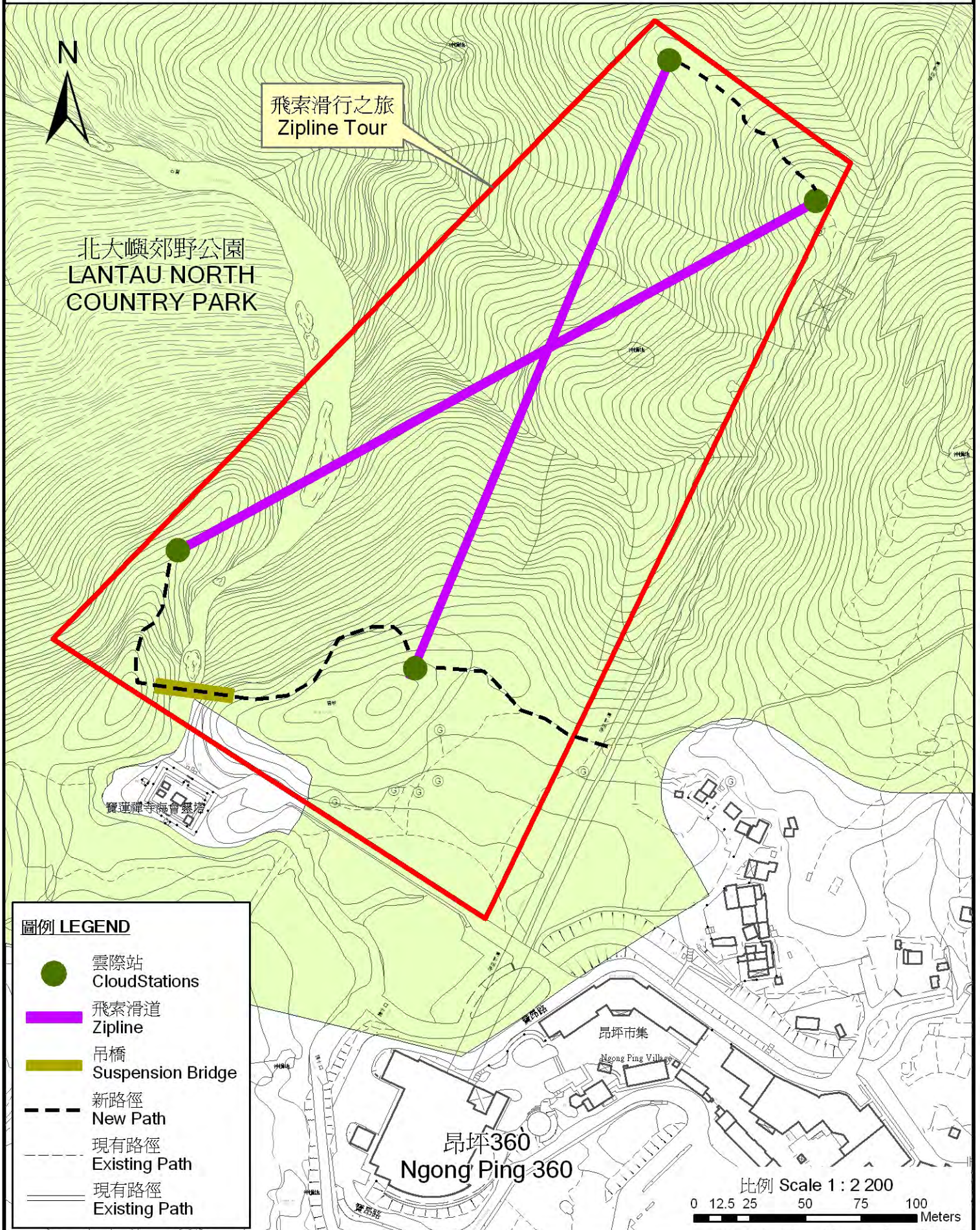


Proposed Eco-adventure Zipline Tour at Ngong Ping, Lantau North Country Park  
北大嶼郊野公園「昂坪生態飛索滑行之旅」計劃書



# 平面圖 LAYOUT PLAN

Annex 2  
附件二



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# COUNTRY AND MARINE PARKS BOARD

## A Working Paper for the proposed Flying Fox Eco-Adventure Zipline Tour at Ngong Ping, Lantau North Country Park

17<sup>th</sup> October 2012

### 1. Purpose

This paper aims to appraise Members of an eco-adventure zipline tour, which Flying Fox proposes to install beside Ngong Ping Cable Car and Village, occupying an area of approximately 0.26 hectares of land within Lantau North Country Park; and to seek Members' approval for the project to proceed as a desirable recreational and educational development under the Country Parks Ordinance.

### 2. Vision

Flying Fox's vision is to create a genuine eco-adventure in a wild and beautiful corner of Lantau. Our mission is to provide a thrilling, challenging, outdoor tourism and educational experience which reinvigorates our guests' reverence for the natural beauty of Hong Kong.

### 3. Zipline tours: a healthy, eco-adventure experience

Eco-adventure can be defined as *the use of mild or moderate physical adventure to enhance the enjoyment and appreciation of an ecologically diverse, important or scenic landscape.*

Zipline tours do this brilliantly. They allow a participant to access wild and pristine locations without significantly impacting those locations; they do not require powered systems, construction of invasive roads, use of vehicles, or any resource depletion. Both installation and operations touch lightly on the ground and harmonize with their surroundings.

Ziplines give a feeling of flight, opening up exhilarating 'never-before-seen' perspectives to a large number of people – of all ages and physical abilities. Zipline tours are long enough to allow participants to absorb themselves in dramatic views and interesting interpretation, but short enough to fit into a morning or afternoon's activity. They promote an enjoyment and renewed appreciation of the outdoors and encourage moderate physical exercise.

A zipline tour is a fun, safe and healthy way to experience the countryside. The combination of outdoor adventure, beautiful natural scenery, knowledgeable guides and visual resources provide an interactive learning platform for people of all ages, but especially young people.

### 4. Flying Fox Lantau – the guest experience

The Flying Fox eco-adventure zipline tour will comprise two sets of parallel ziplines each of 300m in length, a 50m long suspension walkway and around 1km of hiking, located in the hilly country of Lantau North Country Park beside NP360's Terminal Building and Tower 7.

It will be a 60-90 minute experience comprising of the following elements:

- **Booking:** guests will have several ways to book the experience – the best offers will be in advance through the existing web portal [www.flyingfox.asia](http://www.flyingfox.asia) which provides a

real-time reservation system, accepts online payments and issues automated e-tickets. Alternatively guests will be able to book and pay on the day at Flying Fox sales outlets, located near the NP360 terminals at Tung Chung and in Ngong Ping village.

- **Check in & Gear up:** guests will check in at the Flying Fox office in Ngong Ping village, get fitted into safety harnesses and join a pod of up to 12 people; two trained instructors will accompany them at all times to ensure their safety and provide commentary on points of ecological and cultural interest.
- **Safety briefing & Orientation:** all guests will receive a safety briefing and orientation in how to use the equipment before embarking on the zipline tour.
- **Approach to Zip 1: 300m walk, starting from the Terminal Building** (elev. 434m), walk 200m north-east along the existing rescue trail, then 100m north-west on a new path across undulating land to the start point of Zip 1 (elev. 442m), near the crest of a rocky summit to the north of the Terminal Building; approx. 8m of ascent.
- **Zip 1: 300m parallel ziplines** fly across the valley to the lower knoll (elev. 400m) beneath Tower 7; approx. 42m of descent; magnificent views west down to Sham Wat and the South China Sea beyond.
- **Path to Zip 2: 130m hike** to the upper knoll (elev. 432m) beside Tower 7, along a meandering new path; approx. 32m of ascent.
- **Zip 2: 300m zipline** across the valley, crossing above Zip 1, to land on a rocky spur (elev. 404m) beside the gorge created by the Sham Wat Stream; approx. 28m of descent; marvellous views of the Sham Wat waterfall.
- **Ridge walk: 80m hike** beneath Tall Shrub up a narrow rocky ridge to the suspension walkway (elev. 422m); approx. 18m of ascent.
- **Suspension walkway: 50m long**, crossing the spectacular Sham Wat gorge at approx. 15-20m above stream level. This area feels intensely wild and remote and yet is within a few hundred metres of Ngong Ping village.
- **Rock ramble: 120m hike** on a new path over rocky ground to Zip 1; approx. 20m of ascent; **return walk of 300m** along the approach path back to the Terminal Building.
- **De-kit and shop:** guests will return to the Flying Fox office in Ngong Ping village where they will return their safety equipment and have the opportunity to purchase branded merchandise, including HD HeadCam video footage of their journey.
- **Total tour length:** 1,580m (650m in the air on ziplines & suspension walkway; 980m hiking)
- **Vertical ascent** (hiking): 78m; **Vertical descent** (zipping): 70m
- **Outdoor learning opportunities:** guests will learn about the ecology of the area through a series of interpretation boards and commentary from our trained instructors.

The tour's carrying capacity will be around 60 persons per hour (480 persons per day). Ticket prices will be comparable to existing tourism attractions in the area but we are keen to find a way to allow disadvantaged citizens discounted access to the facility. For a set of maps, photographs and designs of the proposed installation, see **Annex 1**. For more detail on infrastructure and construction methods see Annex 3.2 and section 7b. below.

## **5. Company background**

Flying Fox was established in 2007 by Jonathan Walter and Richard McCallum. Jonathan was with the British Army in Hong Kong (1993-95) and subsequently edited numerous environmental and humanitarian publications. Richard was formerly with the Swire Group and Cathay Pacific, based in Hong Kong (2002-4), Pakistan & India. In Hong Kong we are assisted by Mr Ernst Zimmermann, previously VP of Sofitel Luxury Hotels in China and CEO of Zenith Hotels. Mr Zimmermann has lived in Greater China for 30 years.

Flying Fox is the trading name of Zip Adventures Ltd, a UK registered company, operating three zipline tour locations in India (with a fourth under construction). Two are located beside 15<sup>th</sup> Century forts in Rajasthan, while our third and fourth sites are located in private and government forest reserves.

After five years of success in India, we are looking to expand our unique brand of aerial eco-adventure to new world-class destinations, including Lantau and a spectacular new forest canopy tour in a Grade 1 listed landscape at Castle Howard, North Yorkshire, UK.

## **6. Justification & benefits – summary of Annex 2**

Our proposal raises many valid questions – why does Hong Kong need a zipline tour; why Lantau; why in a Country Park; what will be the benefits and who will benefit most?

### **a. Why does Hong Kong need a zipline tour?**

- *Hong Kong is 70% countryside, but it's missing out on eco-adventure*
- *The Tourism Commission is prioritising eco-tourism to attract foreign visitors*
- *The hard-working people of Hong Kong need fun, stress-busting outdoor activities to stay healthy and productive*

#### ***i) Hong Kong is missing out on eco-adventure***

It is an irony that Hong Kong's worldwide image is that of an iconic urban landscape ('Asia's World City'), when 70% of the land is countryside and 43% of the territory is designated Country or Marine Park.

One reason is that eco-tourism, and eco-adventure in particular, is less developed in Hong Kong than in other great destinations globally and regionally. There are thriving zipline tours in North America (100 sites in the USA), Latin America, South Asia, Europe (hundreds in France and Germany; 30 sites in UK government forests), Australia, New Zealand, Thailand, Malaysia, Philippines and Singapore.

While residents and visitors can appreciate Hong Kong's breath-taking landscape and biodiversity by trekking its hiking trails, joining one of AFCD's outdoor education programmes, or visiting the Hong Kong Global Geopark of China, they are missing out on eco-adventure. We believe this needs to change: *a world-class city with extensive, beautiful and expertly-managed countryside needs world-class eco-adventure.*

Zipline tours are an ideal eco-adventure product: allowing dramatic wilderness to be experienced in a managed, low-impact, safe, compact, regulated and accessible way.

#### ***ii) Tourism Commission is prioritising eco-tourism to attract foreign visitors***

The Tourism Commission has identified eco-tourism as a key development objective for Hong Kong, while HKTB launched *Great Outdoors Hong Kong!* since 2009 to promote, among other things, "popular hiking trails and other green attractions." Eco-tourism is important because it helps to increase visitor numbers and diversity, and enhance the quality of the visitor experience, thereby driving tourism revenues – a pillar of the Hong Kong economy.



Hong Kong's urban, artificial attractions are perceived by foreign tourists as more accessible than the hiking trails which criss-cross the countryside. But a zipline tour in North Lantau, benefiting from the area's existing transport networks, would create Hong Kong's first genuinely accessible eco-adventure, offering visitors and residents alike the unique and enticing combination of 60-90 minutes thrilling exercise and the chance to experience a stunningly beautiful Country Park.

Hong Kong needs to develop its eco-tourism infrastructure to compete with rival destinations in the region and to help showcase its conservation work to a visiting audience. The zipline tour will encourage foreign tourists who might not ordinarily visit the Country Parks to gain an appreciation of the scenery, landscape and biodiversity of Hong Kong.

### ***iii) The hard-working people of Hong Kong need fun, stress-busting outdoor activities***

According to an April 2008 survey on 'work-life balance' by the University of Hong Kong, "82.5% of people said they suffered stress and 75.4% from lack of exercise", which in turn affected their ability to do their job properly. It is widely recognised that getting outdoors to do some moderate physical exercise is an excellent stress buster and can enhance employee wellbeing and productivity.

In 2005, the Department of Health published a report, *Tackling Obesity*, in which it wrote: "Hong Kong is also affected by the global epidemic of obesity. Local data suggest that... 22.3% of men and 20.0% of women are obese... There is also a significant trend among the younger age groups to become obese." A study in 2011 by the Hong Kong Polytechnic found that obesity among primary school students had increased from 16.4% in 1997/98 to 22.2% in 2008/09.

In a speech in March 2012, Secretary for Food & Health Dr York Chow pointed to "the lack of physical activity" as a key cause of obesity, saying it could lead to heart disease and diabetes, which in turn "will affect our labour productivity and standard of living in the long run, undermining our economic vitality and competitiveness." Dr Chow's solutions included "providing more diversified recreation and sports activities and facilities to the public".

The Hong Kong Department of Health recommends "at least 60 minutes of moderate to vigorous-intensity physical activity every day" for children and "at least 150 minutes a week of moderate intensity aerobic physical activity" for adults aged 18-64 years.

The zipline tour will involve moderate physical activity, including 1 kilometre of walking trails and nearly 80 metres of vertical ascent. Given that the trekking is interspersed with exhilarating ziplines, Flying Fox will prove particularly motivating for people not normally inclined to go hiking. The zipline tour will offer a new, outdoor activity for the people of Hong Kong, encouraging them to adopt a healthier, more active lifestyle.

### **b. Why Lantau?**

- *Lantau North is an important tourism and recreational hub, so Flying Fox is not breaking into pristine new areas*
- *Flying Fox builds on and benefits from the existing NP360 infrastructure*
- *Flying Fox will bring investment, employment & skills transfer for local people and enterprises*

### ***i) Lantau North is evolving as an important tourism and recreational hub***

Over the past decade, North Lantau has evolved into an important development area for tourism and recreation. The Planning Department's concept is "to focus major economic infrastructure and urban development in North Lantau to optimise the use of the existing and planned transport links and infrastructure", while protecting Lantau's natural environment for "conservation and environmentally sustainable recreational and visitor uses."

It would seem sensible that a new eco-tourism attraction for Hong Kong should remain within an existing tourism development 'footprint' such as that of North Lantau – with its network of attractions, facilities and transport infrastructure – rather than opening up a completely fresh or more rural destination. North Lantau's existing tourism infrastructure includes the AsiaWorld-Expo, Tung Chung Fort, Ngong Ping 360 Cable Car & Village, Giant Buddha & Po Lin Monastery, Ngong Ping Nature Centre & Wisdom Path. Flying Fox will build on the foundations laid by these initiatives to create Lantau's first eco-adventure.

A zipline tour will fit snugly within the 'shadow' of North Lantau's existing large tourism infrastructure, without impacting conservation priorities. In fact, one of Flying Fox's objectives is to showcase conservation principles (see below). It will help to define the Ngong Ping area as Hong Kong's premier eco-adventure destination, distinct from the more artificial and built-up sites at Disneyland and Ocean Park.

### ***ii) Flying Fox builds on and benefits from the existing NP360 infrastructure***

For a zipline tour to succeed in delivering the best eco-adventure to the most visitors, it must be accessible, with sufficient facilities to service their needs. It cannot be in a total wilderness – there must be public access, toilets, food and beverage areas, first aid stations, evacuation and rescue options. If these facilities already exist onsite, this avoids the need to build new logistics infrastructure, with the added environmental impacts that would bring.

NP360 forms an ideal location for Flying Fox as it provides the transport facilities and amenities essential for the success of a zipline tour. We want to build incrementally on NP360's achievements and help in their vision to enable visitors to 'get back to nature'.

### ***iii) Bringing investment, employment & skills transfer***

A zipline tour in Hong Kong will bring economic benefits to Lantau and Hong Kong. Although the zipline infrastructure is relatively small-scale, the investment required in specialist design, materials, training and installation is considerable. A significant proportion of this inward investment will be channeled into local suppliers.

Once operational, the zipline tour will employ up to 20 local people as instructors and managers. Flying Fox will begin a comprehensive skills transfer programme, providing local staff with industry-leading zipline operation skills as well as investing in their knowledge of the ecology of Lantau North Country Park.

Once open, the zipline tour will add to the tax collection of Hong Kong and pay a rental for the use of the land. We are also interested in channeling a portion of any profits into conservation projects in the local area.



### c. Why in Lantau North Country Park?

- *Hong Kong's ideal location for a sustainable zipline tour, combining the right topography, "wow" factor, ecological & cultural interest and infrastructure*
- *The zipline tour fits with AFCD's priorities of recreation, education and conservation which lie at the heart of the Country Parks Ordinance*
- *Minimal impact on small area of Country Park adjacent to Ngong Ping*

#### *i) Hong Kong's ideal location for a sustainable zipline tour*

Lantau North Country Park and Ngong Ping form probably the most suitable location for a sustainable zipline tour anywhere in Hong Kong, for four key reasons:

- **Steep topography:** the right mix of hills and valleys for ziplines to work, allowing gravity to propel guests without the need for motorised equipment.
- **"Wow" factor:** highly dramatic views of mountains, valleys, rocky outcrops, gorges and waterfalls, sea views to attract participants.
- **"Edutainment" potential:** the combination of geography, rich flora and fauna, and the cultural interest surrounding the Giant Buddha, make this an outstanding location to engage the mind and promote outdoor learning.
- **Existing infrastructure:** as we have seen, the zipline tour benefits from its location next to NP360, with its public access and logistical facilities

#### *ii) Boosting recreation and enjoyment opportunities – attracting more youth*

The zipline tour presents a great opportunity for AFCD to showcase to a wider, younger audience its principles of recreation, education and conservation and to be at the forefront of an exciting new form of eco-adventure, not previously realised in the East Asian region.

Section 4 of the *Country Parks Ordinance* states: "It shall be the duty of the Authority...to take such measures in respect of Country Parks and special areas as he thinks necessary - (i) to encourage their use and development for the purposes of recreation and tourism".

A zipline tour will greatly enhance the recreation and tourism potential of Lantau North Country Park – especially as the operating area we are proposing is tantalisingly viewable from the cable car but currently virtually inaccessible. The tour will encourage a different demographic of recreational visitor to experience the Country Park. In India, while our customers range from 10-80 years, over 75% are below 35 years. We anticipate attracting more, younger visitors to Lantau North Country Park than currently visit the area.

#### *iii) Enhancing education through outdoor learning and interpretation*

The AFCD is proactive in organising outdoor learning activities for young people through the *Nature in Touch* programme which prioritises "Hiking, Countryside Learning and Outdoor Experience," and through field studies for schools. The Ngong Ping Nature Centre provides guided tours and aims to "to promote public awareness of environmental and ecological conservation, and above all to encourage ethical, responsible and sustainable Hong Kong tourism".

Our zipline tour, with its combination of hiking, aerial adventure and outdoor interpretation will build on these excellent initiatives and help AFCD deliver on its educational objectives.

We aim to provide an ‘interactive learning platform’ for North Lantau, in which guests of all ages learn more about the role of the Country Parks, their ecological importance and the conservation challenges they face, through:

- **An engaging website**, featuring a ‘clickable’ map with pop-up information on items of ecological and cultural interest, allowing visitors to prepare before they go and undertake follow up learning afterwards.
- **Interpretation boards**, located along the tour, will provide fun, visual information about flora and fauna, key conservation issues, the stewardship of the AFCD.
- **Our knowledgeable instructors**, on hand to engage guests with fun commentary on a range of ecological and conservation issues.
- **Reconnection with nature**: during the tour, guests will reinvigorate their sense of reverence for nature by immersing themselves in a corner of wilderness made uniquely accessible.
- **Learning reinforced**: the adventurous experience of zipping over valleys, hiking beside a waterfall and crossing high above a deep gorge, will help to reinforce guests’ learning by providing a memorable, thrilling outdoor experience.

We welcome the opportunity to work with AFCD and Ngong Ping Nature Centre to help develop our educational resources. We appreciate that AFCD prioritises free education for the public; for that reason we are open to providing concessionary tours to select public groups, for example school children, at designated times.

#### *iv) Encouraging conservation through sustainable tourism*

Conservation is important to Flying Fox, not only in the way we build and operate our zipline tours but also in the messages we want to convey to our participants – that conservation can be fun and that tourism can be sustainable and environmentally friendly.

According to the international Convention on Biological Diversity (of which Hong Kong is a signatory): “Sustainable tourism can make positive improvements to biological diversity conservation especially when local communities are directly involved with operators... [it] can serve as a major educational opportunity, increasing knowledge of and respect for natural ecosystems and biological resources...[it] can generate jobs and revenues, thus providing an incentive for preserving natural areas. It can also raise public awareness of the many products and services provided by natural ecosystems ... Sustainable tourism clearly has the potential to reconcile economic and environmental concerns and give a practical meaning to sustainable development.”

We appreciate that the science of conservation is well outside our competency. However, in providing visitors to Lantau North Country Park with an engaging, fun outdoor experience we will encourage them to appreciate the Country Parks a little bit more, and take away from the experience an enhanced knowledge of why conservation matters.

#### *v) Minimal impact on small area of Country Park adjacent to Ngong Ping*

Flying Fox is not requesting to use a large area of pristine Country Park. Our proposed operational area lies adjacent to NP360’s Terminal Building and Tower 7. The land area occupied by Flying Fox infrastructure will total around 740m<sup>2</sup> (0.07ha), with a further 1850m<sup>2</sup> (0.19ha) of airspace taken up by the ziplines and suspension walkway.



While Section 16 of the Country Parks Ordinance refers to controlling any use which would “substantially reduce the enjoyment and amenities of the Country Park”, we see no contradiction between encouraging new recreation within Lantau North Country Park and ensuring continued enjoyment of the Park by the public and local stakeholders.

The area we propose to use is currently inaccessible to the public for their enjoyment and lacks amenities. The eastern side is bounded by NP360’s rescue trail, which has a locked gate 200m from the Terminal Building to prevent visitor access. There are no other physical trails into the area and the ground is rough, steep and inaccessible for recreational purposes. The only visitor experience of this corner of the Country Park is currently when viewed at a distance from the cable car itself or from a Country Trail leading to the Angle Station.

#### **d. Summary of benefits and beneficiaries**

##### **For AFCD & the Country Park:**

- Showcase the diversity and richness of Hong Kong’s ecology and landscapes, and the AFCD’s conservation initiatives and stewardship
- Diversify current recreation opportunities – in turn broadening the visitor profile to the countryside and encouraging new, younger visitors
- Encourage foreign visitors to Hong Kong to appreciate the wonder of its scenery and conservation record – in an accessible way
- Assist the AFCD with its mandate to encourage the use and development of the countryside for the purposes of recreation, education and conservation
- In a modest way, enhance and burnish Hong Kong’s eco-tourism credentials in the region
- Generate rental income for the Hong Kong Govt. which can be ploughed back into initiatives of benefit to Lantau North Country Park

##### **For Hong Kong residents:**

- Create a new “must-do” eco-adventure to increase the attractiveness of Hong Kong as a tourism destination and broaden the spectrum of foreign visitors
- Provide the hard-working people of Hong Kong with a fun, outdoor stress-busting new recreation – which is also healthy because it gets people – especially kids – exercising in the fresh air
- Provide a medium for outdoor environmental learning for all ages, especially youth, on the premise that new knowledge ‘sticks’ in the mind better if the participant is engaged and having fun
- Boost investment into Hong Kong and generate employment opportunities and skills transfer from industry experts to local employees

##### **For Lantau:**

- Contribute to the continued development of North Lantau, in line with the Tourism Commission’s eco-tourism objectives
- Complement the impressive existing attractions of Lantau
- Enhance the appeal of North Lantau for Hong Kong residents and foreign tourists, which in turn will be good for the economic prosperity of the area
- Retain tourists in the area for longer, which will lead to increased revenue generation for local people and businesses

## 7. Environmental impact management – summary of Annex 3

Flying Fox's Environmental Impact Management strategy is in draft form – to be finessed in discussion with AFCD and other interested stakeholders. We have drawn on first hand research during numerous site visits to Lantau North Country Park as well as on desk research with particular reference to the MTR Corporation Ltd's document, *Tung Chung Cable Car Project, Environmental Impact Assessment (Final)*, March 2003. We intend to adopt the Environmental Code of Conduct presented in this assessment.

Our reading of the EIA Ordinance suggests that a formal EIA for this project is not required. However, it is clearly desirable to address all issues around environmental impacts, using the MTR's Cable Car EIA as our baseline survey and template.

### a. Land and airspace required

- Paths: 200m of existing rescue trail; 430m of new paths; no paths beneath ziplines
- "CloudStation" launch / landing points: halo design of 10m diameter and 2-3m in height; four sites each of 78m<sup>2</sup> = total 312m<sup>2</sup>
- Airspace for ziplines: 2 parallel zips of 300m long x 3m wide = 1800m<sup>2</sup>
- Airspace for suspension walkway: 50m long x 1m wide = 50m<sup>2</sup>
- **Total land area dedicated to Flying Fox: approx. 740m<sup>2</sup>, or 0.07ha**
- **Total airspace required by Flying Fox: 1850m<sup>2</sup>, or 0.19ha**
- **Total combined land area and airspace required: 2,590m<sup>2</sup> or 0.26 hectares** (0.01% of the total land area of Lantau North Country Park)
- Flying Fox falls outside the Outline Zoning Plan for Ngong Ping
- We will require the use of commercial space in Tung Chung and Ngong Ping village as sales outlets; we will also require the use of a small room in or near the Terminal Building for storing safety equipment, spare materials & tools.

### b. Construction philosophy and planned infrastructure

- Flying Fox will employ a low impact construction philosophy to ensure a well managed and environmentally friendly installation.
- Design principles include: visually low impact, constructability, maintainability, aesthetics & integration in environment.
- All components will be pre-fabricated to minimise onsite storage of materials and transported by cable car to minimise environmental impact. The on-site time for construction will be around 2-3 months.
- A construction method statement will be prepared once design parameters have been agreed with AFCD and EMSD, and following the detailed planning phase.
- Four **ziplines** will be rigged along two axes, comprising 12-14mm diameter galvanised wire rope; with an additional service line of similar diameter above each zipline to facilitate operation of the braking system.
- Four **CloudStations** will anchor each zipline termination to the ground, provide a structure on which to mount the braking system and allow guests to gather in an orderly manner before launch and after landing. The proposed design envisages 10m-diameter, halo-shaped CloudStations, made from galvanised or weathering steel, with pre-formed ballast installed within the structure to reduce the need for large concrete foundations. The structure will sit on small concrete feet where the ground is flat; deeper foundations may be required where the land is uneven – to be determined by a geotechnical survey.
- *Should the CloudStation design be considered inappropriate for the Country Park setting, we are open to dialogue with AFCD over alternative launch/landing*



*structures, using more natural materials, e.g. timber.*

- A single lightweight **Suspension walkway** of 50m length x 1m wide will span the Sham Wat gorge. Constructed of wire rope, natural rope and wooden decking, it will be anchored directly into the rock – subject to a geotechnical survey.
- **Paths.** Four new pathways totaling approx. 430m long x 1m wide will connect the various sections of the journey. Some steps may be required to negotiate the rocks along the “Ridge Walk”. Existing paths will be utilised where possible.
- *AFCD is invited to discuss low impact path design options, e.g. stone paths, grated steel walkways or timber boardwalks.*
- *See Annex 1 for photographs and preliminary designs of proposed infrastructure.*

#### **c. Impacts on air quality**

- During construction, these will be small to negligible, as drilling and use of concrete during construction will be minimal
- Operations require no powered parts, making Flying Fox a zero emission activity.
- Smoking and cooking will be prohibited in the operational area at all times to minimise fire risk.

#### **d. Impacts on water quality**

- The operational area is a Water Gathering Ground, consequently protection of watercourses is of the utmost importance.
- During construction, mitigation measures will be taken to avoid or control accidental spillage of materials or fuels, sedimentation of watercourses due to erosion, and generation of wastewater or domestic waste by workers.
- During operations, guests will not be permitted to take food or drop litter
- No toilets will be installed; all workers and guests will use toilets at NP360

#### **e. Waste management**

- Flying Fox will create a Waste Management Plan to minimise impacts due to excavated materials, construction / chemical / municipal wastes.
- Wastes will be removed immediately and not stored or burned onsite.
- Excavated materials will be reused where possible.

#### **f. Noise impacts**

- Any noise generated by plant during construction will be mitigated by use of quieter plant and noise barriers where necessary
- We are mindful of the Noise Control Ordinance and will identify representative NSRs within 300m of the project limit.
- Operational noise will be minimal; noise generated by zipline pulleys can be mitigated by the use of plastic sheathed wire rope.

#### **g. Ecological impacts**

- Key habitats in the operational area are streams, woodland and tall shrub habitat, assessed to be of medium to high ecological value. Flying Fox will be using areas of abandoned cultivation, grassland, low shrub and tall shrub, but no woodland. The ziplines and suspension walkway will cross branches of the Sham Wat stream.
- The most ecologically valuable habitat along the route of the zipline tour is the Tall Shrub between Zip 2 and the suspension walkway – a distance of 80m.
- Mitigation measures will be taken to ensure minimal lopping of tall shrubs and compensatory planting as required.

- Mitigation principles of Avoidance, Minimization and Compensation will be strictly adhered to.
- Mitigation measures will be taken to ensure no waste products, pollutants or sedimentation affect the watercourses.
- The species of conservation interest are widely distributed and do not appear confined to any single location. The exceptions are amphibians that have relatively low mobilities and may be impacted.
- The uncommon Leaf Litter Toad has been observed in a Sham Wat tributary stream near to the path leading from Zip 1 to Zip 2. Particular care will be taken to ensure its riparian habitat and behaviour are not disturbed.
- Disturbance will generally have insignificant impacts on mobile taxa, or taxa which do not have highly specific habitat requirements, such as birds, large mammals, most reptiles, and butterfly and dragonfly adults.
- Bird collisions are not considered a potential significant impact, as no evidence is present that the area is a migratory bird flight path or an area situated close to breeding or feeding colonies of migratory birds. No bird species mortality has been reported from the collision of bird species into transmission lines in Hong Kong.

#### **h. Landscape and visual impacts**

- These impacts will be small, for the following key reasons:
- The installation is considerably smaller than the current cable car infrastructure immediately adjacent to the operational area.
- The installation has been designed to nestle into the landscape and topography, avoiding straight-line paths or silhouetting structures on the skyline.
- The installation can only be seen from two existing viewpoints:
  - The cable car gondolas, from which the view of Flying Fox is framed by foreground views of the cable car installation
  - A section of Country Trail leading north from Ngong Ping to the Angle Station. The view west from these trails is first blocked by the large knoll to the east of Tower 7, and then framed in the foreground by the cable car infrastructure of towers, gondolas and cables.
- The great majority of viewers will be from the cable car – these viewers, in the act of taking the cable car, have arguably adapted to the concept of man-made structures in the Country Park and will be unlikely to object to the smaller Flying Fox installation.

#### **i. Cultural and heritage impacts**

- There will be no adverse visual or aesthetic impacts on the area's cultural heritage, as all works areas are located at a sufficient distance from the monastery and associated structures and are separated from them by wooded or hilly areas.
- We have redirected our paths to avoid any graves and give them a wide berth.
- The installation will not be visible from the Great Buddha, the Po Lin monastery, or the Ling Tap columbarium.
- There are no recorded Fung Shui features within the operational area.

#### **j. Precedent: Yellowstone Park, zipline environmental assessment (see Appendix D)**

- A US Government Forest Service environmental assessment of a proposed 7-zipline tour within national forest beside Yellowstone Park concluded that there would be no effects to sensitive species of wildlife and no habitat loss.
- The assessment suggested major groundwork and use of heavy equipment should be limited to seasons when minimal soil compaction or sedimentation of rivers occurs.

## **8. Safety and risk management – summary of Annex 4**

### **a. Overview and safety record**

- Ziplines are an extremely safe, exhilarating and inclusive form of adventure activity.
- At Flying Fox, safety is our No. 1 priority: since opening in January 2009, we have operated approximately 200,000 safe zipline descents.

### **b. Standards**

- Our installations, which consist of robust and permanent galvanized steel posts and cables, are designed to the European Standard EN 15567 for high ropes adventure courses and to ISO 4309 which governs the use of wire rope.
- EMSD have suggested the Hong Kong *Code of Practice for Amusement Rides 2003* will apply, with reference to international industry standards where appropriate.

### **c. Imported equipment**

- The safety equipment (PPE) worn by participants is imported from leading international brands such as Petzl of France, and it conforms to UIAA standards.
- Guests are attached to the zipline by two points of attachment, using lanyards with a safe working load of 22kN, a pulley system and self-locking karabiners.
- Each Flying Fox instructor carries a rescue bag onsite which includes the equipment necessary to rescue any participant at any point mid-span along the zipline.

### **d. Guest safety briefing and practice**

- Guests receive a full safety brief from one of our instructors and practice zipping techniques before embarking on the zipline tour.
- They also sign a “Risk Acknowledgment and Disclaimer Form”

### **e. Instructor training, supervision & communication**

- Each site is operated by an experienced team of expatriate and local instructors, led by a Manager with an international climbing / mountaineering qualification.
- All instructors are trained to European standards and are assessed in their operational and rescue protocols every month. They also hold First Aid certificates.
- Guests are supervised at all times by Flying Fox instructors, who are responsible for clipping all guests onto the ziplines at each launch and unclipping them at each landing, as well as managing the safe flow of participants around the tour.
- Guests will travel in groups of up to 12 persons at a time, supervised by two instructors. During periods of high occupancy, we will staff each CloudStation and the Suspension walkway with two instructors to improve the safe flow of guests.
- Communication between instructors and the duty manager will be by hand-held UHF radio (“walkie-talkie”); all radio communications are logged.

### **f. SOPS, risk assessments & emergency procedures**

- Flying Fox has developed Standard Operating Protocols (SOPs) to cover all routine and emergency procedures, in conjunction with some of the world’s leading high wire adventure consultants. These SOPs, along with Company Policies, are contained in a comprehensive online Operations Manual.
- Each site has a Risk Assessment document which is updated on a quarterly basis.
- In the unlikely event of a guest stopping short while zipping, all instructors are trained and equipped to recover the guest to the end of the zipline within less than 20 minutes, without needing to lower the guest to the ground.



- Flying Fox has developed standard evacuation protocols in the event of poor weather, which will be customised to suit the specific site in Lantau.
- We will be in close contact with the cable car operators to ensure that we are “in the loop” on any severe weather warnings issued by the Hong Kong Observatory; we will adopt similar windspeed warning criteria as NP360 for evacuating and closing the site. The site will close during electrical storms and heavy rain.

#### **g. Site inspection regime**

- **Daily inspection:** visual checks of the installation; physical check of all safety equipment before use by guests; physical test ride of each zipline & braking system.
- **Monthly inspection:** thorough check of the installation, retuning of ziplines to ensure maximum ride safety, thorough check and maintenance of all the PPE.
- **Periodic/Quarterly checks:** ziplines are inspected for wire breaks, critical wire rope U-bolt terminations are torque-wrenched to the correct tension, tension reading of all ziplines and stays, revision of Risk Assessment, groundwork repairs.
- **Annual certification:** by an independent third party expert to EN Standards, including onsite proof tests on safety critical anchors.

#### **h. Head Office oversight**

- Full set of paperwork safety critical Annexes, signed off by the Manager on a daily and monthly basis.
- Online Operations Report, summarizing the inspections and training completed, emailed to the Director of Operations.
- Operations Manager visits each site once per month to ensure paperwork, training and inspection regime in order.

#### **i. Public access**

- Flying Fox limits access to its installations only to those guests who have undergone the correct induction and safety briefing procedure.
- We would limit public access to Flying Fox Lantau, by gating off the CloudStations which provide access to the ziplines, and also the suspension walkway.
- The question of how much unsupervised public access to permit on Flying Fox’s pathways is to be discussed with AFCD.

### **9. Process**

Flying Fox visited Hong Kong in August 2011 to conduct an initial onsite feasibility study, followed by a second confirmatory site visit in August 2012. During the first visit an initial presentation was given to a joint meeting of the Tourism Commission and the Hong Kong Tourism Board (HKTb) to introduce Flying Fox and the concept.

On 10<sup>th</sup> September 2011, Flying Fox directors met with Daisy Lui, Deputy Executive Director of HKTb, in New Delhi, India, to discuss the zipline tour project. At that meeting Ms Lui confirmed the support of HKTb’s Executive Director Anthony Lau and Chairman James Tien for the project.

On 6<sup>th</sup> January 2012 a follow up meeting was organised by the Tourism Commission, during which Flying Fox presented the findings of its feasibility study to Vincent Fung, Assistant Commissioner for Tourism, and Patrick Kwok, General Manager of HKTb.

On 15<sup>th</sup> August 2012 a third meeting was organised by the Tourism Commission, during which Flying Fox introduced its eco-adventure operation to relevant HKSAR Government Departments, in order to take feedback from each department. Attending the meeting were representatives from: Tourism Commission, Tourism Board, AFCD, EMSD, CEDD and Lands Department.

All the departments consulted have been helpful in providing guidance on permit application procedures, and we are confident of our ability to meet the high standards and regulations required to operate in Hong Kong. In particular, we received useful feedback from Dr Maria Lau-ching Young, Country Parks Officer Lantau, who advised us of the need to present our proposal to the Country & Marine Parks Board (CMPB), as a first stage in securing permission from the AFCD.

This is a preliminary submission to the CMPB. It is our intention to take feedback and advice from the members of the Board, so as to refine the project where appropriate. Ultimately it is our objective that the CMPB should give its blessing and approval for this exciting new eco-tourism project.

*The following organizations and individuals have advised on, support and endorse this submission:*

- *Tourism Commission*
- *Hong Kong Tourism Board*
- *Mr Wilson Shao, Managing Director, NP360*
- *Dr Glenn Frommer, Chief Sustainable Development Manager, MTR*

The following paragraph has been provided by the Tourism Commission:

*“The Tourism Commission welcomes the proposal of developing a zipline tour facility in the Lantau North Country Park area, and encourages further consideration by relevant government departments to the proposal put forward by Flying Fox. Subject to the technical feasibility and environmental compatibility of the development, the proposed zipline facility could become a new attraction on Lantau. This is in line with the policy intention to further promote green and eco-tourism in Hong Kong. This could showcase to our international visitors the often-neglected natural beauty of Hong Kong's countryside.”*

## ANNEXES

1. Maps, Photographs & Proposed Designs
2. Justification & Benefits
3. Environmental Impact Management
4. Safety & Risk Management

## APPENDICES

- A. References
- B. Definitions & Glossary
- C. International zipline tours in national parks
- D. Yellowstone Park case study
- E. Sample interpretation boards
- F. Ecological significance of habitats in operational area
- G. Environmental Code of Conduct
- H. Risk mitigation measures

***Note: the Annexes contain the main body and detail of Flying Fox's submission to the CMPB; we would encourage the Members to read the Annexes and Appendices in full when considering the zipline tour proposal***





**Working Paper submitted to the Country and Marine Parks Board**

**Proposed Flying Fox Eco-Adventure Zipline Tour at Ngong Ping, Lantau North  
Country Park**

*17<sup>th</sup> October 2012*

**ANNEX 1. MAPS, PHOTOGRAPHS & PROPOSED DESIGNS**

- 1.1 Images of Flying Fox installations
- 1.2 Maps of the operational area and proposed installation
- 1.3 Photographs indicative of the types of structures envisaged
- 1.4 Photographs of proposed locations of zipline tour infrastructure
- 1.5 Images showing the context for visual impacts

**Annex 1.1 Images of Flying Fox installations**



*Flying Fox Neemrana*



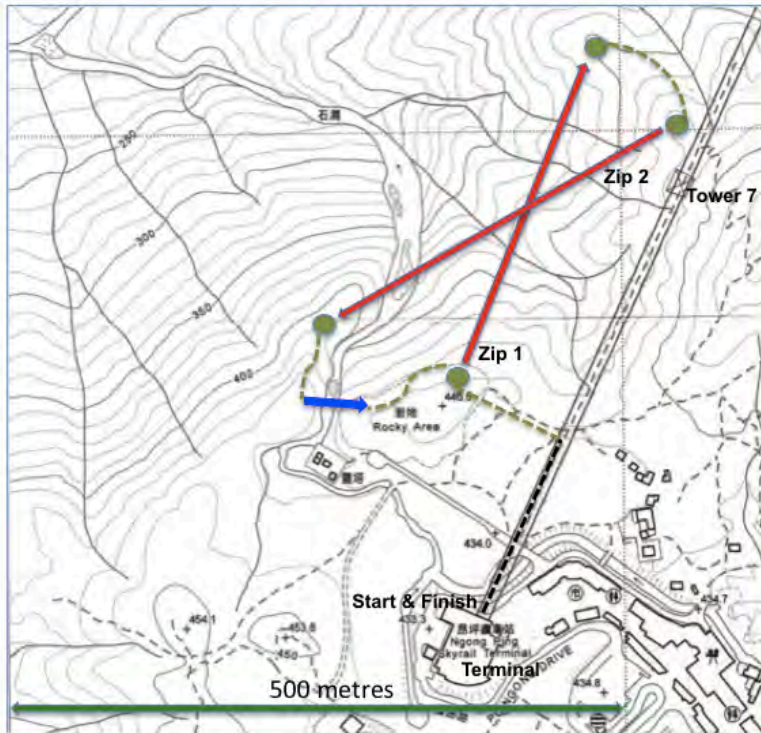
*Flying Fox Jodhpur*



*Flying Fox Kikar*

## Annex 1.2 Maps of the operational area and proposed installation

### Proposed route & footprint of Flying Fox Lantau



- Approach walk: 300m (200m of existing path, 100m of new path)
- Zip 1: 300m twin zipline
- Path to Zip 2: 130m
- Zip 2: 300m twin zipline
- Ridge walk: 80m
- Suspension walkway: 50m span
- Rock ramble: 120m then return to start along approach path
- Total tour length: 1,580m
- Land area for launch / landing:  $78\text{m}^2 \times 4 \text{ sites} = 312\text{m}^2$
- Total length of new paths:  $430\text{m} \times 1\text{m wide} = 430\text{m}^2$
- **Total land area approx. 0.07ha**
- CloudStation launch / landing
- Suspension walkway New path
- Zipline Existing path

Zip Adventures Ltd 2012©



Approximate location of proposed Flying Fox zip tour experience



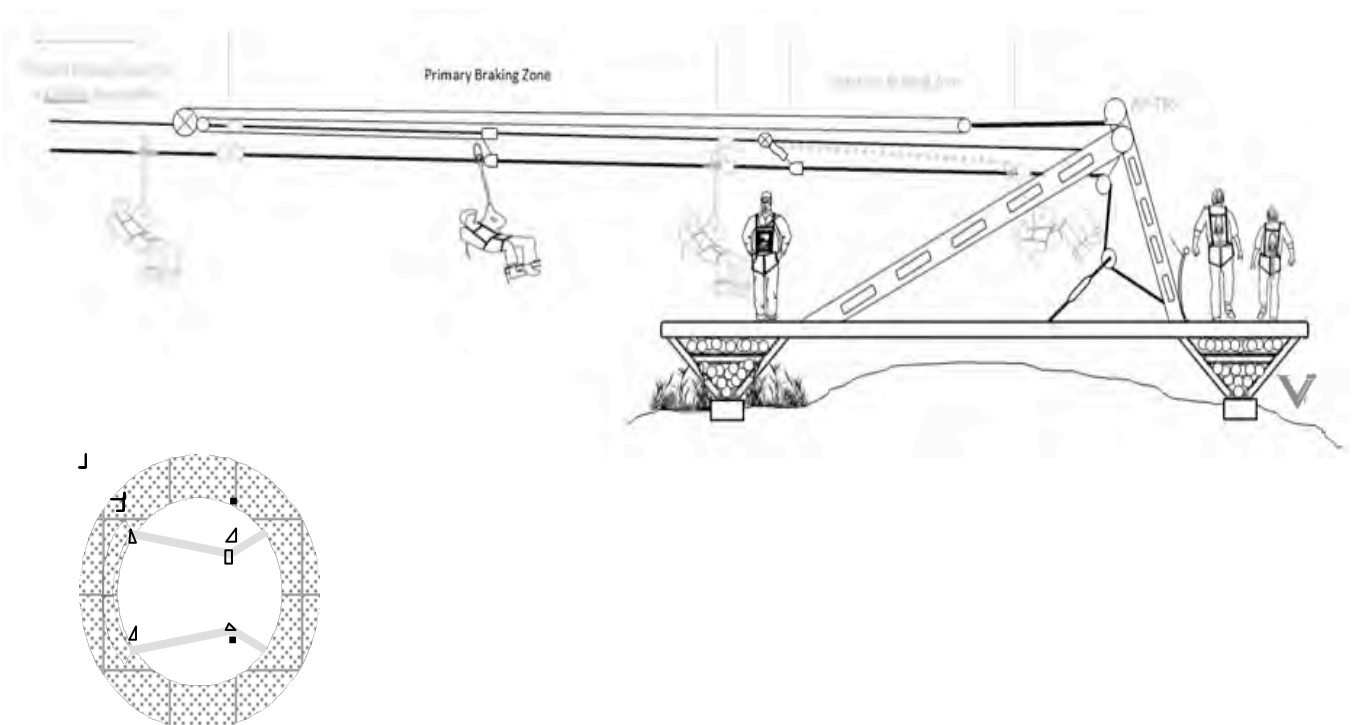
## Annex 1.3 Photographs indicative of the types of structures envisaged

### Schematic elevation of proposed zipline tour

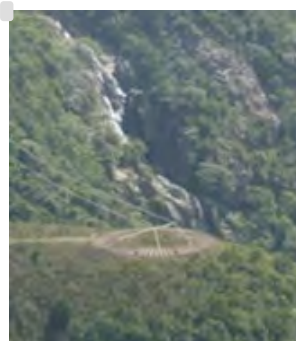
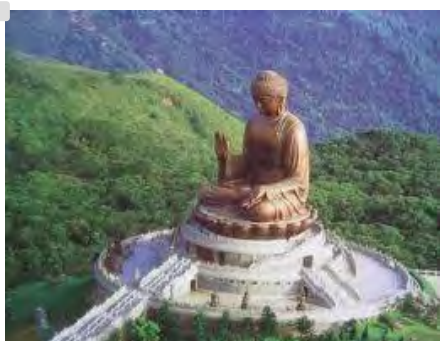
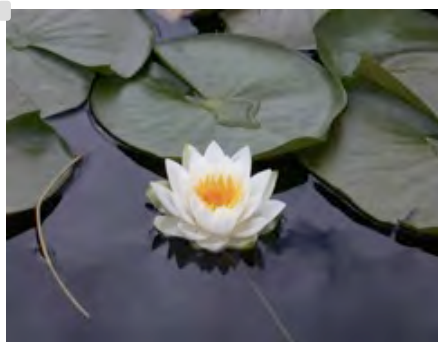


### CloudStation

Sample design elevation & plan for structure of 10m in diameter, 2-3m high, which acts as launch & landing platform, zipline anchoring system and structure to support braking system



**CloudStation:** bio-mimicry, artist's impression when in location, detail of tread, natural discolouration







### Suspension walkway

Wire rope, natural rope & timber deck



### Path design options

a) Galvanised steel grated & raised walkway



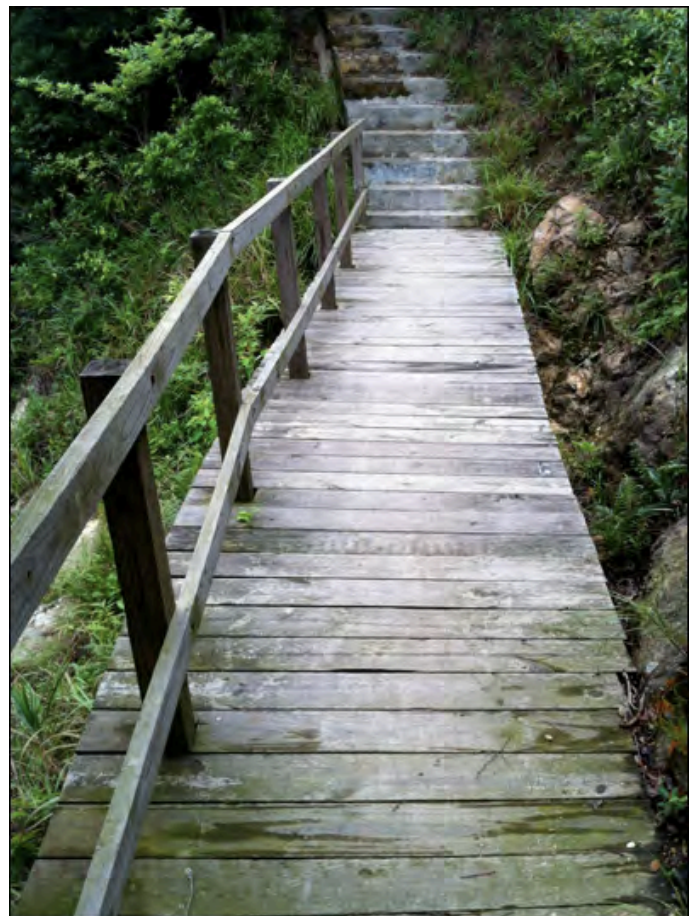
**Path design options:**

b) Stone paved – as per existing Lantau Trail



**Path design options:**

b) Timber raised boardwalk – as per sections of existing Rescue Trail





**Annex 1.4 Photographs of proposed locations of zipline tour infrastructure**



Launch of Zip 1 options – grassland (top) or rocks (bottom)







Landing of Zip 1 and route of path to launch of Zip 2, towards Tower 7



Launch of Zip 2, beside Tower 7

Landing of Zip 2 on rocks



Route of ridge climb from Zip 2 towards Suspension walkway (ridge to right / far side of gorge)





Route of Suspension walkway – rocks to rocks,  
beneath skyline



Section of Lantau Trail to be used as  
access path





## **Annex 1.5 Images showing the context for visual impacts**



### **View of Flying Fox operational area & proposed installation from cable car**

- This is the view which the great majority of Country Park users will have of Flying Fox
- The image shows an artist's impression of the zipline tour installation
- Note the 47m high Tower 7 immediately adjacent to the operating area
- Note the 12m high white Terminal Building beyond
- Note that the view is framed by pre-existing cable car infrastructure



### **Distant view of operational area from cable car**

- Note that the view is framed by pre-existing cable car infrastructure
- Note the large knoll to the left of the cable car Tower 7 which conceals the operational area from the Ngong Ping plateau and Lantau & Country Trail



### **View of operational area from the south-west**

- This is a view from a hilltop with no public access paths
- Note the 47m high Tower 7 and cable car gondolas adjacent to the operating area
- Note the upper and lower knolls to the left of the Tower where CloudStations will be located
- The CloudStations will be halo-shaped, 2-3m high and 10m in diameter
- Tower 7 is 47m high and its legs occupy a footprint of 35m x 35m





**View of operational area from cable car, as it crosses Tower 7**

- This is the view which the great majority of Country Park users will have of Flying Fox
- Note the 12m high white Terminal Building beyond
- Note that the view is framed by pre-existing cable car infrastructure



**View of rescue trail from cable car**

- Note how visible the trail is, both in terms of finish and straightness
- Flying Fox trails would seek to blend in by using natural materials and meandering around the contours of the land



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Country Park**

*17<sup>th</sup> October 2012*

## **ANNEX 2. JUSTIFICATION & BENEFITS**

- 2.1 Why it's good for Hong Kong
- 2.2 Why it's good for Lantau
- 2.3 Why Lantau North Country Park is the perfect location
- 2.4 Why it's good for the AFCD
- 2.5 The Triple Bottom Line
- 2.6 Summary of project benefits

## **ANNEX 2. JUSTIFICATION & BENEFITS**

### **2.1 Why it's good for Hong Kong**

#### **a. Showcase Hong Kong's rich ecological and scenic variety**

One of the world's great cities, Hong Kong is also among the most ecologically diverse and professionally-managed nature conservation areas in Asia.

Seventy per cent of the land of Hong Kong is countryside. Forty-three per cent of the total area is under statutory protection as Country or Marine Park, containing an extraordinary and dense variety of plant and wildlife species and landscapes; from sandy and rocky coastlines to wetland, scrubland, grassland and woodland, culminating in towering 3000 ft. peaks.

The countryside and biodiversity of Hong Kong can be enjoyed in a variety of ways by the people of Hong Kong and her visitors. There is an extensive range of nature parks and ecological reserves, varying in scale from botanical gardens and small urban parks to the Hong Kong Wetland Centre and the Hong Kong Global Geopark of China, which encompasses 50 km<sup>2</sup> of the New Territories.

There are over 300 kilometres of hiking trails – and a growing network of designated mountain bike trails – attracting 12 million visits annually. Situated along these trails are beaches, barbecue sites, child recreation areas and interpretation centres. In addition, beyond the Country and Marine Parks, Hong Kong offers a kaleidoscope of outdoor recreation opportunities, from sailing and swimming to golf and go-karting.

*Hong Kong has a tremendous variety of scenery and biodiversity for the visitor and the resident alike to enjoy and appreciate, and a proud legacy of conservation and stewardship of its countryside to showcase. This makes Hong Kong the ideal location for an eco-adventure activity.*

#### **b. Hong Kong is missing out on eco-adventure**

And yet for somewhere with such a high proportion of countryside to urban land, with such a breadth of landscapes and species, and a substantial and sophisticated resident and visiting population, eco-adventure is less developed in Hong Kong than in many other Asian cities or in national parks worldwide.

Before providing examples of eco-adventure which could be replicated in Hong Kong, it is important to clarify what we mean by eco-adventure because it tends to be over used as a catch-all. For a full definition see **Appendix B**; in short, eco-adventure can be defined as *the use of mild or moderate physical adventure to enhance the enjoyment and appreciation of an ecologically diverse, important or scenic landscape.*

Zipline tours (and canopy tours<sup>1</sup>) do this brilliantly. They allow a participant to access wild and pristine locations without significantly impacting those locations; for

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<sup>1</sup> A canopy tour is a (usually) guided adventure journey from tree-to-tree specifically within the canopy of a forest by means of platforms, ladders, suspension walkways, alternative



instance, they do not require highly mechanised or powered systems, the construction of invasive roads, use of vehicles, or any resource depletion. The installation and operation of the zipline tour touches lightly on the ground and it is designed to harmonize with its surroundings.

Ziplines give a feeling of flight, opening up exhilarating ‘never-before-seen’ vistas and perspectives to a large number of people – of all ages and physical abilities. Zipline tours are long enough to allow participants to absorb themselves in dramatic views and interesting interpretation, but short enough to fit into a morning or afternoon’s activity. They promote an enjoyment and renewed appreciation of the outdoors and encourage moderate physical exercise.

There are so many commendable zipline or canopy tour eco-adventures around the world that it is difficult to narrow down a few good examples. Canopy and zipline tours exist in North America (the USA has 100 individual sites), Central and South America, South Asia, Europe (the UK Forestry Commission alone has nearly 30 privately operated sites within government forests), Australia and New Zealand. For a selection of international precedents for zipline tours in national parks, see **Appendix C**.

In Southeast Asia they are sparser, but nevertheless there are thriving zipline or canopy tours in Thailand, Malaysia, the Philippines and Singapore. The HSBC Treetop Walk, although it is a canopy not a zipline tour, is a good example of the principle behind eco-adventure. Located in the MacRitchie Reservoir Park, Singapore, it has a dual stated purpose. “Besides providing another avenue for nature recreation for Singaporeans... it also helps to ... further our understanding of how forest ecosystems work”, according to the National Parks Board website.<sup>2</sup>

Interestingly, rather than being perceived as invasive or harmful to the Park’s biodiversity and landscape, this canopy tour – which consists of a sizeable steel suspension walkway and newly constructed timber boardwalks – was conceived as a new way to enjoy and learn about the natural environment and a new form of outdoor recreation for the local population.

Another good example, further afield, is the recently approved 7-zipline tour for the Shoshone National Forest at Yellowstone National Park, USA. In sanctioning this project, the US Department of Agriculture’s Forest Service assessment recognised that “the zip line tour would provide a recreation opportunity not currently available in the area.”<sup>3</sup>

Zipline tours use topography and dramatic views to produce a completely new form of recreation – which attracts new types of visitors and provides the existing visitor

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crossings, swings and ziplines. The original canopy tours of Costa Rica are a series of ziplines and suspension walkways which transport participants from platform to platform within and over the rainforest canopy.

<sup>2</sup>[http://www.nparks.gov.sg/cms/index.php?option=com\\_visitorsguide&task=attractions&id=64&Itemid=73](http://www.nparks.gov.sg/cms/index.php?option=com_visitorsguide&task=attractions&id=64&Itemid=73)

<sup>3</sup> United States Department of Agriculture, Forest Service, August 2012. Predecisional Environmental Assessment: Sleeping Giant Ski Area Development Projects. Wapiti Ranger District, Shoshone National Forest, Park County, Wyoming, p.58-59

with another reason to return. As the promoter behind New Zealand's first canopy zipline tour operation – on the densely forested Mamaku Plateau near Rotorua – explains: "many of our customers will have never walked in forest like this full of giant, centuries old native trees, let alone explored it at heights of 22 metres above the forest floor, where the views are simply breathtaking,"<sup>4</sup>

If this is true of New Zealand, it's true of Hong Kong. How many people in Hong Kong (even those who ordinarily visit a Country Park) have gazed down from a 50m suspension walkway at a waterfall descending through the gorge below, or arrived at a rocky mid-ravine knoll to marvel at a dramatic view of the South China Sea on one side and the towering heights of Hong Kong's second tallest peak on the other? With the zipline tour, this will become a reality.

*Currently, Hong Kong does not have a zipline or canopy tour. There is no suitable forested area which can support a canopy tour, but the addition of a zipline tour and suspension walkway would provide an additional and varied recreation activity for its residents and another way in which to experience Hong Kong's unique landscape and biodiversity.*

### **c. Eco-tourism: the missing link in Hong Kong's tourism portfolio**

In the words of the Tourism Commission's August 2011 document, *Hong Kong: The Facts*, "the tourism industry is a major pillar of the economy of Hong Kong." The Tourism Commission's objective "is to establish and promote Hong Kong as Asia's premier international city, and a world-class destination for leisure and business visitors."<sup>5</sup>

A world class city which is 70% countryside needs world class eco-tourism.

This explains why the Tourism Commission has identified eco-tourism as a key development objective for Hong Kong. And why HKTB launched *Great Outdoors Hong Kong!* in 2009 "to promote the Hong Kong National Geopark, the natural scenery of outlying islands, popular hiking trails and other green attractions."<sup>6</sup>

Eco-tourism is important because it helps to increase visitor numbers and diversity, and enhance the quality of the visitor experience. From our operations in India, we have identified four elements to this phenomenon: attractiveness; visitor diversification; repeat visits; visit duration:

- **Attractiveness:** at our first location, Neemrana, a 15<sup>th</sup> century fort in Rajasthan, based on four years of operations, we know that 65% of our current visitors come to the site especially because of Flying Fox. These are new visitors to the location.

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<sup>4</sup> Rotorua Canopy Tours director James Fitzgerald [http://www.newzealand.com/travel/media/press-releases/2012/7/nature\\_new-rotorua-canopy-tours.cfm](http://www.newzealand.com/travel/media/press-releases/2012/7/nature_new-rotorua-canopy-tours.cfm)

<sup>5</sup> Tourism Commission, Hong Kong: The Facts, August 2011

<sup>6</sup> Tourism Commission, Hong Kong: The Facts, August 2011

- **Visitor diversification:** the zipline tour also diversifies the visitor demographic – in Rajasthan, whose overall tourist profile is above the age of 35 years, 75% of our participants are aged *below* 35 years.
- **Repeat visits:** a zipline tour is exciting enough to want to do more than once, especially if it also engages the mind – 17% of Flying Fox’s Indian customers return for a second time.
- **Visit duration:** by adding an eco-tourism component to an existing tourist location (for example, beside the Ngong Ping 360 cable car and village) tourists will remain on site for longer, which is beneficial for the local economy and for existing tourism providers.

Furthermore, fun eco-adventure will constitute a new and effective way to encourage foreign visitors to experience and appreciate the Country Parks of Hong Kong.

We all wish that foreign tourists to Hong Kong could enjoy, say, the breath-taking grandeur of the hiking trail to Lantau Peak or the serenity of the Sai Kung Country Park; but too often these excursions are eclipsed by ‘snappier’, more urban and artificial attractions which are perceived as more accessible. Those who know and love Hong Kong appreciate that while hiking through a Country Park should be at the top of the list for visitors to Hong Kong, usually it isn’t.

A zipline tour offers the visitor to Hong Kong the unique and enticing combination of 60-90 minutes thrilling exercise and an appreciation of a stunningly beautiful Country Park (and the work of the AFCD in preserving that park).

If it is the objective of Hong Kong to catch up with and to promote world-class eco-tourism, this is the way to do it. Zipline tours allow dramatic wilderness to be experienced in a managed, low-impact, safe, compact, regulated and accessible way.

*Tourism is a pillar of the Hong Kong economy. Hong Kong needs to develop its eco-tourism infrastructure to compete with rival destinations in the region and to help showcase its conservation work and legacy to a visiting audience. The zipline tour will encourage foreign inbound tourists who might not ordinarily visit the Country Parks during a visit to Hong Kong to gain an appreciation of the scenery, landscape and biodiversity of Hong Kong. The effectiveness of the zipline tour in this regard is demonstrated by its widespread use in protected landscapes and parks around the globe.*

#### **d. Interactive outdoor learning opportunity**

In India, our zipline tours combine fun with interpretation. The interpretation depends on the location, but we specifically choose locations which are of natural and cultural interest. We have four locations in India:

- **Neemrana Fort-Palace:** our first zipline tour starts and finishes inside a 15<sup>th</sup> century hillside palace, located along a branch of the Silk Route in the two-billion year old Aravalli Hills



- **Mehrangarh Fort, Jodhpur:** our second tour is located beside another 15<sup>th</sup> century palace, one of the largest forts in the world, and encompasses the Rao Jodha Desert Rock Park
- **Kikar Lodge, Punjab:** our third tour is within a private forest and nature resort in the Shivalik foothills; home to leopard, sambar, cheetal and python
- **Kerva Lake, Bhopal:** this tour, which opens in October 2012, is a government funded project between Flying Fox and the Madhya Pradesh Ecotourism Development Board (MPEDB) located above a lake on Forest Department land south of Bhopal, home to a wide variety of migratory bird species

During each tour, which typically lasts about 90-120 minutes, participants learn a little more about the location in an exhilarating, anecdotal and interactive way.

At Flying Fox Jodhpur, for example, the tour begins in a recently restored 18<sup>th</sup> century Rajput scent garden (home to *Tabernaemontana coronaria* and the sweet smelling *Maurya exotia*). Participants then fly from the garden into the Rao Jodha Desert Rock Park. All our guides receive training from Pradip Krishen, a renowned Indian environmentalist and the Park's restorer and ecologist. This training allows them to talk to participants knowledgeably about the Park's indigenous species; for example about how the *Euphorbia caducifolia* has effective ways of overcoming low rainfall.

The tour then culminates in a long zipline from Jodhpur's City Wall back to the fort; a breath-taking panoramic view which takes in the fort's massive western bastions, its two lakes and the 'Blue City'. This provides an opportunity for guides to talk about the fort's defence systems, how the fort still conserves and uses water from the lakes, and even why the Blue City is blue!

Not everyone who enjoys our zipline tours in India comes for a learning experience – some just want to feel the sensation of flight, admire the views and do something different and unique on their holidays. But in a modest way, the zipline tour can be used as outdoor classroom for people of all ages, but especially young people.

*The Flying Fox Lantau zipline tour will combine outdoor adventure, beautiful natural scenery, knowledgeable guides and visual interpretation to provide an interactive learning platform. The act of zipping over the countryside, hiking beside a gorge and over rocky summits and crossing the suspension walkway, will help to reinforce learning by providing a memorable, thrilling outdoor experience. Above all, participants will understand more about the outdoors by having fun outdoors.*

For a more detailed vision of how a zipline tour in North Lantau Country Park can be used for outdoor learning and interpretation, see Section 2.4b below.

#### **e. Boosting health & wellbeing**

In 2005, the Hong Kong SAR's Department of Health published a report, *Tackling Obesity*, in which it wrote: "Hong Kong is also affected by the global epidemic of obesity. Local data suggest that 20.1% of men and 15.9% of women are overweight,

and 22.3% of men and 20.0% of women are obese... There is also a significant trend among the younger age groups to become obese.”<sup>7</sup>

This problem has not gone away. A study by the Hong Kong Polytechnic in September 2011 found that “[t]he prevalence of overweight[ness] including obesity (defined as more than 120% median weight for height) among primary school students, increased from 16.4% in 1997/98 to 22.2% in 2008/09.”<sup>8</sup>

One of the causes of obesity is lack of physical exercise. In the Legislative Council, on 28<sup>th</sup> March 2012, Secretary for Food & Health, Dr York Chow had this to say about the causes of obesity in Hong Kong:

“The rising trend of overweight and obesity is largely attributable to the lifestyles of unhealthy dietary habits, the wide availability of high fat and sugary foods and *the lack of physical activity.*” [our emphasis]<sup>9</sup>

Obesity matters because, “risk factors such as overweight or obesity are causes to NCDs [non-communicable diseases] such as heart disease and diabetes, which in turn will affect our labour productivity and standard of living in the long run, undermining our economic vitality and competitiveness.”<sup>10</sup>

Dr Chow continued that, “[t]he effective tackling of the issue of overweight in our population requires concerted efforts from our society as a whole and collaboration between the Government, public and private organisations.”<sup>11</sup>

As such, Hong Kong has to “keep the existing recreation and sports services under review, examining the feasibility of providing more diversified recreation and sports activities and facilities to the public, and creating an environment which is more conducive to active and regular participation by the public in sports and physical activities.”<sup>12</sup>

Usefully, the Hong Kong Department of Health has guidelines for recommended daily and weekly physical activity: “[H]ealthy children and youth aged 5-17 years

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<sup>7</sup> Central Health Education Unit, Centre for Health Protection, Department of Health, Tackling Obesity: It's Causes, the Plight and Preventive Actions, 2005

<sup>8</sup> The Hong Kong Polytechnic University, Research Report on Childhood Obesity, February 2011

<sup>9</sup> Legislative Council proceeding, Press Release 28 March 2012  
<http://www.info.gov.hk/gia/general/201203/28/P201203280265.htm>

<sup>10</sup> Legislative Council proceeding, Press Release 28 March 2012  
<http://www.info.gov.hk/gia/general/201203/28/P201203280265.htm>

<sup>11</sup> Legislative Council proceeding, Press Release 28 March 2012  
<http://www.info.gov.hk/gia/general/201203/28/P201203280265.htm>

<sup>12</sup> Legislative Council proceeding, Press Release 28 March 2012  
<http://www.info.gov.hk/gia/general/201203/28/P201203280265.htm>

should accumulate at least 60 minutes of moderate to vigorous-intensity physical activity every day.”<sup>13</sup>

And not just for children. “[H]ealthy adults aged 18-64 years should do at least 150 minutes a week of moderate intensity aerobic physical activity, or at least 75 minutes a week of vigorous-intensity aerobic physical activity. For additional health benefits, *adults should increase their moderate-intensity aerobic physical activity to 300 minutes a week*, or engage in 150 minutes of vigorous-intensity aerobic physical activity a week, or an equivalent combination of moderate and vigorous-intensity activity” [our emphasis].<sup>14</sup>

The zipline tour will provide a moderate level of physical activity, including approximately 1 kilometre of sometimes steep walking trails involving nearly 80 metres of vertical ascent. The difference between a trek in the country and a trek as part of the zipline tour (with due respect for hiking, of which we are avid fans!), is that the zipline tour is interspersed with highly exhilarating and exciting zip lines. They are particularly exciting and motivating for young people.

It is also widely recognised that getting outdoors to do some moderate physical exercise is an excellent stress buster. According to an April 2008 survey on ‘work-life balance’ by the University of Hong Kong, of 1027 interviewees, “82.5% of people said they suffered stress and 75.4% from lack of exercise”, which in turn affected their ability to do their job properly.<sup>15</sup> A little exercise in the outdoors is a good way to rejuvenate and enhance employee productivity and wellbeing.

*The zipline tour will offer a new, healthy outdoor activity for the people of Hong Kong. It provides a moderate level of physical activity. Encouraging people, especially young people, to adopt a healthier, more active lifestyle and to get outdoors is a very important part of the future and Flying Fox wants to play a small part in that.*

#### **f. Bringing investment, employment & skills transfer**

It goes without saying that a zipline tour in Hong Kong will bring additional, direct and indirect economic benefits to the SAR and to North Lantau specifically.

Although the installation for the zipline tour is relatively minimal in scale, the investment required to get the right design and materials and for training and installation is considerable. A significant proportion of this inward investment will be channelled into local suppliers in Hong Kong.

In addition, once operational the zipline tour will employ up to 20 local people to conduct tours and manage the operation under our guidance. Flying Fox will engage in a comprehensive skills transfer programme, providing local staff with a range of

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<sup>13</sup> Department of Health, Guidelines on Physical Activity  
[http://www.change4health.gov.hk/en/physical\\_activity/guidelines/youth/index.html](http://www.change4health.gov.hk/en/physical_activity/guidelines/youth/index.html)

<sup>14</sup> Department of Health, Guidelines on Physical Activity  
[http://www.change4health.gov.hk/en/physical\\_activity/guidelines/youth/index.html](http://www.change4health.gov.hk/en/physical_activity/guidelines/youth/index.html)

<sup>15</sup> The University of Hong Kong, Work Life Balance in Hong Kong Survey Results, April 2008, [http://www.hku.hk/press/news\\_detail\\_5755.html](http://www.hku.hk/press/news_detail_5755.html)



practical first aid and industry-leading zipline operation skills as well as knowledge of the ecology and culture of the Lantau North Country Park.

Once open, the zipline tour will add to the tax collection of Hong Kong and pay a rental for the use of the land. We are also interested in channelling a portion of any profits into conservation projects in the local area. On this subject, we look to the Country and Marine Parks Board for guidance.

*The zipline tour development will provide inward investment in Hong Kong and its operation will contribute rental and tax revenues to the Government. Specifically it will have a beneficial economic effect on the North Lantau area and create employment and skills transfer opportunities.*

## **2.2 Why it's good for Lantau**

Over the past decade, Lantau generally and North Lantau specifically has evolved into an important development area for tourism and recreation. This is not accidental. The website of the Planning Department states that “[o]ur planning vision is to promote sustainable development of Lantau by balancing development and conservation needs. The overall planning concept is to focus major economic infrastructure and urban development in North Lantau to optimise the use of the existing and planned transport links and infrastructure, while protecting the other parts of Lantau, which comprise primarily high-quality landscape and ecologically sensitive natural environment, for nature conservation and environmentally sustainable recreational and visitor uses....”

In particular, the focus is “[t]o strengthen North East Lantau as a major tourism hub, with Hong Kong Disneyland as the focus and compatible tourism and recreational uses in the vicinity”.<sup>16</sup>

It concludes that, “[a]s tourism is one of Hong Kong’s main economic pillars and there are few alternative locations in Hong Kong suitable for large-scale tourism or recreation facilities, the option for longer term development of the area for large-scale tourism or recreation facilities should be kept open having regard to market demand.”<sup>17</sup>

It would seem sensible that a new eco-tourism attraction for Lantau should remain within the existing tourism development ‘footprint’ of North Lantau – with its network of attractions, facilities and transport infrastructure – rather than opening up a completely fresh or more rural destination.

Currently North Lantau’s recreation and tourism infrastructure includes:

- AsiaWorld-Expo (conference, meetings, concert facilities)
- Tung Chung Fort
- Ngong Ping 360 Cable Car
- Ngong Ping 360 Village

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<sup>16</sup> [http://www.pland.gov.hk/pland\\_en/lantau/en/digest/overallconcept.html](http://www.pland.gov.hk/pland_en/lantau/en/digest/overallconcept.html)

<sup>17</sup> Land Development Task Force, Concept Plan for Lantau, Public Consultation Document November 2005, p.11-16

- Giant Buddha & Po Lin Monastery
- Ngong Ping Nature Centre
- Wisdom Path

These are excellent tourism and recreation attractions. What is missing from the list, in our opinion and based on our knowledge of the wider industry, is an interactive physical eco-adventure.<sup>18</sup> Fortunately, pre-existing initiatives such as the Wisdom Path and the Ngong Ping Nature Centre (with its guided tours) have laid a strong foundation for the development of additional eco-tourism at this location.

This why we conducted a joint feasibility study into the concept with NP360 and have spent over a year in consultation with the Tourism Commission to develop that feasibility study into a meaningful proposal. Our discussions with the Tourism Commission have confirmed that the development of eco- and outdoor tourism remains their priority for North Lantau.

*A zipline tour fits the Tourism Commission’s strategy for Lantau and will complement and fit snugly within the ‘shadow’ of North Lantau’s existing large tourism infrastructure, without impacting conservation priorities. In fact, one of Flying Fox’s objectives is to showcase conservation principles (see below). It will help to define the Ngong Ping area as Hong Kong’s premier eco-adventure destination, as distinct from the more artificial and built-up sites at Disneyland and Ocean Park.*

### **2.3 Why Lantau North Country Park is the perfect location**

There are four combined reasons why Lantau North Country Park is not only an ideal location for the zipline tour but quite possibly the only suitable location in Hong Kong for a sustainable zipline tour.

- a. Any zipline tour requires a topography comprising of hills and valleys, to permit the natural drape and downward angle required for the zipline to work and to permit its customers to be propelled from one end to the other using only the force of gravity (as no electricity or power is required).
- b. For the zipline tour to be an attractive proposition for participants, there needs to be natural drama – the “wow” factor – that sense of flying into the unknown, across wild country, with views which are both dramatic and far reaching, as well as close up views of passing mountainsides and forest canopies.
- c. Thirdly, for a zipline tour to be sustainable it must have some content which engages the mind – an outdoor learning component, which combined with physical activity creates the perfect “edutainment” experience. This can be in the form of education about the local ecology or culture, delivered by trained

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<sup>18</sup> *Although a bit out-dated, this was noted in the Concept Plan for Lantau, 2005, which recorded “strong support for the countryside recreation facilities and nature-based attractions proposed in rural Lantau. The Hong Kong Tourism Board and the tourism sector were of the view that the countryside recreation and green tourism proposals in the Concept Plan would provide alternative visitor experience, complementing the major tourism attractions on Lantau and in the main urban area.”* Land Development Task Force, Concept Plan for Lantau, Public Consultation Document November 2005, p.11-16

guides or through the medium of interpretative information boards. However, to give this educational aspect meaning, there must be sufficient ecological interest at the location in the first place. (See *Education and Interpretation below*).

- d. Fourthly, for a zipline tour to succeed in delivering the best possible eco-adventure experience to the highest number of visitors, it needs to be accessible, with sufficient facilities to service their needs. It cannot be in a total wilderness – there must be public access, toilets, food and beverage areas, first aid stations, evacuation and rescue options. Ideally, these infrastructure facilities will already exist onsite, avoiding the need to increase the impact on the environment that comes with building new logistics infrastructure.

North Lantau has the right combination of topography, dramatic views and ecological interest. The provides the necessary transport facilities and other essential amenities. Furthermore, the development of eco-tourism in North and Western Lantau is an objective of the Hong Kong Tourism Commission.

Lantau North Country Park and the adjacent Ngong Ping Cable Car and Village form an ideal location as they deliver these four key components:

- Topography: the right combination of hills and valleys for ziplines to work
- “Wow” factor: highly dramatic views of mountains, valleys, rocky outcrops, gorges and waterfalls, sea views
- “Edutainment” potential: the combination of geography, rich flora and fauna, and the cultural interest surrounding the Giant Buddha, make this an outstanding location for outdoor learning
- Existing infrastructure: the zipline tour benefits from its location next to NP360, with its logistical facilities, including:
  - Public access by cable car or bus
  - Food and beverage facilities
  - Toilet facilities
  - First aid facilities
  - Rapid rescue and evacuation facilities (which will complement Flying Fox’s own rescue and evacuation plans)

## **2.4 Why it’s good for the AFCD**

The fact that a small corner of the North Lantau Country Park is ideal for the installation of a zipline tour is not on its own a good enough reason to go ahead. Just because the topography, aesthetics and accessibility of the site are ideal does not mean it should happen. There has to be more to this project than that.

We believe the reason the project should proceed is because it presents a good opportunity for AFCD to showcase its principles, embrace the values at the heart of Country Parks and be at the forefront of an exciting new form of eco-adventure – not previously realised in the East Asian region but popular in North & South America, Europe and Australia.



The zipline tour will burnish the eco-tourism credentials of AFCD and showcase the stewardship of the AFCD to Hong Kong residents and especially to foreign visitors to Hong Kong. To explain this in more detail we have taken three core principles from the Country Parks Ordinance as our themes:

### **a. Recreation & enjoyment**

The AFCD's website states: "Over 12.5 million visitors [to Country Parks] were recorded in 2008 and most visitors engaged in leisure walking, fitness exercises, hiking, barbecuing, family picnics and camping."<sup>19</sup> The mandate of and method for the management of the Country Parks is codified in the *Country Parks Ordinance*, of which *Section 4. Duties of the Country and Marine Parks Authority, part (c)*, states:

"It shall be the duty of the Authority-

(c) to take such measures in respect of Country Parks and special areas as he thinks necessary-

(i) to encourage their use and development for the purposes of recreation and tourism; [our emphasis]

(ii) to protect the vegetation and wild life inside Country Parks and special areas;

(iii) to preserve and maintain buildings and sites of historic or cultural significance within Country Parks and special areas but without prejudice to the Antiquities and Monuments Ordinance (Cap 53); and

(iv) to provide facilities and services for the public enjoyment of Country Parks and special areas."<sup>20</sup> [our emphasis]

Meanwhile, Section 16 of the Ordinance (Control of Use of Land) refers to controlling any use which would "substantially reduce the enjoyment and amenities of the Country Park". We see no contradiction between encouraging new recreation and tourism within the Country Park and ensuring continued enjoyment of that Park by the public and local stakeholders.

The corner of Lantau North Country Park which Flying Fox proposes to use, what we call the "operational area", is currently inaccessible to the public and local stakeholders. The eastern side of the operational area is bounded by the Cable Car's rescue trail. However hikers on this trail are greeted with a locked gate across the trail 200m from the Terminal Building which states: "No Unauthorised Entry". There are no other physical trails into the operational area and the ground is rough, steep and often densely shrubbed; hence the area is inaccessible for recreational purposes to all but the most adventurous and determined users.

It also helps to look at international precedents. For example, the US Forest Service recently published an environmental assessment of a (considerably more extensive) 7-zipline tour in the Shoshone National Forest, Yellowstone National Park (see **Appendix D**). The assessment found that: "[t]he proposed zip line project will provide additional recreation opportunities on the forest and will not significantly affect other recreation opportunities on the Wapiti Ranger district... [and also] would

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<sup>19</sup> [http://www.afcd.gov.hk/english/country/cou\\_lea/our\\_work.html](http://www.afcd.gov.hk/english/country/cou_lea/our_work.html)

<sup>20</sup> CAP 208 COUNTRY PARKS ORDINANCE, S 4 Duties of Authority

not significantly affect forest recreation resources. *The proposed action, would not have any negative effects on any existing developed or dispersed recreation sites.*” [our emphasis]<sup>21</sup>

In fact, Flying Fox would suggest that rather than having any negative impacts, the zipline tour would have the opposite effect and actually *increase* the enjoyment and amenities of the Country Park. A Flying Fox zipline tour eco-adventure will greatly enhance the recreation and tourism potential of Lantau North Country Park – especially as the operating area we are proposing is tantalisingly viewable from the cable car but currently virtually inaccessible.

The tour will encourage a different demographic of recreational visitor to experience the Country Park; we hope a wider range than currently hike or trek. In India our customers range from the ages of 10-80 years but the activity is particularly appealing to young people and to families with children – 75% of Flying Fox’s existing customer base in India is aged below 35 years. Interestingly, a 2010 McKinsey & Co. study commissioned by NP360 identified ‘families with children’ as a visitor segment that was under-represented in Ngong Ping; the report suggested more eco-tourism initiatives as a way to reach that segment.

*To summarise, the zipline tour will provide a new type of recreation inside Lantau North Country Park, which will in turn open the area to a new type of visitors, allowing the AFCD to further promote conservation and education values to visitors, and to showcase its stewardship of the area.*

## **b. Education & Interpretation**

The AFCD is proactive in organising outdoor learning activities for school children and young people in Hong Kong. This includes the Nature in Touch Programme (and Nature in Touch Volunteer Programme) which prioritises “Hiking, Countryside Learning and Outdoor Experience.”<sup>22</sup> Also, guided tours at the Lions Nature Education Centre, the Schools Visit programme, guided field study for secondary schools and Hiking and Planting days.

In the project area, the Ngong Ping Nature Centre provides guided tours and aims to “enhance visitor’s knowledge about the biodiversity and nature landscape, and to promote public awareness of environmental and ecological conservation, and above all to encourage ethical, responsible and sustainable Hong Kong tourism”.<sup>23</sup>

We believe Flying Fox’s zipline tour, with its combination of hiking, aerial adventure, and outdoor interpretation will help AFCD deliver on these objectives. We want to build on these excellent initiatives, incrementally enhancing the eco-adventure opportunities available in North Lantau.

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<sup>21</sup> United States Department of Agriculture, Forest Service, August 2012. Predecisional Environmental Assessment: Sleeping Giant Ski Area Development Projects. Wapiti Ranger District, Shoshone National Forest, Park County, Wyoming, p.58-59

<sup>22</sup> [http://www.natureintouch.gov.hk/learning/activity/school\\_field\\_studies/0/521](http://www.natureintouch.gov.hk/learning/activity/school_field_studies/0/521). Also, the Country Parks – Ranger Services Division’s first stated aim is: “Visitor services and education.”<sup>22</sup>

<sup>23</sup> <http://www.np360.com.hk/en/lantau-outdoor-fun/land/np-nature-centre.html>

The zipline tour can become an ‘outdoor classroom’ for North Lantau, in which residents and tourists of all ages learn more about the role of the Country Parks, their ecological benefits and importance, and the conservation challenges they face.

By combining outdoor adventure, beautiful natural scenery, knowledgeable guides and visual resources we can create an interactive learning platform. This is how it will work:

- An engaging website will allow visitors (particularly families and young people) to prepare before they go, and undertake follow up learning or activities afterwards. This website could include, for example, a ‘clickable’ map with pop-up information on items of ecological or cultural interest.
- During the tour, participants will reconnect with their environment and reinvigorate a sense of reverence for nature by immersing themselves in a corner of wilderness made uniquely accessible.
- Interpretation boards (see **Appendix E**) in Chinese and English will provide fun, visual information about:
  - the flora and fauna indigenous to Lantau Island
  - some of the key conservation issues facing Hong Kong & its Country Parks
  - the stewardship and conservation initiatives of the AFCD protecting the Country Parks
- Our knowledgeable guides will be on hand to engage in a fun and elementary way with participants. At set ‘stations’ along the route, participants will be introduced to concepts such as geography, biodiversity, conservation, ecology, sustainability, hydrology
- Because it is not possible to absorb all of this in one go, participants will want to return to learn and experience more, and with each repeat visit their understanding of the area will deepen.
- The act of zipping over the countryside, hiking up beside the river gorge and crossing the suspension walkway, will help to reinforce their learning by providing a memorable, thrilling outdoor experience.

*We welcome the opportunity to work with the AFCD and Ngong Ping Nature Centre to help us develop our website and onsite interpretation boards and to enhance the quality of ecological awareness among our customers.*

*We also appreciate that one of AFCD’s priorities is to deliver countryside learning and outdoor experiences free to the public; for that reason we are open to the idea of providing at-cost or concessionary eco-adventure zipline tours to select public groups, for example school children at designated times. We would look to the Country and Marine Parks Board to provide guidance on this subject.*

### **c. Conservation through sustainable tourism**

Conservation is important to Flying Fox. For a fuller exploration of our Environmental Impact Management strategy, please refer to Section 3. However, conservation is not only important in the way we build and operate our zipline tours but also in the messages we want to convey to our participants.



A key issue for Hong Kong is how to strike a delicate balance between economic growth and conservation priorities. It is an inescapable fact that Hong Kong's rich natural heritage is often threatened by urban expansion and it is vital that residents and visitors to the territory have opportunities to understand the importance of the territory's green assets. To this end, the zipline tour will increase the number of visitors who go beyond the man-made confines of Ngong Ping village into the wilderness beyond, increasing their appreciation for the countryside.

Conservation is not passive. It has to be passed from generation to generation in a sustainable way. As a 2002 report authored in Hong Kong points out, "Many countries eager to make conservation economically profitable have embraced eco-tourism, including Hong Kong."<sup>24</sup>

The international Convention on Biological Diversity (of which Hong Kong is a signatory) is clear that eco-tourism, while it can negatively impact biodiversity when done incorrectly, has an important part to play in conservation: "Tourism based on the natural environment (ecotourism) is a vital growing segment of the tourism industry and... tourism does present a significant potential for realizing benefits in terms of the conservation of biological diversity and the sustainable use of its components."<sup>25</sup>

The Convention adds: "Sustainable tourism can make positive improvements to biological diversity conservation especially when local communities are directly involved with operators... Moreover, sustainable tourism can serve as a major educational opportunity, increasing knowledge of and respect for natural ecosystems and biological resources."<sup>26</sup>

Furthermore, in the Convention's *Guidelines on Biodiversity and Tourism Development*, the authors note that:

"[s]ustainable tourism can generate jobs and revenues, thus providing an incentive for preserving natural areas. It can also raise public awareness of the many products and services provided by natural ecosystems and biological resources and respect for traditional knowledge and practices. Sustainable tourism clearly has the potential to reconcile economic and environmental concerns and give a practical meaning to sustainable development."<sup>27</sup>

*The Flying Fox zipline tour is not a scientific project and the science of conservation is well outside our competency. However, we believe that in providing visitors to Lantau North Country Park with an engaging, fun outdoor experience we will*

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<sup>24</sup> CREATING OPPORTUNITIES: SAVING HONG KONG'S NATURAL HERITAGE  
Joyce Wan & Anastasia Telesetsky, January 2002

[civic-exchange.org/en/live/upload/files/200201\\_NaturalHeritage.pdf](http://civic-exchange.org/en/live/upload/files/200201_NaturalHeritage.pdf)

<sup>25</sup> Convention on Biological Diversity, Tourism, Introduction  
<http://www.cbd.int/tourism/intro.shtml>

<sup>26</sup> Convention on Biological Diversity, Tourism, Introduction  
<http://www.cbd.int/tourism/intro.shtml>

<sup>27</sup> Convention on Biological Diversity, Development of Guidelines for Sustainable Tourism in Vulnerable Ecosystems, 2004. <http://www.cbd.int/tourism/intro.shtml>

*encourage them to appreciate the Country Parks a little bit more, and take away from the experience a slightly better knowledge of why conservation matters.*

## **2.5 The Triple Bottom Line**

As we have seen, recreation, education and conservation are key concerns of the AFCD and are the *raison d'être* for the Country Parks. Tourism can help deliver in these three areas, but it has to be sustainable and environmentally friendly. At Flying Fox we aim to embrace the philosophy and practice of the “Triple Bottom Line”, summarised in the catchphrase *People Planet Profit*.

### **THE TRIPLE BOTTOM LINE**

#### **PEOPLE: Socially responsible**

- Our concept provides Hong Kong’s residents and visitors with a world-class, safe, interactive outdoor recreation and learning adventure experience
- Our guests will not only have a great time, they’ll learn a little more about themselves and their environment in the process
- We seek to work with AFCD to recruit & train tour guides from within Hong Kong, transferring skills in zipline tour & adventure management

#### **PLANET: Environmentally friendly**

- Our footprint will be light or – for zipline tracks – non-existent!
- Our installation uses no power and has zero emissions
- Our pathway designs allow penetration of light and moisture
- We will strive to promote greater understanding of environmental issues among our guests

#### **PROFIT: Financially sustainable**

- Our business model will be commercial in order to be self-sustaining
- No seed funding, capital expenditure or ongoing funding is required from the Hong Kong Govt.
- We will pay rental income to the Hong Kong Govt. which can be ploughed back into initiatives of benefit to Lantau North Country Park

## 2.6 Summary of project benefits

### **For AFCD:**

- Showcase the extraordinary diversity and richness of Hong Kong's ecology and landscapes, as well as the remarkable conservation initiatives and stewardship of the AFCD
- Diversify current eco-adventure and recreation opportunities – which will in turn diversify the visitor profile to the countryside and encourage a new type of visitor
- Encourage foreign visitors to Hong Kong to appreciate the wonder of its scenery and conservation record – in an accessible way
- Assist the AFCD with its mandate to encourage the use and development of the countryside for the purposes of recreation, education and conservation
- In a modest way, enhance and burnish Hong Kong's eco-tourism credentials in the region
- Generate rental income for the Hong Kong Govt. which can be ploughed back into initiatives of benefit to Lantau North Country Park

### **For Hong Kong residents:**

- Increase the attractiveness of Hong Kong as a tourism destination and broaden the spectrum of foreign visitors
- Provide the hard-working people of Hong Kong with a fun, outdoor stress-busting new recreation – which is also healthy because it gets people – especially kids – exercising in the fresh air
- Provide a medium for interactive education and ecological learning for all ages, especially for young people and school children, on the premise that new knowledge 'sticks' in the mind better if the participant is engaged and having fun
- Invest in Hong Kong and generate employment opportunities as well as skills transfer from industry experts

### **For Lantau:**

- Contribute to the continued development of North and Western Lantau, in line with the Tourism Commission's development objectives
- Complement the impressive existing attractions of Lantau
- Enhance the appeal of North / Western Lantau for Hong Kong residents and foreign tourists, which in turn will be good for the economic prosperity of the area
- Retain tourists in the area for longer, which will lead to increased revenue generation for local people and businesses





**Working Paper submitted to the Country and Marine Parks Board**

**Proposed Flying Fox Eco-Adventure Zipline Tour at Ngong Ping, Lantau North  
Country Park**

*17<sup>th</sup> October 2012*

### **ANNEX 3. ENVIRONMENTAL IMPACT MANAGEMENT**

- 3.1 Overview
- 3.2 Project introduction
- 3.3 Air quality assessment
- 3.4 Water quality assessment
- 3.5 Liquid and solid waste management assessment
- 3.6 Noise impact assessment
- 3.7 Ecological impact assessment
- 3.8 Landscape and visual impact assessment
- 3.9 Cultural heritage impact assessment
- 3.10 Environmental Code of Conduct
- 3.11 Yellowstone Park Zipline Case Study

## **ANNEX 3. ENVIRONMENTAL IMPACT MANAGEMENT**

### **3.1 OVERVIEW**

#### **3.1.1 Methodology**

What is presented here is Flying Fox's draft Environmental Impact Management strategy, to be finessed in discussion with AFCD and other interested stakeholders.

We have drawn on first hand research during numerous site visits to Lantau North Country Park in August 2011 and August 2012; as well as on desk research based on the following publications:

- a. *MTR Corporation Ltd, Tung Chung Cable Car Project, Environmental Impact Assessment (Final), March 2003* (referred to hereafter as the "Cable Car EIA")
- b. *Country Parks Ordinance (Cap. 208)*
- c. *AFCD website material*
- d. *United States Department of Agriculture Forest Service August 2012, Predecisional Environmental Assessment Sleeping Giant Ski Area Development Projects, Wapiti Ranger District, Shoshone National Forest Park County, Wyoming, USA*

Note on terminology: the term "Study Area" refers to the entire area under consideration by the Cable Car EIA; the term "operational area" refers to the specific area, within the Study Area, which relates to Flying Fox's zipline tour installation and operations.

#### **3.1.2 Objectives**

- Describe Project and associated works
- Describe community and environment likely to be affected
- Provide alternatives to avoid and minimise environmental impacts
- Quantify emission & sources and propose mitigation measures to reduce pollution of air and water resources during construction and operation
- Quantify waste sources and propose mitigation measures
- Quantify noise sources and propose mitigation measures
- Quantify potential damage to flora, fauna and natural habitats & propose mitigation measures
- Quantify potential landscape and visual impacts & propose mitigation measures
- Quantify potential impacts on sites of cultural heritage & propose mitigation measures
- Specify methods and standards to be included in design, construction and operation necessary to mitigate identified environmental impacts and cumulative effects
- Specify environmental monitoring and audit requirements to ensure effective implementation of environmental protection measures

### 3.1.3 Project requirements

- Recognition of the unspoilt and natural beauty of the majority of the route
- Selection of a route which would be of benefit to, and would be acceptable to existing residents, users and visitors of Ngong Ping
- Minimisation of the overall environmental impacts during both construction and operational phases
- Minimisation of the number of sensitive receivers affected by visual or noise-related impacts
- Adoption of an *Environmental Code of Conduct* for the project by all contractors, workers, employees and end-users

### 3.1.4 Requirement for a formal Environmental Impact Assessment

Flying Fox defines its zipline eco-adventure tour as a Tourist and Recreational Development.

According to Schedule 2 of the *Environmental Impact Assessment Ordinance* promulgated by the Environmental Protection Department (EPD) of the Hong Kong Government, under section “O. Tourist and Recreational Developments”, the following types of project are required to carry out an Environmental Impact Assessment:

- “O.1. An outdoor golf course and all managed turf areas.
- O.2. A marina designed to provide moorings or dry storage for not less than 30 vessels used primarily for pleasure or recreation.
- O.3. A horse racing course.
- O.4. A motor racing circuit.
- O.5. An open firing range.
- O.6. An open air concert venue with a capacity to accommodate more than 10 000 persons.
- O.7. An outdoor sporting facility with a capacity to accommodate more than 10 000 persons.
- O.8. A theme park or amusement park with a site area of more than 20 ha in size (Added L.N. 205 of 1999);”

Flying Fox’s eco-adventure tour does not fall under any of these categories; in particular, the tour capacity is considerably less than 10,000 persons and the site area is also considerably less than 20ha in size.

Furthermore, the EIA Ordinance, Schedule 2, Section “Q. Miscellaneous” states the following exceptions within Country Parks do not require EIAs (our highlighting in yellow):

“Q.1. **All projects** including new access roads, railways, sewers, sewage treatment facilities, earthworks, dredging works and other building works partly or wholly **in an existing or gazetted proposed Country Park** or special area, a conservation area, an existing or gazetted proposed marine park or marine reserve, a site of cultural heritage, and a site of special scientific interest, **except for the following---**

- (a) minor maintenance works to roads, drainage, slopes and utilities;
- (b) minor public utility works including the installation of telecommunication wires, joint boxes, power lines with a voltage level of not more than 66 kV, and gas pipelines with a diameter of 120 mm or less;
- (c) education and recreational facilities not otherwise designated projects listed in Parts A to P and approved by the Country and Marine Parks Authority;
- (d) all earthworks relating to forestry, agriculture, fisheries and the management of vegetation;
- (e) New Territories exempted houses;
- (f) footpaths and facilities relating to sitting out areas;
- (g) minor facilities relating to the management and protection of marine parks, marine reserves, Country Parks and special areas;
- (h) all works not otherwise designated projects listed in Parts A to P undertaken by the Country and Marine Parks Authority under section 4 of the Country Parks Ordinance (Cap. 208) or section 4 of the Marine Parks Ordinance (Cap. 476) for developing and managing Country Parks and special areas, marine parks and marine reserves;
- (i) maintenance of existing waterworks installations; or
- (j) minor works including---
  - improvements to catchwaters;
  - the provision of---
- (A) water pipes and valves of diameter 450 mm or less;
- (B) water tanks;
- (C) hydrological stations and associated structures; and
- (D) village supply schemes.

**Q.2. Underground rock caverns.”**

Consequently it would appear from the provisions of the EIA Ordinance that a formal EIA for this project is not required. However, it is clearly desirable to address the issues of environmental impacts in all forms, using the *MTR Corporation Ltd, Tung Chung Cable Car Project, Environmental Impact Assessment (Final), March 2003* as the baseline survey for our operational area and template document.

## **3.2 PROJECT INTRODUCTION**

### **3.2.1 Project vision**

Flying Fox’s vision is to create a genuine eco-adventure in a wild and beautiful corner of Lantau Country Park. Our mission is to provide a thrilling, challenging, outdoor educational experience which reinvigorates our visitors’ reverence for the natural beauty of Hong Kong.

### **3.2.2 Project outline**

Flying Fox Lantau will be a 60-90 minute eco-adventure located in the hilly country of Lantau North Country Park to the north of the Ngong Ping cable car Terminal Building and to the immediate west of Tower 7. It will comprise the following



elements:

- **Booking:** guests will have several ways to book the experience – the best offers will be in advance through the existing web portal [www.flyingfox.asia](http://www.flyingfox.asia) which provides a real-time reservation system, accepts online payments and issues automated e-tickets. Alternatively guests will be able to book and pay on the day at Flying Fox sales outlets, located near the NP360 terminals at Tung Chung and in Ngong Ping village.
- **Check in & Gear up:** guests will check in at the Flying Fox office in Ngong Ping village, get fitted into safety harnesses and join a pod of up to 12 people; two trained instructors will accompany them at all times to ensure their safety and provide commentary on points of ecological and cultural interest.
- **Safety briefing & Orientation:** all guests will receive a safety briefing and orientation in how to use the equipment before embarking on the zipline tour.
- **Approach to Zip 1: 300m walk**, starting from the Terminal Building (elev. 434m), walk 200m north-east along the existing rescue trail, then 100m north-west on a new path across undulating land to the start point of Zip 1 (elev. 442m), near the crest of a rocky summit to the north of the Terminal Building; approx. **8m of ascent**.
- **Zip 1: 300m parallel ziplines** fly across the valley to the lower knoll (elev. 400m) beneath Tower 7; approx. **42m of descent**.
- **Path to Zip 2: 130m hike** to the upper knoll (elev. 432m) beside Tower 7, along a meandering new path; approx. **32m of ascent**.
- **Zip 2: 300m zipline** across the valley, crossing above Zip 1, to land on a rocky spur (elev. 404m) beside the gorge created by the Sham Wat Stream; approx. **28m of descent**.
- **Ridge walk: 80m hike** beneath Tall Shrub up a narrow rocky ridge to the suspension walkway (elev. 422m); approx. **18m of ascent**.
- **Suspension walkway: 50m long**, crossing the spectacular Sham Wat gorge at approx. 15-20m above stream level.
- **Rock ramble: 120m hike** on a new path over rocky ground to the start of Zip 1; approx. **20m of ascent**; return **walk of 300m** along the approach path back to the Terminal Building.
- **De-kit and shop:** guests will return to the Flying Fox office in Ngong Ping village where they will return their safety equipment and have the opportunity to purchase branded merchandise, including HD HeadCam video footage of their journey.
- **Total tour length: 1,580m**
- **Total length of hiking: 980m**
- **Total distance travelled in the air (on ziplines & suspension walkway): 650m**
- **Total vertical ascent (hiking): 78m**
- **Total vertical descent (zipping): 70m**
- The tour's carrying capacity will be around 60 persons per hour (480 persons per day).
- *Note: the proposed outline above is feasible but still provisional and subject to change based on final geotechnical surveys and ongoing dialogue with Hong Kong Government departments.*

For a map of the operational area and proposed installation, see **Annex 1.2**.

### 3.2.3 Participatory not passive

The experience will be participatory, requiring guests not only to fly along ziplines, but also to hike, explore their environment and engage in an ecological journey – distinguishing it from amusement rides.

### 3.2.4 Project structures

The physical structures required for creating Flying Fox Lantau can be broken down as follows:

- a. **Zip lines.** The zips comprise of parallel twin ziplines, each approx. 300m long; hence the total number of zipline cables to be erected is four. The lines themselves are 12-14mm diameter galvanised wire rope; with an additional service line of similar diameter above each zipline to facilitate operation of the braking system.
- b. **CloudStations.** Four CloudStations will anchor each zipline termination to the ground, provide a structure on which to mount the braking system and allow guests to gather in an orderly manner before launch and after landing. The proposed design is to install four separate halo-shaped CloudStations, manufactured out of galvanised or weathering steel. The design allows for pre-formed ballast to be installed into the halo structure of the CloudStation, reducing the need for large concrete foundations. The structure will sit on small concrete feet where the ground is flat; deeper foundations may be required where the land is uneven – to be determined by a geotechnical survey. The originally proposed dimensions were 14m diameter x 3m height. However, this can be reduced to 10m diameter. *Should the CloudStation design be considered inappropriate for the Country Park setting, we are open to dialogue with AFCD over alternative launch/landing structures, using more natural materials, e.g. timber.*
- c. **Suspension walkway.** A single lightweight suspension walkway will be erected across the gorge created by the Sham Wat Stream. It will be approx. 50m in length, constructed of wire rope, natural rope and wooden decking; it will be anchored directly into the rock – subject to a geotechnical survey.
- d. **Paths.** Some new pathways will be built to connect the various sections of the journey; approx. 430m of new paths will be required, to be built in conformity with AFCD guidelines for paths in Country Parks. Some steps may be required to negotiate the rocks along the “Ridge Walk”. Existing paths will be utilised where possible. *AFCD is invited to discuss low impact path design options, e.g. stone paths, grated steel walkways or timber boardwalks.*

For photographs and designs indicative of the types of structures envisaged, see **Annex 1.3.**

### 3.2.5 Land & airspace requirements

- a. Existing paths: 200m of rescue trail leading north-east from Terminal Building (used for approach walk and return walk)
- b. New paths: 430m long x 1m wide = 430m<sup>2</sup>
- c. Launch & landing points (CloudStations – halo design of 10m diameter): 4 sites each of 78m<sup>2</sup> = 312m<sup>2</sup>
- d. Total land area dedicated to Flying Fox: approx. 740m<sup>2</sup>, or 0.07ha**
- e. Airspace for ziplines: 2 separate lines of 300m long x 3m wide = 1800m<sup>2</sup>
- f. Airspace for suspension walkway: 50m long x 1m wide = 50m<sup>2</sup>
- g. Total airspace required by Flying Fox: 1850m<sup>2</sup>, or 0.19ha**
- h. Total land area and airspace required: 2,590m<sup>2</sup> or 0.26 hectares**
- i. The total land area required represents 0.01% of the total land area of Lantau North Country Park's 2,200 hectare total area.
- j. The proposed Operating Area falls entirely outside the Outline Zoning Plan for Ngong Ping
- k. We will require the use of commercial space in Tung Chung and Ngong Ping village as sales outlets; we will also require the use of a small room in or near the Terminal Building for storing safety equipment, spare materials & tools.
- l. Note: it is not a Flying Fox requirement to build paths or firebreaks along the ground beneath ziplines; the ground beneath the ziplines remains pristine and untouched
- m. Proportional impact on the Country Park (as a percentage of the total 1,580m journey):
  - i. Zip lines: 600m = 38%
  - ii. New paths: 430m (not incl. 100m reused on return walk) = 27%
  - iii. Existing paths: 400m (incl. 200m reused on return walk) = 25%
  - iv. Suspension walkway: 50m = 3%

### 3.2.6 Design principles

Flying Fox's designers have framed the following key principles to inform the design of the zipline tour structures:

- a. Visually low impact
- b. Light enough to minimise wind loads but stiff enough to resist those wind loads
- c. Constructability – assembled in segments which can be air lifted to site
- d. Maintainability – selecting structural form which avoids corrosion & facilitates onsite maintenance
- e. Aesthetics & integration in environment
- f. Uniformity of design

### 3.2.7 Construction philosophy & method statement

Flying Fox will employ a low impact construction philosophy to ensure a well managed and environmentally friendly installation. The tour is expected to take approximately six months to fabricate and construct. The on-site time for construction is predicted to be around 2-3 months. These are some strategies that will help minimise construction impact:

- Most infrastructure is fabricated off-site. Installation therefore becomes simply a matter of importing the material and assembling the units. This strategy keeps environmental impact and on-site time to a minimum
- Use only hand, mules, ziplines or a helicopter to import materials
- Include environmental impact issues on each Work Method Statement
- Remove foreign soil and seed from shoes and clothing before attending the site
- Stick to the defined access routes and work zones
- Only remove/lop vegetation of greater than nominated girth after approval from AFCD
- Report sightings of significant fauna or flora to AFCD
- Source labour and building supplies locally where possible
- Ensure fuel and oil containers are leak free before being brought on site and that they remain capped when not in use
- Top up petrol powered tools more than 50m from any water source or use spill trays
- Notify AFCD immediately should an environmental incident occur
- Be courteous and honest to Country Park users and interest groups
- Respect all on-site sensitive environmental issues.
- Adhere to fire risk management strategies
- Adhere to other conditions stipulated by AFCD
- A construction method statement will be prepared once design parameters have been agreed with AFCD and EMSD, and following the detailed planning phase.

### **3.3 AIR QUALITY ASSESSMENT**

#### **3.3.1 Potential impacts on air quality during construction**

Hong Kong has tight controls on dust generation during construction projects, including the Air Pollution Control Ordinance. Possible causes of dust generation during the construction of Flying Fox Lantau include:

- a. Construction of pathways
- b. Drilling of foundations for CloudStations
- c. Drilling anchor points for suspension walkway

#### **3.3.2 Mitigation measures during construction**

- a. Minimal use of concrete to construct pathways. Options include: wooden boardwalks, grated steel causeways, stone paths with concrete pointing only
- b. Covering of building materials during construction to prevent dust entering atmosphere

#### **3.3.3 Comparison with NP360**

According to the EIA conducted for NP360: “the dust generated from excavation for the towers and earthworks for the construction of emergency rescue trail would be of small scale, localised and short-term and no ASRs [Air Sensitive Receivers] have been identified within the study boundary”.



Given that NP360 installed 7 towers with an individual footprint of 35m x 35m and a height of, in the case of Tower 7, 47m, we believe that any dust generation during the installation of Flying Fox, whose infrastructure is considerably smaller than NP360's, will be negligible.

### **3.3.4 Potential impacts on air quality during operation & mitigation measures**

Flying Fox uses no powered parts during its operations. Guest walk from one zipline to the next, while the energy required to impel guests down each zipline is provided by gravity only. Hence, Flying Fox is a zero emissions activity.

In addition, we prohibit smoking by guests while they are wearing their safety harnesses. Hence, there will be no air pollution due to smoking. This also reduces the fire risk and consequent air pollution arising from hill fires.

Consequently, no mitigation measures are required.

## **3.4 WATER QUALITY ASSESSMENT**

### **3.4.1 Background**

Flying Fox's operational area lies within the Ngong Ping Water Gathering Ground (WGG), which is part of the North Western Water Control Zone. The project will be mindful of the Water Supplies Department (WSD) guidelines on protection of Water Gathering Grounds.

Protection of the WGG is of the utmost importance and an emergency contingency plan for construction and operational phases of the works is required to protect this resource.

There are no alterations to watercourses proposed as a result of the construction of any Flying Fox zipline tour elements.

### **3.4.2 Location specific sensitivities**

Both ziplines fly over 3 minor tributary branches of the Sham Wat Stream; while the suspension walkway crosses the gorge created by the major tributary of the Sham Wat Stream where it emerges from the Ngong Ping plateau to the north west of the cable car Terminal Building.

### **3.4.3 Potential impacts on water quality during construction**

- a. Accidental spillage of materials or fuels
- b. Wastewater generated by workforce
- c. Domestic waste generated by workforce

### **3.4.4 Mitigation measures during construction**

- a. The minimal amount of concrete required for the CloudStation footings will be brought in ready-mixed or hand mixed onsite. Ballast for the CloudStations will be precast.
- b. The Contractor will not be permitted to rinse out any containers or materials contaminated with concrete or to discharge such wastewater within the Country Park.
- c. A spill control plan will be prepared to mitigate the impact of any fuel spillage from portable generators or hand tools; drip trays will be specified as requirements for the generators; no refilling of fuel-powered plant will be permitted within 50m of any watercourse.
- d. No fuels will be permitted to be stored in the Country Park, thereby reducing the potential for accidental spillage while unattended.
- e. At the CloudStation locations within the Water Gathering Grounds there will be measures taken to minimise rainfall ingress through erection of canopies over the installation areas to direct rain water off the CloudStation footprint; the perimeter of the work sites can be fenced off to prevent off site migration of materials.
- f. The anticipated workforce onsite will not exceed 6-10 persons at one time. Given the proximity of the cable car Terminal Building, all onsite workers will be required to use toilet facilities at Ngong Ping to avoid the need to erect temporary toilet facilities within the Country Park.
- g. No kitchen or canteen facilities will be provided within the Water Gathering Grounds. All workers will be required to take their daily rations to site.
- h. Workers will be required to take all waste materials (lunchboxes, waste papers, construction wastes etc) out of the Country Park each evening.
- i. Notices will be displayed to remind workers not to discharge any contaminants or wastewater into the nearby environment during the construction phase of the project.
- j. No fertilizers or pesticides will be used in the Country Park or Water Gathering Grounds.
- k. Environmental training and audits will provide an effective control of any malpractice.

### **3.4.5 Potential impacts on water quality during operation**

- a. Wastewater generated by guests
- b. Domestic waste generated by guests

### **3.4.6 Mitigation measures during operation**

- a. Guests will not be permitted to take food with them while on the Flying Fox zipline tour; drinking water will be issued in recyclable containers
- b. Guests will be reminded that littering is strictly forbidden within the Country

- Park; Flying Fox instructors will ensure enforcement of this policy and collect any litter dropped by guests at the end of each day
- c. Guests will not be permitted to go to the toilet within the Water Gathering Grounds; Flying Fox instructors will ensure guests have the opportunity to go to the toilet before embarking on the zipline tour, and will ensure enforcement of this policy at all times

### **3.5 LIQUID AND SOLID WASTE MANAGEMENT ASSESSMENT**

#### **3.5.1 Potential types of waste generated during construction**

- a. excavated materials – e.g. vegetation and topsoil removed from site clearance around the CloudStation locations and along new paths
- b. construction waste materials;
- c. chemical waste material; and
- d. municipal wastes.

#### **3.5.2 Mitigation measures during construction**

- a. Creation of a Waste Management Plan (WMP) prior to construction aimed at minimizing waste generation, maximising recycling onsite, and the setting up of appropriate routes for waste disposal. The WMP will refer to the Waste Disposal Ordinance (Cap. 354) & relevant regulations.
- b. Excavated materials will where possible be re-used – for example, excavated stone will be used to build new paths; material excavated during path construction will be backfilled to avoid the export of soil offsite.
- c. All construction, chemical and municipal waste materials will be transported out of the Country Park by helicopter or cable car.
- d. An area within the construction site will be designated to allow for sorting and segregation of materials into those which can be re-used and those requiring disposal.
- e. Material deliveries onsite will be carefully coordinated to minimise storage times onsite
- f. Site staff will be trained in waste minimization practices
- g. Waste products will be transported offsite as soon as possible
- h. No onsite burning will be permitted
- i. Accurate waste records will be maintained

#### **3.5.3 Potential types of waste generated during operation**

- a. Littering by guests while on the zipline tour
- b. Waste generated by materials brought onsite for maintenance purposes

#### **3.5.4 Mitigation measures during operation**

- a. Guests will not be permitted to take any food with them while on the Flying Fox zipline tour; drinking water will be issued in recyclable containers
- b. Guests will be reminded that littering is strictly forbidden within the Country Park; Flying Fox instructors will ensure enforcement of this policy and collect

- any litter dropped by guests at the end of each day
- c. Flying Fox's Waste Management Plan will continue to be applied during maintenance works

### **3.6 NOISE IMPACT ASSESSMENT**

#### **3.6.1 Potential noise impacts during construction**

- a. Use of mechanised plant or machinery onsite
- b. Drilling into rock
- c. Helicopter landing and take-off while delivering materials onsite

#### **3.6.2 Mitigation measures during construction**

- a. The project will be mindful of the Noise Control Ordinance (Cap. 400) which defines the Acceptable Noise Level in the Ngong Ping area to be 60dB during daylight and evening hours 0700-2300) and 50dB during the night time (2300-0700)
- b. Flying Fox will identify representative Noise Sensitive Receivers (NSRs) within 300m of the project limit, in order to assess noise impacts and develop mitigation measures
- c. We will explore the possibility of transporting materials to site by cable car to avoid the requirement for helicopters
- d. Should drilling into rock be required, such work will be prohibited on Sundays, public holidays and any time between 1900-0700; and if required a Construction Noise Permit will be sourced for any such work during daytime hours from Monday – Saturday
- e. Only quiet, well-maintained plant will be operated on-site and plant will be serviced regularly during the construction works;
- f. Machines and plant that may be in intermittent use will be shut down between work periods or throttled down to a minimum;
- g. Plant known to emit noise strongly in one direction, will, where possible, be orientated to direct noise away from the NSRs;
- h. Material stockpiles and other structures will be effectively utilised, where practicable, to screen noise from on-site construction activities.
- i. Movable noise barriers can be utilised as required.

#### **3.6.3 Potential noise impacts during operation & mitigation measures**

- a. The zipline tour installation does not use any motorised elements, so there will be no engine noise associated with operations
- b. The passage of the guest trolley on the zipline can generate some noise. This can be mitigated by the use of plastic-sheathed wire rope, which, according to data from the US, reduces trolley noise by 60%.
- c. Guests can spontaneously whoop with delight or shout with exhilaration while zipping; this is a natural impulse which Flying Fox would not seek to curtail unless it became an issue for NSRs.



## **3.7 ECOLOGICAL IMPACT ASSESSMENT**

### **3.7.1 Objectives of the ecological impact assessment**

The objectives of this assessment are as follows:

- a. Establish an ecological baseline for the operational area, identifying the ecological significance of the principal habitats present
- b. Assess the ecological impacts of the zipline tour
- c. Develop feasible and effective mitigation measures for significant impacts
- d. Determine whether residual, post mitigation impacts are acceptable
- e. Assess the post mitigation acceptability of the design

### **3.7.2 Ecological baseline survey of the operational area**

Flying Fox proposes to use the EIA conducted for the Tung Chung Cable Car Project as the baseline ecological survey for the operational area. The findings of the EIA can be supplemented by onsite ground truthing as required.

### **3.7.3 Habitats within operational area**

According to an analysis of the habitat map presented in Fig. 7.3 of the Tung Chung Cable Car EIA, the habitats featured in Flying Fox's operational area can be identified as follows:

- a. Route from cable car Terminal Building to launch of Zip 1 – Abandoned cultivation & Grassland
- b. Zip 1 launch – Grassland
- c. Zip 1 landing – Low Shrub
- d. Path from landing of Zip 1 to launch of Zip 2 – Low Shrub
- e. Zip 2 launch – Low Shrub
- f. Zip 2 landing – Tall Shrub
- g. Path from Zip 2 landing to suspension walkway – Tall Shrub
- h. Path from suspension walkway back to start – Grassland
- i. None of the paths proposed by Flying Fox cross any watercourses; however the tour passes close to watercourses as follows:
  - a. Both ziplines fly over three minor tributary branches of the Sham Wat Stream near Tower 7
  - b. The suspension walkway crosses a major branch of the Sham Wat Stream, at a height of approx. 15-20m
  - c. The path from the landing of Zip 1 to the launch of Zip 2 passes approx. 20-30m to the south of a watercourse where the Leaf Litter Toad has been observed
- j. The operational area does *not* impinge on any areas of woodland, the vegetation type of highest ecological importance in the area.

### **3.7.4 Ecological significance of habitats within operational area**

An evaluation of the ecological significance of the various different habitat types found within Flying Fox's operational area is contained in the Tung Chung Cable Car EIA. For an analysis of their significance within Flying Fox's operational area, see **Appendix F**. What follows is a summary:

- a. Abandoned cultivation:**
  - i. Species diversity is low to moderate
  - ii. Moderate ecological value
- b. Grassland:**
  - i. Species diversity is low
  - ii. Low ecological value
  - iii. Grasslands do support some rare and/or protected plant species such as orchids, two restricted range birds and one rare snake.
- c. Low Shrub:**
  - i. Species diversity is low to moderate
  - ii. Low ecological value
- d. Tall Shrub:**
  - i. Species diversity is moderate to high
  - ii. Moderate to high ecological value
  - iii. Tall Shrub supports five rare or uncommon bird species
- e. Watercourses:**
  - i. The natural watercourses within the Study Area are evaluated as of high ecological value and species rich
  - ii. Sham Wat Stream (SWS) is considered a very productive ecosystem
  - iii. The uncommon Leaf Litter Toad has been observed in a tributary branch of the SWS

### **3.7.5 Types of potential ecological impacts**

The potential ecological impacts arising from construction activities fall into two categories:

- a. Direct impacts due to habitat loss (e.g. loss of vegetation)
- b. Indirect impacts due to increased human activities and disturbance (e.g. noise, air quality, water quality, fire impacts)

Potential operational phase ecological impacts consist of the following:

- a. Disturbance due to increased human activities (e.g. noise, domestic waste, fire risk)
- b. Barrier effects of paths
- c. Possible bird strikes

A summary of the potential impacts of construction on different habitats within the operational area, along with proposed mitigation measures, is presented below.

### **3.7.6 Mitigation principles**

The following ecological impact mitigation principles will be strictly adhered to, in order of priority:

- a. Avoidance: Potential impacts should be avoided to the maximum extent practicable by adopting suitable alternatives

- b. Minimization: Unavoidable impacts should be minimized by taking appropriate and practicable measures such as constraints on intensity of works operations or timing of works operations
- c. Compensation: The loss of important species and habitats may be provided for elsewhere as compensation. Enhancement and other conservation measures should always be considered whenever possible.

### **3.7.7 Potential ecological impacts of construction on habitats, and mitigation measures**

#### **a. Abandoned cultivation**

- i. The approach route from the cable car Terminal Building to the launch of Zip 1 crosses an area of abandoned cultivation
- ii. We propose to use 200m of existing paths and trails (including the Lantau Trail and the NP360 Emergency Trail) to cross this area
- iii. Consequently there will be no habitat loss and no mitigation measures required

#### **b. Grassland**

- i. The approach route from the cable car Terminal Building to the launch of Zip 1 crosses an area of grassland, after the route leaves the Emergency Trail mentioned above, for a distance of approx. 80-100m.
- ii. The path from the suspension walkway back to the start also covers rocky grassland for approx. 100-120m.
- iii. Given the paths will be 1m wide, the total grassland area to be covered by new paths is therefore approx. 200m<sup>2</sup>.
- iv. The CloudStation launch of Zip 1 will be on rocky grassland, occupying approx. 78m<sup>2</sup> of land
- v. In line with the Cable Car EIA, “considering the extent of grassland habitats in the local area... minimal ecological impact is anticipated from grassland habitat removal”.
- vi. The impact from new paths can be mitigated by selecting a style of pathway (e.g. raised wooden boardwalk or grated steel deck) which lifts the pathway above ground level and permits rainwater and light to penetrate to the earth, as well as allowing minor taxa to pass beneath the pathway.
- vii. Due to the rocky nature of the route from the end of the suspension walkway back to the start, the pathway will probably need to be elevated a little from ground level for engineering reasons.
- viii. To reduce the impact of the pathways further, we have designed the return route from the suspension walkway to link up with the approach route to Zip 1 from the Cable car terminal, thereby avoiding the need of building a completely new return path.
- ix. The impact from the CloudStation has already been mitigated during the design process, by envisaging the use of pre-formed ballast contained within the above-surface structure of the CloudStation to avoid the necessity for deep concrete foundations; in addition the decking of the CloudStation will be grated steel raised above ground

level to permit rainwater and light to penetrate to the earth, as well as allowing minor taxa to pass beneath the platform.

- x. The impact from the CloudStation could be mitigated further by reducing the diameter of the installation (currently envisaged to be 14m – small diameter to be confirmed if possible)

**c. Low Shrub**

- i. The landing of Zip 1, the path from the landing of Zip 1 to the launch of Zip 2, and the launch of Zip 2 all occupy areas of low shrub, near to Tower 7.
- ii. The two CloudStations will occupy a total land area of approx. 300m<sup>2</sup>, while the path will meander for about 130m between the two CloudStations, occupying a further 130m<sup>2</sup> of land area.
- iii. In line with the Cable Car EIA, “minimal ecological impact is anticipated from low shrub habitat removal”.
- iv. The impact from the path and CloudStations could be mitigated further by taking the measures mentioned in section b. above.

**d. Tall Shrub**

- i. The landing of Zip 2 and the path from there 80m up to the suspension walkway passes through an area of Tall Shrub.
- ii. The CloudStation will occupy 78m<sup>2</sup> of land while the path will occupy approx. 80m<sup>2</sup> of land.
- iii. This is the most ecologically high value area on the zipline tour.
- iv. According to the Cable Car EIA: “No rare or protected flora was recorded in this habitat along the development footprint... The potential impact is considered moderate, however mitigation measures should minimise any ecological impacts... Clearing these habitats will require mitigation (compensatory planting).”
- v. In order to mitigate the ecological impact of the CloudStation, we propose situating the structure on the spur of a rocky ridge which, although defined as a Tall Shrub habitat, does not appear to feature any tall shrubs presently; given the rocky steep terrain, it will be necessary to install foundations to support the CloudStation; however, there will be no requirement to remove any tall shrub species.
- vi. The path leading steeply up the ridgeline for approx. 80m to the suspension walkway leads through an area of existing Tall Shrub, some of which would have to be cleared to make way for the path. We could consider compensatory planting to reduce the impact of this path construction.

**e. Watercourses**

- i. None of the paths proposed by Flying Fox cross any watercourses; however the tour passes close to watercourses as follows:
  - a. Both ziplines fly over three minor tributary branches of the Sham Wat Stream near Tower 7
  - b. The suspension walkway crosses a major branch of the Sham Wat Stream, at a height of approx. 15-20m



- c. The path from the landing of Zip 1 to the launch of Zip 2 passes approx. 20-30m to the south of a watercourse where the Leaf Litter Toad has been observed
- ii. Flying Fox does not require paths or fire breaks to be constructed beneath the ziplines or suspension walkway for safety or operational reasons. During the construction process, line launchers will be used to rig the zipline cables, avoiding the need for workers to walk the full line of the zipline routes. Consequently, the watercourses will not be affected by the construction or operation of the zipline tour.
- iii. Great care will be taken during the design and construction of the path from the landing of Zip 1 to the launch of Zip 2 to ensure that no damage – due to either human disturbance or spillage of construction materials or fuels – occurs to the riparian vegetation along the Sham Wat Stream tributary harbouring the Leaf Litter Toad.

#### **f. Photographs**

For photographs of the proposed locations for zipline tour infrastructure, see **Annex 1.4**.

### **3.7.8 Summary of mitigation measures to reduce habitat loss, by infrastructure**

#### **a. Paths**

- i. The route has been designed to use existing paths where possible and to reuse both new and existing paths, to reduce the construction of new paths to a minimum.
- ii. Existing paths account for 400m or 25% of the total tour length of 1,580m.
- iii. New paths account for 430m or 27% of the total tour length of 1,580m.
- iv. Path design to reduce erosion of topsoil and vegetation can be developed in consultation with AFCD. Options include:
  - Stone pointed with cement – naturalistic, but forms a barrier and covers the earth, durable, can be slippery when wet
  - Raised walkway of grated galvanised steel – allows ingress of light and rainwater to earth, allows small taxa to pass beneath walkway, not naturalistic, will not decay, less slippery than stone or wood when wet.
  - Raised boardwalk of timber – allows ingress of rainwater to earth, allows small taxa to pass beneath boardwalk, naturalistic, will decay quicker than steel, slippery when wet.

#### **b. CloudStations**

- i. The original design conceived large CloudStations of 14m in diameter in order to accommodate up to 30 guests at a time on the structure, avoiding the need for them to wander across unprotected land. This design totals 154m<sup>2</sup> of land requirement per CloudStation. For four CloudStations, that totals over 600m<sup>2</sup> of land.
- ii. We are confident that the CloudStation design could be modified to reduce the diameter to 10m. This would halve the land area required to 78m<sup>2</sup> per CloudStation, or a total 312m<sup>2</sup> for all four CloudStations.

- iii. It is possible that the CloudStations' diameter could be reduced further still, subject to confirmation from the design engineers.
- iv. If the galvanised steel structure of the CloudStations is not desirable in a Country Park, we can consider using a timber structure instead.

**c. Zip lines**

- i. The ziplines themselves are an inherently ecologically low impact form of travel. They do not disturb the flora or fauna beneath them. They do not require a path beneath them. They require very little trimming of vegetation. Consequently they are probably the lowest impact form of travel across a mountain landscape.
- ii. The Flying Fox ziplines total 600m in length – 38% of the entire tour length of 1,580m.

**d. Suspension walkway**

- i. Our design engineers are confident that the suspension walkway can be anchored into the natural rockfaces on either side of the Sham Wat gorge. This will avoid the need to lay concrete foundations.
- ii. The suspension walkway will pass 15-20m above the level of the stream.
- iii. Consequently the ecological impacts of the suspension walkway will be negligible.

**3.7.9 Potential ecological impacts of disturbance due to construction and operation, and mitigation measures**

- a. Potential disturbance impacts on flora and fauna species due to increased human activities during construction include:
  - i. Waste and contamination
  - ii. Soil erosion and sedimentation
  - iii. Air pollution (dust)
  - iv. Trampling of grass and shrub species
  - v. Fire risk
  - vi. Noise and lighting
  - vii. Extraction of water from watercourses
- b. The working capacity of the Flying Fox zipline tour is approx. 480 persons per day. Potential disturbance impacts on flora and fauna species due to increased human activities during operation include:
  - i. Domestic waste
  - ii. Soil erosion
  - iii. Trampling of grass and shrub species
  - iv. Fire risk
  - v. Noise
- c. Mitigation measures will be taken as follows:
  - i. Strict adherence to the Flying Fox Waste Management Plan during both construction and operations; no machine will be maintained or refuelled within 50m of a watercourse; litter control will be strictly enforced by onsite instructors during operations

- ii. Covering with tarpaulins of any soil exposed during the construction process, to avoid ingress of rainwater and subsequent erosion; particular care taken to avoid ingress of any construction materials into the Sham Wat Stream and its tributaries; exposed areas will be revegetated
- iii. Covering of building materials during construction to prevent dust entering atmosphere
- iv. Strict adherence to existing paths during construction and operations; fencing off construction sites to minimise trampling of grass and shrub species
- v. Any areas of temporary vegetation loss will be revegetated with suitable species
- vi. Total ban on smoking in the operational area during both construction and operations to minimise fire risk; installation of relevant fire fighting equipment as required
- vii. Noise mitigation measures will be enforced during the construction period as mentioned above; night time construction and operations will be avoided; permanent lighting of the zipline tour installation is not considered necessary for safety or operational reasons.
- viii. Extraction of water from watercourses for construction purposes is not permitted in Country Parks – this will be strictly enforced during the construction phase.

### **3.7.10 Potential ecological impacts on fauna due to operational disturbance**

The following material is quoted verbatim from the Cable Car EIA:

- a. “Disturbance is an unavoidable impact of the operation process. Disturbance will generally have insignificant impacts on mobile taxa, or taxa which do not have highly specific habitat requirements, such as birds, large mammals, most reptiles, and butterfly and dragonfly adults, and in these cases disturbance impacts will be avoided by ensuring operational activities are undertaken according to Environmental Code of Practice and the proposed mitigation measures.”
- b. Barrier effects of paths: “The emergency rescue trail [in Flying Fox’s case, the access path] is narrow and the impact of ‘exposed areas’ will generally not impact on fauna species. It is possible that some cryptic species (e.g. Short-legged Toad) avoid the trail as a consequence. The trail is unlikely to act as a barrier to movement of such species between areas of suitable habitat bisected (and or fragmented by) the trail. This impact is considered to be insignificant.

### **3.7.11 The possibility of bird strikes**

We have consulted with our Australian design engineers on this point. They confirm that out of the approximately 400 zipline installation projects in which they have been involved, they have never heard of any instances of mortality due to bird strikes.

In addition, the following material is quoted verbatim from the Cable Car EIA:

- a. “Bird collisions are not considered a potential significant impact, as no evidence is present that the area is a migratory bird flight path or an area situated close to breeding or feeding colonies of migratory birds.”
- b. “The impact of electrocution of raptors is considered to be the main cause of mortalities of Bonelli’s Eagle *Hieraetus fasciatus* in Europe (Manosa and Real 2001 In Ove Arup & Partners Hong Kong Ltd, 2002). The cables of the Cable Car System will not be electrified and no mortalities are anticipated.” Flying Fox’s cables are also not electrified.
- c. “It is anticipated that non-migratory species will not to be impacted upon. They will have familiarly with the Cable Car System (once operating) and will have a lower potential to collide with the cableway or towers.”
- d. “No bird species mortality has been reported from the collision of bird species into structures from the construction or operation of the Ocean Park Cable Car System or transmission lines in general in Hong Kong.”

### **3.7.12 Summary of potential impacts of construction and operation on key species**

These impacts are discussed in the Cable Car EIA and reproduced verbatim in summary form below:

- a. Mammals (Ferret Badger, Barking Deer & Seven-banded Civet): “Insignificant impact from construction disturbance. The species is expected to be able to temporarily relocate/ adapt.”
- b. Birds: “Insignificant impacts are predicted as no nesting trees will require removal. The cable car structures are unlikely to cause disturbance (i.e. noise) due to the mobility of the species.”
- c. Amphibians: “Potential impacts may result from construction near the Ngong Ping stream and subsequent disturbance (sedimentation and pollutants) without mitigation measures.”
- d. Reptiles: “Insignificant impacts associated with construction.”
- e. Insects (including birdwing butterflies): “No impacts predicted, as habitat will not be disturbed during construction activities.”

### **3.7.13 Ecological impact management – conclusions**

#### **a. Ecological value of operational area.**

- i. According to the Cable Car EIA, the Study Area (and by extension Flying Fox’s operational area) “contains a variety of habitats, of which the most ecologically valuable are streams, secondary woodland, and tall shrub habitat. ... Overall, the Study Area is assessed to be of medium to high ecological value.”

#### **b. Impact on habitats and flora**

- i. According to the Cable Car EIA, “Many streams and forest habitats in the Study Area are of particularly high ecological value due to a low level of anthropogenic disturbance, and it is crucial that impacts to these highly sensitive habitats are avoided or minimised wherever possible.”



- ii. Flying Fox will be using areas of abandoned cultivation, grassland, low shrub and tall shrub, but no woodland. The ziplines and suspension walkway will cross over various branches of the Sham Wat stream
- iii. The most ecologically valuable habitat along the route of the Flying Fox zipline tour is the Tall Shrub leading from the landing of Zip 2 up the ridgeline to the suspension walkway – a distance of 80m.
- iv. Mitigation measures will be taken to ensure minimal lopping of tall shrubs and compensatory planting as required.
- v. Mitigation measures will be taken to ensure no waste products, pollutants or sedimentation affect the watercourses within the operational area.

**c. Impacts on fauna**

- i. According to the Cable Car EIA, “The species of conservation interest appear to be widely distributed in the wider survey area and do not appear confined to any single location. The exception to this is amphibians that have relative low mobilities and may be impacted upon by sedimentation and contamination.”
- ii. The uncommon Leaf Litter Toad has been observed in a Sham Wat tributary stream near to the path leading from Zip 1 to Zip 2. Particular care will be taken to ensure its habitat and behaviour are not disturbed.

### **3.8 LANDSCAPE AND VISUAL IMPACT ASSESSMENT**

#### **3.8.1 Impact Assessment Methodology**

In line with the Cable Car EIA, the assessment of the potential landscape and visual impacts of the proposed works comprises two distinct sections as follows:

- baseline survey
- potential impact assessment

A preliminary survey has already been conducted of views towards the proposed zipline tour development, which could be developed further as follows:

- The visual envelope (2km distance or defined by natural or manmade features) within which the proposed development may be contained whether wholly or partially within views, including indirect effects such as temporary contractor’s works areas.
- The visually sensitive receivers (VSRs) within the visual envelope whose views will be affected by the scheme.
- The baseline survey describes and records by photograph typical views from within visual envelope for low-level & high level viewpoints

The sensitivity of each receiver group and quality of views typically will be based on the following:

- *High:* e.g. residential properties, upland hillwalkers and visitors to Ngong Ping.
- *Medium:* e.g. workplaces, schools etc.
- *Low:* e.g. recreational facilities or partially screened views etc.

The assessment of potential visual impacts will result from the following:

- identification of the sources of visual impacts and their magnitude that would be generated during construction and operation; and
- identification of the principal visual impacts with particular consideration given to the degree of change to the baseline conditions.

The impact assessment will compare the typical existing views identified in the baseline survey of the key receiver groups and the potential view after the proposed works are complete. Some typical factors affecting the magnitude of changes and sensitivity for assessing visual impacts will include the following:

Factors affecting the magnitude of change:

- compatibility of the project with the surrounding landscape;
- duration of impacts under construction and operation phases;
- scale of development;
- reversibility of change;
- viewing distance; and
- potential blockage of view.

Factors affecting the sensitivity of receivers:

- value and quality of existing views;
- availability and amenity of alternative views;
- type and estimated number of receiver population;
- duration and frequency of view; and
- degree of visibility.

A set of photomontage images can be used to compare views of existing site conditions, the unmitigated impacts of the zipline tour installation, and the views following mitigation measures.

### **3.8.2 Existing landscape and baseline context**

The Cable Car EIA subdivided its Study Area into key landscape character units (LCUs) within 500m of the proposed cable car development. For the purposes of Flying Fox, the entire zipline tour installation is contained within LCU11, defined as follows:

**“LCU 11. (Upland Terrain)** This LCU comprises the spectacular topography of the hills and hinterland of Tung Chung and San Tau. The slopes and ridges are typically steep and vegetated by extensive areas of scrub and grassland criss-crossed by a number of walking trails. There are copses of trees in the more sheltered ravines and lower slopes. The cable car development will result in the temporary loss of scrub and grassland during construction of Towers 3, 4, 5, 6 and 7 as well as the Angle Station between Towers 5 and 6. It is not anticipated that any trees within this LCU will be affected directly by the cable car which will pass overhead with generous clearance. However, the current proposal to build a rescue trail will require clearance of vegetation and this is discussed in more detail below. The main landscape impact is likely to result from the intrusion of the man-made structures into an otherwise undeveloped landscape.”

It is worth noting that the new paths which connect the start and finish of the zipline tour to the cable car Terminal Building lie adjacent to, but do not cross, LCU 15, defined as follows:

**“LCU 15. (Burial Areas)** This LCU comprises burial sites with a number of graves and a columbarium. The centre of the site is relatively level ground surrounded by a series of small rocky knolls with mainly hillside scrub and grass vegetation cover. A small stream meanders across the site. There is a belt of amenity tree planting by the side of the access road. The cable car terminal is located within this LCU and although it does not impact directly on the graves it will result in the permanent loss of mainly scrub and grass vegetation and require re-channelling of the stream course.”

The only point at which the zipline tour crosses LCU15 is when guests use the pre-existing trail from the Terminal Building to the point where the new path branches north-west towards the launch of Zip 1. The new path has been designed specifically to avoid the boundary of LCU15.

Clearly, since the research was carried out for the Cable Car EIA, the Cable Car itself has now been constructed and this development has had its own impact on Flying Fox’s operational area, thereby generating its own impacts on the landscape and views of the baseline area in question.

Specifically, within Flying Fox’s operational area, which broadly consists of the hilly basin drained to the west by the Sham Wat Stream, the following cable car installations now exist:

- **Tower 7:** measuring 47m high, with a ground footprint of 35m x 35m, this tower is directly adjacent to the Flying Fox operational area
- **Ngong Ping Terminal Building:** measuring 12m high with a ground footprint of 20m x 60m, this building lies less than 200m from the launch of Zip 1, atop the Ngong Ping plateau
- **Tower 3:** measuring 16m high, with a ground footprint of 35m x 35m, this tower lies approx. 900m from the landing of Zip 1 and launch of Zip 2.
- **Rescue trail:** measuring approx. 450m long x 1.5m wide, this straight stone trail runs underneath the cable car from the Terminal Building to a point beyond Tower 7, directly adjacent to the Flying Fox operational area

### **3.8.3 Potential landscape and visual impacts**

Potential impacts can be divided into temporary impacts due to construction works and permanent impacts due to the development footprint of the completed structures.

#### **a. Temporary impacts – construction**

- i. Four halo-shaped CloudStations, each measuring approx. 14m in diameter; these will require approx. 20m x 20m of space each for assembly and installation
- ii. One suspension walkway measuring 50m long x 1m wide; this will not require any additional construction space as it will be anchored into steep rock faces

- iii. Four new paths, measuring in total approx. 430m long x 1m wide; these will require minimal additional construction space, probably another metre to either side of the path track.

**b. Permanent impacts – footprint of structures**

- i. Four CloudStations, each 10m in diameter (78m<sup>2</sup> in area) and 2-3m in height
- ii. One suspension walkway, measuring 50m x 1m, at a height of approx. 15-20m above the river
- iii. Four new paths, measuring approx. 430m x 1m
- iv. Four aerial ziplines, running for 300m each in two parallel tracks 3m apart; each zipline measures approx. 12-14mm in thickness

**3.8.4 Assessment of potential landscape and visual impacts – magnitude of change**

Below is our assessment of the potential impacts of the Flying Fox zipline tour, in terms of the factors affecting magnitude of change (large, intermediate, small, negligible):

**a. Compatibility of the zipline tour with the surrounding landscape**

- i. The surrounding landscape is dominated on its eastern flank by the man-made intrusion of the cable car. Given the height of the nearest cable car structure – the 47m high Tower 7 – as well as the 450m long rescue trail, we would assess the landscape impact of the zipline tour to be small.
- ii. While the straight line of the rescue trail is visually harsh, Flying Fox's paths will meander naturally, making use of contours, natural vegetation cover and rock formations, to blend in better with the landscape; by these measures we would ensure that our paths generate a small visual and landscape impact
- iii. The surrounding landscape to the west is more naturalistic, although the first signs of construction of the new Hong Kong-Macau road bridge are now visible from the site. The landscape and visual impact of the zipline tour from this perspective will be slightly greater; however, the scale of the proposed development compared to the scale of the landscape features themselves is minimal, suggesting a small magnitude of change to the landscape and view.

**b. Duration of impacts under construction and operation phases**

- i. Construction will take approx. 6 months broken into two phases: pre-fabrication of all components (3 months); installation of all components onsite (2-3 months). Therefore the duration of impacts during the construction phase will be limited to 2-3 months.
- ii. The duration of impacts during the operation phase will be for as long as license as the Hong Kong Government grants for operational use of the installation.

**c. Scale of development**

- i. The scale of the development is small compared to the cable car development immediately adjacent to the Flying Fox operational area.

- ii. While Tower 7 of the cable car is 47m high with a footprint occupying 1,225m<sup>2</sup>, the Flying Fox CloudStations will each be 2-3m high with a footprint of 78m<sup>2</sup> – approx. 6% of the footprint of one cable car tower. All four proposed CloudStations will occupy a visual footprint of 312m<sup>2</sup>, approx. one quarter the footprint of one cable car tower.
- iii. The length of the cable car rescue trail in this part of the landscape adjacent to Flying Fox’s operational area is 450m; this compares to approx. 430m of new paths proposed by Flying Fox; while the Flying Fox paths are of a similar length to the rescue trail, they will appear smaller scale for two reasons: 1) the 430m of paths are split into four separate short paths; 2) the paths will meander in a naturalistic fashion
- iv. The two sets of twin zipline cables are each 300m long and 12-14mm in diameter, compared to the cable car cables which stretch for over 5,000m with an approx. diameter of 54mm; consequently the ziplines will be virtually invisible compared to the cable car cables. The main visual element will be the guests flying down the ziplines, but again they will appear very small compared to the size of an individual cable car gondola.
- v. The suspension walkway is 50m long, less than the width of the Terminal Building, and just 1.5m high, compared to the 12m height of the Terminal Building; consequently the suspension walkway will appear delicate in comparison.

**d. Reversibility of change**

- i. The zipline tour installation has been designed to use the minimum amount of foundations possible; all components will be pre-fabricated offsite and assembled onsite.
- ii. This leaves open the possibility of dis-assembling the components at some stage in the future and removing them from the site, leaving a minimal footprint behind.
- iii. The reversibility of the paths would depend on whether they are made of stone or using a timber or grated steel deck – the stone design would be less easily reversed.

**e. Viewing distances – from the north and above**

- i. The nearest view of the zipline tour installation will be from the cable car gondolas themselves as they approach from the north. At their closest point they will pass approximately 50m above and 30m to one side of the launch of Zip 2.
- ii. While this viewing distance is small, it can be argued that this specific set of “visually sensitive receivers” (VSRs), in the act of using the cable car, has already adapted to the idea of a man-made construction within this particular enclave of Lantau North Country Park.
- iii. In addition, their view of the zipline tour will be framed by a view of the infrastructure of cables, towers and gondolas which is conveying them towards Ngong Ping.

**f. Viewing distances – from the east and above**

- i. The second set of VSRs would be hikers using the nearby Lantau Trail and/or Country Trail. These two trails lead separately from the Ngong Ping plateau,



- around the western flank of Nei Lak Shan, converge to the north-east of Tower 7 and lead as one path towards the Angle Station.
- ii. However, at the point where these paths are nearest to the zipline tour installation, the view of Flying Fox is obscured as the paths pass behind a knoll feature (Spot height 491.6m) lying close to the south east of Tower 7.
  - iii. Near where the two paths converge, on a spur at 470.8m, a view of the launch of Zip 2 (at a height of 430m) is likely at a distance of approx. 300m. However, this view of Flying Fox – and all the views of Flying Fox from this footpath as it leads towards the Angle Station – will be framed in the foreground by the cable car infrastructure of cables, towers and gondolas.
  - iv. So it can coherently be argued that the view from this path has already been significantly impacted by the cable car, and the addition of the zipline tour infrastructure will be visually negligible.

**g. Viewing distances – from the south**

- i. From Ngong Ping plateau, the Flying Fox zipline tour has been carefully designed to ensure none of the infrastructure is skylined or silhouetted on any visible ridge or hill top.
- ii. Consequently, the installation will be virtually invisible from the Terminal Building and completely invisible from the Buddha, Po Lin monastery, and the columbarium, referred to on the 1:10,000 map series as Ling Tap.

**h. Viewing distances – from the west and below**

- i. The nearest viewpoint from the west is the road to Sham Wat as it nears the coast. The road at this point is nearly 2km distant from the Flying Fox installation and over 400m lower in elevation.
- ii. It is therefore likely that the zipline tour will be virtually invisible from this distance, especially given the outline of the cable car infrastructure immediately beyond.

**i. Potential blockage of view**

- i. The analysis above makes clear that at no point are any existing views blocked by the zipline tour installation.
- ii. The two main viewpoints of Flying Fox will be from: 1) the cable car gondolas themselves, from which the view is already partially blocked by cable car infrastructure; 2) the hiking trails around the flank of Nei Lak Shan, from which the views of Flying Fox will feature the cable car infrastructure in the foreground

**3.8.5 Assessment of potential landscape and visual impacts – sensitivity of receivers**

Below is our assessment of the potential impacts of the Flying Fox zipline tour, in terms of the factors affecting the sensitivity of receivers (large, intermediate, small, negligible):

**a. Value and quality of existing views**

- i. As established above, there are two sets of existing views of Flying Fox’s operational area: 1) From the north from within the cable car gondolas; 2) From the east from the hiking trails around Nei Lak Shan.

- ii. Both of these views have already been compromised by the existing cable car infrastructure; hence the addition of Flying Fox's installation will have a negligible visual impact on the value and quality of the existing views.
- iii. There are no views of the operational area from the Ngong Ping plateau to the south, as there are no public access footpaths to the top of the hill overlooking the operational area.
- iv. The views of the operational area from the west are at a distance of nearly 2km, near Sham Wat. This distance is far enough to render the impact of Flying Fox on the value and quality of the view from Sham Wat to be negligible.

**b. Availability and amenity of alternative views**

- i. For the hikers, there are innumerable alternative views of the Country Park afforded by the Lantau Trail
- ii. For users of the cable car, the view of Flying Fox is one among many views of both natural and man-made features during the journey from Tung Chung to Ngong Ping.

**c. Type and estimated number of receiver population**

- i. The population using the cable car annually is approx. 1.7 million
- ii. The population using the Lantau Trail and Country Trail from Ngong Ping to the Nei Lak Shan Angle Station is not known to Flying Fox.
- iii. Hence the vast majority of VSRs will be cable car users. It has been argued above that this receiver group, in the act of using the cable car, is already adapted to the idea of man-made structures within the Country Park environment, and is therefore unlikely to view the Flying Fox installation from a negative angle.

**d. Duration and frequency of view**

- i. The principal receiver group, cable car users, will view the Flying Fox installation for approx. 5 minutes on their journey from the Angle Station towards the Terminal Building
- ii. While the frequency of view will be high (1.7 million views per year), the duration will be relatively low (5 minutes for each passing gondola)

**e. Degree of visibility**

- i. The CloudStations will be the most visible part of the installation, but the combined footprint of all four CloudStations will be approx. half the footprint of one cable car tower
- ii. The paths will meander to blend into the topography and reduce visibility
- iii. The suspension walkway will be less than the width of the Terminal Building and below the skyline of the Ngong Ping plateau
- iv. The zipline cables will be approx. one quarter the width of the cable car cables and virtually invisible from any viewpoint
- v. The guests flying on the ziplines will be visible as small moving objects within a large landscape
- vi. Overall the degree of visibility is assessed as small

### 3.8.6 Measures to mitigate the landscape and visual impacts

Although the landscape and visual impacts of the Flying Fox zipline tour installation are assessed as small, the following mitigation measures have been or can be considered to reduce the impact further:

- a. Bio-mimicry:** the CloudStation's halo design has been conceived to mimic the natural knoll formations found in the operational area, as well as mimicking the circular plinth of the Great Buddha.
- b. Naturalistic routes:** the routes taken by the connecting paths have been designed to meander around the contours, behind rock formations and beneath shrub cover to disguise their appearance as far as possible.
- c. Path design:** the paths can be made in a variety of materials: 1) stone pointed with cement; 2) wooden raised boardwalk; 3) grated raised steel walkway. Flying Fox invites AFCD to comment on the environmental and visual merits of each style.
- d. Platform design:** the current CloudStation design proposes to use either galvanised or weathering steel as the main material. This type of material is widely used in the US and Australasia in zipline and canopy tour construction within country or national parks. Over the years, the metal discolours and takes on the visual appearance of its background, without losing structural integrity. However, the steel could be painted in a way which camouflages its natural colour and sheen to blend it into the background.

The CloudStation design originally envisaged a structure with a 14m diameter. This can be reduced to 10m diameter, thereby halving the land area from 154m<sup>2</sup> to 78m<sup>2</sup> per CloudStation, consequently halving the landscape and visual impact of the installation.

Alternatively, the CloudStation design could be replaced by a more traditional timber launch and landing structure if AFCD deem such a structure to be more in keeping with the environment and aesthetic of the Country Park. However, some structural steel is likely to be required for the anchoring and redirection of the ziplines themselves.

- e. Suspension walkway design:** it is proposed to use steel wire rope only for the load bearing portions of the suspension walkway – the most visible materials will be natural rope lengths suspending the timber decking.

- f. Replanting or transplanting:** where the path leads through Tall Shrub from the end of Zip 2 up to the suspension walkway, we propose transplanting or replanting any shrubs removed to create the 80m pathway.

### 3.8.7 Conclusion

The landscape and visual impacts of Flying Fox's zipline tour installation will be small, for the following key reasons:

- The infrastructure is considerably smaller in scale than the current cable car infrastructure which lies immediately adjacent to Flying Fox's operational area.

- The infrastructure has been designed to blend into the landscape and topography, avoiding straight-line paths or silhouetting structures on skylines.
- The installation can only be seen from two existing viewpoints:
  - i. The cable car gondolas themselves, from which the view of Flying Fox is framed by foreground views of the cable car installation
  - ii. The section of Lantau Trail and Country Trail leading from Ngong Ping plateau to the Angle Station. The view of Flying Fox from these trails is itself framed in the foreground by the cable car infrastructure of towers, gondolas and cables.
- The great majority of viewers will be from the cable car itself – these viewers, in the act of taking the cable car, have arguably adapted to the concept of man-made structures in the Country Park and will be unlikely to object to the much smaller Flying Fox installation adjacent to the cable car.

For a set of images showing the context for the likely visual impacts, see **Annex 1.5**.

### **3.9 CULTURAL HERITAGE IMPACT ASSESSMENT**

#### **3.9.1 Archaeological sites**

According to the Cable Car EIA, “No archaeological sites have been recorded in areas which will be directly impacted by the proposed project...The steep slopes [of Nei Lak Shan] are not suitable for settlement and there is no record of occupation or cultivation”.

#### **3.9.2 Monastery and Great Buddha**

The Po Lin or ‘precious lotus’ monastery was founded in 1905 and officially inaugurated in 1928. The Tian Tan or Great Buddha was completed in 1993. However, the Flying Fox zipline tour installation will not be visible or audible from either the Great Buddha or the monastery, which lie respectively 600m and 700m away from the nearest proposed Flying Fox structure.

#### **3.9.3 Ling Tap columbarium**

Our field survey has confirmed that the only cultural or heritage resource within 200m of the project boundary is the columbarium known as Ling Tap. This structure lies at an elevation of 429m approx. 90m to the south of the proposed location of the suspension walkway, which will be at an elevation of 420m. Between the columbarium and the suspension walkway is a knoll of 437m elevation. Given that the suspension walkway is located at an elevation 17m below the summit of the knoll, it is assessed that the suspension walkway is beyond the audible as well as visual range of the columbarium.

#### **3.9.4 Graves**

Maps and ground truthing have revealed the locations of several graves on the south-eastern slopes of the knoll feature known on the 1:1000 map as “Rocky Area” (Spot height 446.5m), lying to the north of the Terminal Building and to the east of Ling

Tap. Flying Fox has adjusted the approach path from the Terminal Building to the launch of Zip 1 to give these graves a wide clearance.

### **3.9.5 Fung Shui**

The Cable Car EIA found two fung shui features in the Study Area – the Elephant’s Trunk (which lies on the coast near Tin Sam) and the Dragon’s Back (which runs down the mountain spine north from the Angle Station). Neither feature is near Flying Fox’s operational area.

### **3.9.6 Conclusion**

There will be no adverse visual or aesthetic impacts on the area’s cultural heritage due to the proposed project, as all works areas are located at a sufficient distance from the monastery and associated structures and are separated from them by wooded or hilly areas.

## **3.10 ENVIRONMENTAL CODE OF CONDUCT**

Flying Fox proposes to adopt the “Environmental Code of Practice for the Works of Tung Chung Cable Car Project” presented in the Cable Car EIA – see **Appendix G**. This booklet will be provided to all personnel directly and indirectly involved in the construction works for this project. In addition training will be given to the workforce to ensure there is full comprehension and ‘buy-in’ to the environmental policies being adopted for this project.

## **3.11 YELLOWSTONE PARK ZIPLINE CASE STUDY**

### **3.11.1 Environmental assessment**

In August 2012 the United States Department of Agriculture, Forest Service, published *Predecisional Environmental Assessment: Sleeping Giant Ski Area Development Projects. Wapiti Ranger District, Shoshone National Forest, Park County, Wyoming*. The assessment considered the environmental impact of upgrading the summer adventure activities at the Sleeping Giant ski area, within a national park/forest, of which a zipline project formed one part.

It was not suggested that the zipline project alone required an environmental assessment; but the project formed part of a larger upgrade which did require such an assessment. See **Appendix D** for a summary of the assessment’s findings.

### **3.11.2 Proposed zipline tour within national park / forest**

The zipline project consisted of:

- **7 ziplines** (compared to Flying Fox’s two parallel ziplines)
- **1 suspension walkway**
- **8 steel tower anchor stations between 2.5m and 14m high** (compared to Flying Fox’s four 2-3m high CloudStations)



- **Total impact on ground 0.4ha** (compared to Flying Fox's 0.07ha)
- **Total project area of 7.7ha**

### **3.11.3 Impact assessment & conclusions**

The assessment examined seven areas of potential impact and came to the following conclusions:

- Cutting 10-20 trees scattered across the project area would have no effect on diversity
- Major groundwork and use of heavy equipment should be limited to seasons when minimal soil compaction or sediment delivery to rivers would occur
- There would be no effects to sensitive species of wildlife and no habitat loss
- Limiting operations of the ziplines from 8am to 7pm would be a mitigating factor
- The project area of 7.7ha is too small to constitute a significant impact to any species listed
- Surface erosion would be minimal due to the small area of 0.4ha disturbed
- No fire risk attached to the construction or operation of the ziplines
- Use of a rubberized zipline would eliminate any noise from the zipline
- The project would provide a recreation opportunity not currently available in the area and would not have any negative effects on existing recreation sites in the forest
- Structures and land form alterations should in their design borrow from naturally established form, line, color and texture



**Working Paper submitted to the Country and Marine Parks Board**

**Proposed Flying Fox Eco-Adventure Zipline Tour at Ngong Ping, Lantau North  
Country Park**

*17<sup>th</sup> October 2012*

#### **ANNEX 4. SAFETY & RISK MANAGEMENT**

- 4.1 Overview and safety record
- 4.2 Safety standards & associations
- 4.3 Imported equipment
- 4.4 Guest safety briefing and practice
- 4.5 Staff training
- 4.6 Standard Operating Protocols
- 4.7 Risk assessments
- 4.8 Site inspection regime
- 4.9 Head Office oversight
- 4.10 Public access
- 4.11 Risk management summary

## **ANNEX 4. OPERATIONAL SAFETY & RISK MANAGEMENT**

### **4.1 Overview and safety record**

Ziplines are an extremely safe, exhilarating and inclusive form of adventure activity. Our tours are the only zipline activities in India which conform to international standards on construction and operations. Below is more information about our safety record and protocols.

Since opening in January 2009, we have operated approximately 200,000 safe zipline descents. During this period we have enjoyed a 100% safety record, with zero accidents requiring hospitalization. In a survey of 1,521 guests over a 15 month period in 2009-10, 98.9% of our guests scored our Safety Briefing with 5 points out of 5, while 99.1% rated our Instructors with 5 out of 5.

### **4.2 Safety standards & associations**

At Flying Fox, safety is our No. 1 priority. Our installations, which consist of robust and permanent galvanized steel posts and cables, are designed by some of the world's leading zipline technicians. We currently conform to the European Standard which encompasses zipline tours (EN 15567 Parts 1 & 2) and to ISO 4309 which governs the use of wire rope.

For the installation in Hong Kong, we have already entered into discussions with the EMSD about which safety standards are most applicable; the current consensus is to apply the Hong Kong *Code of Practice for Amusement Rides 2003*, with reference to applicable international industry standards where appropriate, including:

- EN 15567 Parts 1 & 2 – the European Standard for *Sports and recreational facilities – Ropes Courses – Part 1: Construction and safety requirements; Part 2: Operation requirements*
- EN 13411 – the European Standard for *Terminations for steel wire ropes*
- ISO 4309 – the International Standard for *Cranes – Wire ropes – Care, maintenance, installation, examination and discard*
- AS 2316.1 – the Australian Standard for *Artificial Climbing and Abseiling Structures*
- *Challenge Course and Canopy/Zip Line Tour Standards, Seventh Edition 2008* – published by the US-based Association for Challenge Course Technology (ACCT)

Flying Fox is also a member of various professional associations, including the Adventure Tour Operators Association of India (ATOAI) and the Association for Challenge Course Technology (ACCT). Flying Fox would seek to work with the Tourism Commission of Hong Kong to ensure that these international standards for zipline tours are introduced to Hong Kong.

### **4.3 Imported equipment**

The safety equipment worn by participants while zip lining is called Personal Protective Equipment (PPE). All our PPE is imported from leading international

brands such as Petzl of France, and it conforms to UIAA standards. Our PPE design ensures that each guest is connected to the wire by two separate and secure points of attachment while descending the zipline – one principal pulley and one safety backup, connected to the guest by lanyards and self-locking karabiners with a safe working load of 22kN. It is physically impossible for a guest to become disconnected from the zipline once he or she is corrected attached.

In addition to the safety equipment worn by participants, each Flying Fox instructor carries a rescue bag onsite which includes the equipment necessary to rescue any participant at any point mid-span along the zipline. We do not practise rescues using vertical lowering from the zipline to the ground as this exposes the guest to unnecessary risk. We have all the portable equipment required to recover guests to either end of the zipline while remaining safely attached at all times. All instructors are First Aid trained and carry a First Aid kit with them.

#### **4.4 Guest safety briefing and practice**

Guests are thoroughly briefed, verbally and in writing, about the physical and mental requirements for zipping. They receive a full safety brief from one of our instructors and each guest practices zipping techniques themselves before embarking on the full zipline tour. In addition, they sign a “Risk Acknowledgment and Disclaimer Form” which absolves the company of liability in the event of negligence on the part of the guest.

#### **4.5 Instructor training, supervision & communication**

Each Flying Fox site is managed by an experienced team of expatriate and local instructors, led by a Manager who holds either a British or international climbing / mountaineering qualification. He is supported by a Senior instructor, who deputizes as Duty manager in the absence of the Manager.

All our instructors are trained to European standards before the commercial season starts. They receive refresher training and are assessed in their operational and rescue protocols every month during the operating season. They also hold First Aid certificates.

Guests are supervised at all times by Flying Fox instructors, who are responsible for clipping all guests onto the ziplines at each launch and unclipping them at each landing, as well as managing the safe flow of participants around the tour.

Guests will travel in groups of up to 12 persons at a time, supervised by two instructors. During periods of high occupancy, we will staff each CloudStation and the Suspension walkway with two instructors to improve the safe flow of guests.

Communication between instructors and the duty manager will be by hand-held UHF radio (“walkie-talkie”); all radio communications are logged.

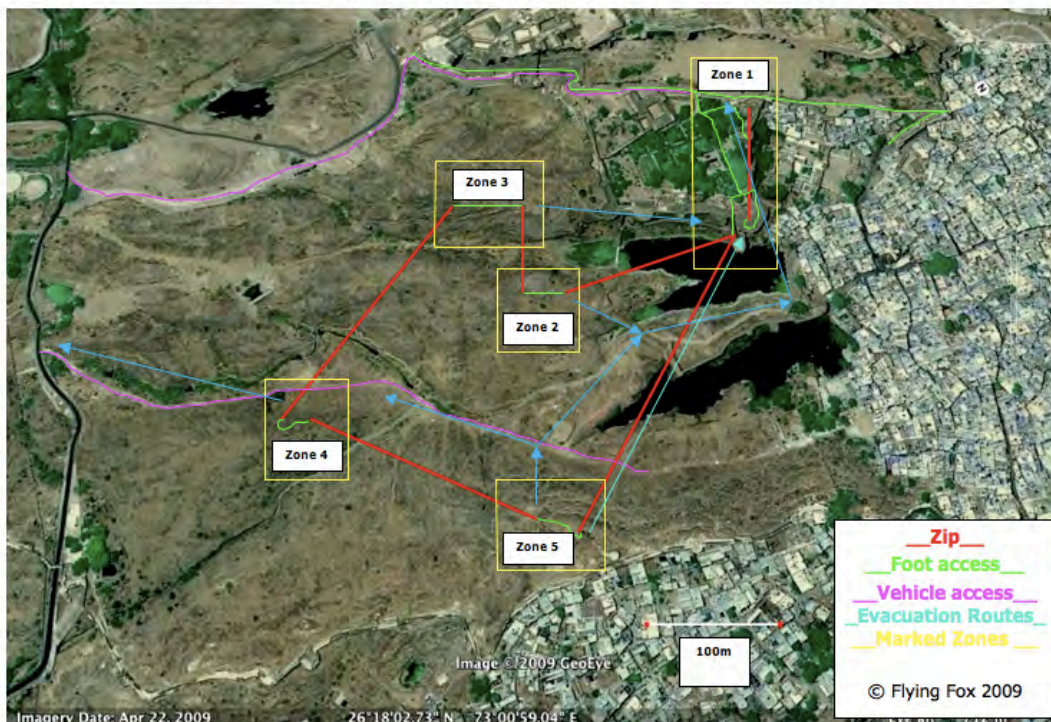
## 4.6 Standard Operating Protocols & emergency procedures

Flying Fox has developed its own Standard Operating Protocols (SOPs), in conjunction with consultants from some of the world's leading high wire adventure operators. These protocols are contained in our Operations Manual & Annexes. We train all our instructors in the following safety critical areas:

- Fitting guest safety harnesses
- Delivering a clear, intelligible safety brief
- Conducting a group safely over rough terrain
- Safe clipping and unclipping of guests to the ziplines
- Safe progression of a group of guests through the entire zipline experience
- Radio protocols – all instructors carry UHF radios and report back to Base on every aspect of the zipline tour; Base in turn logs every event and radio call in the Radio Log
- First Aid relevant to our mountainous locations
- Standard rescue techniques to recover guests who do not reach the end of the zipline – instructors are trained and equipped to complete such rescues within 10 minutes
- Specialized rescue techniques to recover guests mid-span on the zipline, in the unlikely event of gear failure – there is no requirement to lower guests to the ground; instructors are trained and equipped to complete such rescues within 20 minutes.
- Evacuation SOPs in the event of poor weather, which will be customised to suit the specific site in Lantau (see **Fig. 4.1** below).

ANNEX 3.7D SITE SPECIFIC EVACUATION  
FLYING FOX JODHPUR – EVACUATION MAP & PROTOCOLS

Fig. 4.1 Sample Evacuation Plan





- Significant incident protocols, including the evacuation of injured guests by stretcher. These protocols include liaising with the landlord’s onsite team, local emergency services and creating a comprehensive paper trail of Witness statements and Significant incident reports to ensure the event is correctly documented.
- *Note: We will be in close contact with the cable car operators to ensure that we are “in the loop” on any severe weather warnings issued by the Hong Kong Observatory; we will adopt similar windspeed warning criteria as NP360 for evacuating and closing the site. The site will close during electrical storms and heavy rain.*

#### **4.7 Risk assessments**

Each site has a Risk Assessment document which is updated on a quarterly basis. It comprises two sections: a set of generic risks common to all zipline sites; and a set of risks specific to the particular site.

The severity of each risk is scored on a scale of 1-5, while the likelihood of a risk is scored on a scale from 1-3. Our management team work with the onsite staff to ensure that mitigation measures are in place to reduce the severity and likelihood of the risks. However, if the total score for a specific risk reaches over 6, then more effective precautions are implemented.

#### **4.8 Site inspection regime**

We have four distinct inspection regimes:

- i. Daily checks** – every day, our instructors conduct the following:
  - Visual check of every aspect of the physical installation
  - Visual check of the zipline tour environment, including paths, trees, slopes etc.
  - Physical test ride of each zipline & braking system before opening to the public
  - Physical check of all PPE before use by guests
  
- ii. Monthly checks** – every month, our Managers and Senior Instructors conduct the following:
  - Thorough check of every aspect of the installation, including all nut/bolts, critical wire rope terminations, turnbuckles, shackles, concrete footings, steel & welded components, zipline integrity, braking system, platforms & paths – looking for any signs of tampering, metal fatigue or degradation
  - Retuning of ziplines to ensure maximum ride safety, obstacle clearance and correct speed
  - Thorough check and maintenance of all the PPE, utilizing a grading system to monitor wear and tear (Good, Monitor, Quarantine). Any equipment suspected of wearing out is quarantined, removed from the site and assessed by our Operations Manager.

**iii. Periodic/Quarterly checks** – Head Office ensures that the following happens periodically:

- All ziplines are inspected visually for wire breaks and conform to ISO 4309
- All critical wire rope U-grip terminations are torque-wrenched to the correct tension in N/m
- Tension reading of all ziplines and stays, using digital Tensiometer – adjustment of zip and stay tensions as required to bring within safety parameters
- Risk Assessment is reassessed and revised
- Any groundwork repairs to paths, platforms or slopes are completed

**iv. Annual certification** – each year, an independent third party expert:

- Inspects and certifies our installations and operations to European standards
- Conducts onsite proof tests on any safety critical anchors

#### **4.9 Head Office oversight**

In order to ensure a safely operating installation and workforce, the inspection regime and staff training clearly have to be as good in practice as they are on paper. To that end, Flying Fox Head Office has established the following systems to ensure onsite compliance to our protocols:

- A full set of paperwork Annexes, relating to each safety critical inspection or training objective, to be completed and signed off by the Manager on a daily and monthly basis
- An online Operations Report, summarizing the inspections and training completed, to be emailed on a weekly basis to the Director of Operations at Head Office
- Full time Operations Manager, whose job it is to visit each site at least once per month to:
  - ensure that all safety-related paperwork is in order
  - conduct safety training and assessments for the Manager and instructor team
  - conduct First Aid refresher training
  - make spot checks on the installation and operations

#### **4.10 Public access**

Flying Fox limits access to its installations only to those guests who have undergone the correct induction and safety briefing procedure. The equipment can be dangerous if used by members of the general public who have not been correctly briefed or who are not supervised by Flying Fox instructors.

For this reason, we would need to limit public access to the installation itself, by gating off the CloudStations which provide access to the ziplines, and also the Suspension walkway.

The question of whether to permit public access on Flying Fox's pathways to non-

Flying Fox guests was raised in a preliminary meeting with AFCD. It should be noted that NP360 currently restricts public access to its rescue pathways.

However, we could consider permitting unaccompanied public access along our pathways during operational hours, to permit the public to enjoy the landscape from a different perspective or to watch Flying Fox guests flying through the air. Flying Fox welcomes the views of the AFCD and CMPB on this point.

#### **4.11 Risk management summary**

##### **a. Staff training**

- Instructor competencies are identified
- Trainee instructor induction process is established
- Hazard and incident forms are provided
- Emergency procedures are established
- Risk Management Strategy is established
- Standard Operating Procedures are established
- All work at height is done in accordance with Occupational Health and Safety Regulations and activity context
- Appropriate Personal Protective Equipment (PPE) meets industry standards and is supplied
- Graduated training method is established
- Instructor Training Manual is produced
- Instructor training and assessing results are documented and kept
- Periodic quality assurance assessment strategy is established
- Instructor disciplinary procedures are established

##### **b. Tour Operation**

- Risk identification and management is consistent with relevant standards
- Guest induction process is established
- Hazard and incident forms are provided
- Emergency procedures are established
- Risk Management Strategy is established
- Appropriate PPE meets industry standards, is inspected, maintained and supplied
- Standard Operating Procedures are established
- Safety Manual is produced
- Periodic inspections are conducted
- Local emergency services are invited to familiarise themselves with the tour and the in-house emergency procedures
- Reasonable measures to prevent unauthorised access can be designed