



**WORLD GREEN
ORGANISATION**



Social Innovation Inventor - Competition for Innovative Design (SII) Summary of Year 5 and Introduction of Year 6

Social Innovation Inventor - Competition

- Entering the 6th year, **SII (Social Innovation Inventor) Design Competition** continues to inspire the future young leaders to get to know more about some of the pressing issues in the community, and to propose solutions through their creativity and innovation
- This competition has already **inspired over 1,700+ young leaders** in the past, featured with new design theme each year that reflects the latest pressing concerns in the society, followed up by various proposed solutions that benefit mainly those living under poverty or facing aging problems, and latest the smart city lifestyle
- A **collaboration** between business sector, technology sector, designer, engineers and architects, as well as social organisations to tackle issues together





**Smart Development
on the Rock Face and in the Rock Cavern**
躍【洞】山城 - 概念空間設計大賽

Social Innovation Inventor – Competition for Innovative Design (Year 6 – 2018/19)

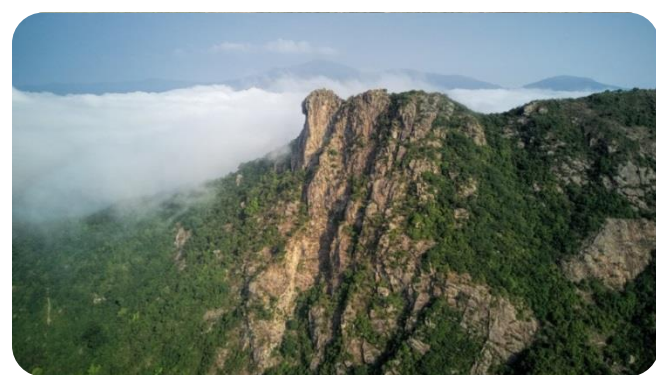
Situation of Hong Kong

1. Topographical setting

- Being a world-class city, Hong Kong is renowned for its **modernized development in urban areas**, in particular along its harbour front
- However, only about **one-fourth of the land** in Hong Kong has been **developed**
- **Steep natural hillsides** significantly limits the extent for urban expansion

2. Sustainable city development

- Further **substantial land formation** on the hillsides (technically **feasible but not preferred**)
- A pressing need to **explore new sources of land supply** to support social and economic development



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Trend towards exploring extra land resources

- Growing population and insufficient land supply in Hong Kong result in increasing rent pressure and soaring property price
- Hong Kong is known for having the smallest average house size (~15m²) world wide. To save the cost of living, the majority of families in Hong Kong are living in a tiny apartments and standing the unsatisfactory living environment.
- **Optimizing the use of 'hidden' land resources** – seeking land mass from a three dimensional instead of two-dimensional perspective

How much space is enough?

Average residential floor space per capita in m²



Note: data for 2009 builds, * China figures urban only, assumes average national household size
Sources: CommSec, RBA, UN, US Census

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Background

The speech of 2018 Policy Address (Ch3 Housing and Land Supply)

60. Land Development – a Daunting Task

- “Enhancing Land Supply Strategy”, which proposed six measures including reclamation outside Victoria Harbour, **rock cavern development**, optimising the use of brownfield sites and agricultural land etc.

2018 Policy Address

IV. Home Ownership, Liveable City

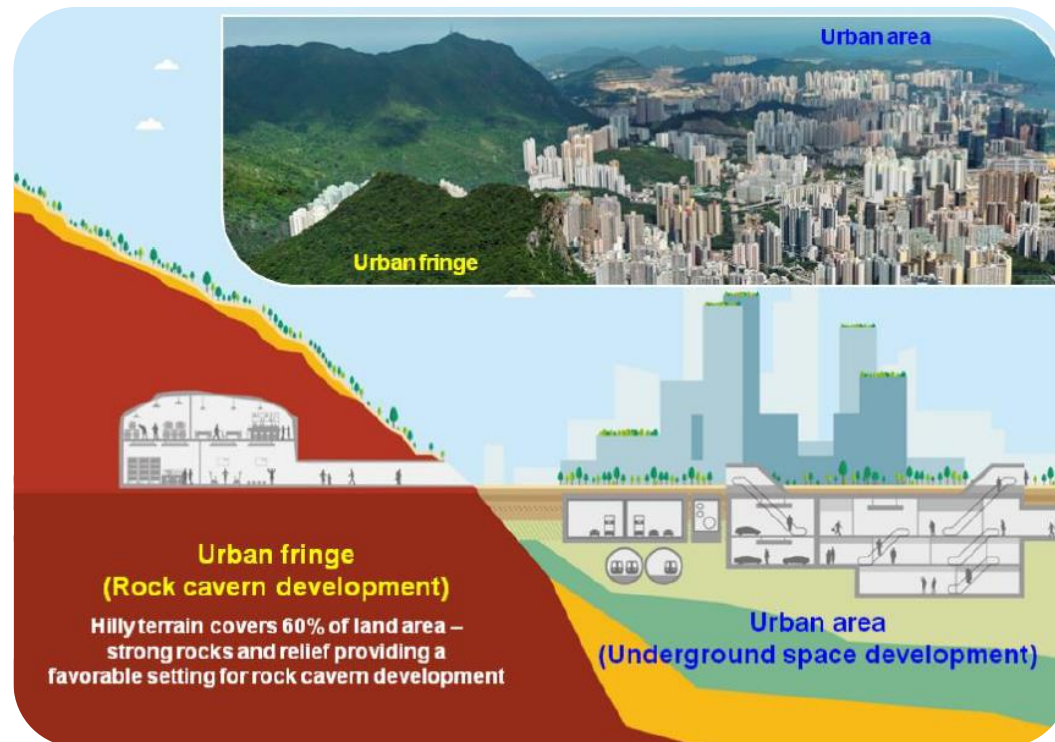
- Develop land resources to **tackle the housing problem** faced by the general public
 - Make available **sufficient land for commercial and industrial developments**, government and community **facilities**, infrastructure, open space, etc.
1. Site investigation works for relocation of the Diamond Hill Fresh Water and Salt Water **Service Reservoirs to caverns** will commence by end-2018
 2. **Relocating** the Sha Tin Sewage Treatment Works **to caverns** in early 2019
 3. Feasibility study on **relocating** the Public Works Central Laboratory in Kowloon Bay **to caverns**



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Rock cavern development at the Urban Fringes

- A number of strategic studies and pilot projects to **unleash the potential of utilization of rock caverns and underground space** in Hong Kong
- **Oversea experience:** applicability can go beyond simply the accommodation of nuisance facilities and extend to a wide variety of beneficial uses



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Environmental Challenges about the project



- Challenge of small living quarters and living spaces for rising urban populations
- Increasing rent pressure and soaring property price



- Hilly landscape and scarce land resources
- Seeking land mass from a three dimensional instead of two-dimensional perspective



- Buildings accounts for 89% of electricity consumption and 60% of carbon emission in HK
- Construction of green building are environmentally responsible and resource-efficient throughout a building's life-cycle (i.e. design, construction, application and demolition)



- The street lighting consumed 140 million kW electricity in 2016
- Innovative design, complementing the LED replacement programme, to improve the level of application of street lighting in the Smart Community

Applying environmental measures through green design, coupled with behavioral change are important to protect the environment and planet resources

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Environmental Objectives



- To encourage the youth – secondary and tertiary students to make green, innovative and applicable **design to solve society's pressing problems** through competition



- To propagate the **concept** of environmental protection and incorporate environmental considerations **into design** requirements



- Costs concept will be taught to **counter-balance environmental benefits and investment**, including resources saving and pay-back-period



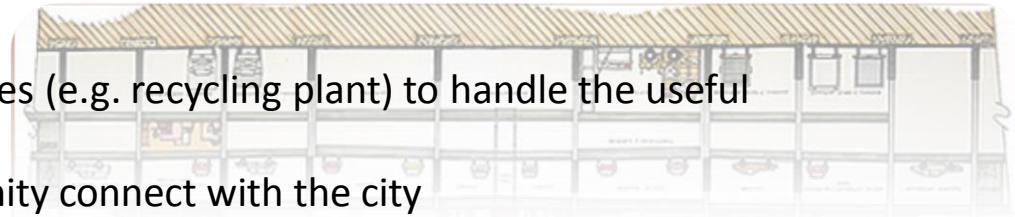
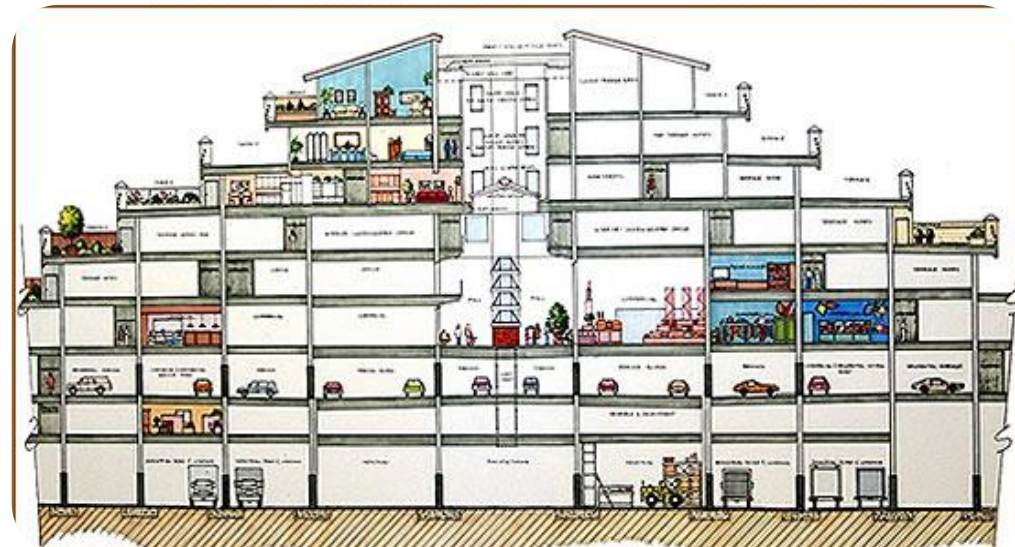
- To cultivate environmental **leaders** through igniting their environmental passion and **advocating the green concepts to the community** in the future

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Environmental Considerations – Smart Community in Rock Cavern

Students need to consider the **land use** in various floors of the Rock Cavern, how to make use of the **natural resources**, **environmental measures**, the **economic opportunity**, **transportation**, **infrastructure**, **education**, **food systems** and **communication, connection** with the city etc. in the rock cavern communities, for example:

- **Energy**: Renewable energy application
- **Air**: Local wind turbine to supply electricity to drive cavern ventilation/lighting
- **Air**: Mechanical ventilation systems inside the cavern
- **Water**: Making use of the groundwater and surface runoff along the slope for electricity generation
- **Lighting**: Potential for the installation of light tubes to supply natural light for community in rock cavern
- **Waste**: Water and Waste Treatment facilities (e.g. recycling plant) to handle the useful resources properly
- **Connection**: How the rock cavern community connect with the city



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Environmental Considerations – Innovative Street Lighting

Students need to consider the **practical application** of the street lighting used in the community (or even in the rock cavern) and how the smart street lighting can **provide extra benefits** to the community, aside from only extending the hours for the activities to take place.

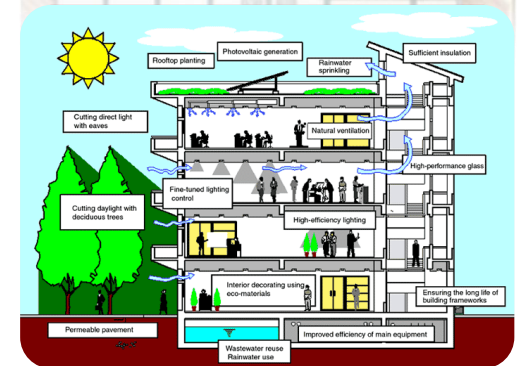
- **Energy:** Making use of the renewable energy to provide energy for daily operations
- **Air:** Supplemented by the wind turbine to improve the ventilation in the city
- **Greening:** Adjust the design of the street lighting to mimic the 'living' tree in the natural environment
- **IoT:** Connected with the air quality management system to evaluate the pollutants suspended in the air



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Environmental Education

- Content in line with - 'Energy Technology and Environment' under **Liberal Studies Curriculum**
- **Technology application:** ICT, Sensor Installation, Air monitoring device, IoT, street lighting systems by Highways Department
- **Behavioral change:** Facilitate the awareness buildings by integrating the daily environmental habits and Green concepts in the innovative design through competition
- Education **campaign** to mobilize youths to become environmental friendly
- **Visits** will be arranged to Waste Recycle Centres, Water Treatment plants etc.
- **Short-listed 20 teams** are required to pledge and become **Green Ambassador** and try best to achieve in lifestyle for energy, water, paper saving and hence prudential use of resources



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Educational Reward Trip

- Exchange between secondary students and tertiary students through study tour
- Champion teams will be sent to Taiwan to visit Taiwan University and exchange experience with local staff and students
- Visits to environmental facilities will be arranged during the reward trip
- Visits to cultural scenery sites to understand the culture and heritage
- Students' sharing after the trip will be arranged to education sector/public (subject to final arrangement and opportunities)



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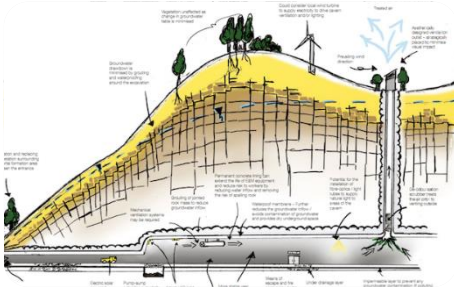
Positive Impacts

- To promote **Green lifestyle** to youths - secondary and university students
- Direct environmental protection **training to several hundred of participating students**
- **Lectures** related to Sustainability concept will be delivered
- **Related training** will be provided by Architect, Engineer, Environmental Experts and Interior Designers
- Encourage students to **walk the talk through lifestyle and design** to make a contribution to environmental protection
- Students are expected to **apply Green knowledge and measures** to their design
- Students bring home the **green practices**

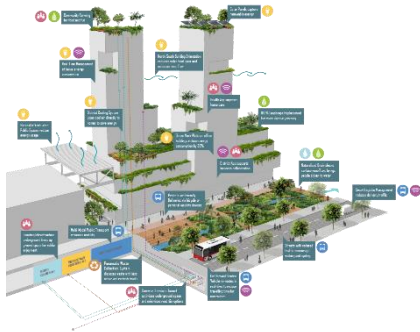


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Design Competition for Rock Face and Rock Cavern Development



Tertiary Education Group
Theme: Smart Community in the Rock Cavern



Secondary School / Yi Jin / Foundation diploma Group
Theme: Smart Residential Estate On the Rock Face



Technical Group
(Suitable for participants major in Engineering)
Innovative Street lighting

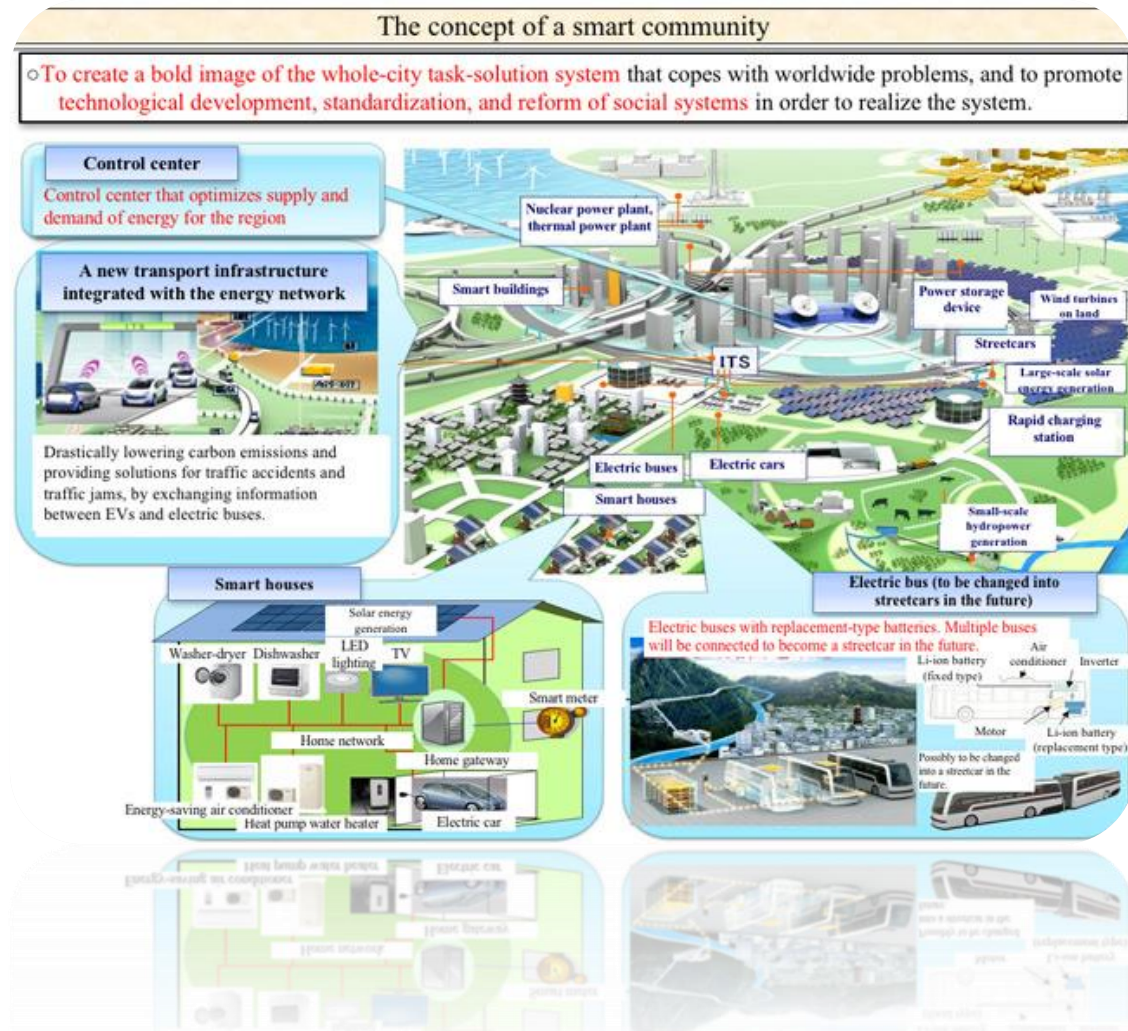
Social Innovation Inventor – Competition for Innovative Design (Year 6 – 2018/19)

Smart Community in the Rock Cavern

Tertiary Education Group

The purpose of the Smart Community (智慧社區)

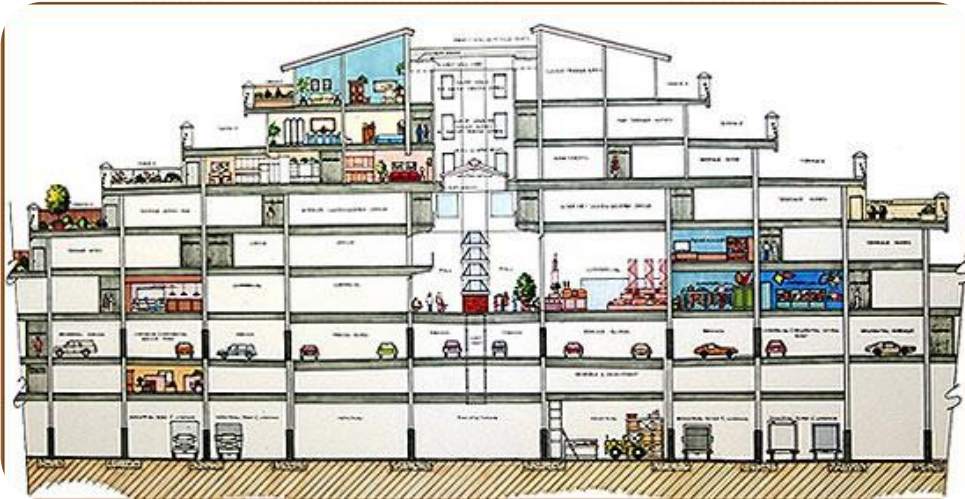
- Various types of convergence (匯流), , such as convergence of energy and ICT, and many kinds of objects and services in society, like electric vehicles and other transport infrastructures, medical care, and city planning (architecture and civil engineering), **will converge into a smart community.**
- The convergence mentioned above will be integrated to **make them more intelligent than before**, and this will make for livable community



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Smart Community in the Rock Cavern

Tertiary Education Group



The simulated smart community in the rock cavern with the **residential area** at the top, the **commercial and mall area** in the centre core while the **industrial and water and waste treatment facilities** are located at underground.



The vertical sub-division of the **pyramid-shaped community** by utilizing the interior space for the functions of a living space, working space and space for commercial and industrial activities **without the application of automobiles.**

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The lighting system of community

Technical Group

1. Highways Department (HYD) is responsible for the operation and maintenance of approximately **145,000 public street lights** and other lighting system (e.g. tunnel lights), which consumed around 140,000,000 kW electricity per year.
2. To be in line with environmental protection policy and to save energy consumption, HYD has launched the **Light Emitting Diode (LED) replacement programme** (公共照明系統開展發光二極管(LED)的更換計劃) for the public lighting system and **around 14,500 lighting system** used in street **would be replaced** within the next 5 to 7 years.
3. **Problem arises when transferring the indoor LED to outdoor environment**
 - Being Subject to the hot weather and frequent occurrence of rainstorm, the components of LED used in indoor environment will be affected by the **poor heat dissipation**
 - New invention in 2018 successfully solved the problem and **extend the lifespan** of LED from 3 years to 15 years

4. Innovative design competition of street lighting



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Qualifications for participation

Secondary School / Yi Jin / Foundation diploma Group

- All students from local secondary schools, Yi Jin and foundation diploma students are welcome to participate
- Each team can consist of 2-3 students
- Team members can come from the same or different schools
- There is no limit on the number of teams from the same school joining the competition
- **The competition is free of charge**

Tertiary Education Group

- All full-time students from local tertiary education institutions are welcome to participate
- Each team can consist of 2-3 students
- Team members can come from the same or different institutions and faculties
- There is no limit on the number of teams from the same institution joining the competition
- **The competition is free of charge**

Technical Group

- All full-time students from local tertiary education institutions who major in engineering
- Each team can consist of 2-3 students
- Team members can come from the same or different institutions and faculties
- There is no limit on the number of teams from the same institution joining the competition
- **The competition is free of charge**

Social Innovation Inventor – Competition for Innovative Design (Year 6 – 2018/19)

Area of Study

發展局局長黃偉綸最後指 **藍地石礦場預計在2022至2023年左右完**
成開採後，會作新的發展用途。他藉此感謝員工「開山劈石」的專業精神，默默貢獻香港發展。

首頁 日報 即時 香港 國際 中國 財經 地產 體育 娛樂 海外綜合 中國綜合 電子報

香港

藍地石礦場開採逾40年 黃偉綸：「開山劈石」為港貢獻

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位於屯門藍地的石礦場，是本港唯一仍然運作的石礦場。發展局局長黃偉綸於網誌上介紹本港石礦業的運作，更邀請土力工程處礦務部的員工現身說法，了解其「開山劈石」的工程。黃偉綸表示，屯門藍地石礦場一個月可以生產約7萬噸石料，至今已開採超過40年，佔地約30公頃。土力工程處礦務部一級爆炸品主任謝偉棠表示，現今的爆破技術已經發展得相當成熟，但為確保整個爆破過程符合安全和環境標準，石礦場營運商均需向礦務部申請及取得批核，才可使用爆炸品進行爆破。在爆破工程前，他們會從政府的炸藥倉庫，運送「條裝」炸藥和「雷管」（即引爆炸藥的裝置），到爆破現場，然後放進預先鑽探好的「炮孔」，進行延時爆破，希望把爆破期間導致的震動、空氣衝擊波、噪音等影響降至最低。但不管無論範圍多大，安全是最為重要，礦務部員工會在現場適當位置設置「炮籠」（爆破防護籠）和「排柵」（垂直屏障）等保護措施，以確保不會有碎石飛彈出作業範圍以外的地區，保障石礦場工友及周邊設施的安全。高級爆炸品主任梁伯明說，現時礦務部有30多名爆炸品主任，由於不少基建項目均需要進行爆破工程，例如地鐵平整時的開山劈石，又或隧道工程的深層挖掘，員工需要於凌晨時分上班，有時更要深入地底。工作環境又熱又焗，工人還要套上一身沉重裝備，箇中滋味，實在難以言喻。黃偉綸最後指，藍地石礦場預計在2022至2023年左右完成開採後，會作新的發展用途。他藉此感謝員工「開山劈石」的專業精神，默默貢獻香港發展。



現時石礦場的一站式的營運，把混凝土廠、選青廠等設於石礦場內。政府圖片



土力工程處礦務部高級工程師孔健忠。政府圖片



黑白照片攝於1956年，反映早期的石礦業以人手開採岩石。政府圖片

Social Innovation Inventor – Competition for Innovative Design (Year 6 – 2018/19)

Area of Study – Lam Tei Quarry (NE of Tuen Mun)

Location

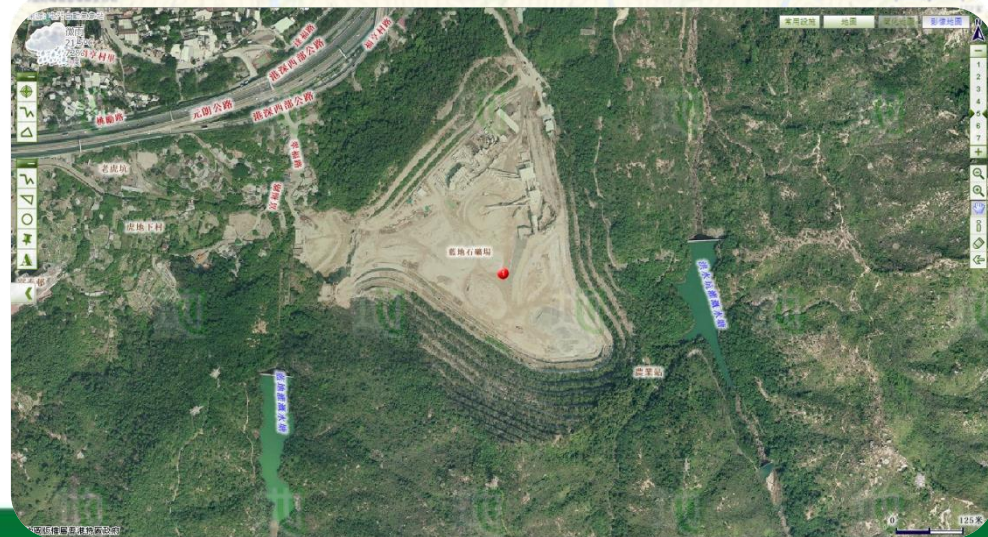
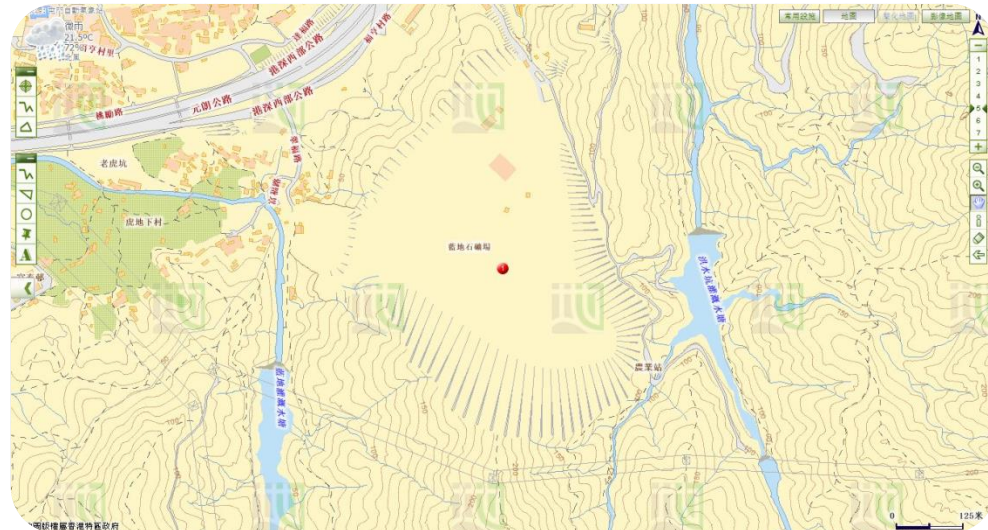
- About 3 km north of Tuen Mun New Town

Size (in total)

- Around 30 hectares (~0.3km²)

The rehabilitation works at Lam Tei Quarry are being implemented in parallel with the rock excavation.

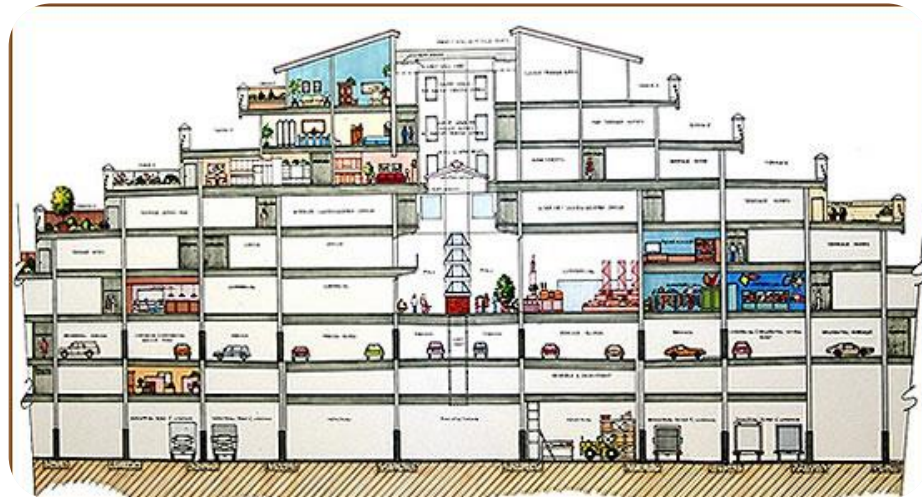
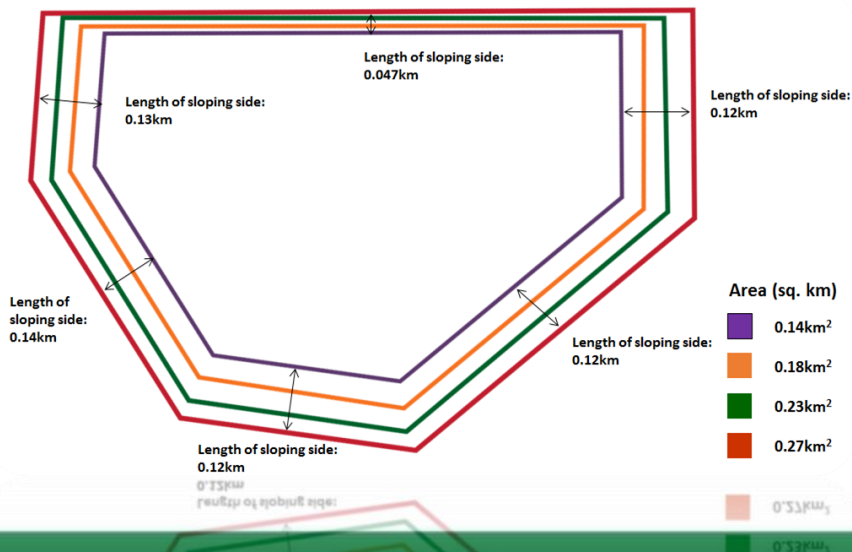
In the future, the quarries will be suitable for a variety of uses beneficial to the community.



Social Innovation Inventor – Competition for Innovative Design (Year 6 – 2018/19)

Design Requirements for Tertiary Education Group

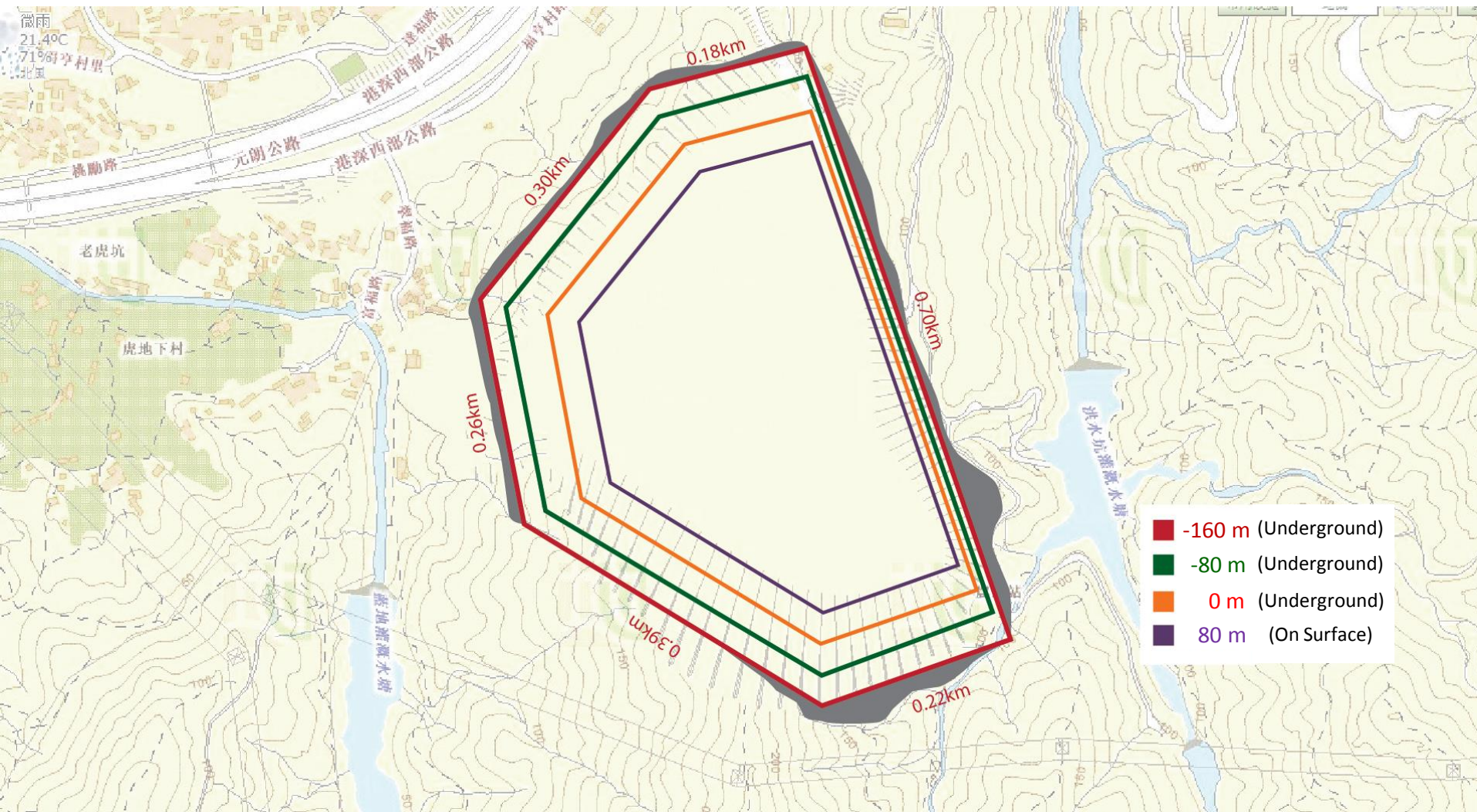
- The maximum space for the rock cavern development is about 0.054km^3 , separating the rock cavern into 3 different levels with the height of 80m each
- Construct different facilities for the smart community built inside the rock cavern, including the housing estate, waste and water treatment facilities, car park, renewable energy facilities, commercial and industrial areas, elevators
- Students should also take account of turning the limitations into the possibilities and advantages throughout the design process (e.g. the space inside the rock cavern) and the innovative idea of transferring the renewable energy from outside to inside



Social Innovation Inventor – Competition for Innovative Design (Year 6 – 2018/19)

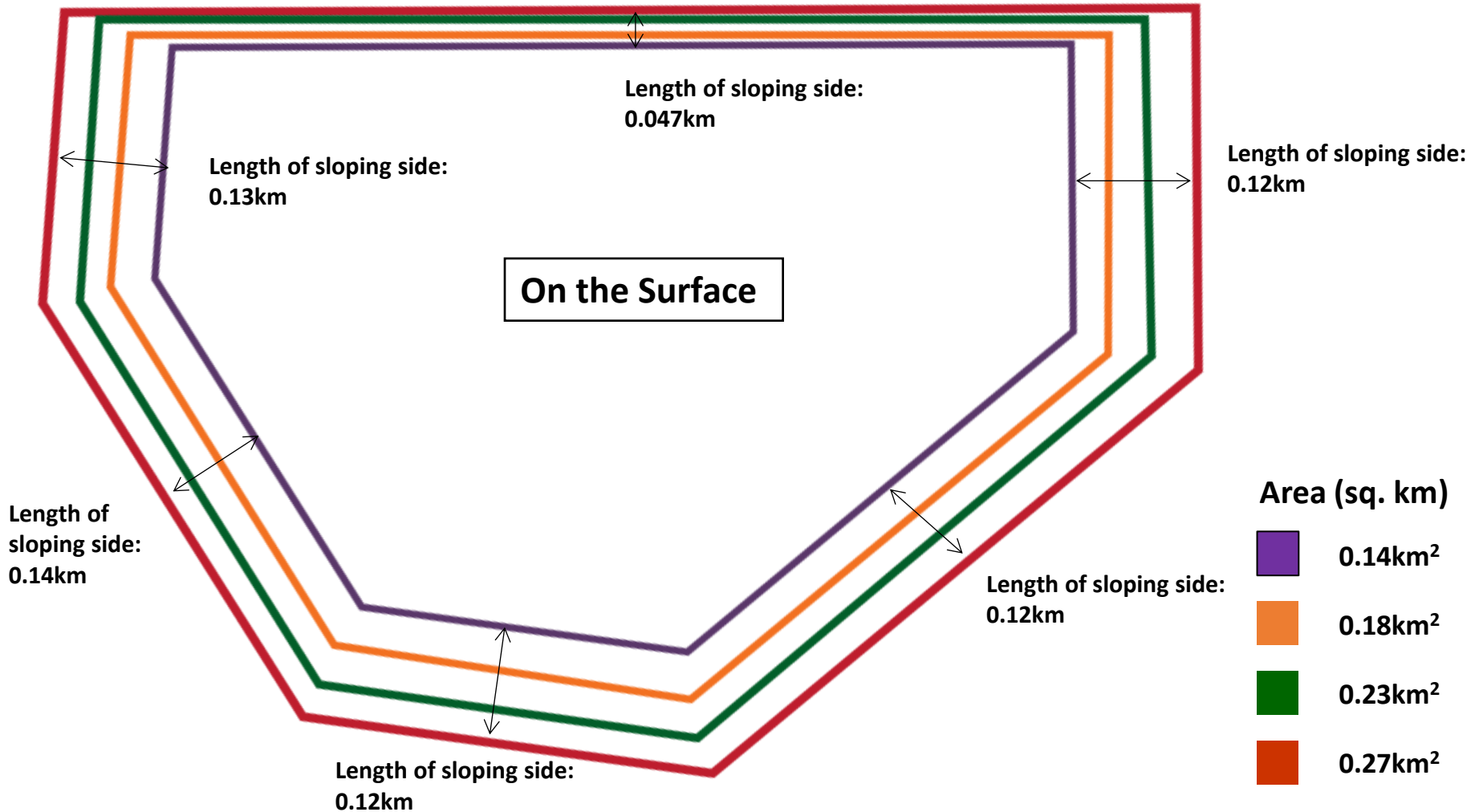
Area of Study – Lam Tei Quarry (NE of Tuen Mun)

Tertiary Education Group



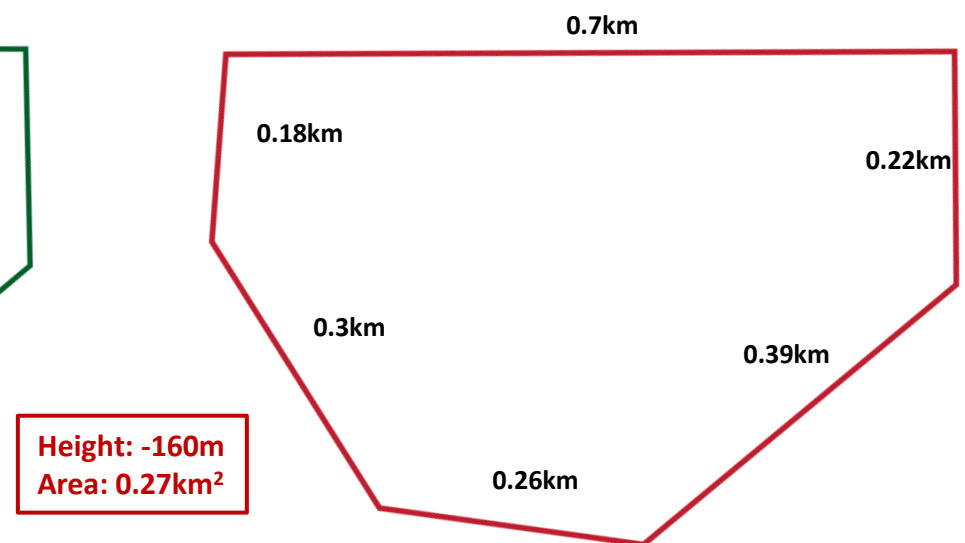
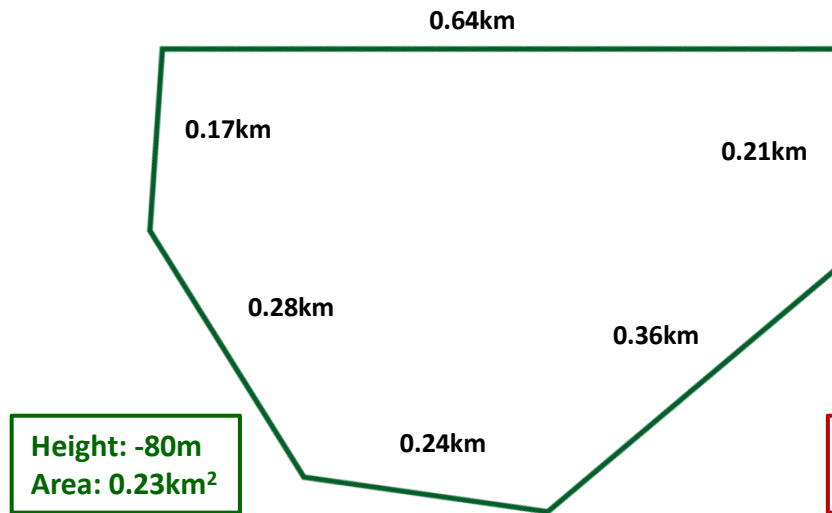
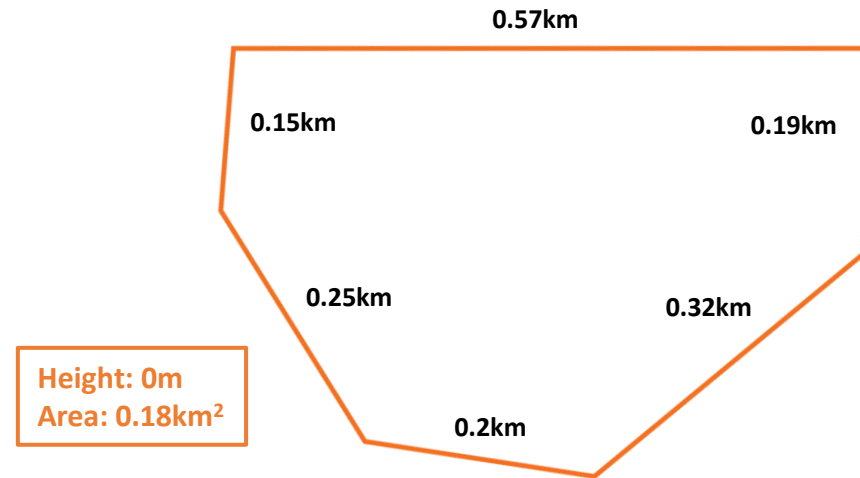
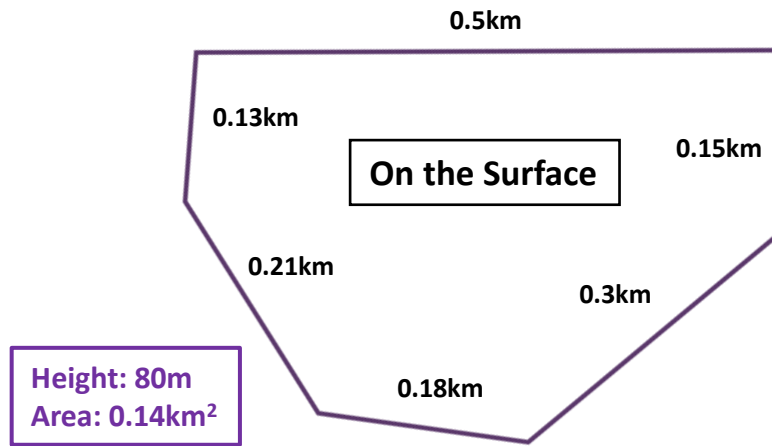
Social Innovation Inventor – Competition for Innovative Design (Year 6 – 2018/19)

Simulated frame of the rock cavern development at Lam Tei Quarry



Social Innovation Inventor – Competition for Innovative Design (Year 6 – 2018/19)

Simulated frame of the rock cavern development at Lam Tei Quarry



Social Innovation Inventor – Competition for Innovative Design (Year 6 – 2018/19)

Design Requirements for Technical Group

(Please refer to the WGO website for the updated information)

- Design and construct the street lighting with the innovative and environmental considerations
- All full-time students from local tertiary education institutions who major in engineering
- Students should create a final product according to the draft with the use of electricity to showcase the practicability of the designed street lighting and demonstrate the product to the judging panel how the street lighting can improve the well-being of the community



Social Innovation Inventor – Competition for Innovative Design (Year 6 – 2018/19)

Judging Standards *(Please refer to the WGO website for the updated information)*

- Creative Concept
- Space usage
- Venue setting
- Functionality
- Energy efficiency & Environmental effectiveness
- Cost effectiveness
- Applicable function
- Sustainability
- Feasibility



Social Innovation Inventor – Competition for Innovative Design (Year 6 – 2018/19)



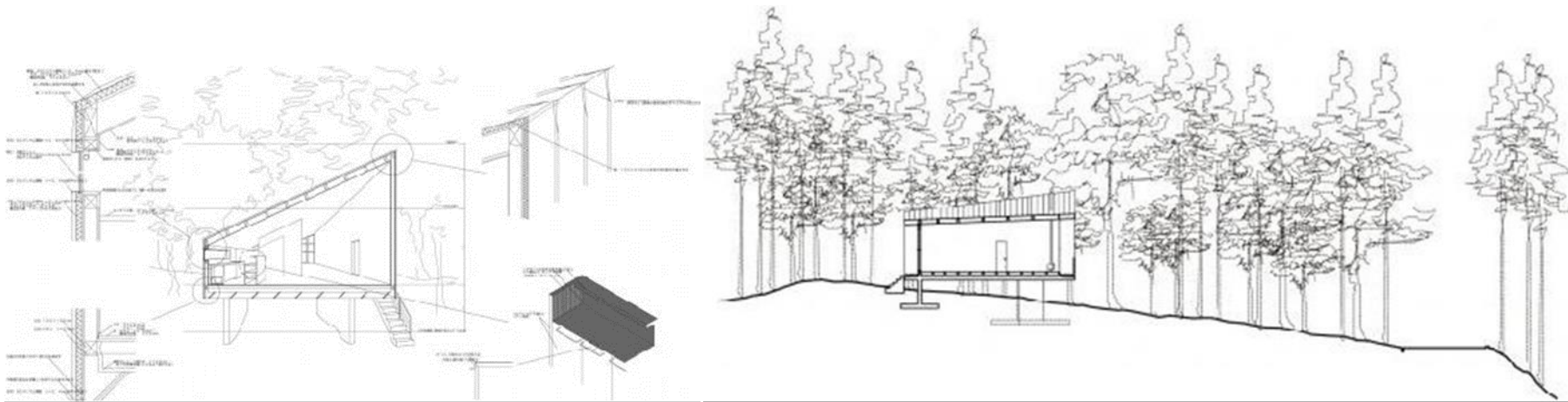
Procedure (Please refer to the WGO website for the updated information)

- 有興趣參加者，可自行組隊於世界綠色組織網頁內的「社會創新發明一躍【洞】山城設計比賽」網上報名版面填妥報名表格，連同每位隊員的學生證副本一併提交。年齡未滿18歲的參賽隊伍成員，需另行提交由監護人或學校老師簽署的「參賽者聲明」。
- Interested parties can join the competition by completing the application form available on the webpage for “Social Innovation Inventor – Competition for Innovative Design”, on the World Green Organisation (WGO) homepage. Please send your application with a copy of the student ID card for each team member. Applicants under the age of 18 are required to submit the “Declaration of Participation” form signed by a guardian or a school teacher.

Social Innovation Inventor – Competition for Innovative Design (Year 6 – 2018/19)

Procedure *(Please refer to the WGO website for the updated information)*

- 合資格參賽隊伍可根據簡介會所提供的指引，構思設計，並於 2019 年 4 月中甸 (確實時間請留意大會網頁)，提交一份以 PDF 格式存檔的「參賽作品概念圖簡介」，連同「參賽隊伍證件」，電郵至 inventor@thewgo.org。所提交的概念圖簡介需以中文或英文設計介紹（於 500 字內）。
- Teams are required to elaborate on the design in either Chinese or English (less than 500 words).



Social Innovation Inventor – Competition for Innovative Design (Year 6 – 2018/19)

Procedure *(Please refer to the WGO website for the updated information)*

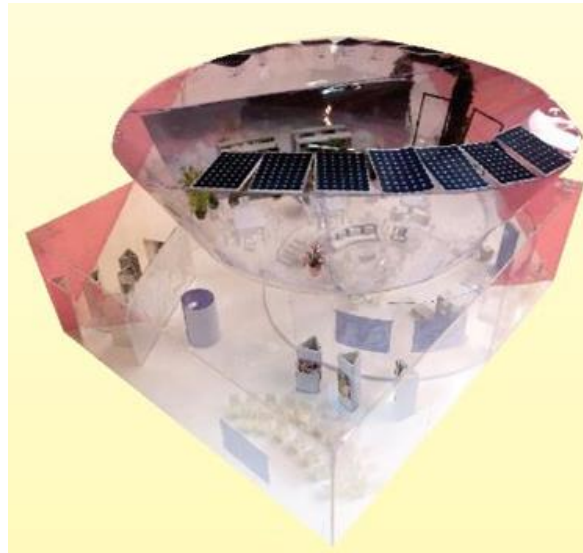
- 評審團將為三個參賽組別選出各 10 隊進入決賽。主辦單位將會安排舉行一系列工作坊，以幫助大家完善其設計及構思。
- 10 teams from each group will be selected as finalists for the final round of the competition. A variety of free workshops will be held to help the participants to further improve their designs and innovative concepts.



Social Innovation Inventor – Competition for Innovative Design (Year 6 – 2018/19)

Procedure *(Please refer to the WGO website for the updated information)*

- 入圍隊伍必需於 2019 年 6 月中旬或之前 (確實時間請留意大會網頁) 遞交最終設計方案。
- Finalists are required to submit their final design proposals on or before mid June 2019 (Please refer to the WGO website for the finalised submission date)



Social Innovation Inventor – Competition for Innovative Design (Year 6 – 2018/19)

Final Judging *(Please refer to the WGO website for the updated information)*

- Finalists (10 teams in total for each category) will be invited to the judging session to introduce their design ideas with the models
所有入圍的參加者（~30支隊伍）介紹他們的設計概念
- Each team which are invited to participate in the judging session will have 10 minutes to share the concept and idea of their design to the judging panel
所有參賽隊伍有十分鐘時間向評審分享他們設計



Social Innovation Inventor – Competition for Innovative Design (Year 6 – 2018/19)

Procedure *(Please refer to the WGO website for the updated information)*

- 評審團將於 2019 年 6 月下旬的參賽隊伍作品簡報會內，選出各組的冠軍、亞軍、季軍及優異獎。
- 得獎隊伍將被邀請出席於 2019 年 7 月舉行之頒獎典禮。
- Final judging will take place in late June 2019. The Champion, the First Runner-up, the Second Runner-up and Merit Awards of each group will be selected.
- Winning teams will be awarded with prizes in a ceremony in July 2019.



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Prize *(Please refer to the WGO website for the updated information)*

- 冠軍：綠色學習之旅
- 亞軍：獎學金
- 季軍：禮券
- 優異獎：豐富獎品

- Champion : Green Study tour
- First Runner-up : Scholarship
- Second Runner-up : Vouchers
- Merit Awards : Special prizes



Social Innovation Inventor – Competition for Innovative Design (Year 6 – 2018/19)

Timeline *(Please refer to the WGO website for the updated information)*

Date	Activity
Late January to Late-February, 2019	Registration
By early-March, 2019	Qualified teams shall receive email from organiser
Early March, 2019	Briefing session
By 12 th Apr, 2019	Submit design proposal
End of Apr, 2019	1 st round of Judging
May, 2019	Training and workshops for finalists
By 15th June, 2019	Finalists submit final design proposal
22 or 29 June, 2019	Presentation by finalists
Early July, 2019	Award Presentation Ceremony
Aug, 2019 onwards	Green Study Tour / Exhibition

Contact us

- Email : inventor@thewgo.org
- Contact Person :
Tel: 2391 1693 (Mr. Sunny Cheng / Mr. Ming Chan)
- Website : <http://www.thewgo.org/inventor>



A young girl with brown hair and bangs is shown in profile, blowing on a bunch of dandelions. The dandelions are white and fluffy, and many seeds are flying through the air. The background is a bright green field. The text "Thank You" and "www.thewgo.org" is overlaid on the right side of the image.

Thank You
www.thewgo.org