

Workshop-cum-Guided field-trip to Shing Mun River Catchment



Workshop: 25 June 2021
Field trip: 26 June 2021



Mr Anthony Yeung & Ms Alice Cho
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**(A) Enquiry field study for
senior secondary
students**

**(B) Enquiry field studies
for junior secondary
students: (1) & (2)**

(A)

Enquiry field study for senior secondary students

Shing Mun River



Ms. Alice Cho
Hong Kong Geographical Association



Enquiry Question

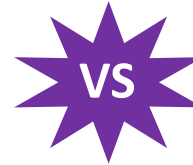
Dissolved oxygen is regarded as an important indicator of water quality. Evaluate the validity of the following statement:

“Dissolved oxygen level in a channelised watercourse is generally lower than that in a natural stream.”



1 Objectives of river management strategies

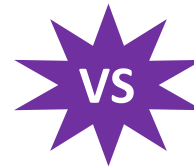
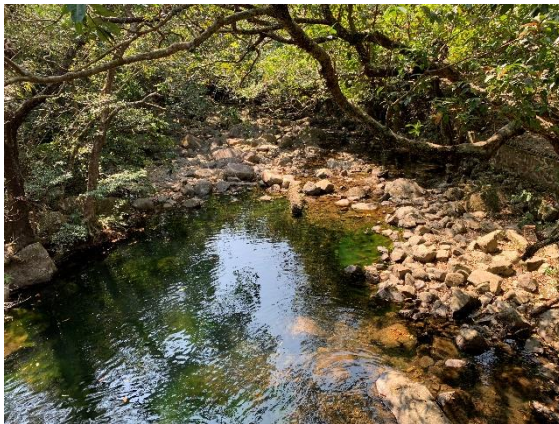
Tai Wai Nullah: Flood control
(since 1970)



Ecological enhancement
(revitalization plan 2024-29)

2 River characteristics

Stream flows into Upper Shing Mun River (natural stream)



Tai Wai Nullah
(channelised watercourse)



3 Water quality related to hard engineering strategies

Dissolved oxygen level

Field Study Sites



http://bit.ly/Shing_Mun





Tai Shing Stream
大城石澗



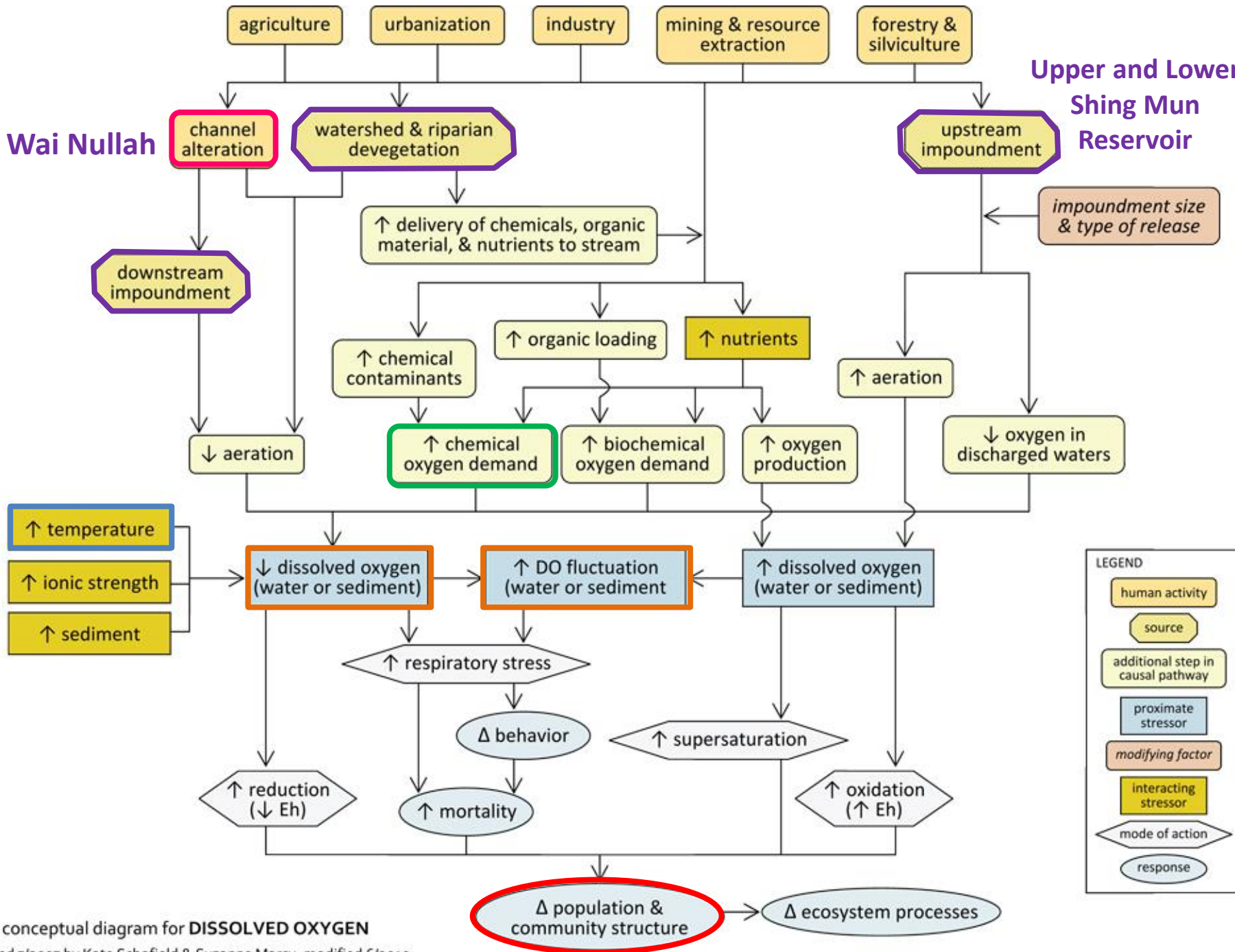


Stream across Pineapple Dam Nature Trail
橫過菠蘿壩自然教育徑之溪流



Tai Wai Nullah

Upper and Lower
Shing Mun
Reservoir

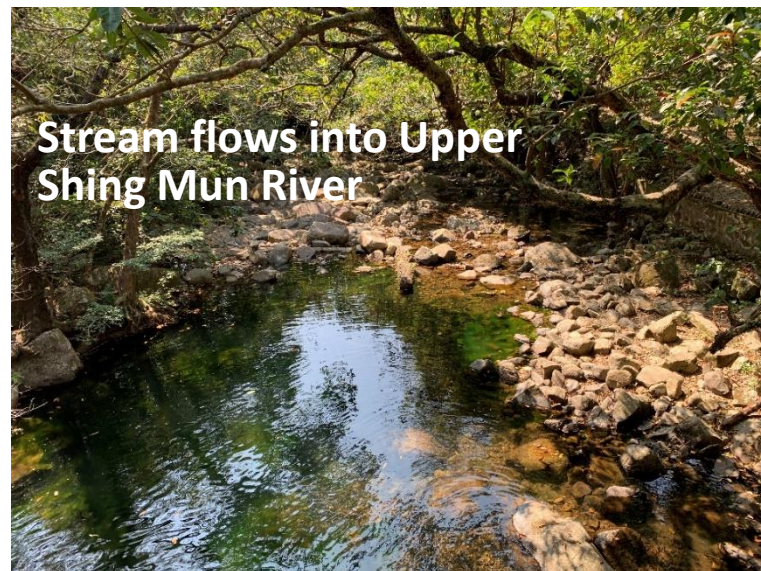


➤ By Observation

Channel Appearance and the Surrounding Environment

pp. 27, 30

- Channel width
- Shape of river bank
- River bed material
- Water depth
- Type of stream flow
- Channel gradient
- Surrounding environment



➤ By Measurement

Water Quality

p. 27, 31-37

- Air temperature (°C)
- Water temperature (°C)
- Dissolved oxygen level (mg/L)
- Chemical oxygen demand (mg/L)
- Conductivity (ppm)
- Salinity (ppt or ‰)



Instruments

Electronic instrument measurement



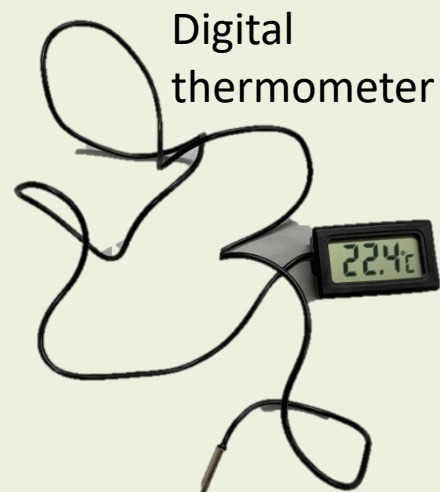
Dissolved oxygen meter



Salinity meter



Conductivity meter



Digital thermometer



Colorimetric



Chemical oxygen demand (COD) rapid test kit



Water monitoring kit



Chemical Oxygen Demand (COD) test






☐ Choose appropriate instruments (pros & cons):

- electronic measuring instruments  rapid test kits (colorimetric)

☐ Precautions when operating the instruments

☐ Choose the right timing of data collection:

- sunny day  cloudy day
- high tide  low tide
- morning  noon
- synchronize data collection at different sites

Feb 2021

'Revitalization of Tai Wai Nullah' project announced in July 2019

Perspectives of the revitalization project from Drainage Service Department

Re-surfacing and greening of
nullah bed and embankment

Modification of
low flow channel

Provision of ecological
enhancement features

Viewing decks

References

- United States Environmental Protection Agency (EPA). *Simple conceptual diagram for dissolved oxygen* [Diagram]. Retrieved from https://www.epa.gov/sites/production/files/2015-11/do-cd_sim_1000_0.jpg
- Drainage Services Department (Aug 2015). *Guidelines on Environmental and Ecological Considerations for River Channel Design* (Drainage Services Department Practice Note No. 1/2015, Version No. 1). Retrieved from https://www.dsd.gov.hk/EN/Files/Technical_Manual/dsd_TechCirculars_n_Practice_Notes/DSDPN_201501.pdf
- Drainage Services Department (Jul 2019). *Project Profile for Revitalisation of Tai Wai Nullah*. Retrieved from <https://www.epd.gov.hk/eia/register/profile/latest/esb320/esb320.pdf>
- Topick.hket.com (2019, Oct 9). 大圍明渠活化 市區首條「親水」渠. Retrieved from <https://topick.hket.com/article/2467727/%E5%A4%A7%E5%9C%8D%E6%98%8E%E6%B8%A0%E6%B4%BB%E5%8C%96%E3%80%80%E5%B8%82%E5%8D%80%E9%A6%96%E6%A2%9D%E3%80%8C%E8%A6%AA%E6%B0%B4%E3%80%8D%E6%B8%A0>

(B)

Enquiry field studies for junior
secondary students

(1) & (2)

Shing Mun River



Mr. Anthony Yeung
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“Why was Shing Mun River valley chosen for the construction of a reservoir?”



Shing Mun Reservoir

- The **Shing Mun Reservoir** was built as part of the Shing Mun Water Supply Scheme to meet the increasing demand for freshwater due from Kowloon.
- Construction began in 1933 and finished in 1937. The reservoir was once popularly known as the **Jubilee Reservoir** to celebrate the Silver Jubilee (1935) of King George V.
- The **dam** is 85 metres in height and had a capacity of 13.6 billion litres.



**Lower Shing Mun
Reservoir**

Built: 1965

Gorge Dam

Introduce students the concept of **GORGE**:

A **gorge** is a narrow valley with steep, rocky walls located between hills or mountains.

城門水塘內的歷史建築物及構築物

Historic Buildings and Structures at Shing Mun Reservoir



(1) 城門水塘紀念碑 (法定古蹟)
Memorial Stone of Shing Mun Reservoir

城門水塘紀念碑於二〇〇九年九月十八日列為古蹟，受《古物及古蹟條例》保護。

城門水塘於一九二三年開始動工，歷時十四年方告完成。城門水塘建造工程規模龐大，當時水塘除了為九龍半島供水，滿足九龍居民的食水需要外，也透過跨海水管把食水輸往人口密集的香港島。當時沙嘴港為所面對的食水需求壓力，城門水塘是戰前最大儲水量的水塘，同時為九龍和港島供水。

城門水塘紀念碑和大潭篤水塘紀念碑，是本港僅有兩項為紀念水塘的興建而豎立的紀念碑，以紀念二次大戰前分別位於新界及港島的兩大水塘的落成。

(1) Memorial Stone of Shing Mun Reservoir (Declared Monument)
The memorial stone of Shing Mun Reservoir was declared a monument on 18 September 2009 and is protected under the Antiquities and Monuments Ordinance.

Commenced in 1923, the construction of Shing Mun Reservoir took fourteen years to complete. The massive scale of the project meant that water could be supplied to cater the needs of the residents of Kowloon Peninsula, but also to relieve pressure on demand on densely populated Hong Kong Island via the cross-harbour mains, and this made it the largest reservoir of the pre-war period to provide water for both sides of the harbor.

The memorial stone at Shing Mun Reservoir and Tai Tam Tuk Reservoir are the only two memorial stones that were erected to mark the completion of the two largest reservoirs in the New Territories and on Hong Kong Island respectively built before the Second World War.



你在此
You are here



(2) 主壩
Gorge Dam

現時城門水塘內的主壩、水掣塔及鐘形溢流口已升為一級歷史建築。鐵橋亦已升為二級歷史建築。

(2) 主壩
位於水塘南端的主壩，在建造時已採用各種先進技術，主壩由鋼筋混凝土建造的截水牆、推力牆、消浪斜坡和位置下游的堆石組底，在主壩頂部設有行人通道，兩旁的護欄由磚石砌成。

(3) 鐵橋
鐵橋

現時主壩東北端的鐵橋，建築起主壩頂部的行人通道和水塘內的水掣塔，鐵橋為拱橋，相鄰以交叉支撐連接，橋面鋪設方格狀鐵板。

(4) 水掣塔
八角形的水掣塔由石塊砌築而成，平頂上設裝飾性的欄杆，大圓窗分佈於小的玻璃方格，建築物的外觀令人聯想起歐洲的堡壘。

(5) 鐘形溢流口
鐘形溢流口為圓形的磚石構築物，以石塊建造而成，它獨特的設計更取代了其他水塘的溢流口的設計，此溢流口由Geoffrey Binnie於一九三五年設計，曾一度獲得英國土木工程師學會頒發的 Telford Premium Award。

The Gorge Dam, Valve Tower and Bellmouth Overflow at Shing Mun Reservoir are accorded with Grade 1 status. The Steel Bridge is accorded with Grade 2 status.

(2) Gorge Dam
The main dam of the reservoir is called the Gorge Dam situated at the southern end of the reservoir. It incorporates several technological advances which were not used in previous dams. The dam consists of reinforced concrete diaphragm wall, a concrete thrust block, and abutment and wedge and rock fill on the downstream side. A walkway runs along the crest of the dam with solid masonry parapet walls on each side.

(3) Steel Bridge
On the upstream face of the dam near the northeast end a Steel Bridge spans across the water to the Valve Tower. The bridge is a bowstring girder bridge with sides formed of segmental top booms and horizontal bottom booms connected by cross-braced lattices. The decking is made up of chequer plate steel sheets.

(4) Valve Tower
The Valve Tower is an Octagonal masonry tower with an ornamental parapet to the flat roof and steel framed windows divided into small glazing squares. The architectural style is reminiscent of castle towers in Europe.

(5) Bellmouth Overflow
Bellmouth Overflow is a circular masonry structure in the reservoir surmounted by a masonry footbridge connecting it to the shore. This unusual feature takes the place of the overspill weirs seen at other reservoirs. The overflow bellmouth was designed in 1935 by Geoffrey Binnie and received the Telford Premium Award from the Institution of Civil Engineers in the UK.



(4) 水掣塔
Valve Tower



(5) 鐘形溢流口
Bellmouth Overflow

水務署
Water Supplies

“Why was Shing Mun River valley chosen for the construction of a reservoir?”

“Locational advantages in topography”

Find out the characteristics of the Shing Mun River valley.

- *Broad or narrow valley?*
- *Steep or gentle valley sides?*
- *Straight or meandering valley?*

“Distance to consumers”

How far is Shing Mun away from urban Kowloon?

- *Map measurement: distance from shing Mun to Kowloon*

Relevance to the S1-3 Geography Curriculum

- **The Trouble of Water – Too much & too little**

- What can be done to solve the water problem?
 - ... The Three Gorges Dam Project ...



- **Damming the river valley** – Damming Shing Mun R Valley

- Simple **landform** study:
 - Valley
 - Spur
- **Map reading skills**
 - Contours

Similarities & differences between the damming of

- Changjiang &
- Shing Mun River

Field Study Site

Tai Shing Stream
大城石澗

大廈、設施、地址等



Stream across Pineapple Dam Nature Trail
橫過菠蘿壩自然教育徑之溪流

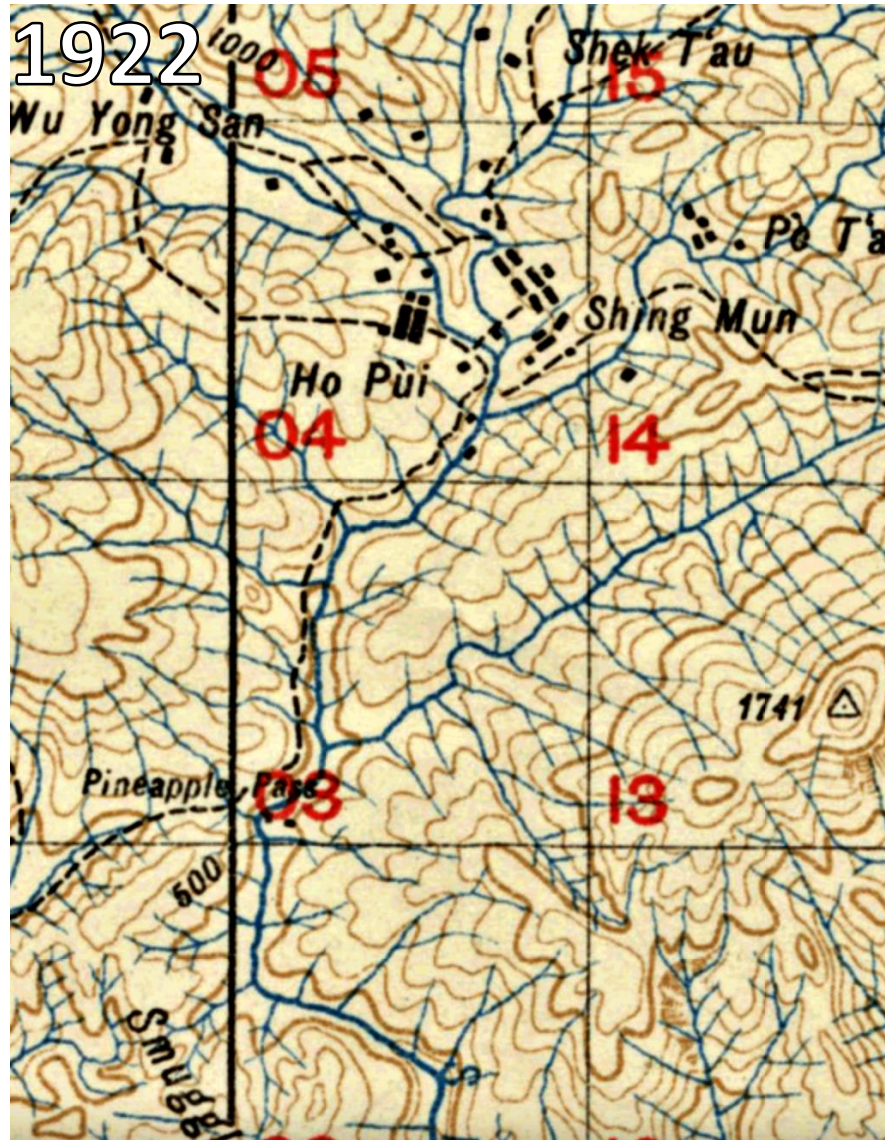


Main Dam
下城門水塘主壩

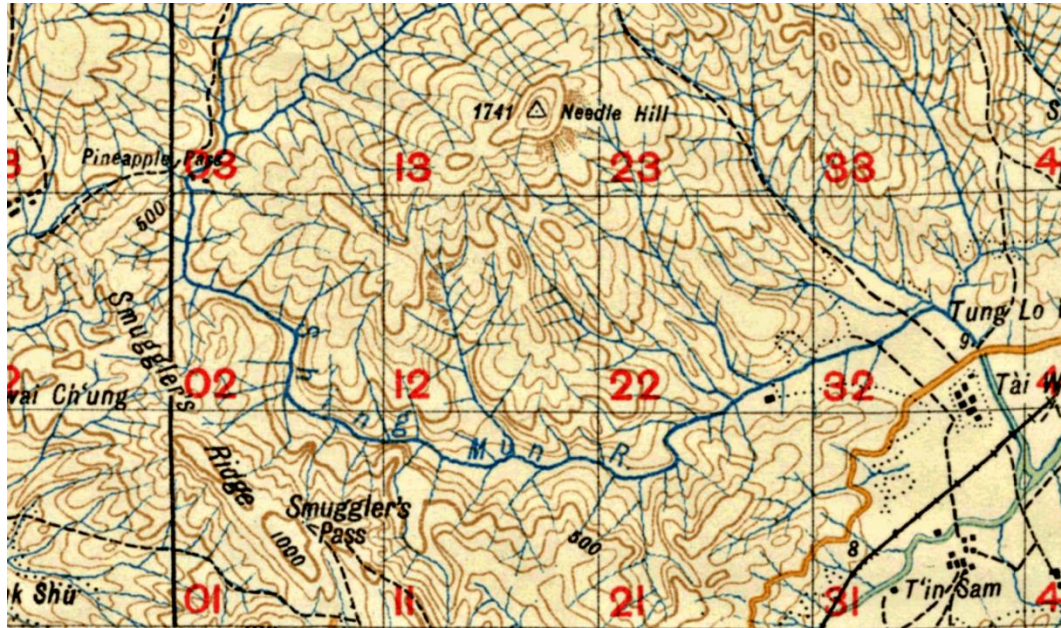
Tai Wai Station
大圍站

Che Kung Temple
車公廟

Upper Shing Mun Reservoir

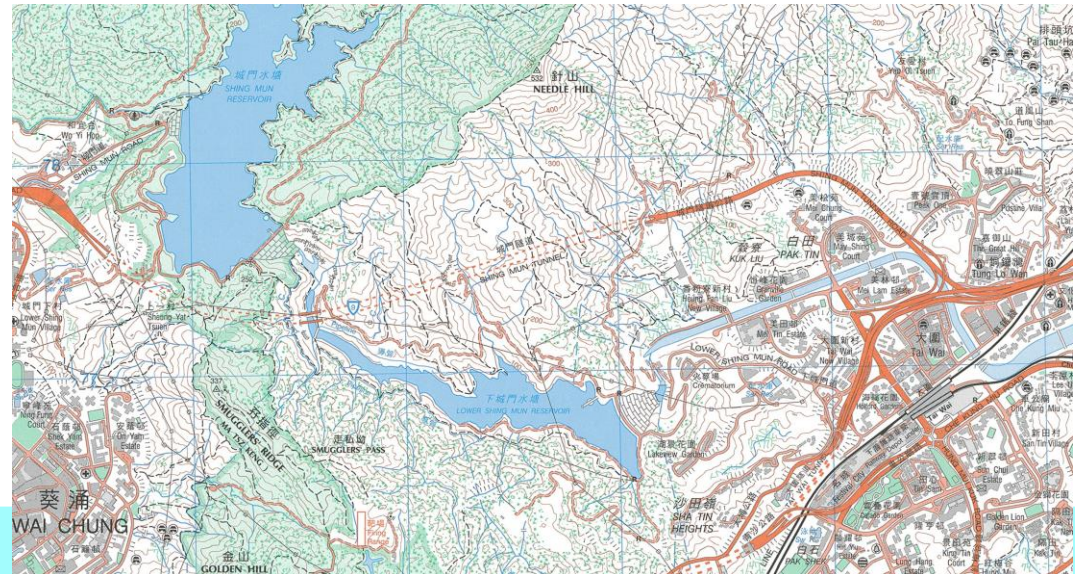


Lower Shing Mun Reservoir



1922

now



Fieldwork Skills



Map & compass work
Map orientation

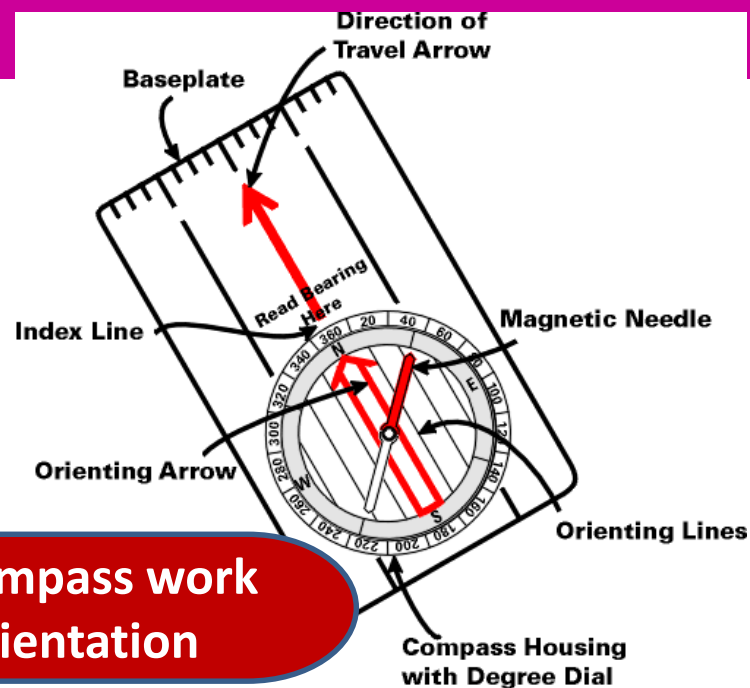
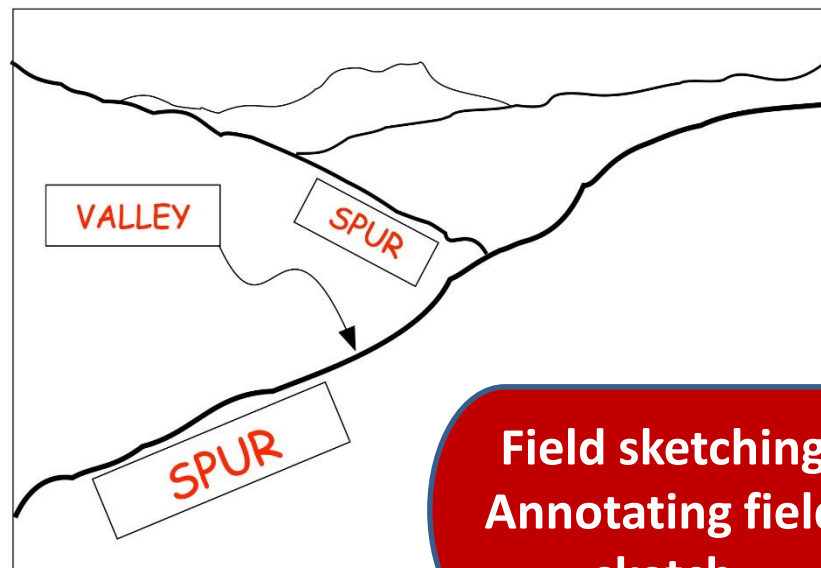


Photo-taking



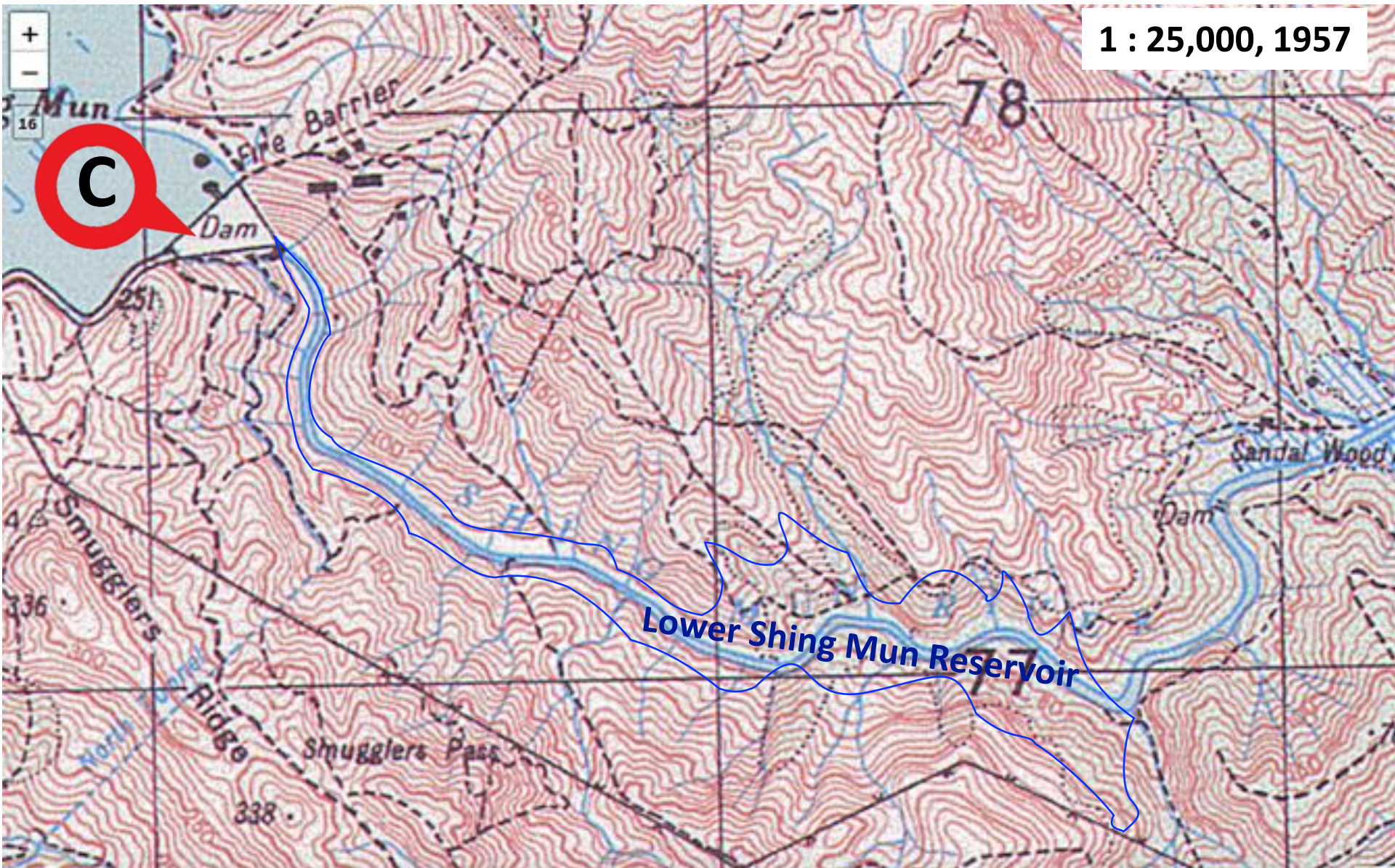
Field sketching
Annotating field sketch

Secondary data (with reference to Lower Shing Mun Reservoir)

- Old Hong Kong topographic maps (contour maps)
 - Before the construction of Shing Mun Reservoir / Lower Shing Mun Res.
 - www.hkmaps.hk (Year 1922, 1952, 1957, 1962)

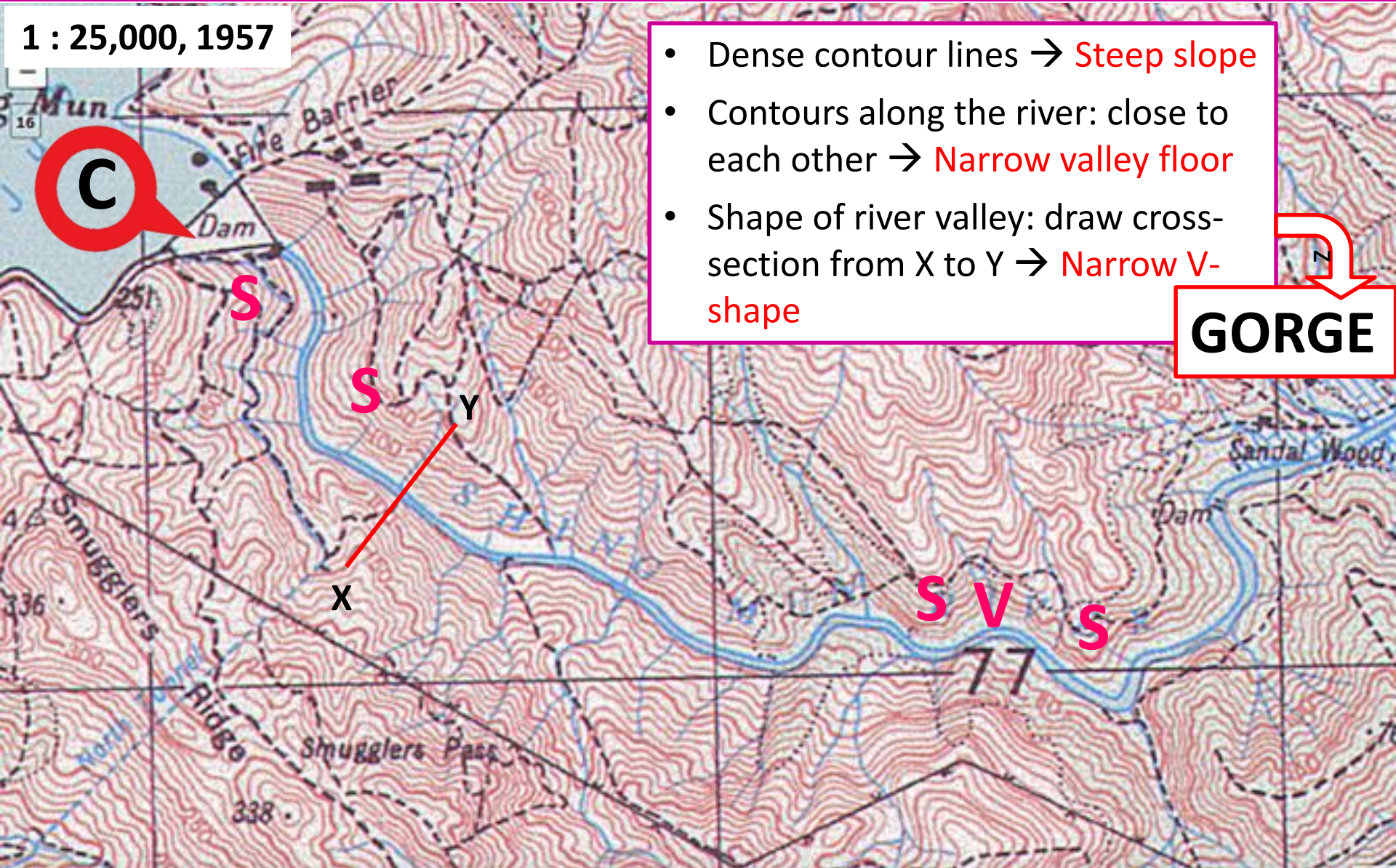


Secondary data – before the construction of lower Shing Mun Reservoir



Secondary data – before the construction of lower Shing Mun Reservoir

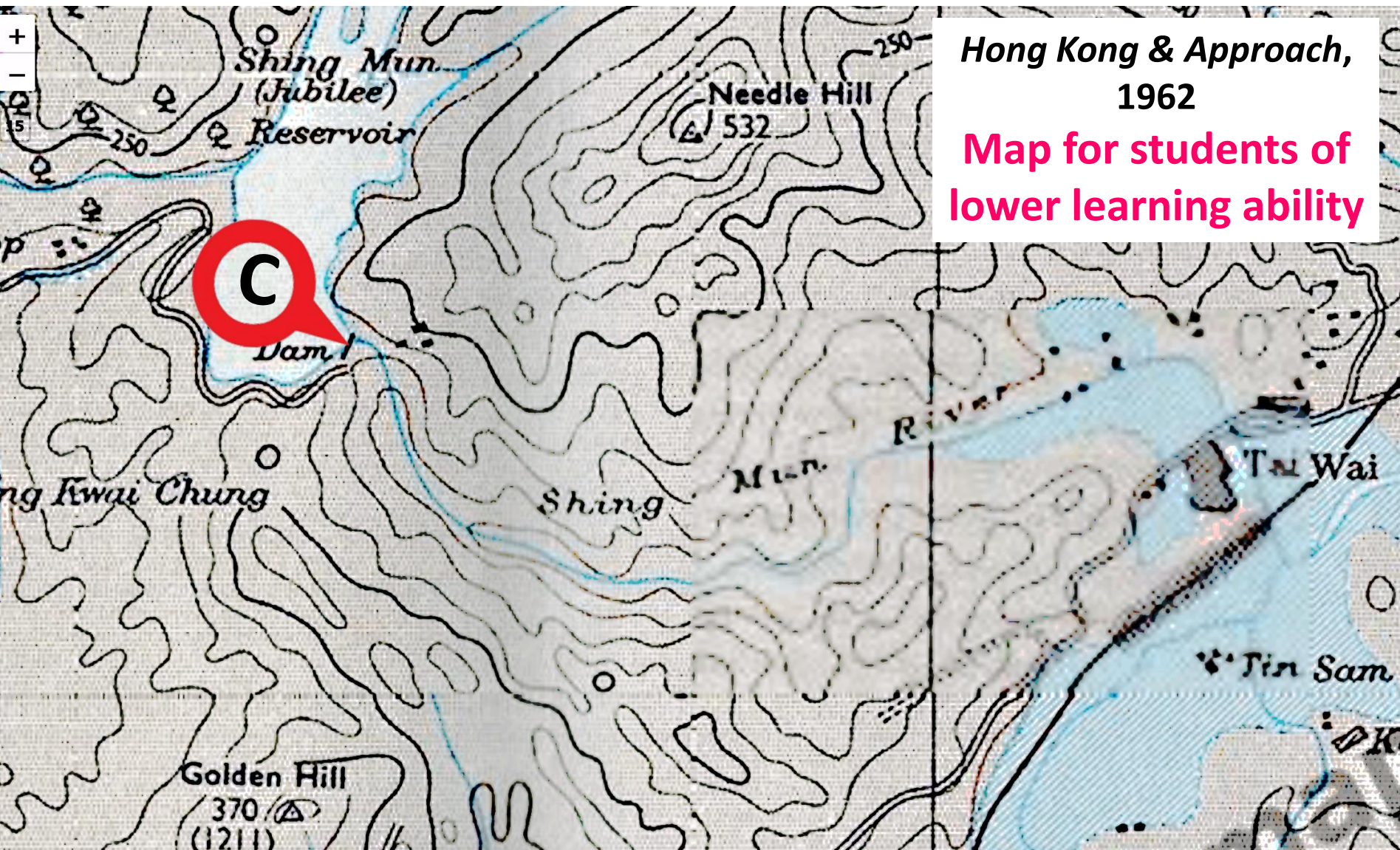
1 : 25,000, 1957



- Dense contour lines → **Steep slope**
- Contours along the river: close to each other → **Narrow valley floor**
- Shape of river valley: draw cross-section from X to Y → **Narrow V-shape**

GORGE

Secondary data – before the construction of lower Shing Mun Reservoir



How does Shing Mun River channel benefit the Hong Kong society?

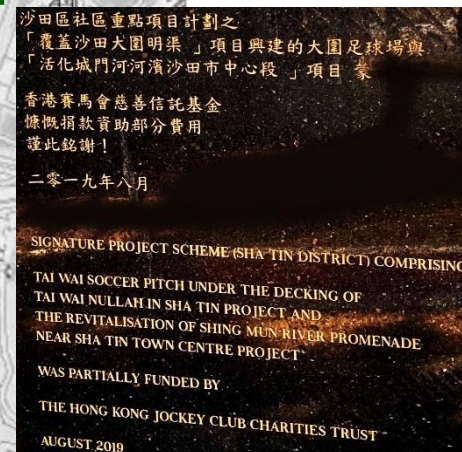
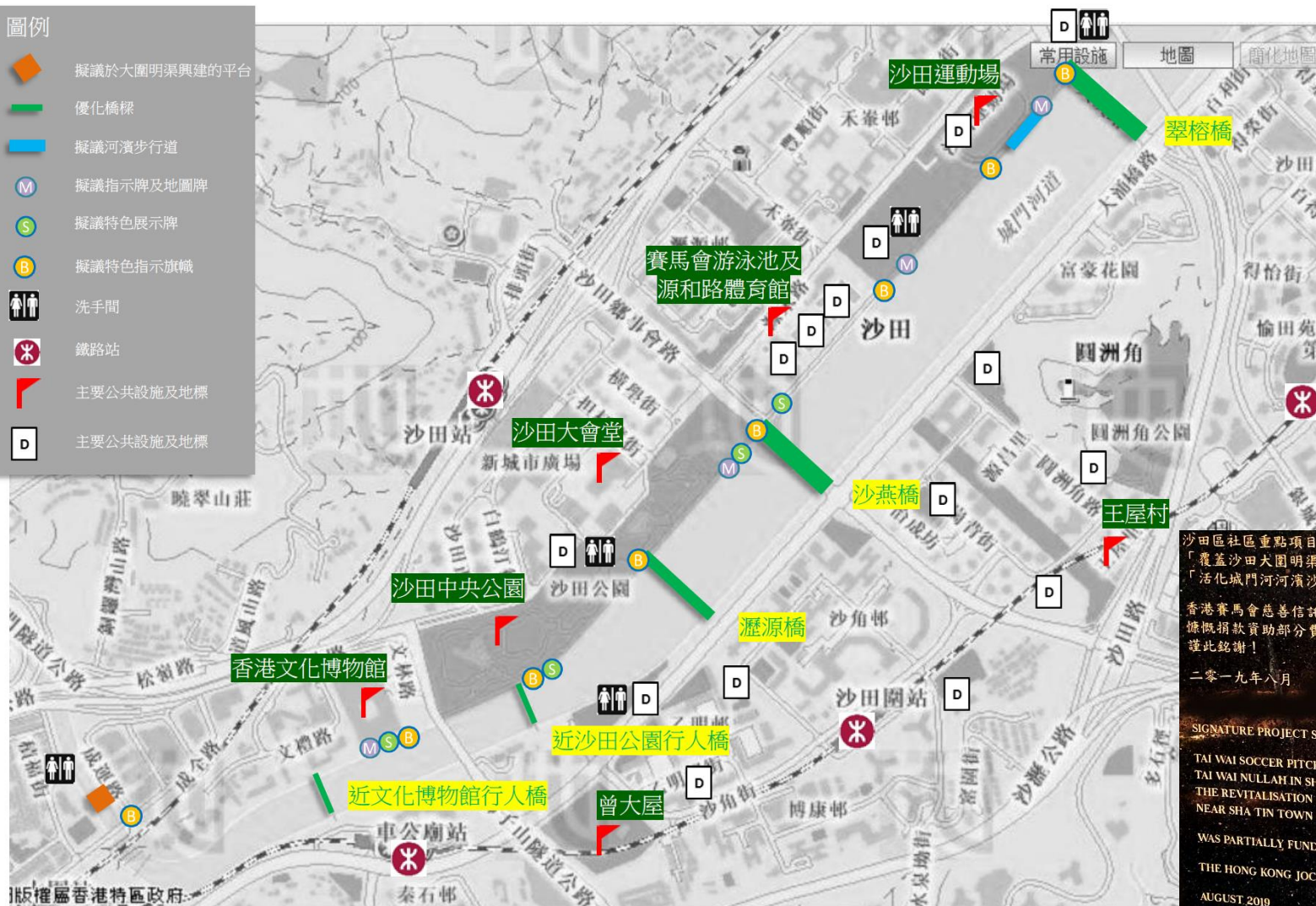


Enquiry Question (2)

How does Shing Mun River channel benefit the HK society?

圖例

- 擬議於大圍明渠興建的平台
- 優化橋樑
- 擬議河濱步行道
- 擬議指示牌及地圖牌
- 擬議特色展示牌
- 擬議特色指示旗幟
- 洗手間
- 鐵路站
- 主要公共設施及地標
- 主要公共設施及地標



What data to collect



Recreational facilities along the channel

Evidence of non-recreational function of the channel

Age of interviewees

Purpose of interviewees visiting the river

Frequency of visit by interviewees to the river

Suggestions to improve the present function of the river channel

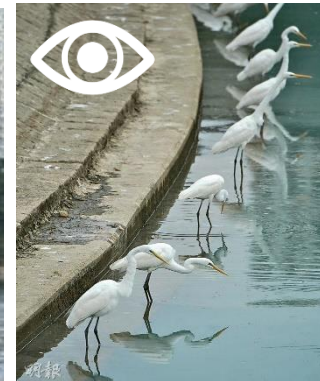
Where and how to collect data

- Work in groups of 2-4 students
- Walk along two channel banks
- With observation and interview



➤ By Observation

Facilities along the channel and embankment



➤ By Interview (with questionnaires)



Age group



Purposes of visit

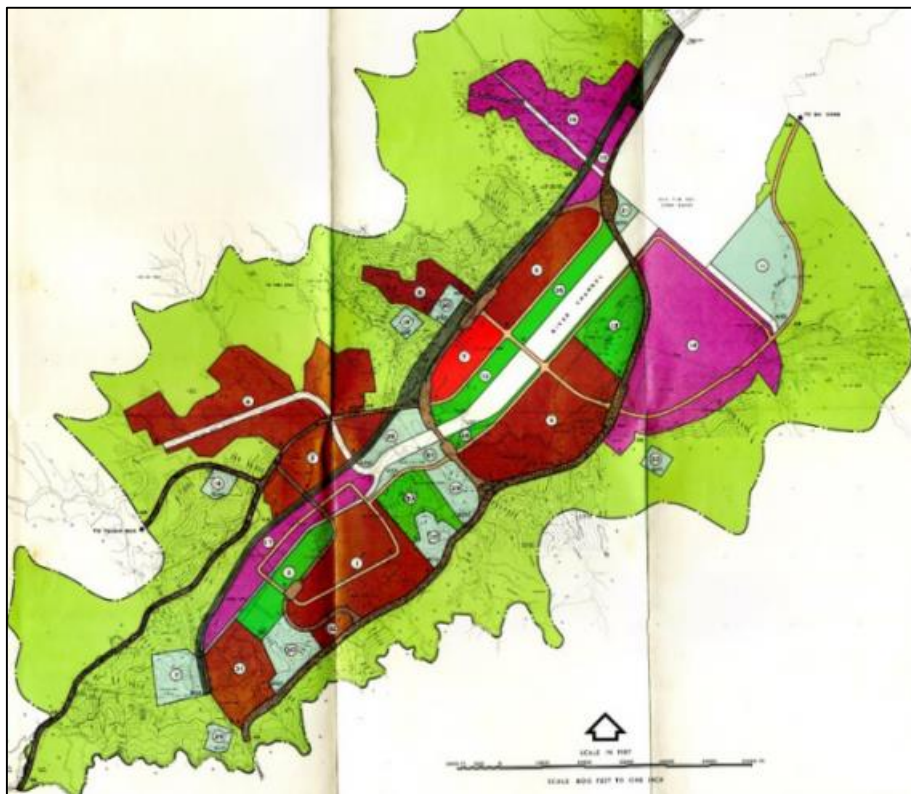


Frequency of visit



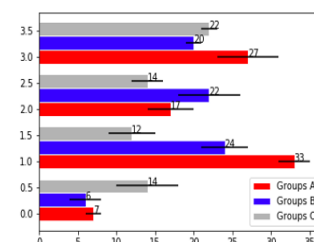
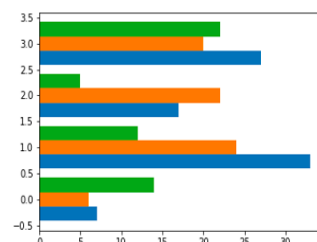
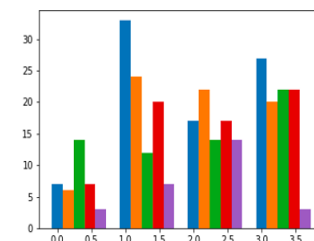
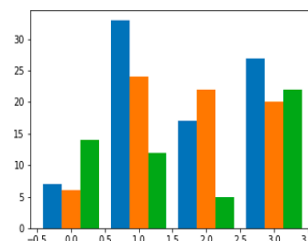
Suggestion for improvement

➤ Draw distribution of recreational facilities



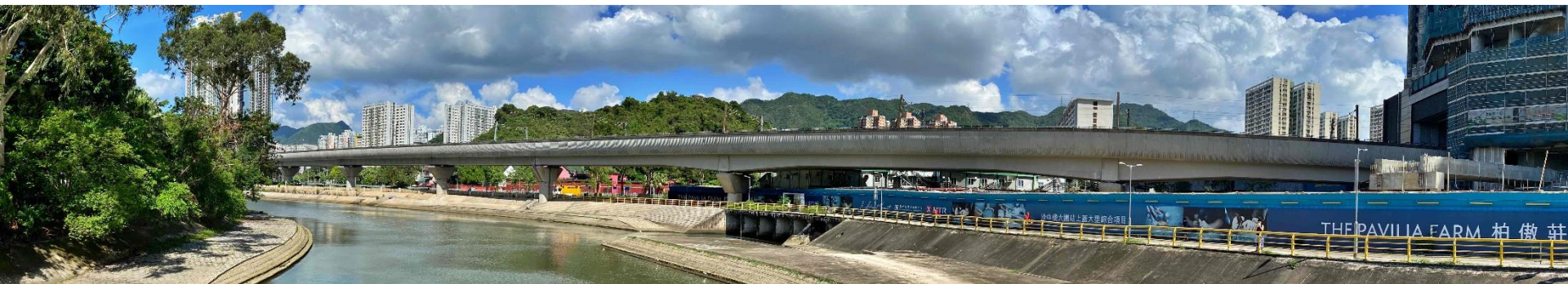
➤ Draw grouped bar graphs

- Purposes of visit
- Frequency of visit
- Strategies for improvement



Questions to discuss

- 1** What benefits does Shing Mun River channel provide to Hong Kong people? Support your answers with evidences.
- 2** Describe the pattern people using the channel as a resource? Which age groups do the common users belong to? How frequent do they visit the channel?
- 3** What improvements on this channel resource do the users expect? Which have the greater demand? Will they be sustainable?



Thank
you!



Shing Mun River