A Road Map for Urban Planning and Cavern Development in West Hong Kong Island

V. Viniarski
Urban Designer & Planner, MAS., Italy
A. Marcolini
Geotechnical Engineer, MSc Eng., Italy
M. Li
Geotechnical Engineer, MICE C.Eng., Hong Kong
J. Hui
Geotechnical Engineer, MHKIE (GEL), MICE C.Eng., Hong Kong

doi: https://doi.org/10.21467/proceedings.7.7.11

ABSTRACT

Through an engineering urban planning analysis and considering various aspects of cavern development in West Hong Kong, there is great potential for sports, recreation and rehabilitation facilities. The proof of concept has been presented in the HKIE Think Deep Programme 2024 and was well received by the panelists and participants. By catering to the needs of the public and infusing the cultural elements into the engineering design and development strategy, it is envisaged that the success of the cavern development initiative in Hong Kong is highly probable.

From a macro-perspective, the strive to create "First in Hong Kong Facilities through Cavern Development" can be used as a catalyst to stimulate the economy through the construction and commercial trading of minerals, allowing Hong Kong to retain a competitive edge as well as attract overseas talents through mega-cavern initiatives. From a micro-perspective, the construction of sports, recreation and rehabilitation facilities are means of improving public livelihood whilst catering for the sustainability, environmental and social aspects.

In this paper, the proposed development is fit into the future economic and financial strategy of Hong Kong to understand if the mentioned project is applicable and can have a positive economical outcome for the region.

1 INTRODUCTION

1.1 The Young Professionals' Think Deep Programme 2024

The HKIE Geotechnical Division Young Professionals' Think Deep Programme 2024 on Urban Planning and Cavern Development in Hong Kong in October 2024 focused on the future potential of cavern development in Hong Kong as well as tackling various issues faced within Hong Kong. The workshop was intended as an international event to explore opportunities and ideas for developing underground spaces. Gathering participants from all over the world, the event tackles the potential of rock caverns expansion, focusing on Hong Kong's suitability for underground space uses. This paper highlights the collaborative effort from HKIE (Geotechnical Division of the Hong Kong Institution of Engineers), ISOCARP (International Society of City and Regional Planners), ITACUS (International Tunnelling and Underground Space Association's Committee on Underground Space) and participants in urban planning, geotechnical engineering, and architectural considerations of cavern potential in Hong Kong and its alignment with the vision of "The Chief Executive's 2024 Policy Address."

Proceedings DOI: 10.21467/proceedings.7.7; Series: AIJR Proceedings; ISSN: 2582-3922; ISBN: 978-81-989164-3-3

1.2 Hong Kong case

A key issue in the long-term development of Hong Kong is creating new land; considering all viable options, rock caverns can be a cost-effective solution to relocate “surface” facilities or develop new services for the local population. It is proven that the combination of the hilly terrain and the geological characteristics of rocks in Hong Kong makes the territory a very suitable environment to develop underground structures.
Given the above, the YPTDP workshop focus was on specific Strategic Cavern Areas (defined in the HK Cavern Master Plan) of West Hong Kong island; in particular, the selected areas are Mount Davis and Pok Fu Lam as per the below map (Figure 1).

Figure 1: Boundaries of Cavern Master Plan in West Hong Kong (2017, Civil Engineering and Development Department, Planning Department, Cavern Master Plan Explanatory Statement).

1.3 Background

In 2023, the Outline Zoning Plan (OZP) for Kennedy Town and Mount Davis was updated. Local authorities' target was to delineate further developments within and outside the region to meet social demand. Multiple consultation processes were carried out throughout the Town Planning Boards (TPB), and residents were given the chance to submit suggestions about future developments.

The workshop "Thinking Deep and Enlivening Island West with Rock Cavern Development" was organized thanks to the efforts of professional bodies, academic institutions, and international learned societies. The main goals were to promote cavern development, enhance residents' quality of life, promote sustainable development, and rethink the use of land for regional growth.

1.4 Urban Planning Elements Considerations

Proceedings DOI: 10.21467/proceedings.7.7
ISBN: 978-81-989164-3-3

Series: AIJR Proceedings
ISSN: 2582-3922

Throughout the workshop, the main focus was on delivering an innovative scenario/use of rock caverns on West Hong Kong Island. The following are the key features considered to develop the project:

1. Regional features and urban setting/foreseen developments.
2. Possible SCVAs' location, as well as actual and proposed land use in the surroundings.
3. Assumptions regarding planning principles and purposes of the proposed cavern development.
4. Strengths and constraints of the development.
5. Integrability between the Cavern development and existing/future developments in West Hong Kong Island.
6. Planning at the local and regional level.
7. Sustainability issues in terms of city planning and cultural development.

1.5 Engineering Elements Considerations

From an engineering point of view, the following are the key elements considered for Cavern design and development:

1. Cavern alignment and geometrical feature/cross-section.
2. Preparatory investigation plan for rock cavern design.
3. Construction sequence and rock support strategy.
4. Operational, security, environmental and MEP requirements.
5. Key sustainability and environmental principles
6. Strive for innovation and the application of new technology.
7. Public engagement and communication.

2 LUNG FU ROCKS

2.1 Regional Integrability

The purpose of the first part of the analysis was to comprehend the context, with an emphasis on Hong Kong's vision and objectives for regional integration. From the perspective of Hong Kong Island West, the plan is to enhance development within the Western Islands of Hong Kong and improve connectivity to the harbour front. This aligns with the Harbourfront Commission's initiative for the future development of the Waterfront Promenade and creating a vibrant city with added elements of culture and the arts to represent Hong Kong.

As we expand beyond Hong Kong Island, regional integrability involves synergetic development and connections between the New Territories, Kowloon, and outlying Islands. With the enhanced network between the outlying Islands and Lantau, the strengthened network between Mainland China (Shenzhen) and Hong Kong Island will become possible, thus increasing the social and commercial activities in both regions.

2.2 Planning Principles

Taking into consideration the above mentioned SCVAs, this paper aims to develop a possible scenario for a strategic rock cavern design that attempts to "listen" to the community to be aligned with residents' values and needs.

In 2011, the District Council conducted a survey using a form with inhabitants related to the development planning of promenades in the Central and Western Districts of Hong Kong. The results also included the public esteem related to the Kennedy Town and Mount Davis Planning Study, produced in 2022, which served as a foundation for an analysis. Furthermore, the University of Hong Kong contributed to a related project in the same context, providing a comprehensive approach to the area. The analysis identified the challenges faced by inhabitants of that area and Hong Kong's population. Based on this, the four key problems are listed below:

1. Elderly population and Rising Demand for Health Facilities
2. Craving for Sports Facilities and Green Areas
3. Shortage of Open Spaces and Recreational Areas
4. Lack of Public and Private Parking Lots.

The survey described above points out the key needs of the locals which drove the main strategies for the rock cavern design. The main pillars of the design strategy were inhabitants' assessments, data analysis of residents' needs, consideration of site constraints, existing buildings, and major upcoming projects. The rock caverns' scheme also considers key locations in the area, such as the University of Hong Kong, the new campus and student accommodation, and Queen Mary Hospital.

To fulfil the community's requirements, the proposed layout for the cavern development foresees the creation of a sports facility and a rehabilitation centre. This project aims to reduce the overcapacity of Hong Kong's amenities by providing high-quality health facilities and, considering the dense urban context, improving the surrounding area by adding public spaces, pedestrian zones and leisure centers.

Therefore, four main pillars have been developed: "Short-term" and "Long-term" development scenarios, "Listening" to the community, a Network of "Open Spaces" and "Sports Facilities" and displacing "Parking Lot" to "The Underground" (Figure 2).

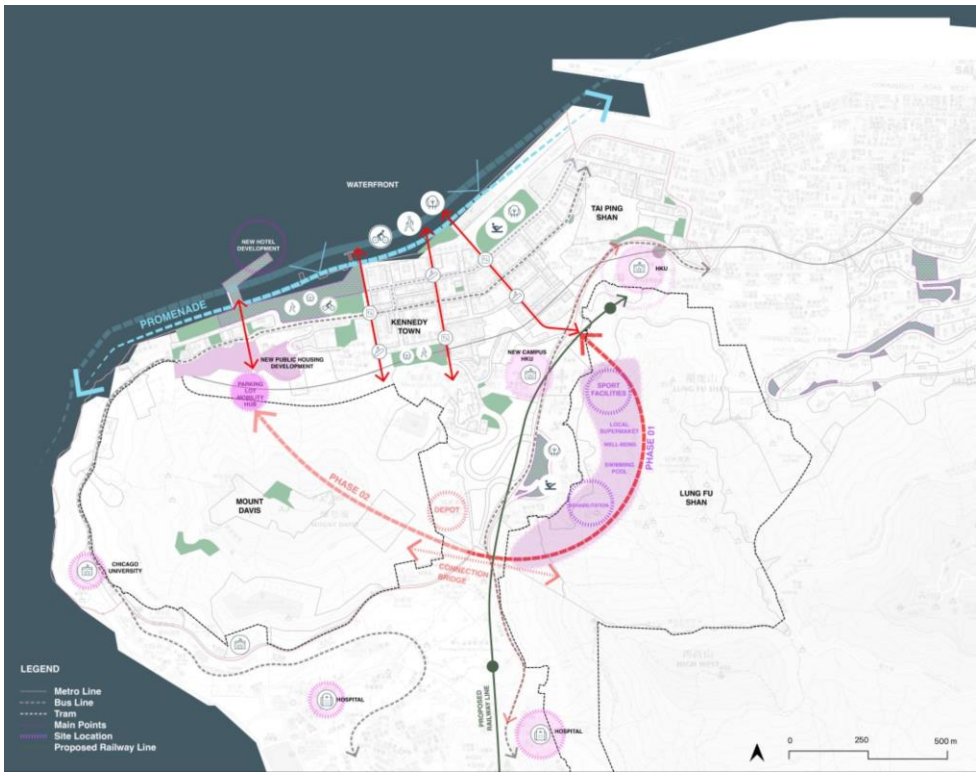

Figure 2: Lung Fu Rocks Vision.

2.3 Cavern Placement

West Hong Kong is heavily populated, so displacing parking lots underground would liberate spaces for recreation areas, walkways, and green areas. Moreover, the connectivity with the railway that intersects Mount Davis and Lung Fu Shan West, Hong Kong, emphasizes the area's relevance. Considering two different time frames, short-term (phase 01) and long-term (phase 02) development stages, the area offers adaptability for enhancements while granting consistent growth.

Lastly, the inclusion of a network of open spaces and sports facilities promotes a comprehensive approach to well-being, which is the bottom line for enhancing quality of life.

Considering the main needs identified for the local population, as per Phase 1, it is foreseen to develop the following: a fully automated car park at Mt.Davis side (SCVAs N.41) to support the new housing plan and move existing car parks underground, and an interconnected series of caverns (at Lung Fu Shan side, SCVAs N.40) that will serve as sports facilities and rehabilitation centers.

The Mt. Davis car park portal/entrance will be located close to the new housing development foreseen in the area, making it easily accessible for locals and the community. Lung Fu Rocks caverns will be served by two

Proceedings DOI: 10.21467/proceedings.7.7
ISBN: 978-81-989164-3-3

Series: AIJR Proceedings
ISSN: 2582-3922

different portals: the North portal will be placed near the new HKU campus, while the South portal will be closer to the Queen Mary Hospital to ease the use of the rehabilitation center.
Being the North Portal location close to/at the place of a gas station, as per common practice and regulations an underground utilities identification process will be put in place. These will be assessed via in-situ testing such as "PNAP APP 137 Ground-borne Vibration and Ground Settlement arising from Pile Foundation and Excavation and Lateral Support Works". On top of that, further liaison will be conducted with the gas station provider, Sinopac and Petrol China for a possible diversion of underground utilities if deemed required based on the assessment as stated above.
The existing Pokfield Road Bus Terminus at the proposed North Portal location will also be upgraded and further enhanced to provide connectivity with the public in the Southern part of Hong Kong.
The overall Plan is here under attached for reference (Figure 3).

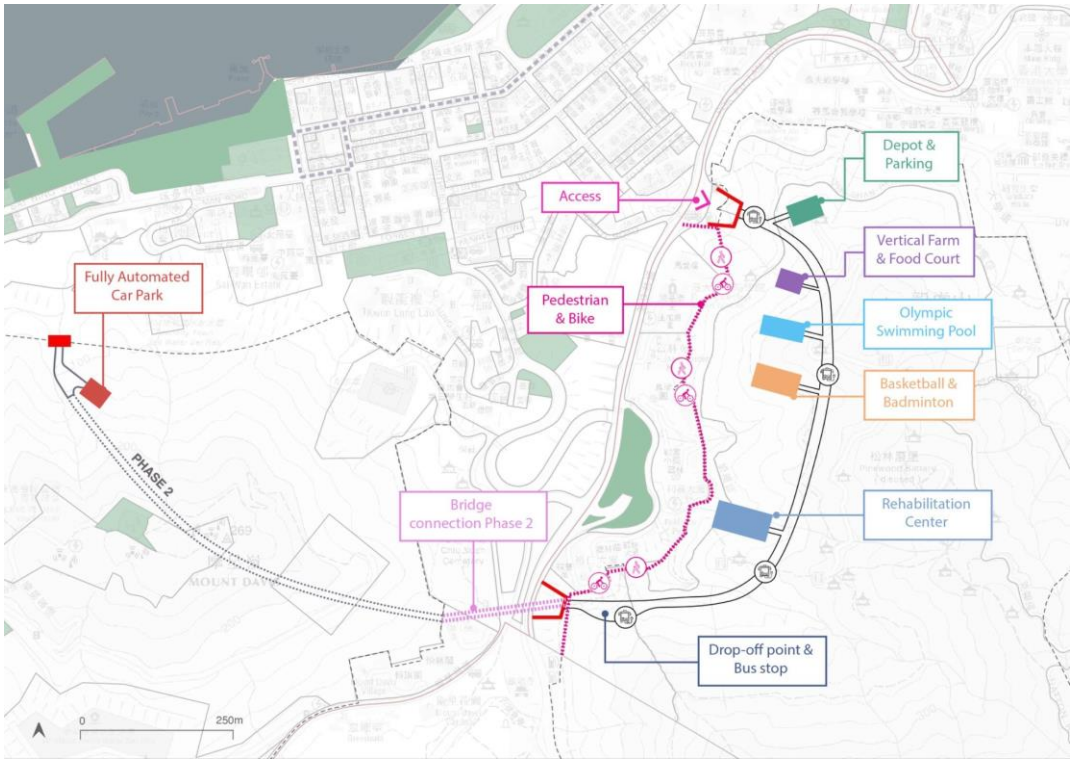

Figure 3: Caverns' plan.

The Lung Fu Rocks cavern complex will also be accessible via a cycle and pedestrian lane excavated all along the hill (reference is to the light purple dotted line in Figure 3). The vision is to have the cycle path run into a gallery, allowing natural light to come into the track through the openings and reducing the need for artificial light.

2.3.1 Mt. Davis - SCVAs 41

A multi-storey parking area will maximize the number of available spots, given the limited space inside the cavern. A fully automated system, with a stacked parking layout, will also allow the population to leave the car at the portal location without entering the underground; a mechanical system will transport the car to and from the car park, completely removing pollution/emissions inside the tunnel and the cavern. Assumes each parking is 3m wide and 5m long, with the height provisioned to stack at least 5 cars, with possibility to further enhance. With a fully automated parking system, the designed cavern will be able to accommodate a maximum of about two hundred car parking spaces, including non-commerical vehicles such as cars and motorcycles, and will be accessed by a tunnel connecting the portal area with the underground area.
Here under are attached the main geometrical properties of the cavern:

- Span: 30 m

- Height: 30 m
- Length: 37.5 m.

2.3.2 Lung Fu Shan - SCVAs 40

This area will accommodate multiple interconnected caverns, each one serving a specific purpose. An internal transportation system via electric self-driven buses will be provided to carry people between the various facilities. In this regard, a 1000 m main tunnel connecting caverns will be excavated at Lung Fu Shan side, while a 200 m main tunnel will be excavated at the Mount Davis portion (being ready for future developments in the long term). A single-lane two-way road will be accommodated in the tunnel. In order to fulfil local regulations for road tunnels and related safety aspects (reference is "Guidance Notes on Design of Road Tunnel Structures and Tunnel Buildings to be Maintained" by the Highway Department, HKSAR), the cross-section of the mentioned tunnel will have a 16 m span and 20 m height. To adhere to local fire safety requirements, during the design phase every possible aspect of the regulations will be taken into consideration. The workflow will be to deliver dedicated plans and analysis for operation, maintenance and fire safety aspects such as CFD Analysis for Smoke Extraction system, Means of Access (MOA) and Escape (MOE), Evacuation Analysis and Fixed Fire Protection systems design. As an example, to ensure safety and timely evacuation in case of fire accident, the staircases inside each cavern will be designed to be connected to pressurized protected corridors, leading to exits of access tunnels, with travel distances to exits limited to ≤36m. Other options such as cross passages would be considered as well if deemed applicable.

Geometrical and functional details regarding each foreseen cavern are listed below.

- Parking spot & Bus depot (Span 30m, Height 20m, Length 40m): The facility will work as a mobility hub for the population enjoying the Lung Fu Rocks complex. It will be located close to the North portal to ease the accessibility of the parking spaces and reduce car traffic inside the main tunnel. Parking (approx. two hundred spots) will be semi-automated, often referred to as puzzle parking, meaning that each car gets parked entirely independently of every other car, allowing access for each car without moving all the other cars around it. The cavern will also accommodate a dedicated bus stop and a depot for the internal mobility transportation system.
- Vertical farm & Coffee shop/event space (Span 20m, Height 20m, Length 30m): The cavern will accommodate a vertical farming system to produce food in spaces that would otherwise be unfit for farming. It will also contain a coffee shop/event space, which will serve as a food court for customers.
- Multipurpose sports hall (Span 32m, Height 20m, Length 60m): The cavern will accommodate N.2 Basketball and N.4 Badminton courts. As two of the most popular sports in Hong Kong, the need for additional courts is one of the most important demands for the community (Figure 4).

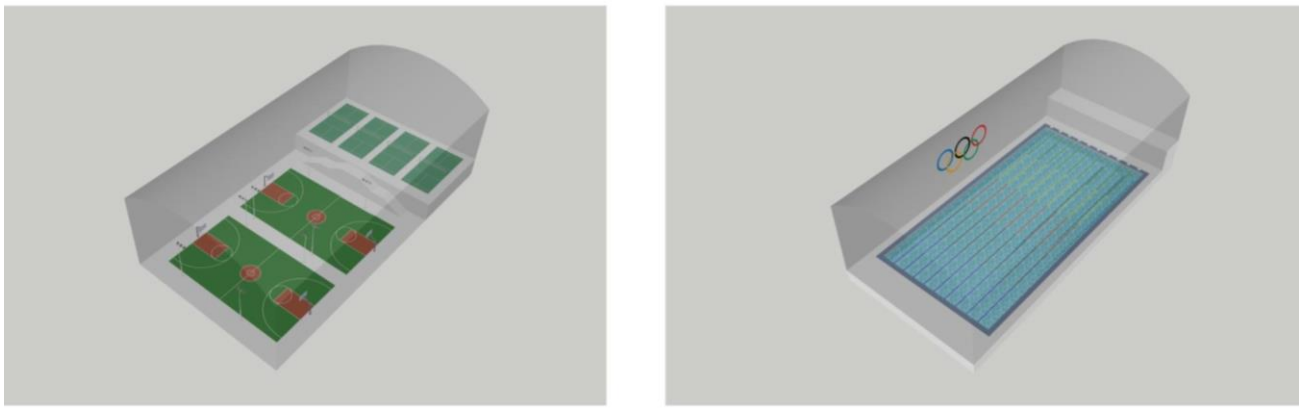

Figure 4: Left: Multipurpose sports hall 3D model (Rex, 2024; Rolie, 2021). Right: Olympic swimming pool 3D model (SDC93, 2014; Olympic rings without rim).

Proceedings DOI: 10.21467/proceedings.7.7
ISBN: 978-81-989164-3-3

Series: AIJR Proceedings
ISSN: 2582-3922

- Olympic grade swimming pool (Span 30m, Height 20m, Length 65m): The Chief Executive's 2024 Policy Address mentioned that the government will continue to foster sports development. One of the proposed measures is the construction of a swimming pool designed to host international competitions. Consequently, the provision of this Olympic swimming pool in the cavern will not only serve as the first Olympic swimming pool in the urban area. However, it will also align with the objectives outlined in the Policy Address (Figure 4).
- Rehabilitation centre (Span 36m, Height 20m, Length 80m): A multi-story building of about 4700 sqm will be erected inside the cavern, providing services such as specialist treatments, radiology, and rehabilitation. The cavern's location is near the South portal, which will bring it closer to Queen Mary Hospital.

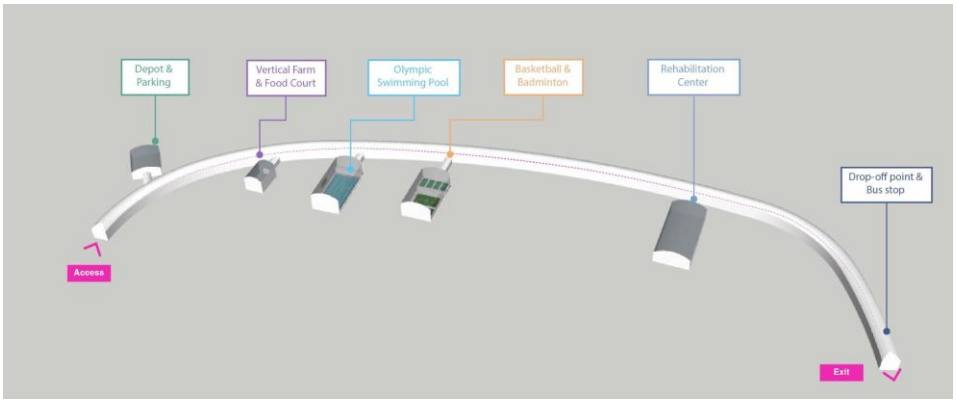

Figure 5: Lung Fu Rocks, Caverns 3D model overview.

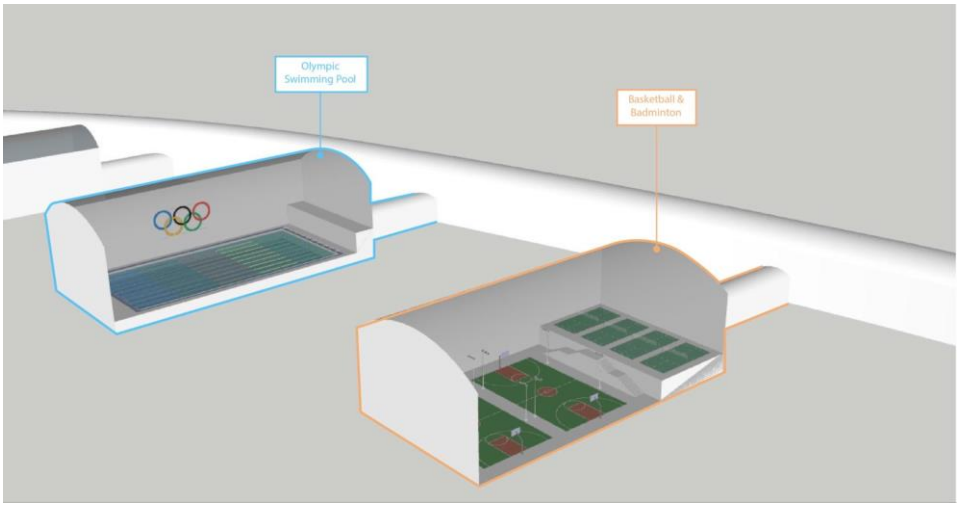

Figure 6: Olympic Pool and Badminton/ Basketball Court (Rex, 2024; Rolie, 2021; SDC93, 2014; Olympic rings without rim).

Every sport-related facility will be furnished with a dedicated area for changing rooms, lavatories and MEP room. It is envisaged that the rooms are to be placed under the 4 badminton courts or in specific areas close to the entrance of each cavern, as shown in the Figure 6 above. Details of each cavern related facilities will be further reviewed and considered in the next detailed design phase.

2.4 Long-Term Vision

Regarding Phase 2, meaning the long-term vision for West Hong Kong development, Lung Fu Shan side and Mt. Davis will be connected through a surface/underground ring road. The main tunnel will be extended to reach the parking spot portal in the Mt. Davis area, and the connection between the two sides of the valley will be

achieved thanks to a bridge (reference Figure 3). Having a surface connection between the two underground areas will function as a marking point for the Lung Fu Rocks complex; the bridge will aim to provide the population with accessibility to the underground facilities. Linking the two strategic cavern areas will allow for future developments of the underground system, allowing local authorities to promote new uses and purposes for rock caverns.

2.5 Architectural elements

The proposed cavern design will have its specific architectural vision; the idea is to seamlessly integrate the structure within the mountain, embracing the essence of landscape architecture. The goal is to create a harmonious blend that appears as a natural extension of the terrain. This draft illustration captures the concept: the mountain's fissures function as both entrances and sources of natural light, seamlessly merging with the rocky facade (Figure 7).

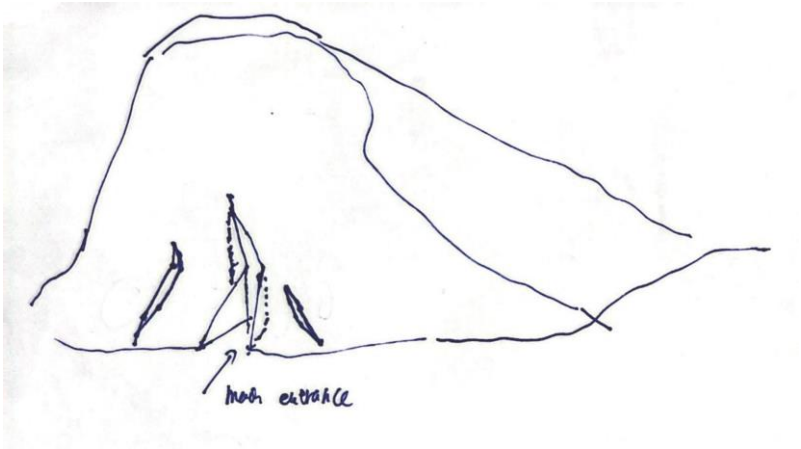

Figure 7: Draft illustration captures the architectural concept.

The concept and the name for "Lung Fu Rocks" were based on the powerful symbols of the Chinese cultural aspects. "Lung" represents the dragon, a figure of majesty and strength, whilst "Fu" signifies the tiger, symbolising bravery and endurance.

For example, the cycle and pedestrian pathways were designed to resemble the sinuous silhouette of a dragon, adapting to the untouched landscape/hills with a fluid shape. The fissures representing the tiger's stripes bring prosperity and fortune. Even though the design honors the mythical symbiosis of the dragon and tiger, it also attempts to invoke abundance and well-being in all users. With a meticulous composition and symbolic depth, "Lung Fu Rocks" is a result and a process of a fruitful collaboration enclosed by nature and human beings.

2.6 Natural Lighting Optimization in Caverns

As explained in the previous section, the core idea in terms of architecture is to optimize the natural lighting entering the complex through the entrance cracks of the cavern design; the use of refracting mirror panels lined along the interior is explored as a possible solution to boost the light coming into the underground.

It is becoming common to enhance the natural lighting in the underground through the concept of a light shaft. The proposed solution protects the natural aesthetic of the mountainous rock facade while reducing the need for lights during the daytime, which also helps to save electricity and reduces the environmental impact of the underground structure.

An existing and reference example is the Reichstag Building in Berlin; the parliament building has an integrated reflecting and refracting mirror system, which serves the conference halls, to focus sunlight and direct it into the underground basement levels. With reference to the mentioned example, a light refraction system is found to be applicable in the proposed cavern design to be integrated into the environment.

Proceedings DOI: 10.21467/proceedings.7.7
ISBN: 978-81-989164-3-3

Series: AIJR Proceedings
ISSN: 2582-3922

2.7 Public engagement

Public engagement is a key aspect of consolidating the concept of Lung Fu Rocks and presenting the underground development to the public. Thus, a well-planned, informative, and interactive public engagement plan will be devised. Through a comprehensive review of past studies from Mount Davis and Kennedy Down Development, public needs and critical aspects will be evaluated and incorporated into the planned design.

Through an interactive public engagement plan, which consists of sports activities at selected venues around Hong Kong Island and community workshops, the goal is to gather public views and propose further development of the design to meet the public's expectations. The vision is to integrate the cultural and geographical aspects of Lung Fu Shan, where "Dragon" and "Tiger" serve as the theme for the cavern development. This theme may be applied to represent Chinese cultural blessings [龍爭虎鬥], meaning competitive spirit, and [龍精虎猛], meaning vitality and growth, which fully aligns with the elements that comprise the foreseen cavern design and development. By infusing these aspects into the project, the public will be much more receptive and appreciative of the development as it creates a recognizable identity in the region.

Concurrently, a series of Value Management Workshops with international Expert reviews and Stakeholder Forums will further enhance the design. Doing so reinforces the Harbourfront Development Initiative and Railway Development Strategy 2014 future SIL(W) project's constructive collaboration with this new scheme. This will bring additional value to the further development of Hong Kong Island, enhance its connectivity to the Harbourfront, and benefit the public.

3 ECONOMIC PROSPECTS

In the previous sections, the vision for cavern development and urban planning in Hong Kong has been elaborated along with various engineering, cultural & heritage, and sustainability aspects considered, which aligns with the various policies under the Chief Executive's 2024 Policy Address. Studies from the Policy Address 2024 and Budget Report 2025-2026 have iterated that Hong Kong remains a service-driven economy. Despite the economic instability due to political interferences and financial deficits, it is foreseen that the construction industry, inclusive of geotechnical and infrastructure, will remain a prominent presence and contribute to Hong Kong's economy.

Although Engineering, Design and Urban Development would not be the solution to resolve the economic constraints faced in Hong Kong, it is common to believe that the construction industry may serve as a catalyst for re-igniting the Hong Kong economy through mega-event constructions. Thus, this Section 3 focuses on the economic viability and financial prospects of the envisaged cavern design / urban development and its potential contribution to add value to the planned projects of Hong Kong.

Based on the policy address, the percentage of the proposed budget was presented, as shown in Figure 8 below. It includes various sectors such as Education, Infrastructure, Social Welfare and various other sectors. Lung Fu Rocks fits well within the share of expenditure. The proposed cavern design falls within the Community & External Affairs, Economic, Education, Health, Infrastructure and Social Welfare. The total coverage accounts for over 65% of the estimated expenditure.

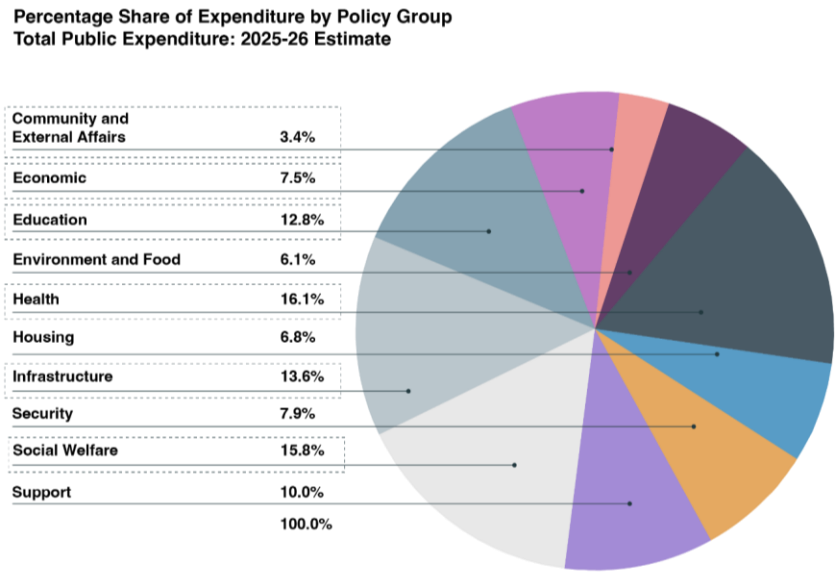

Figure 8: Percentage Share of Expenditure by Policy Group (The 2025-26 Budget. Speech by the Financial Secretary, the Hon Paul MP Chan, moving the Second Reading of the Appropriation Bill 2025).

With the additional Olympic-grade sports facilities and other features, Lung Fu Rocks is believed to help increase local and overseas tourists and thus generate additional economic benefits. Other than that, by moving various infrastructures above ground, the freed-out surface area can be adopted for other usages and generate additional income.

3.1 Value for Sports / Recreation Facilities and Integration with Future Transports

In accordance with the Policy Address 2024, the promotion of Sports Development and building Hong Kong into a Centre for Mega International Sports Events remains one of the long-term goals. It is noted that the current Kai Tak Sports Park can serve as a location for hosting such mega sports events. However, certain restrictions, such as noise restrictions and ease of travel to the Sports Arena, remain a hurdle for fully utilizing the sports facilities.

Whereas by selecting the underground locations of multi-sports facilities, there is greater flexibility in operation time and restrictions on noise, given that the facilities are situated underground. In addition, under the Hong Kong 2025-2026 Budget Report by the Financial Secretary, there are plans to initiate the detailed planning and design of the South Island Line (West) Project. In the proposed strategy for rock caverns, the sports and recreational facilities within the Cavern will add value to the SIL(W) line and serve as a tourist attraction, increasing future MTR patronage.

Furthermore, Kai Tak Sports Park primarily serves as a stadium for non-water-related sports events. It is envisaged that by including into the cavern design an Olympic Grade swimming pool which is a first in Hong Kong, to promote water sports competitions, given the recent success in the 2024 Olympics for Hong Kong and Mainland China. This may bring forth a different sports market in Hong Kong and attract more talent and competition events outside of land-based sports.

In addition, the location of West Hong Kong for housing the various sports facilities in caverns has the potential to stimulate the nightlife economy, which the government is eager to rejuvenate post-COVID. The ideal district to accommodate these desires would be the SOHO and Lan Kwai Fong District, which is near the envisaged Cavern recreation/sport facilities. Thus, this advantageous location has the potential to stimulate the local commercial activities and nightlife economy, giving an edge over Kai Tak Sports Park.

Another advantage of West Hong Kong Cavern Development is the opportunity for expansion. Currently, the above accommodations comprise Phase 1 at Lung Fu Shan. The adjacent Mount Davis is envisaged for future Cavern Development for Phase 2. The possibilities for Phase 2 are vast, with proposals for an underground tunnel network connecting with Mainland China via rail or vehicular access, thus improving the

Proceedings DOI: 10.21467/proceedings.7.7
ISBN: 978-81-989164-3-3

Series: AIJR Proceedings
ISSN: 2582-3922

connectivity between the Islands and Mainland China. This has great prospects for linking up the Commercial Business Districts (CBD) of Hong Kong with Mainland China.

3.2 Value for technology

As defined in the Speech by the Financial Secretary-Budget 2025-26, one of the main core areas to further develop Innovation and Technology in Hong Kong is Artificial Intelligence. The goal is to develop Hong Kong into an international exchange and cooperation hub for the AI industry. In the long-term vision, the use of caverns to install research laboratories and/or development institutes may bring together international talents and investors. Moreover, the specific environmental conditions of rock caverns may facilitate the installation of data centers underground; it is becoming common practice to develop this kind of tech-related area underground to reduce the environmental impact of data centers.

3.3 Value for tourism

An additional key aspect mentioned in the Policy Address 2024 is to enhance and revitalize Hong Kong's tourism through an innovative use of the unique resources of the area. A rock cavern development program such as Lung Fu Rocks may serve as a marking point to promote sports, culture and events in a unique location. It can be a tourist hotspot in an area which is typically not that popular among visitors coming from abroad; coupled with Mt. Davis' historical point of interest, Lung Fu Rocks may become a landmark with a strong appeal in West Hong Kong.

Given the future transportation development in the area, a cavern design such as the one presented in this paper will easily boost the local economy and serve as a reference point for eco-tourism, being presented to the public with its own specific and exclusive characteristics.

4 CONCLUSIONS

In conclusion, based on the various aspects discussed in Sections 2 and 3, it is envisaged that cavern construction and urban development in Hong Kong can still provide added value and contribute to Hong Kong from a social, cultural and economic perspective. Thus, cavern design and urban development provide opportunities to link up with the Mainland, as well as address the 4-key issues that form the basis of the proposed design which coincides with the Policy Address 2024 and the long-term development of Hong Kong

As fellow engineers bearing the "Ir. Title", and those planning to achieve professional status, the Ir – stands for "*Ingeniour*" and is derived from the Latin term "*ingenium*" (meaning knowledge) and Latin term *"ingeniare*" (meaning to create). These attributes define an engineer the ability to envision the possibilities. Thus, this brings the mentioned vision full circle as this exercise began with the Think Deep Programme 2024 focusing on the possibilities inherent in Hong Kong. Through the strive for knowledge and innovations for establishing the foundations for cavern design, this vision may foster to become a reality.

ACKNOWLEDGEMENTS

Gratitude goes to ISOCARP, ITACUS and the HKIE (Geotechnical Division of the Hong Kong Institution of Engineers) for organizing and hosting the workshop. Having local entities involved in the organization and the progress of the symposium inspired all participants to develop a solid project to be integrated into Hong Kong's complex urban development.

REFERENCES

Barrett SVL, McCreath DR. 1995. Shotcrete support design in blocky ground: towards a deterministic approach. *Tunneling and Underground Space Technology, incorporating Trenchless Technology Research*. 10(1): 79-89.

Geotechnical Control Office (GCO). 1986. Hong Kong & Kowloon. *Hong Kong Geological Survey Map Sheet 11, Solid and Superficial Geology, 1:20000 Series HGM20 (Edition I)*. Geotechnical Control Office, Hong Kong.

Geotechnical Engineering Office (GEO). 2012. Hong Kong & Kowloon. *Hong Kong Geological Survey Map Sheet 11, Solid and Superficial Geology, 1:20000 Series HGM20 (Edition II)*. Geotechnical Engineering Office, Hong Kong.

Heiniö, M. 1999. *Rock excavation handbook for civil engineering*. Sandvik Group.

Hoek, E. 2023. *Practical rock engineering – 2023 web edition*.

Kong, K. W. K. 2018. Practical shotcrete rock reinforcement for hard rock openings. *HKIE Transactions*. 25(3): 153–164.

The Hong Kong Special Administrative Region of the People's Republic of China. 2024. The Chief Executive's 2024 Policy Address. *Reform for Enhancing Development and Building Our Future Together.*

Financial Secretary, Hong Kong. 2025. *The 2025-2026 Budget speech*.

Town Planning Board (TPB). 7 October 2016. *Study on Long-term Strategy for Cavern Development: Cavern Master Plan (CMP)*. Paper No. 10185

Ho, Y. K., Tsang, W. H., & Chan, C. C. 2019. *Rock cavern development in Hong Kong: past, present and future*. In Proceedings of the Institution of Civil Engineers-Civil Engineering: Vol. 173, No. 5, pp. 25-31.

Hong Kong District Planning Office. 2023. *S/H1/24 Kennedy Town & Mount Davis (HPA 1) Outline Zoning Plan.*

Hong Kong District Planning Office. 2024. *S/H10/22 Pok Fu Lam (HPA 10) Outline Zoning Plan.*

University of Hong Kong (HKU). URBP7008 Strategic & Community Planning Studio. *Final report-Reimagining a Future-ready Strategic Connector for People to Flourish and Enjoy.*

Proceedings DOI: 10.21467/proceedings.7.7
ISBN: 978-81-989164-3-3

Series: AIJR Proceedings
ISSN: 2582-3922