Early Waterworks in Hong Kong

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The University of Hong Kong
March 2022

Part One

Early Water Supply on Hong Kong Island

"Water gathering from streams flowing down from northern slopes of the Peak or wells"

1841 Mountain Streams
5,650 Chinese

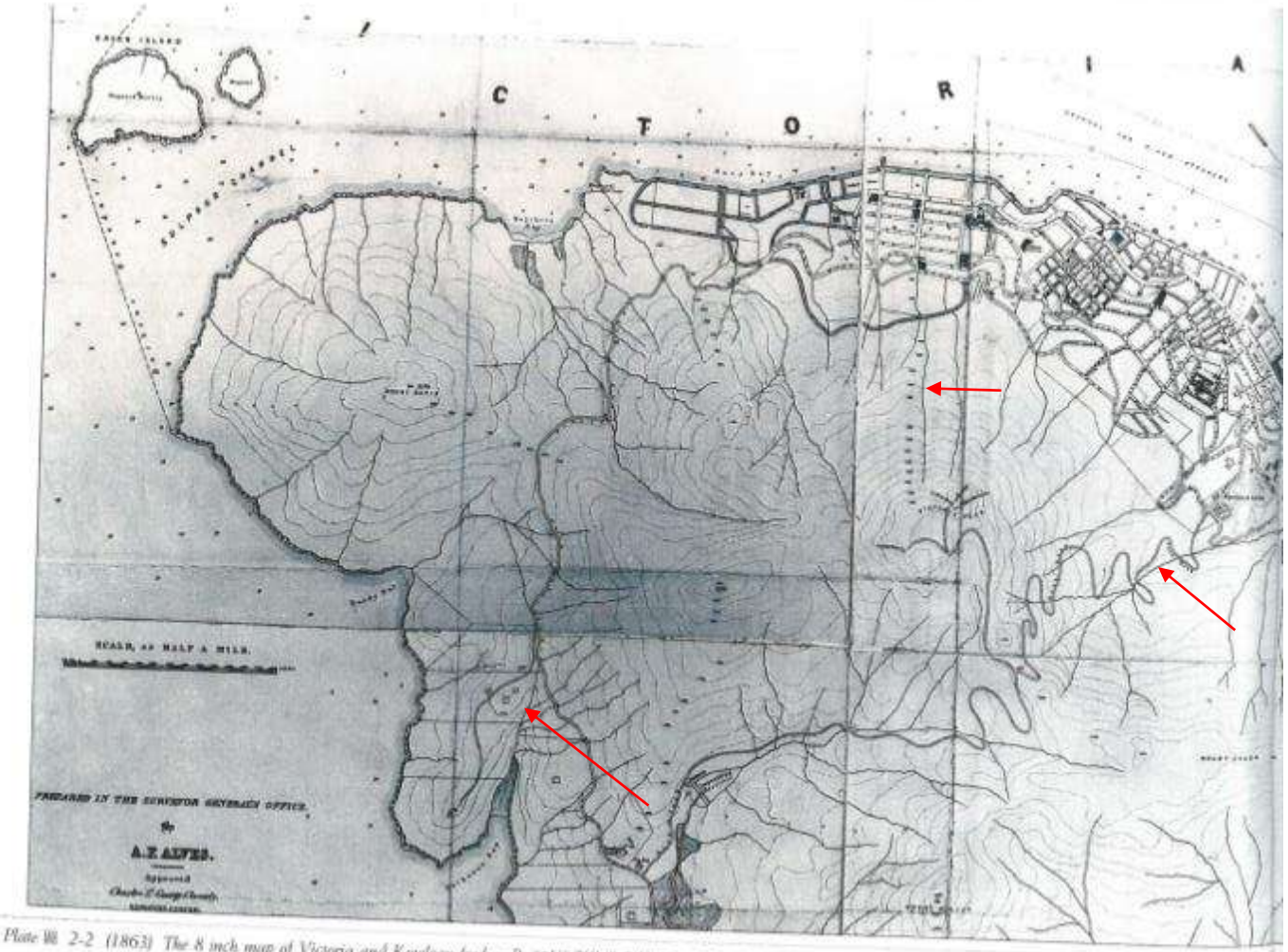
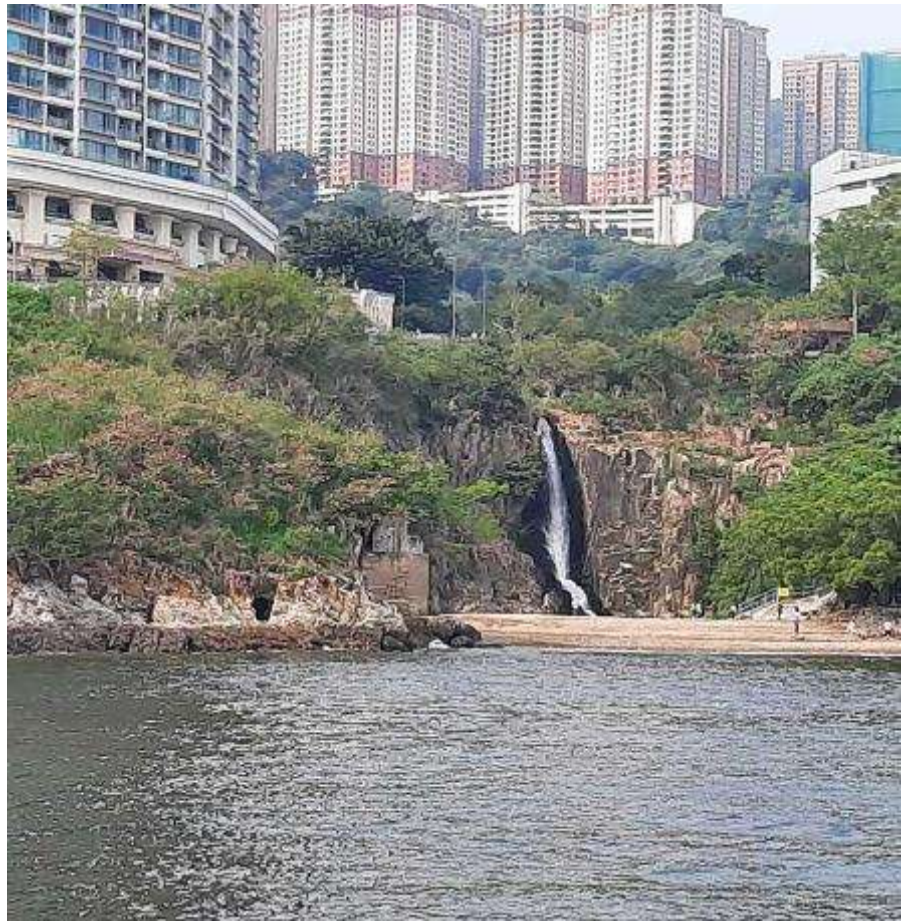
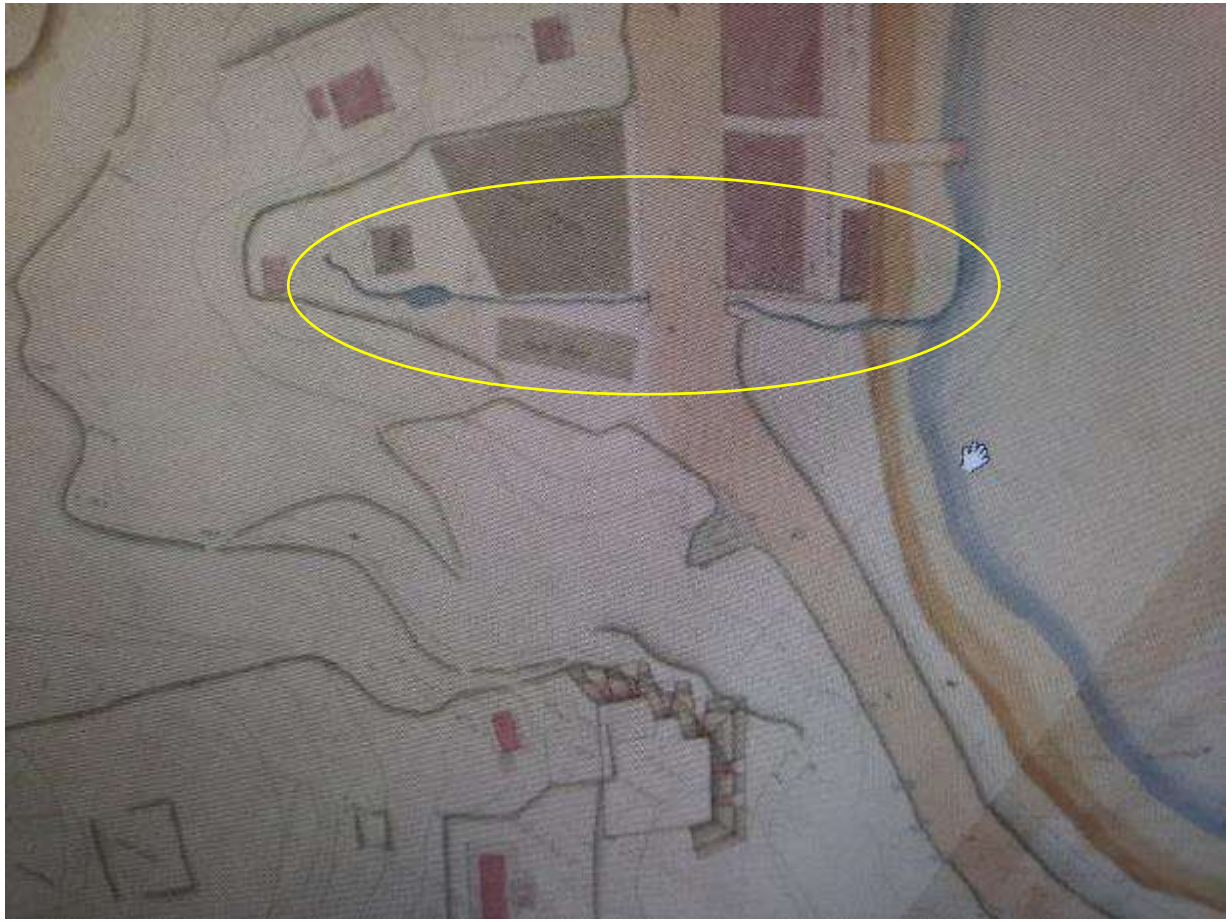


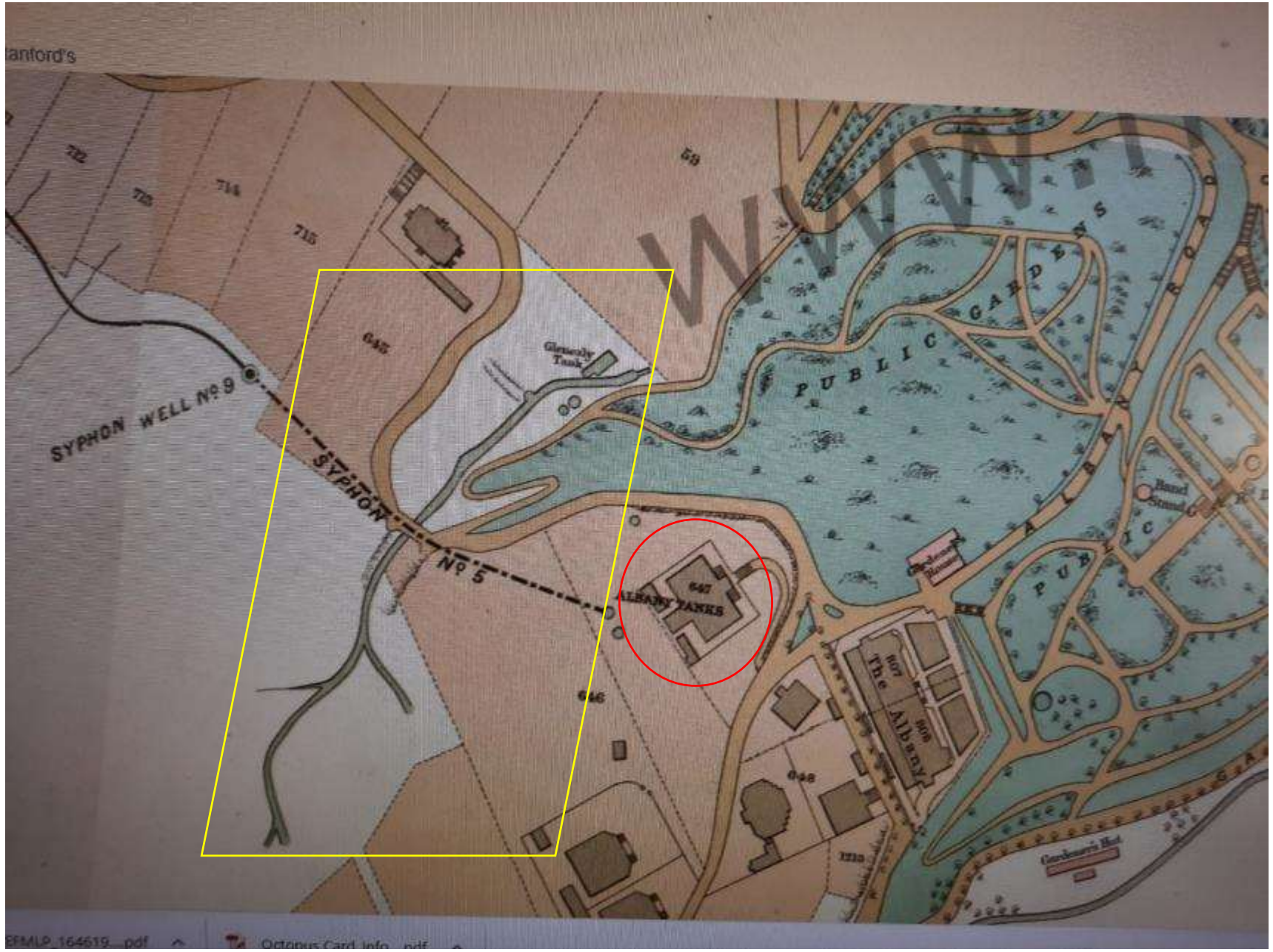
Plate 圖 2-2 (1863) The 8 inch map of Victoria and Kowloon (reduced) 8吋比例的維多利亞城、香港、以及九龍半島平面圖（經縮印）。



Streams, Pools and Tanks



Glenealy Nullah

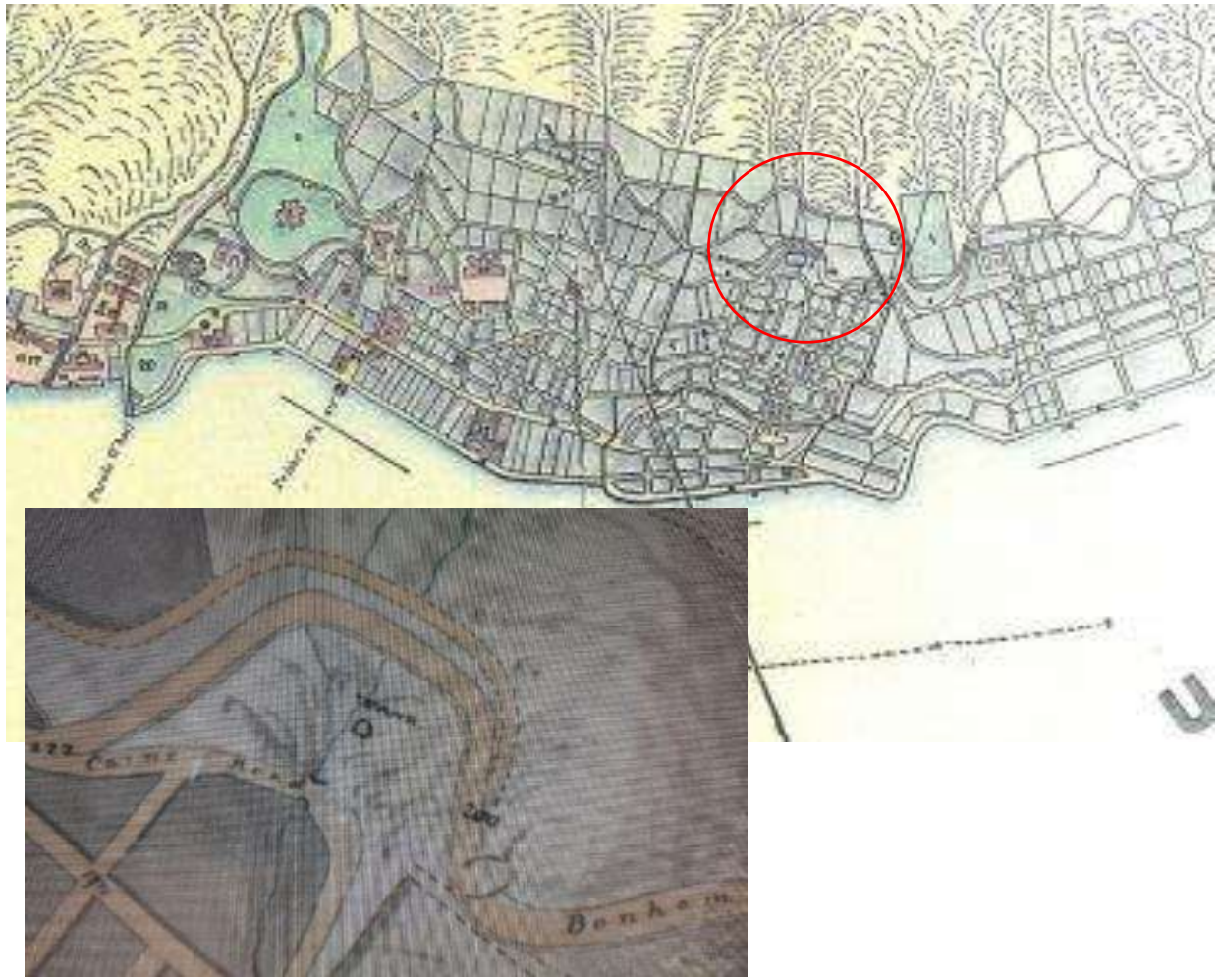


1851 Wells
Total 32,983 souls [1,520 non-Chinese]

- Development of commerce and industry
- Water in short supply and polluted
- Five wells for the city at a cost of 52 pounds
- Small weirs on streams above the urban areas

- Not Government’s job, suggested a company to carry out the works
- Until the change of governor

1859/1865 maps show two tanks @Bonham Road and Robinson Road



1860s and after: Water Tanks and ….

- 10 July 1860 Water Ordinance passed and approved 30,000 pounds for Victoria Water Works, water rate of 2% pa on property value
- 8 Dec 1860 - Rawling's proposal and tender invited + 10" CI pipe [for Western and Central, Eastern served by streams]

Population: Land 49,880 Boat 14,701 Total = 64,581

- 1863 PFLR 2 mg completed (1.5 days), two tanks connected by an aqueduct with PFLR

1863: Total 124,850 souls [3,149 non-Chinese]

- 1865 Winter drought and 1866 Wilson suggested 100 mg expansion

- 1871 PFLR reconstructed to 66 mg
- 1873 Total 121,985 souls [3,000 garrison/shipping], target 5.75 gallons per day

Price proposed PFLR supply to higher level; along 150m (500’) contour to existing water tanks, daily allowance 4.5 gallons (20L) per head

1876: Conduit of brick/masonry (1’6” [3’6”] x 1’6”), CI siphons cross five ravines, two 10” dia CI pipes laid side by side, tender invited on 13 May 1876 and completed in 1877 (13,035 pounds/est 9,278), original 10” dia pipe along PFL road was removed.

- 1890 @PFL - four filter beds total 1,360 sq yd + S/R (141’L, 35’W, 30.5’D) 940,000g, concrete faced with stone and the cover supported by brick arching carried on masonry piers
- 1880s and 1890s Taitam Valley – Tytam Reservoir
- 1889 small S/Rs at Peak Road 700’ 12,000g, Belilios Terrace 500’ 112,000g, Pokfulam Filter Beds 600’ 105,000g
- Water from P/S @ Garden Road to district between Caine Road and Pokfulam Conduit
- 1891 Pumping to Peak, before wells were used
- 1892 S/R at Kennedy Town 16’D, 210’ 340,000g and Wanchai 16’D, 251’ 190,000g

No. 136.

GOVERNMENT NOTIFICATION.

Tenders will be received at the Surveyor General's Office, on or before the 24th Instant, for the execution of the several Services following:—

Item 1.—Construction of a Stone and Brick arched Tank to contain 800,000 Gallons.

Item 2.—Do. do. to contain 200,000 Gallons.

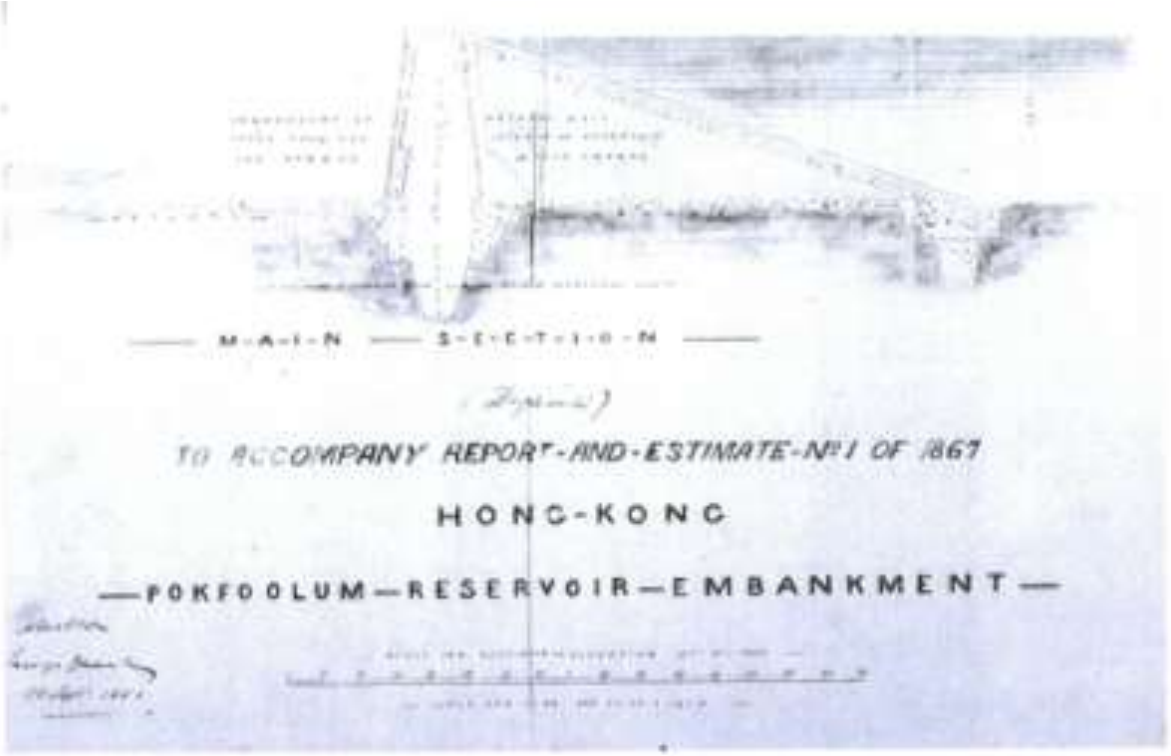
Item 3.—Construction of a Reservoir, Watchman's House, and Stop Cock Vault at Pokfoolam.

Plans and Specifications may be seen on application at the Surveyor General's Office.

By Order,

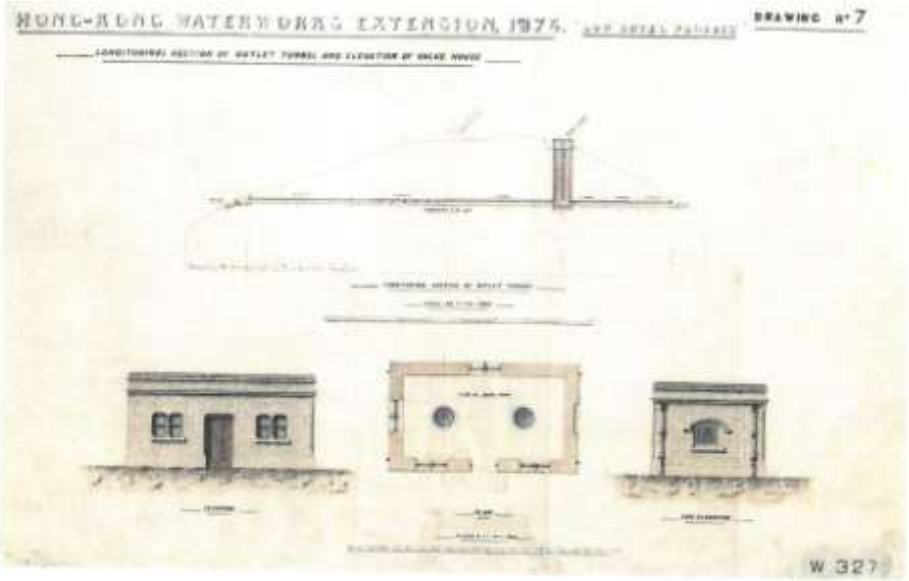
W. T. MERCER,
Colonial Secretary.

Colonial Secretary's Office, Victoria, Hongkong, 8th December, 1860.

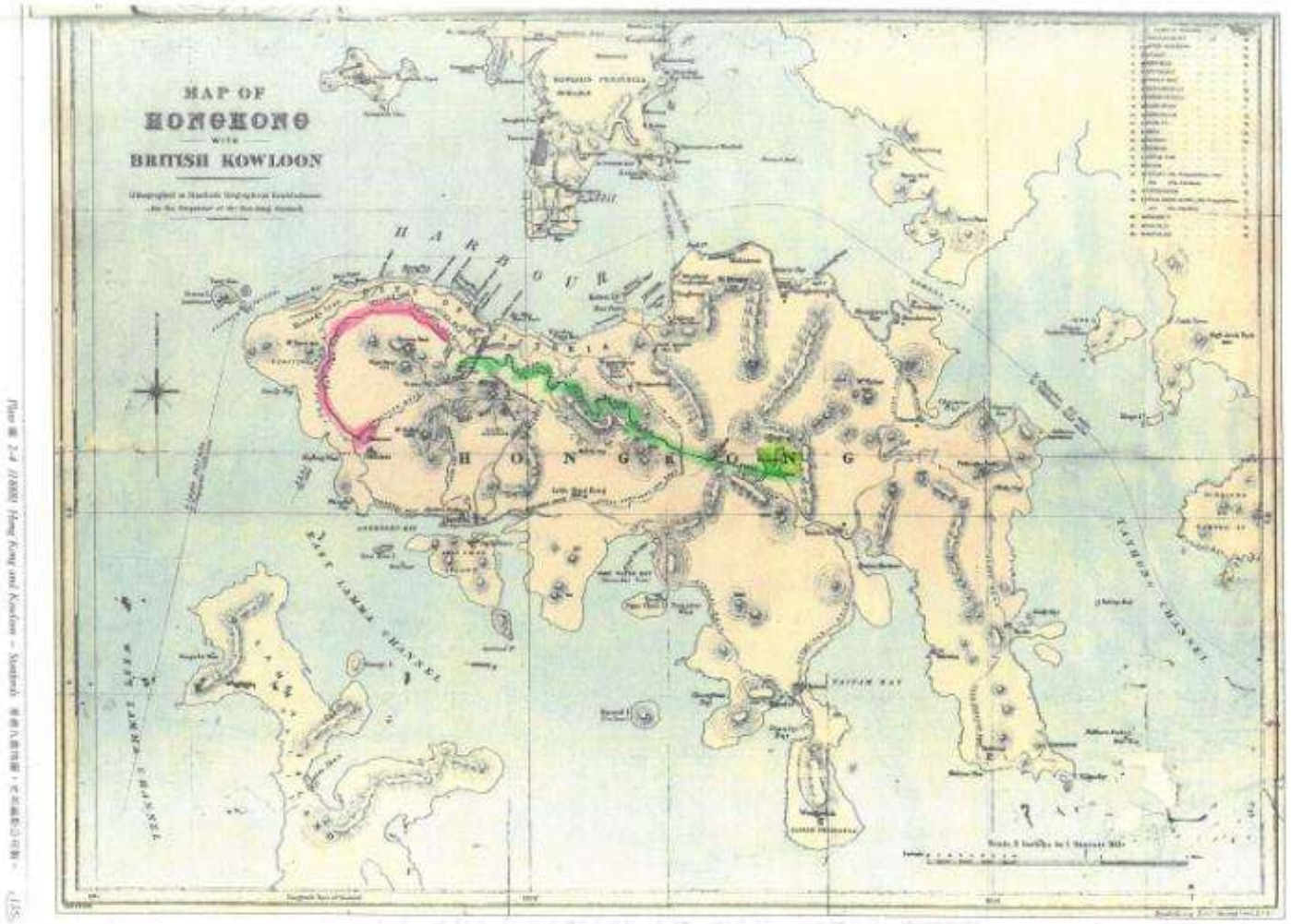


Pokfulam Reservoir
1863/1871 (2 [30]mg/ 68 [100]mg) /1895 (70.4mg)

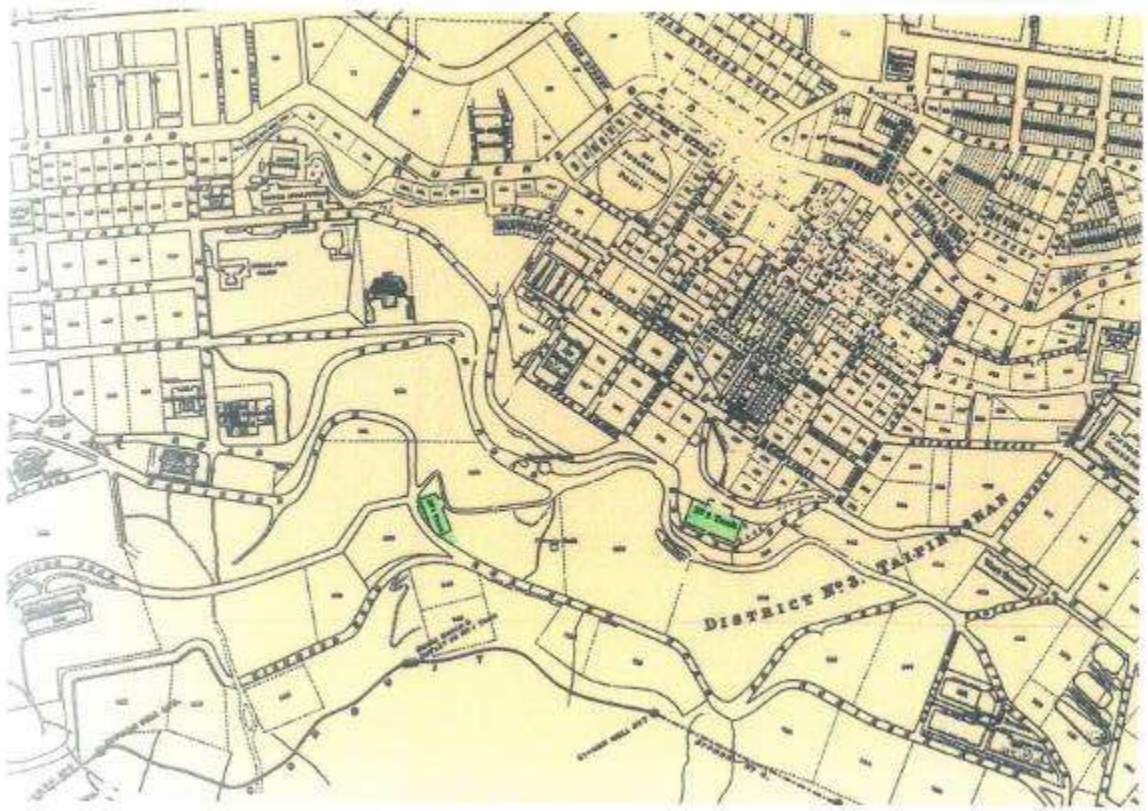
Pokfulam Reservoir – Dam, Intake, Tunnel and Valve House

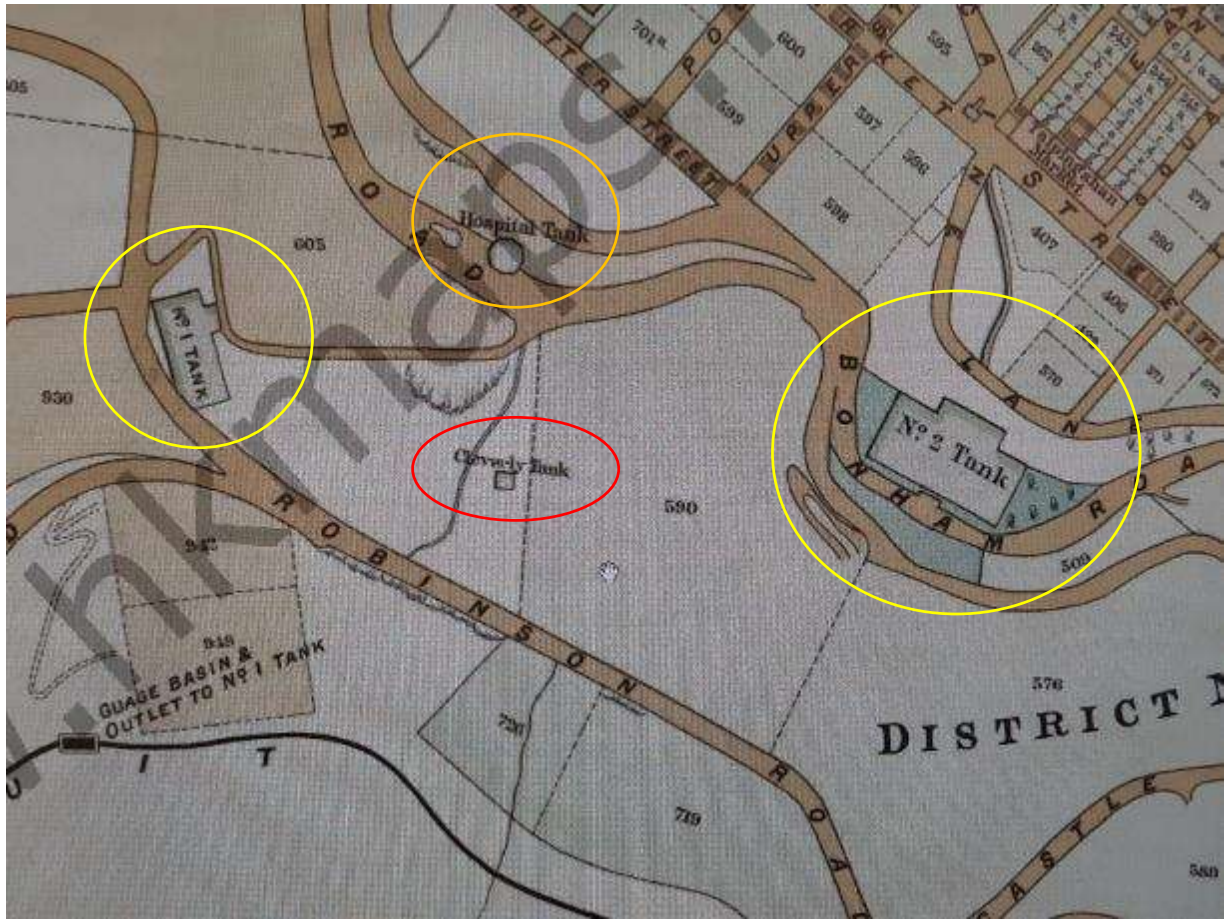


Pokfulam Waterworks Scheme
Tytam Waterworks Scheme

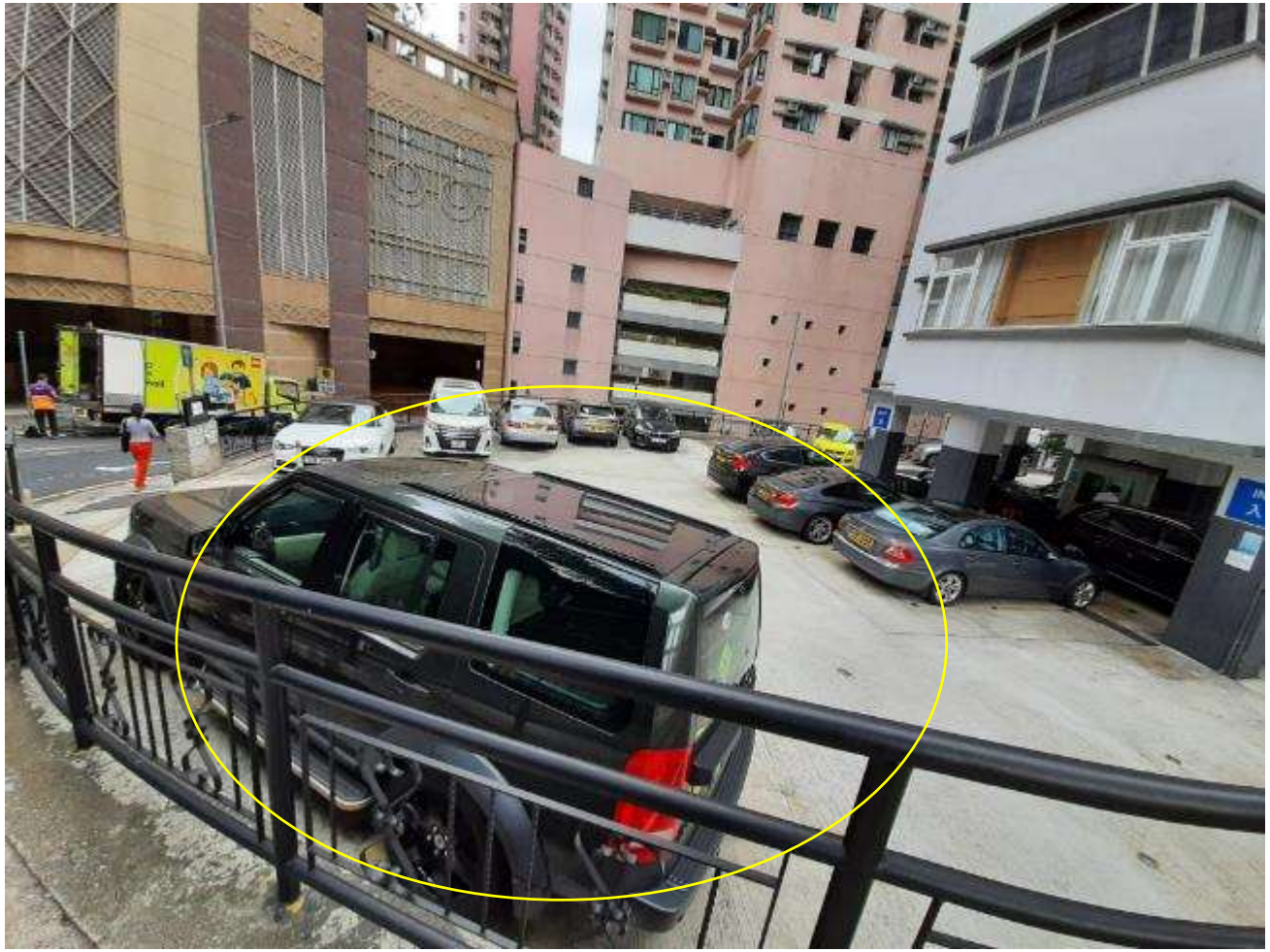


Tank No.1 (200,000g) Tank No. 2 (850,000g) (1860) Other Tanks





Tank No. 1 @ Robinson Road



Tank No. 2 @ Caine Road

Tender 13 May 1876

No. 98.

GOVERNMENT NOTIFICATION.

Tenders will be received at this Office, until Noon of the 5th proximo, for works in connection with the Pokfulum Reservoir.

Particulars may be had on application at the Surveyor General's Office, where also a proper Form of Tender may be obtained.

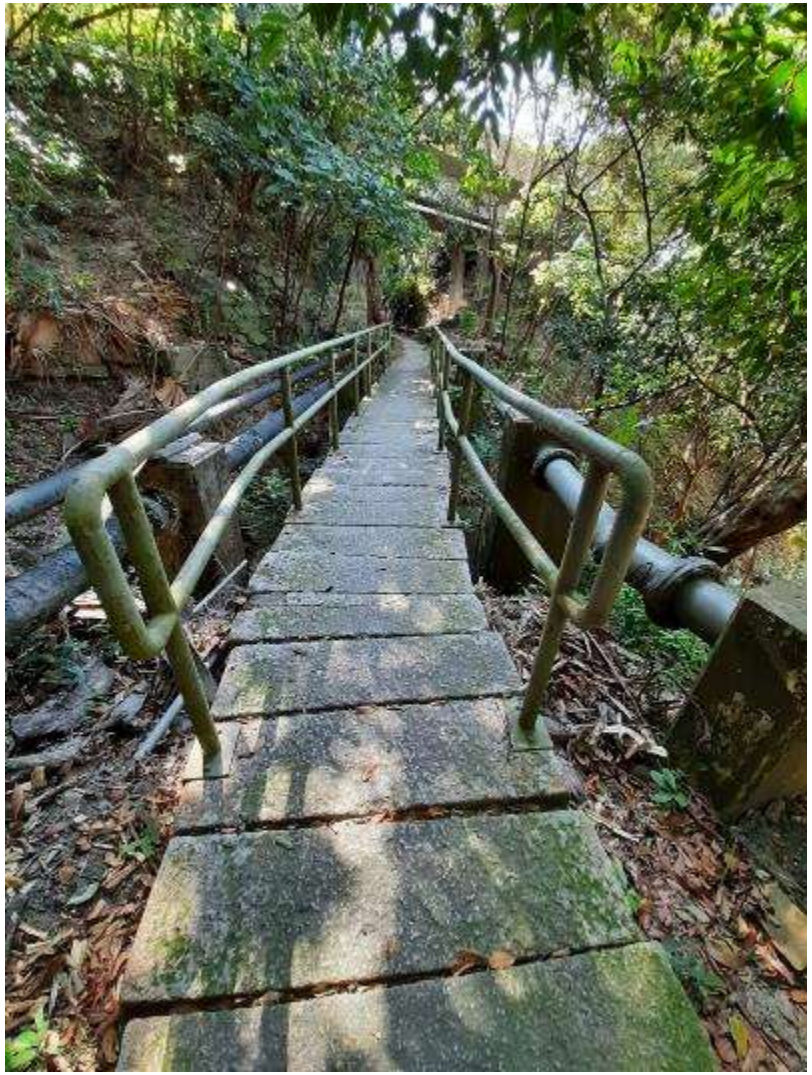
The Government will not bind itself to accept the lowest, or any Tender.

By Command,

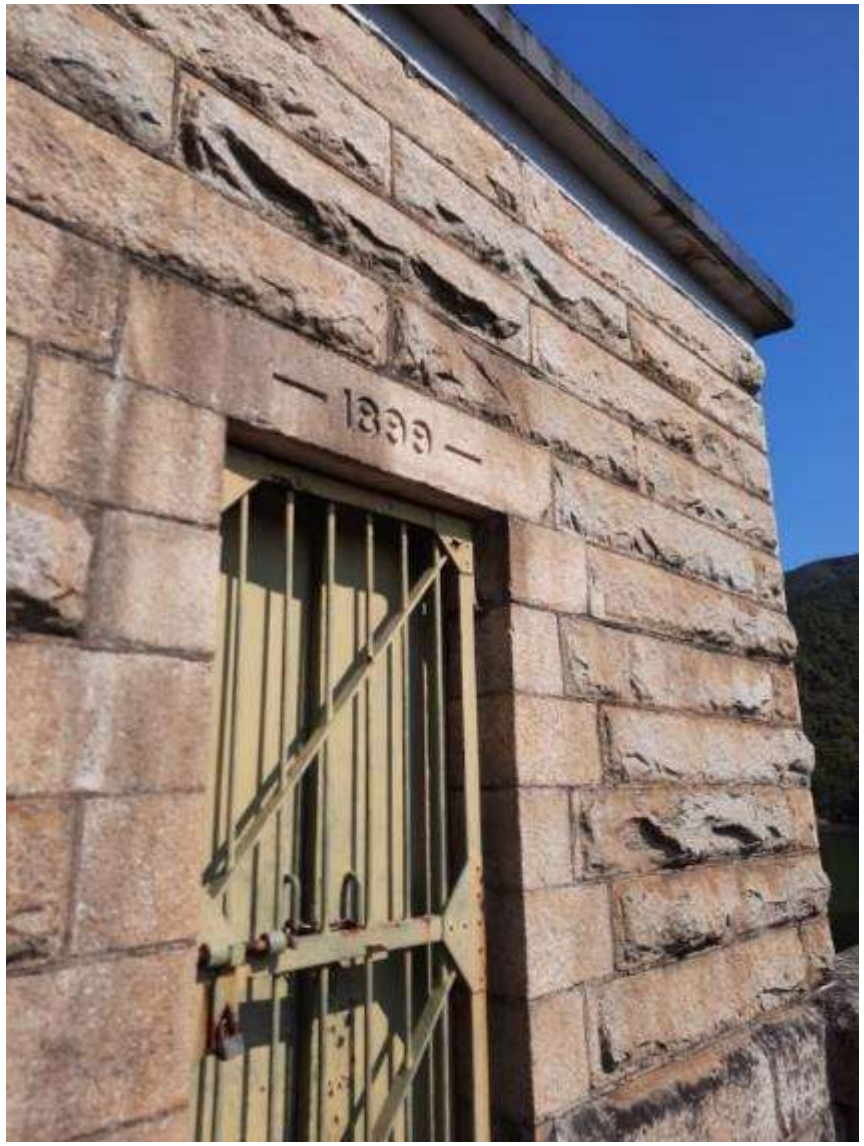
J. Gardiner Austin,
Colonial Secretary.

Colonial Secretary's Office, Hongkong, 13th May, 1876.

Pokfulam Waterworks Scheme
The Conduit



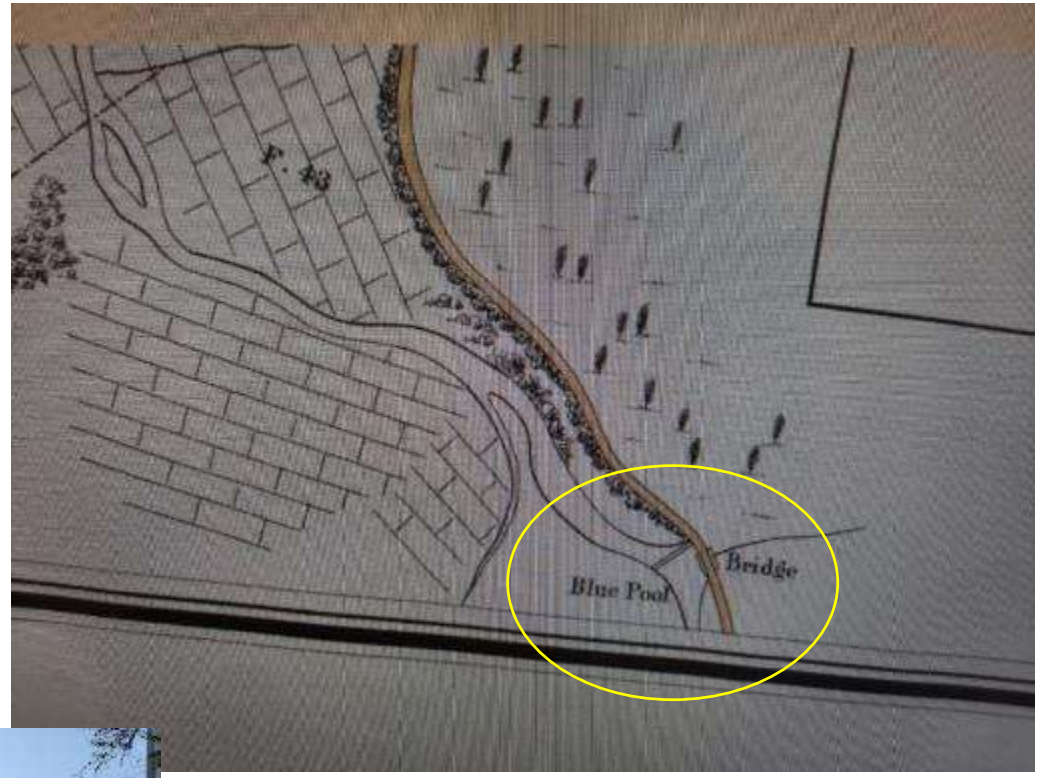
Wong Nai Chung Reservoir, 27mg, 50’H, 270’ curved length (1899)



Private Reservoirs

- 3 out of four belonged to Butterfield and Swire Ltd.
- 1883 1.1mg (Quarry Bay)
- 1894 3mg (Quarry Bay)
- 1895 North Point 13.7mg
- 1890 Tai Shing Paper Manufacture Co. 44.2mg, 1899/1900 dam raised by 18’, 47.8mg, supplied water to Aberdeeb/Apleichau 60,000g/d

Blue Pool (1901 Map)



Mint Dam
True Light Middle School
Tai Hang

THE HONGKONG GOVERNMENT GAZETTE, 21ST JANUARY, 1865. 19

No. 13.

GOVERNMENT NOTIFICATION.

Tenders will be received at the Surveyor General's Office on or before Monday, the 6th Proximo, for the formation of an Impounding Reservoir for the Water supply to the Mint.

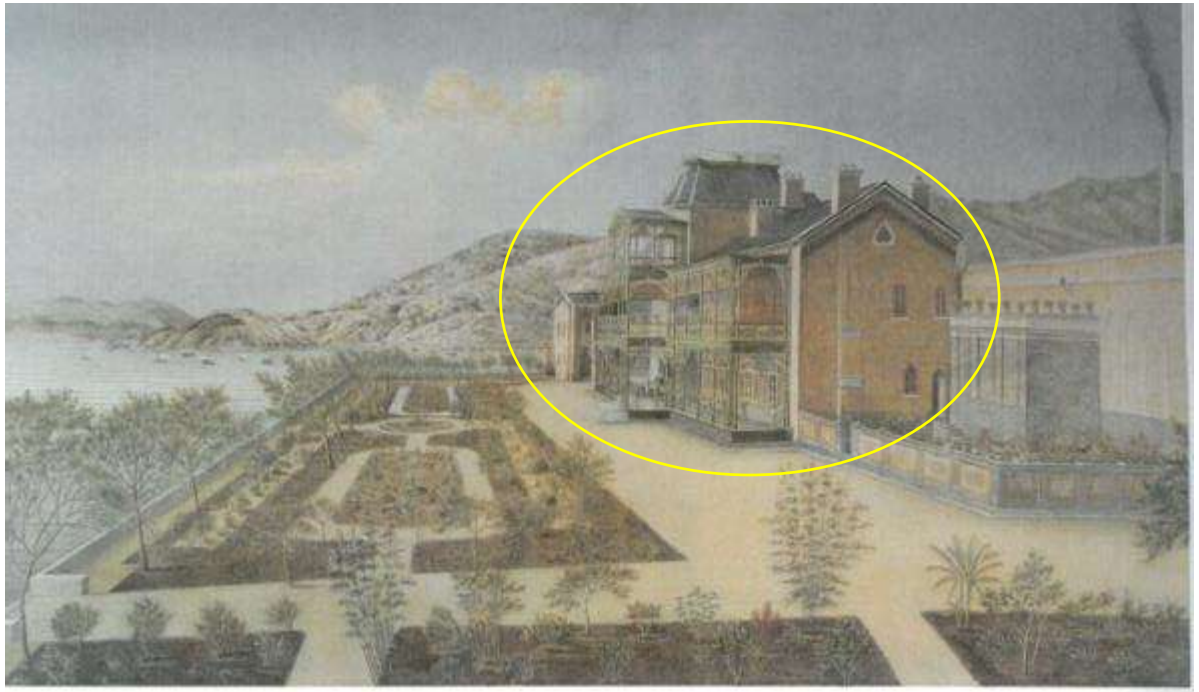
Plans and Specification may be seen on application between the hours of 11 A.M. and 3 P.M.

By Order,

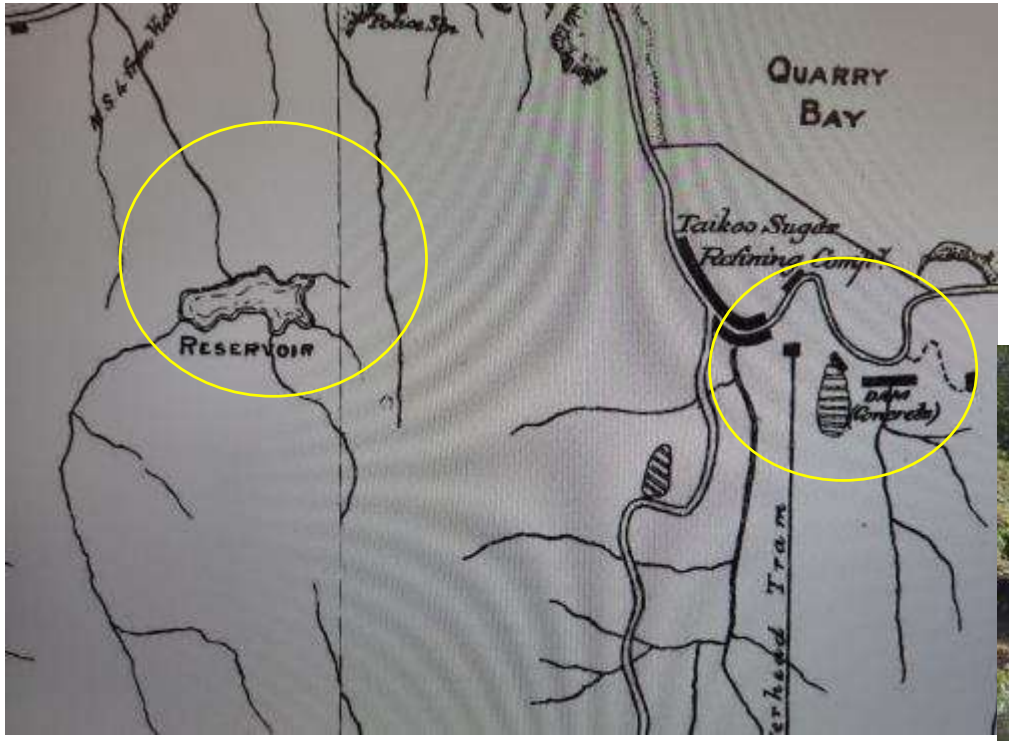
W. T. MERCER,
Colonial Secretary.

Colonial Secretary's Office, Hongkong, 21st January, 1865.

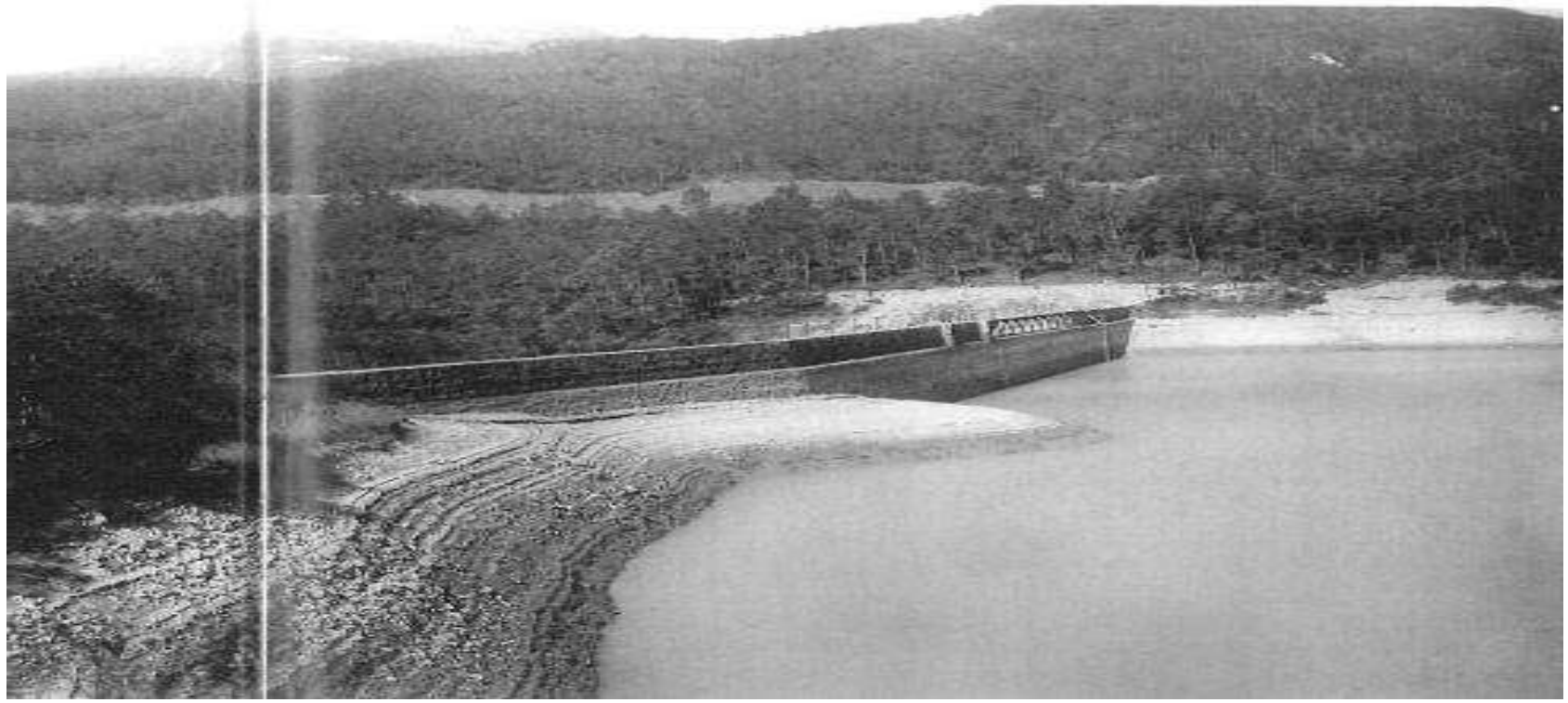
From Mint to Sugar Refinery



Private Reservoir – Braemar Hill Mansions
Choi Sai Woo Park



1890 Aberdeen Lower Reservoir
Tai Shing Paper Manufacture Co.



1889
PFL Filter Beds and S/R

GOVERNMENT NOTIFICATION.—No. 316.

Tenders will be received at this Office until Noon of Monday, the 29th instant, for the construction of the Pokfulam Service Reservoir and Filter Beds.

For form of tender apply at this Office.

For specification and further particulars apply at the Surveyor General's Office.

The Government does not bind itself to accept the lowest or any tender.

By Command,

FREDERICK STEWART,
Colonial Secretary.

Colonial Secretary's Office, Hongkong, 13th July, 1889.

憲示第三百一十六號

輔政使司史

爲

督憲札開招入投接山泉薄澗林水塘及隔沙井所有投票均在本署

此禮拜到來至西曆本年七月二十九日即禮拜一正午止如欲領投

票格式可向本署求取請另欲觀看圖程及知詳細者前赴工務司署

請示可也倘票到無期任由

國家交取或起票不取亦可等因本此合亟出示曉諭爲此特示

一千八百八十九年　七月　十三日示

PFL Filter and S/R Completed in 1890
Note the Design of S/R

No. $\frac{4}{91}$.

HONGKONG.

REPORT ON THE PROGRESS OF WORKS CONNECTED WITH WATER AND DRAINAGE DEPARTMENT.

Presented to the Legislative Council, by Command of His Excellency the Governor, on the 19th March, 1891.

THE WATER AND DRAINAGE DEPARTMENT,
RESIDENT ENGINEER'S OFFICE,
HONGKONG, *7th February*, 1891.

SIR,

NEW WORKS.

Pokfulam Filter-Beds and Service Reservoir.—The Pokfulam Filter-Beds and Service Reservoirs which were commenced in November, 1889, have now been completed.

The filter-beds are four in number having a total area of 1,360 square yards, the invert is constructed on the ridge and furrow system, and gauge wells are provided for the purpose of measuring the water passing through the filters.

The filtering material consists of 12 inches of coarse broken stone, 9 inches of stone broken to ½-inch cubes, 9 inches of coarse sand, and 2 feet of fine sand, the furrows in the invert being filled with very coarse broken stone.

The reservoir 141 feet in length, 35 feet in breadth, and 30 feet 6 inches in depth having a capacity of 940,000 gallons, is constructed of concrete faced with stone and covered over with brick arching carried on masonry piers.

The total cost of this work has been $39,485.59.

Filter and S/F @ PFL

ne filter beds were in operation for many years and only in 1993 were they demolished to allow for the onstruction of the Kotewall Road Fresh Water Service Reservoir.

1890 - 1892

Covered S/R at

- Peak Road 8’D, 12,000 g
- Belilios Terrace 14’D, 112,000g
- West Point 15’D, 105,000g

250 valves, 423 fire hydrants, 108 fountains

1896

- S/R at
- Kennedy Town 16’D, 340,000g
- Wanchai 16’D, 190,000g

After 1890

- Six Cast Iron tanks in Peak District:
- Peak; Mount Gough, 5k g
- Peak; Mt Kellet; Plantation Road; Magazine Gap = 10k g each

- Another proposed S/R covered 16’D, 400k g

1896/1897
S/R at the Peak
Below Peak Signal Station
Concrete face with rubble masonry and a brick arch roof
409,000g

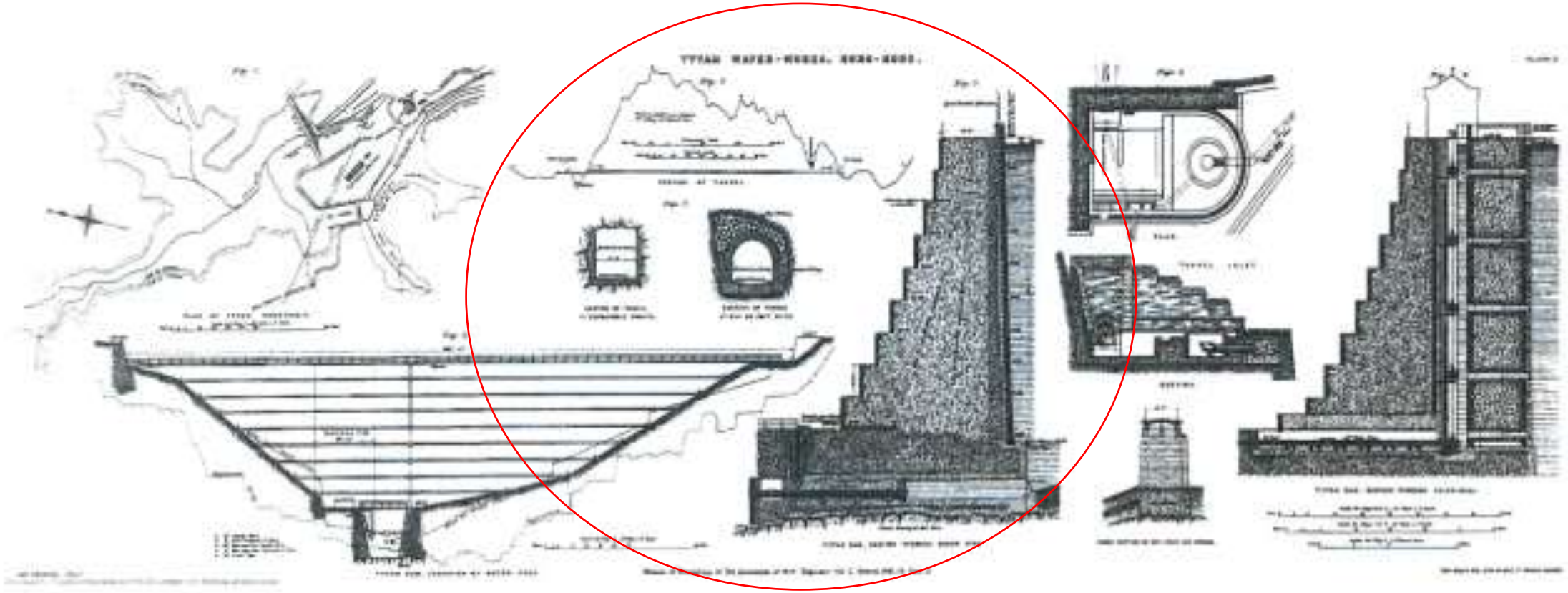
Before, Steel tank and Wells were used

1914 Elliot (West Point) Six Filter Beds 8,200m2 and S/R 5mg to connect with Tai Tam Tuk

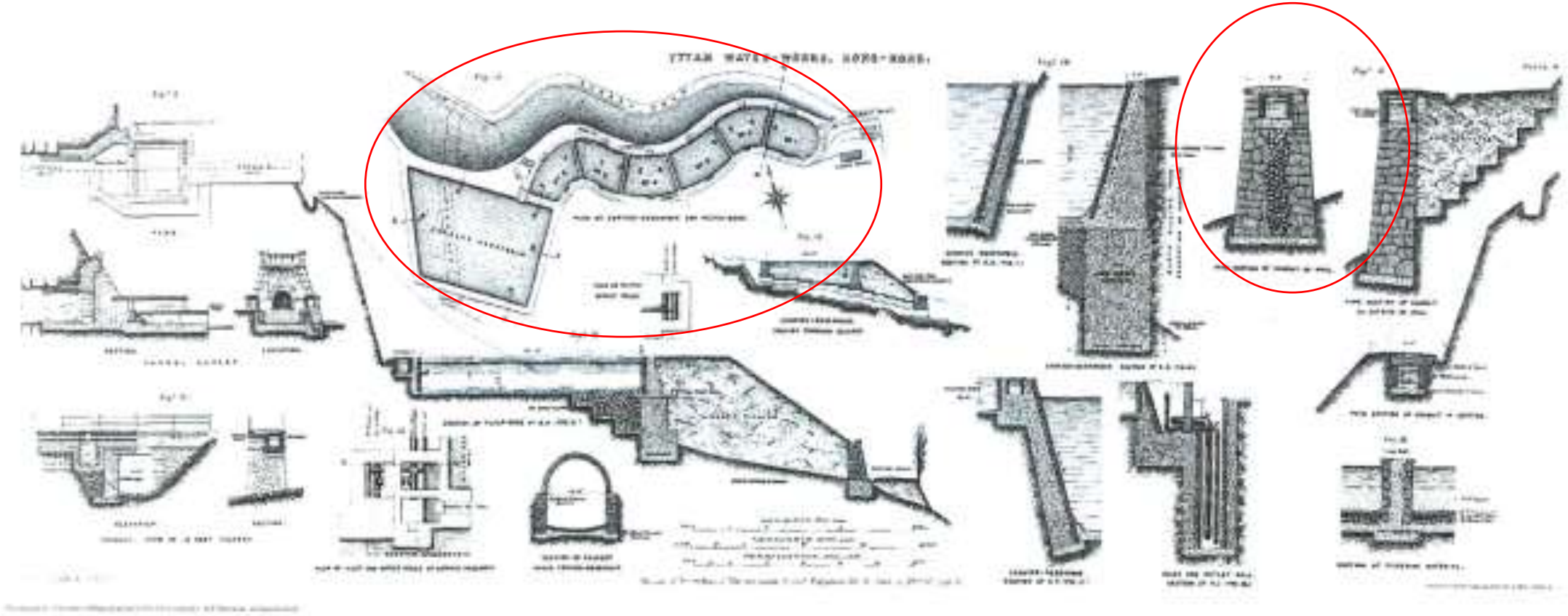
Tytam Reservoir (1885 -1888)

- Reservoir 312 million gallons, 562’ length, dam height 109’
- Tunnel: 2,428 yd
- Covered masonry and brickwork conduit 5,163 yd, 3’wide x 2’6” depth, 1 in 1,200, 7mg/d
- 6 filter beds (3,245 sq yd) + open S/R of 5.7 m g, 30’ depth
- Filter 2’6” fine sand/ 6” stone (0.5’ cube + 9” rough broken stone)
- From open S/R 5.7m gallons, [6m g, 150’ wide and 30’ deep by J. Orange] 18” CI pipe to junction of Bowen and Garden roads
- Total cost = $1, 257,474.
- 1894 Embankment raised 12’6” to 390mg

Tytam Waterworks Scheme



Tytam Waterworks Scheme

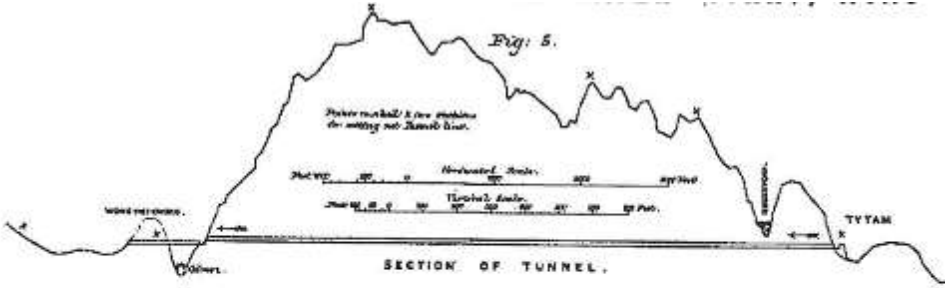


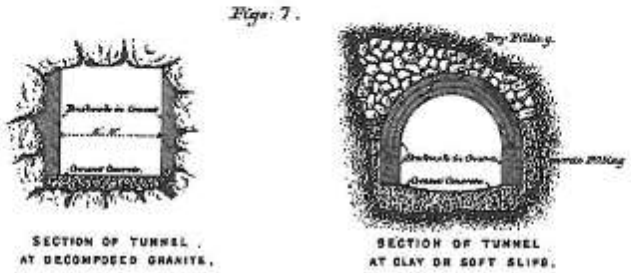
Tai Tam Reservoir (1888)

建造大潭上水塘 - 香港工程歷史轉捩點 （1883-1888年）

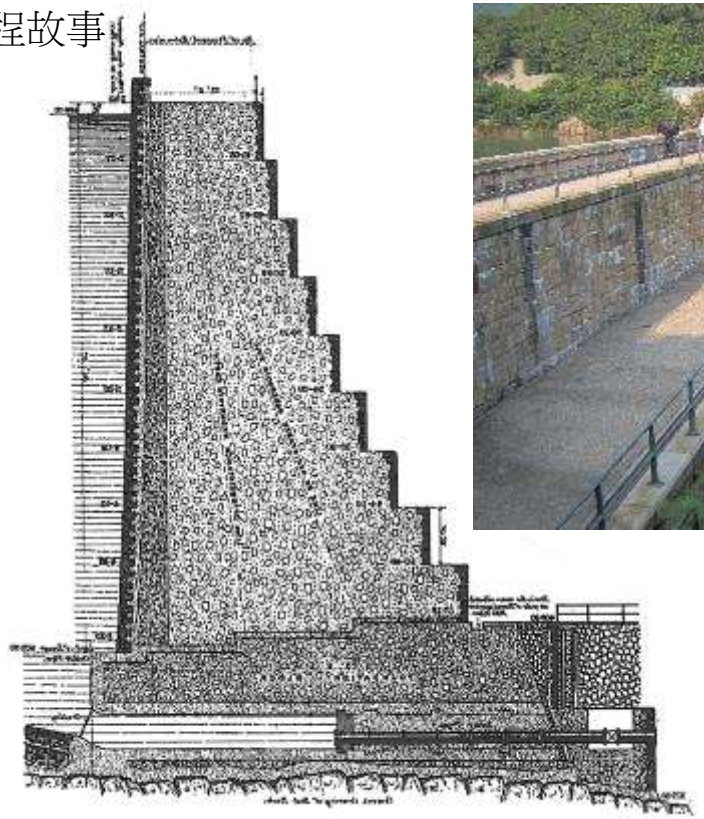
大潭上水塘的工程擁有多項桂冠:

- 第一個在英國殖民地建成的最大石屎霸;
- 第一次把改良沙漿工序用於承造混凝土, 並以碎石和攪拌機代替人手
- 首次進行本地生產英泥測試;
- 第一次使用諾貝爾炸藥和比福導火線; 並以香燭燃點引爆, 配以西方鑽機, 以蠟燭照明, 築成香港第一條隧道;
- 首個過百萬基建工程及
- 首次聘用英國顧問

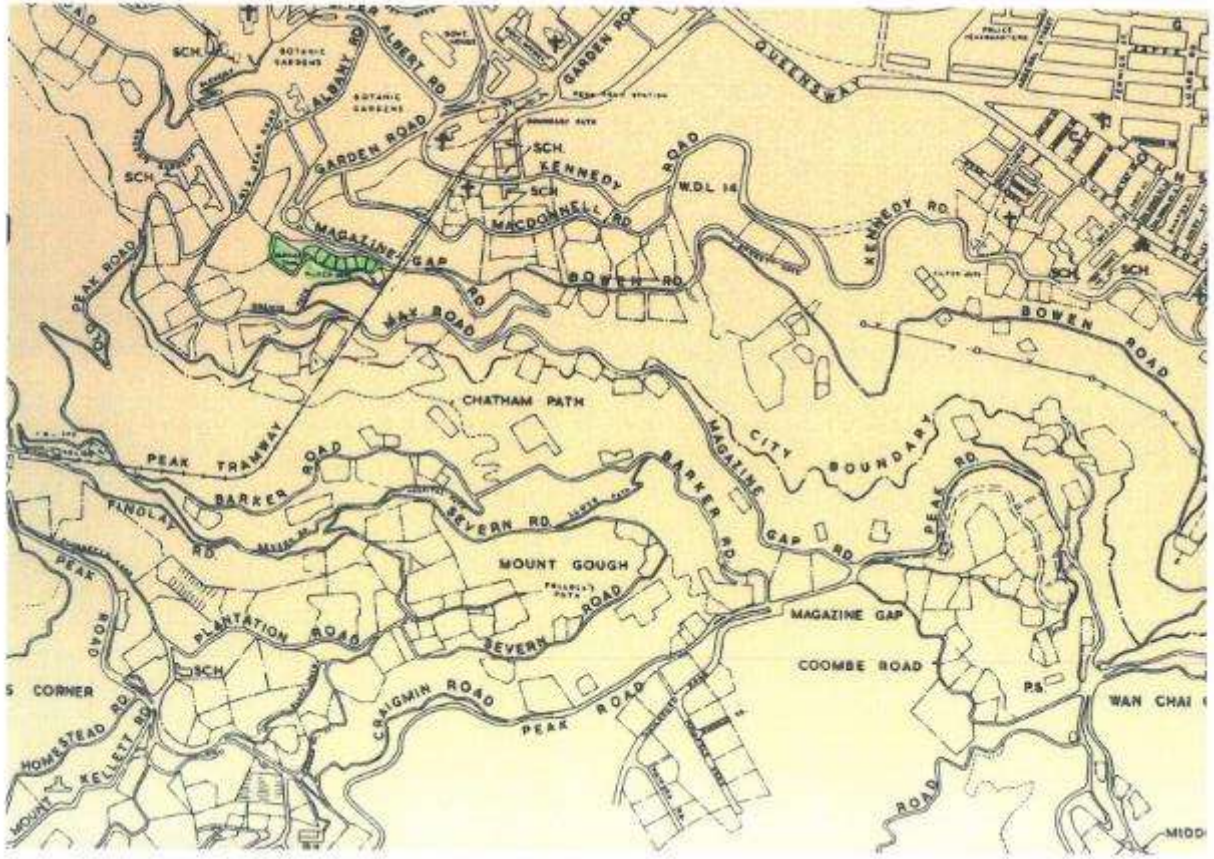


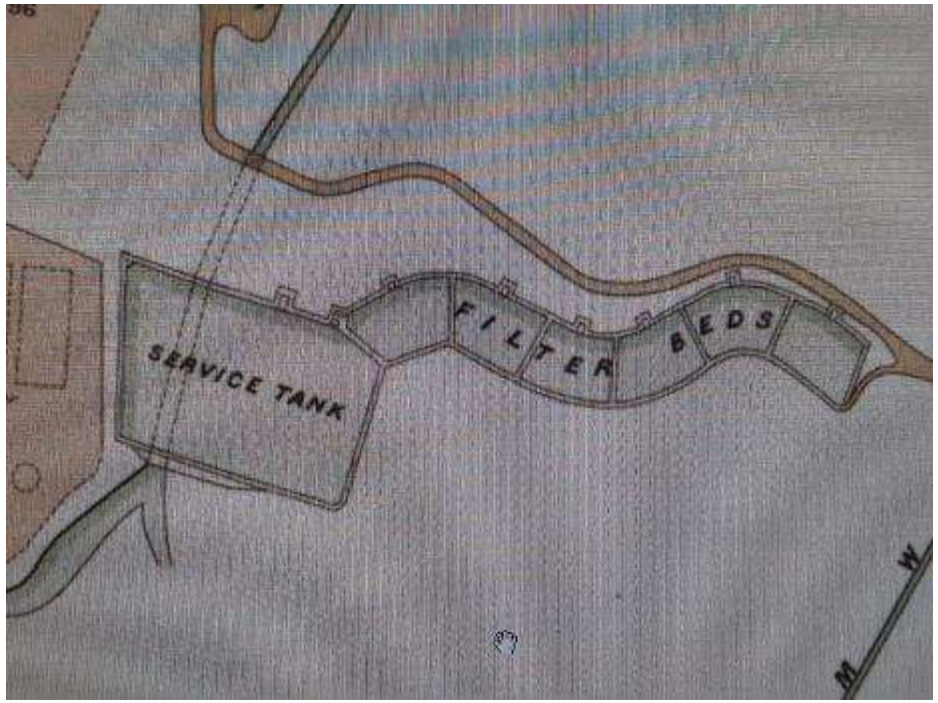


- 文獻參考：香港工程考＋一個建築工程故事 (1841-1953) 馬冠堯著
- 三聯書店2011年第一版

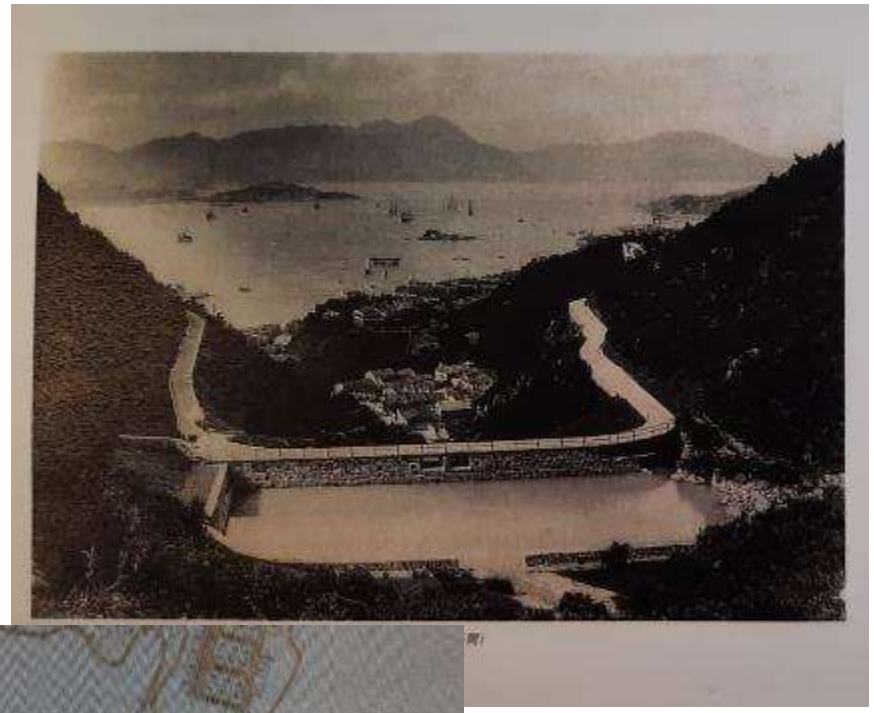


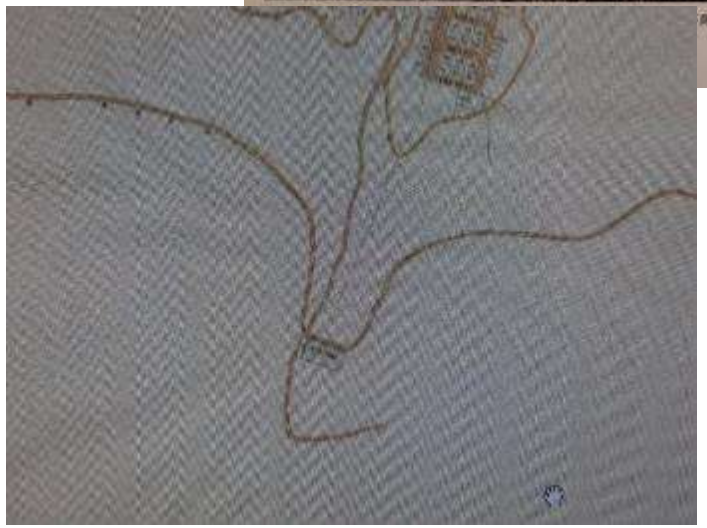
Tytam Waterworks Scheme –
6 Filter Beds and Open S/R 5.7m gallons (Tank No. 3?)





Bowen Road Tank No. 4: 700,000 gallons (2,650m3)





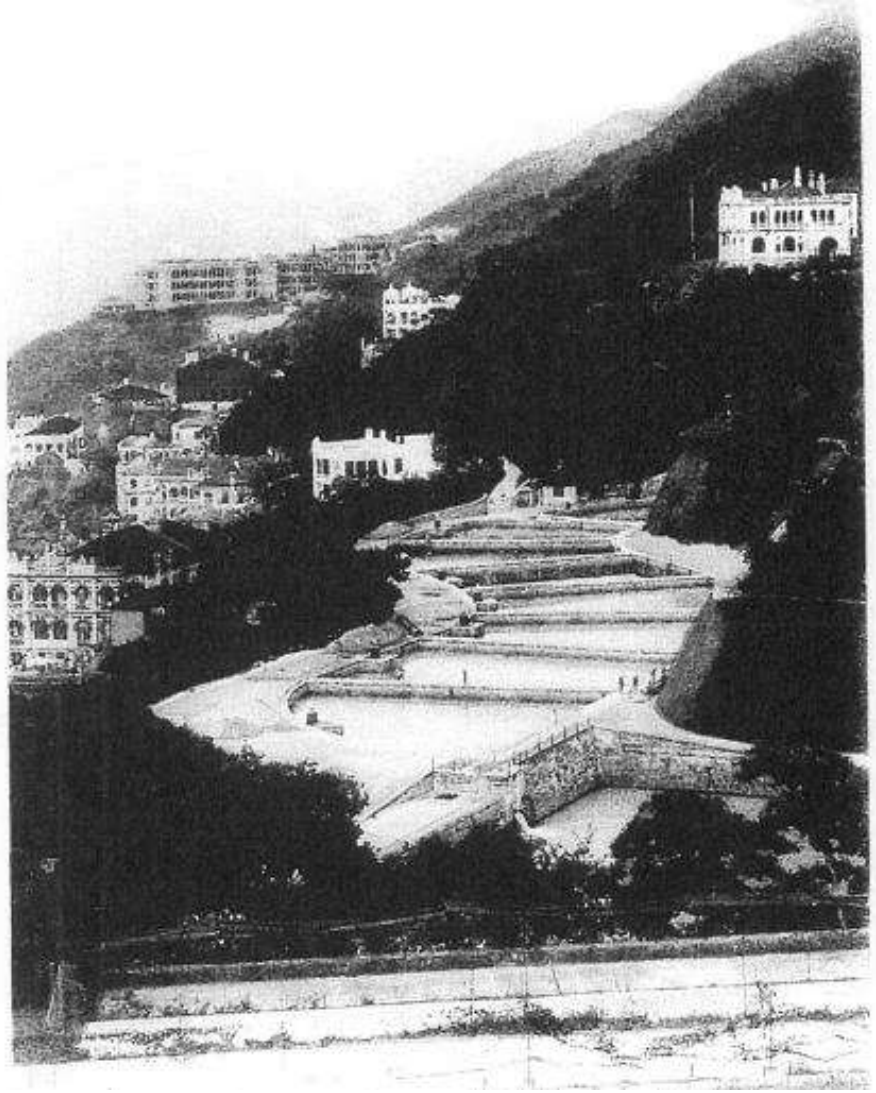
Bowen Road Conduit - 3’ wide x 2’6’ deep, gradient 1 in 1,200, discharge capacity 7 mg per day

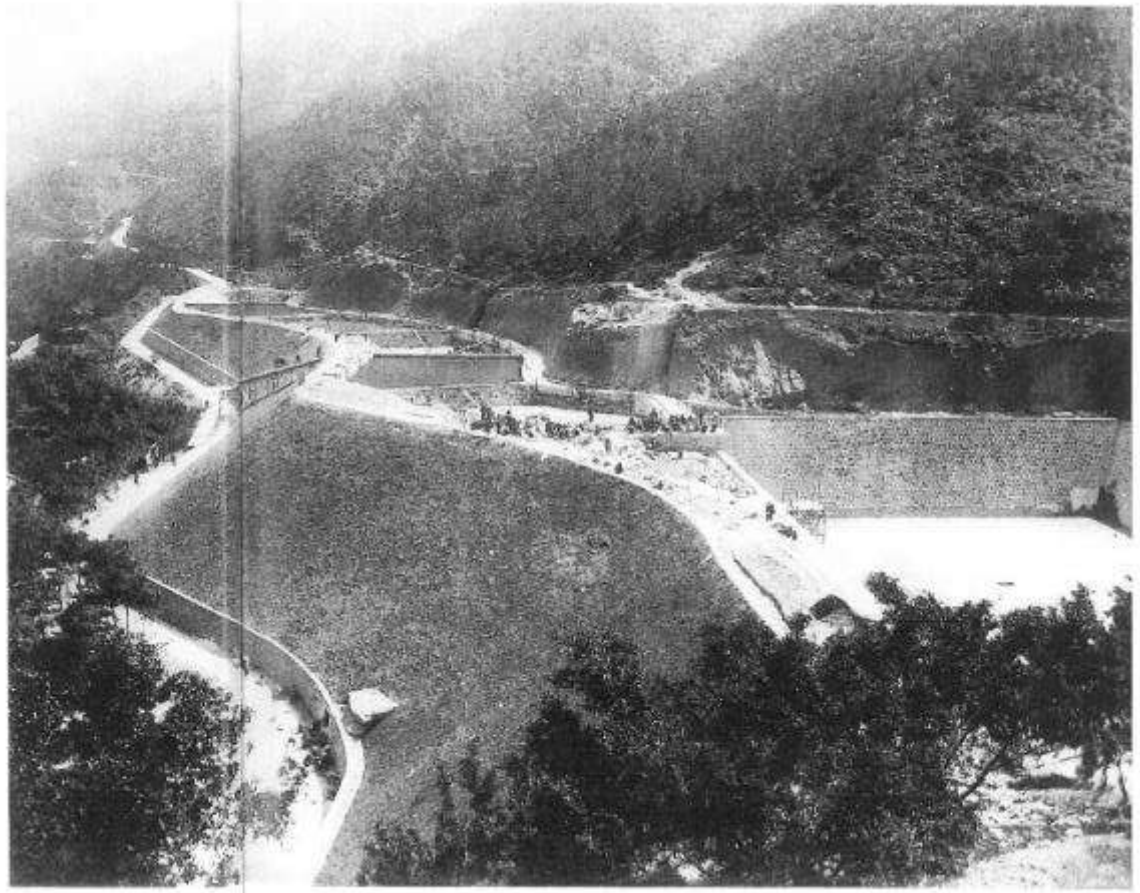
29

30

31

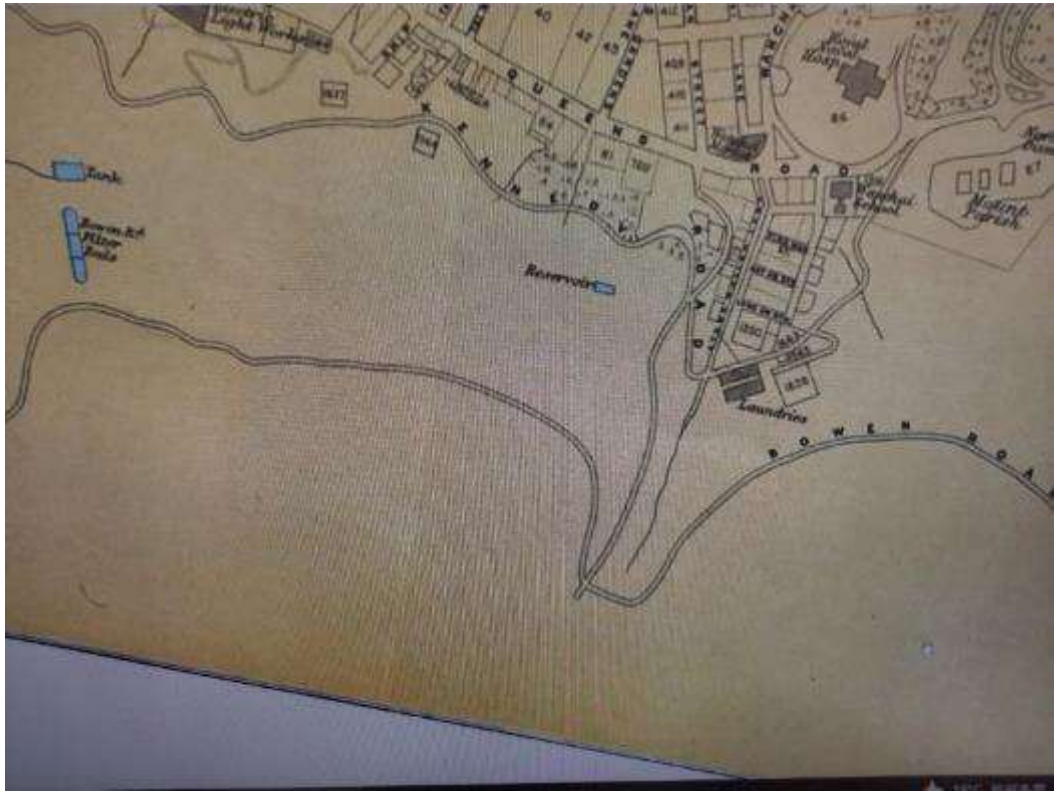
Filter and Service Reservoir at Albany






蒲魯賢徑臨時遊樂場
Brewin Path Temporary Playground
圖例
Legend
你在此
You are here

1896 Bowen Road Filter Beds 1,400m2 and S/R 720,000g, connected with Tai Tam Conduit and supplying water to the eastern part of the city



Bowen Road Filter Beds

End of Part One

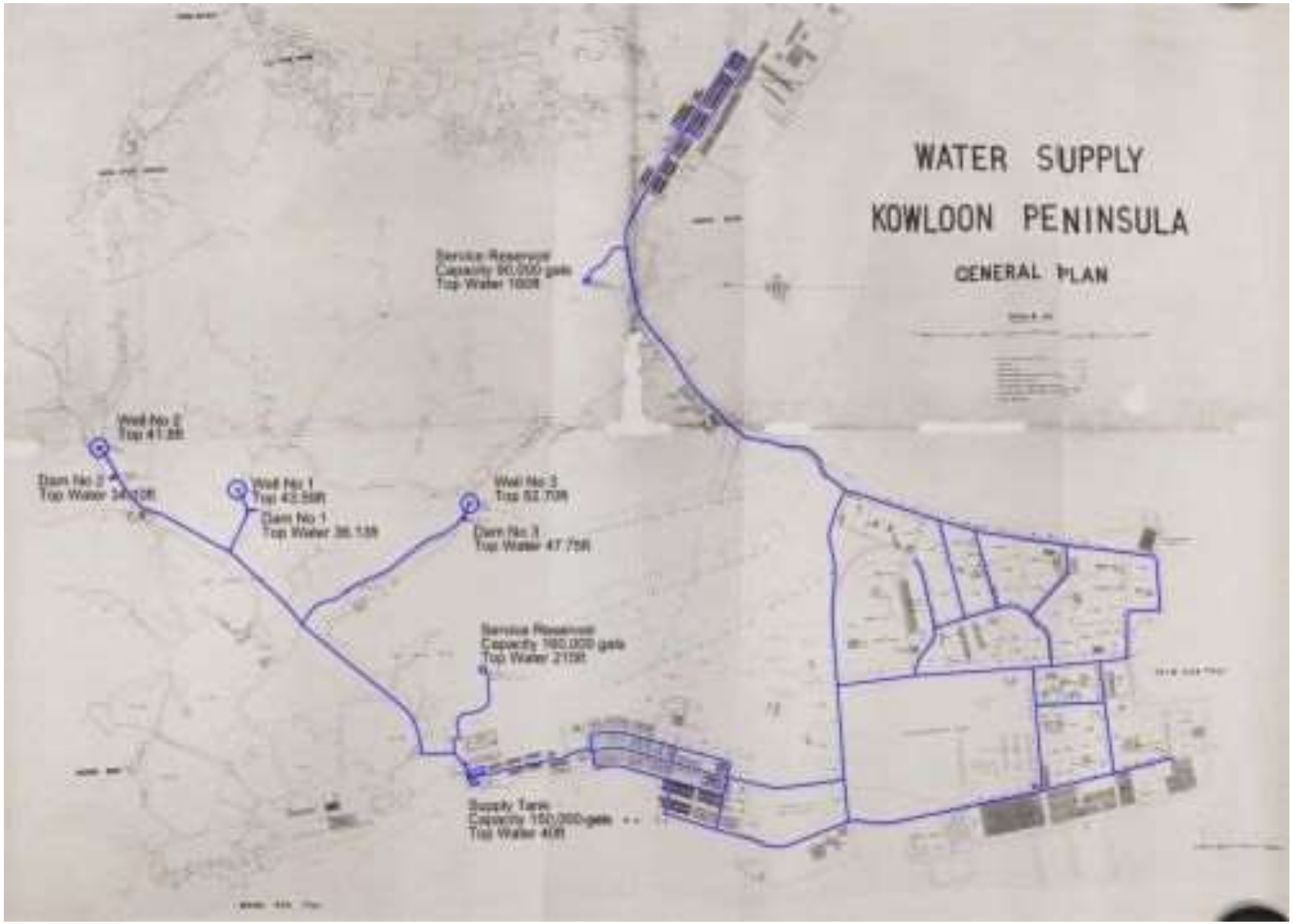
Part Two

Early Water Supply in Kowloon

Three Wells (Cooper and Chadwick Reports)

- Shallow wells and dams, connected by CI pipes to a tank of 150,000 g @ Yau Ma Tei, water pumped into distribution system.
- Regulated by two small reservoirs, YMT 215’ 160,000g and @ Hunghom 160’ 90,000g
- Supply 232,000g/d, pop in 1891 =13,205 +1,000 Indian Troops
- In 1897 =26,442
- In 1898, consumption > supply, authority for collection of supply from hills in NT, no fire hydrant
- Needed one SR @ Kowloon City 150,000g

Distribution System



Kowloon Water Supply (Cooper 1892 Report)

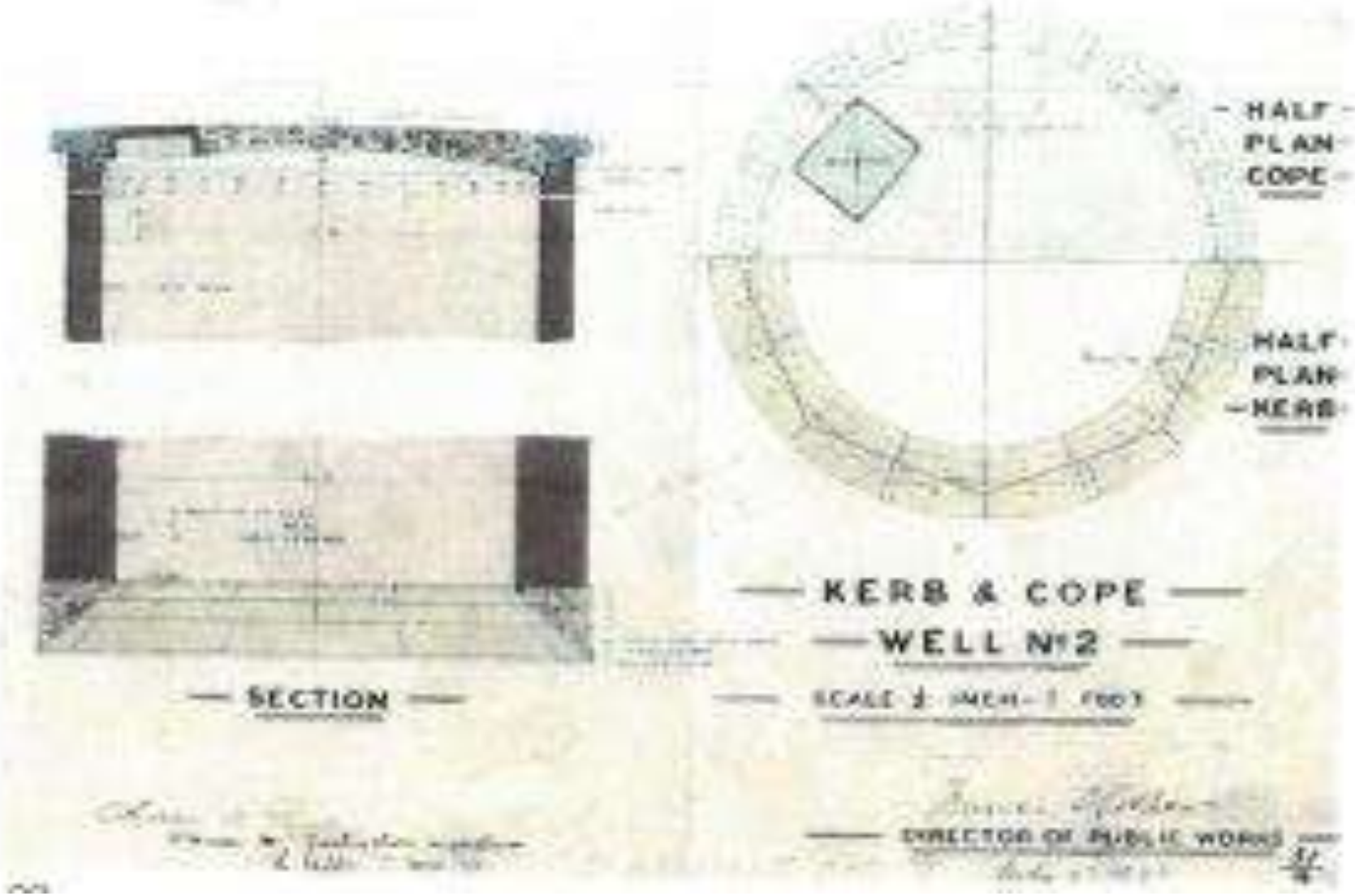
Well No.1 (Proposal Chadwick 1890 Report)

- Brick lining on a metal curb
- Lime concrete dam
- Area served: Mongkoktsui, Yaumati, Tsimshatsui, Hunghom (13,205 souls)
- Check availability of underground water

Well No.2 ($4,000) and No.3 ($4,800)

- 9’ internal dia, sunk until the impervious substratum is reached + a concrete dam
- Ensure sufficient supply during the dry season
- Water connected to P/S @YMT for pumping into the distribution network and a storage R/S

Well No. 2

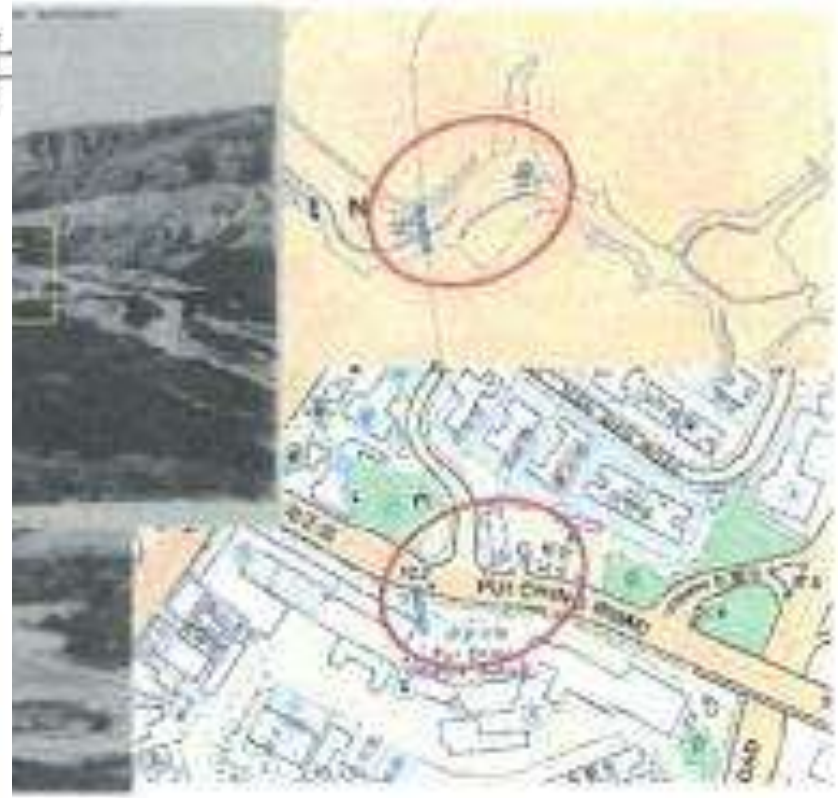

HALF PLAN COPE
HALF PLAN KERB
KERB & COPE
WELL Nº2
SECTION
DIRECTOR OF PUBLIC WORKS

P/S
Engine Room

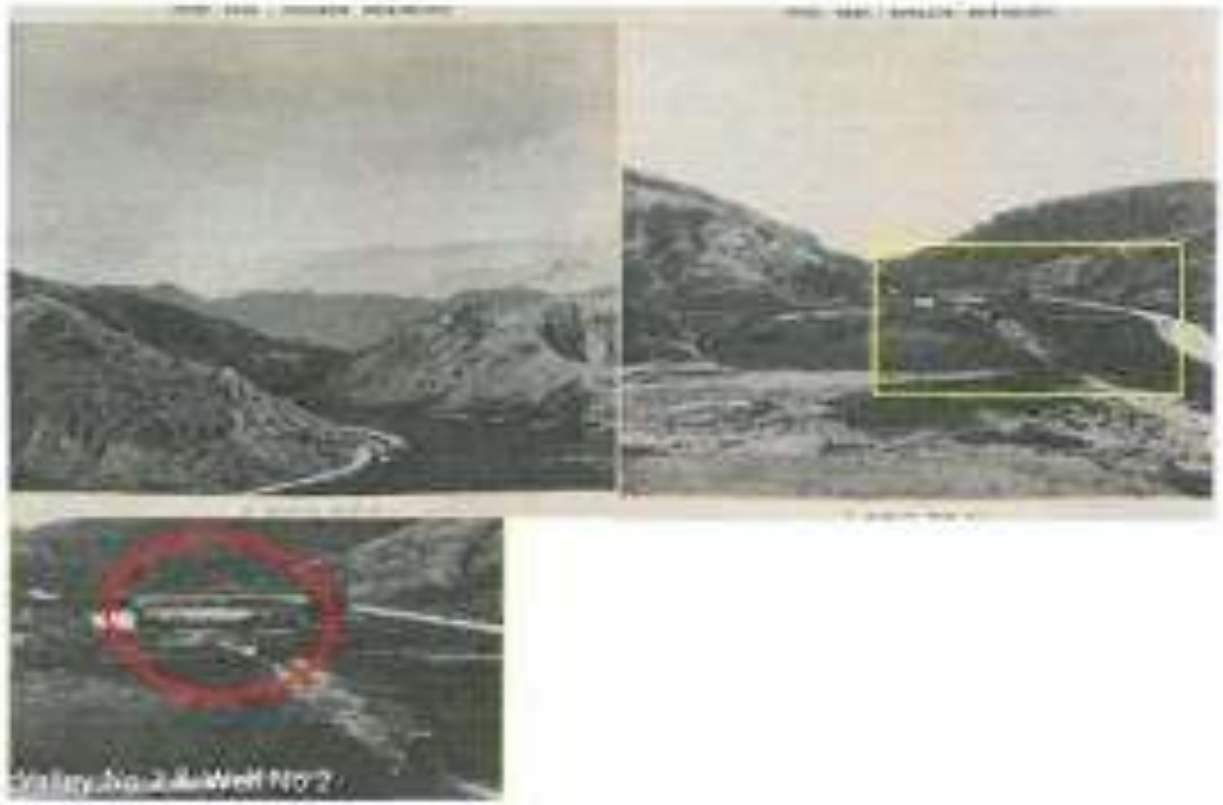
九龍以泵供水:油麻地泵房

Well No. 1 – Pui Ching, wide valley with shallow hills on either side, P/S with brick structures (photo 1896)

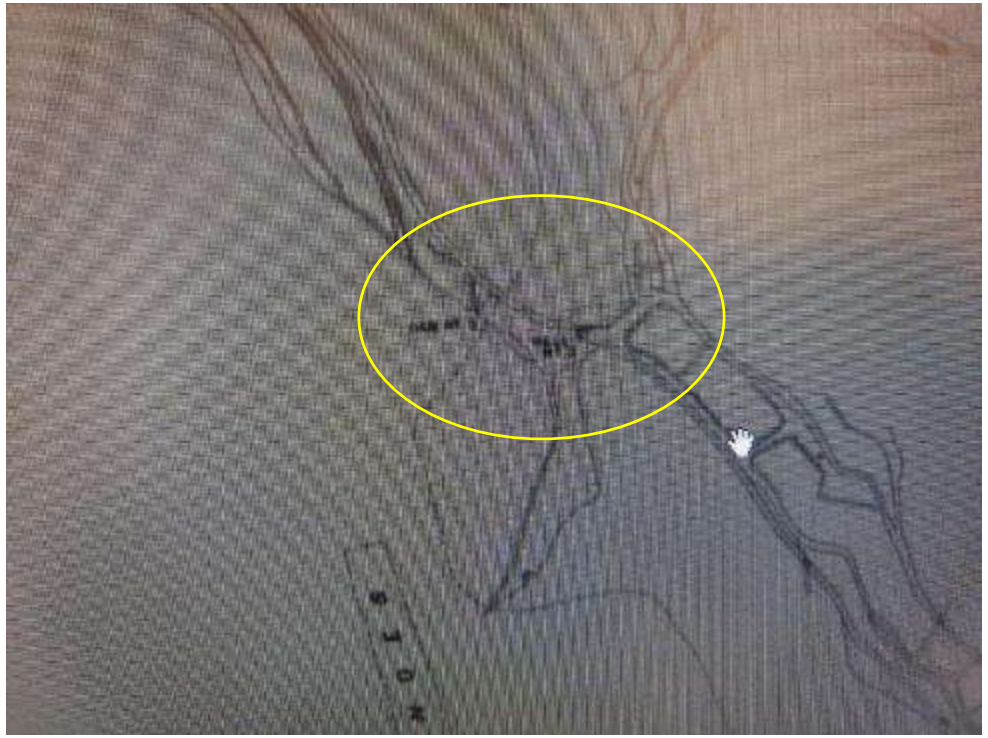
九龍以泵供水：窩打老道井

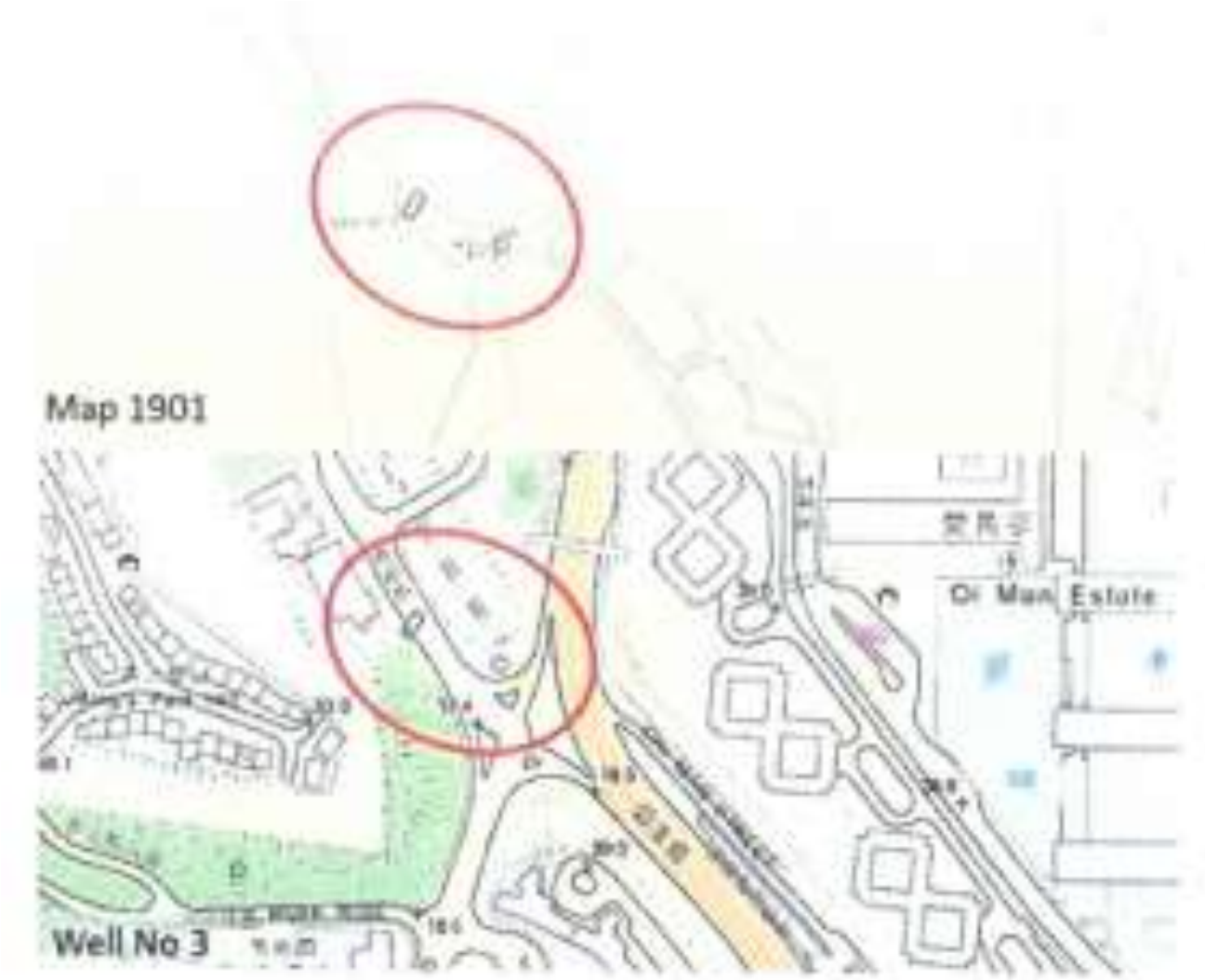


Well No. 2 – Junction of Princess Margaret Road and Argyle Street (photo 1896)

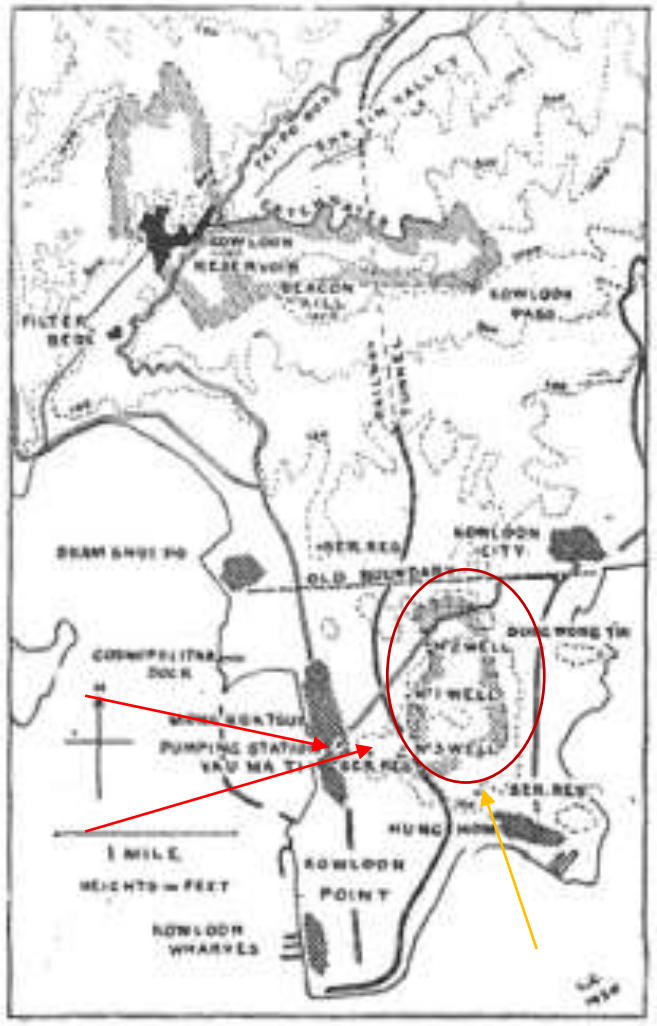


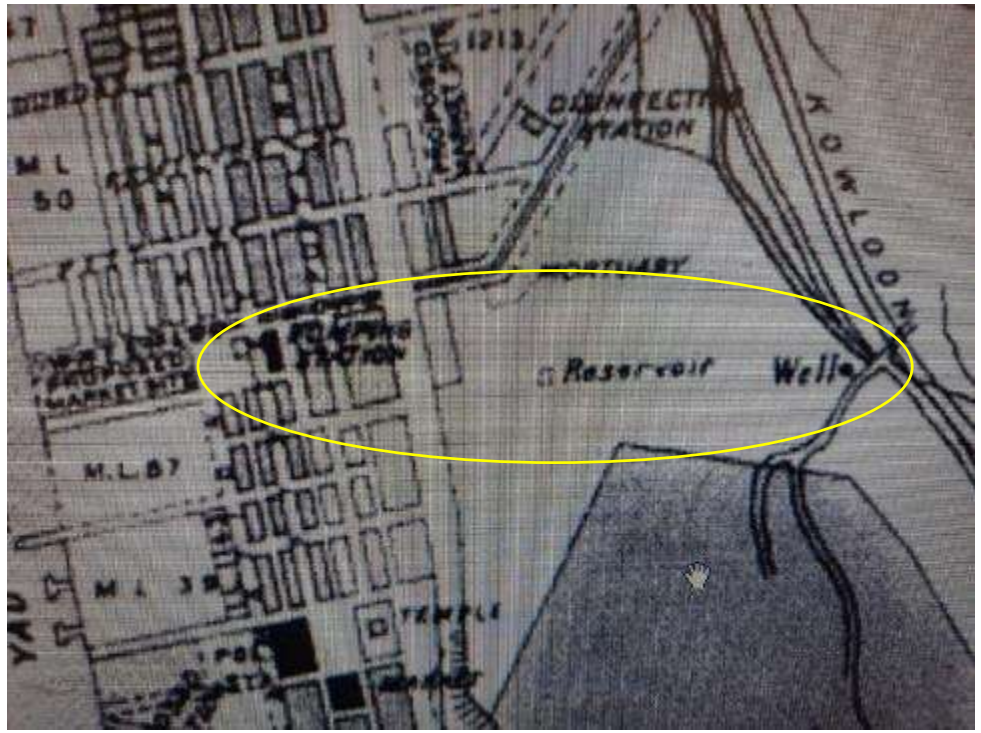
Well No. 3 Junction of Wylie Road and Princess Margaret Road





S/R and P/S @YMT, Three Wells



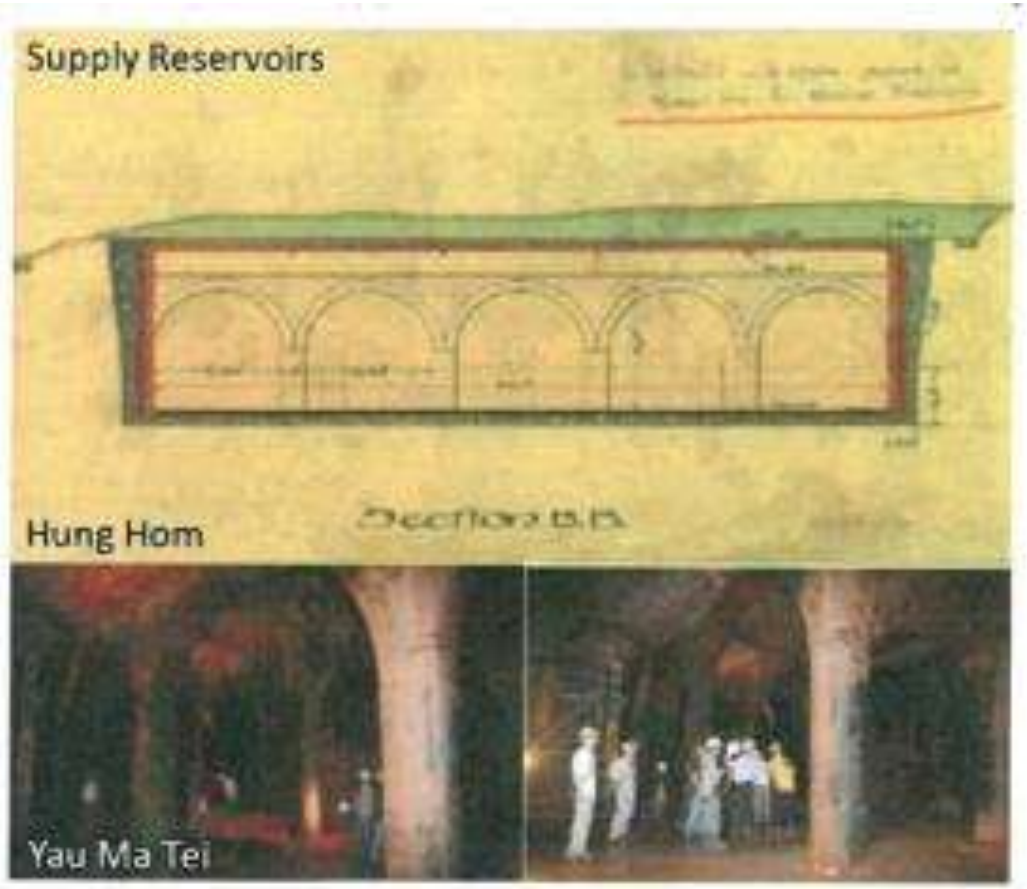


S/R @ Hung Hom

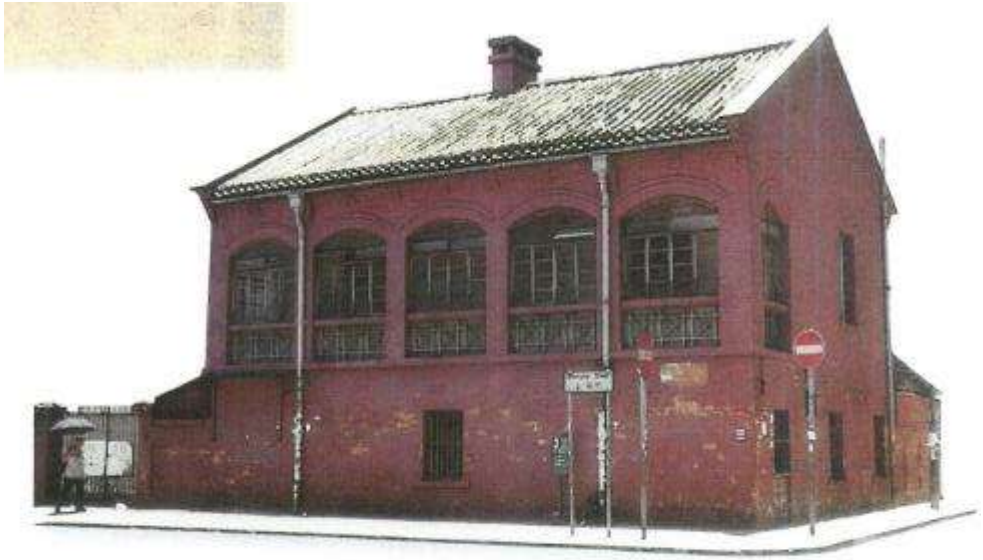
Report on Kowloon Water Supply 8 Jan 1900 by L. Gibbs

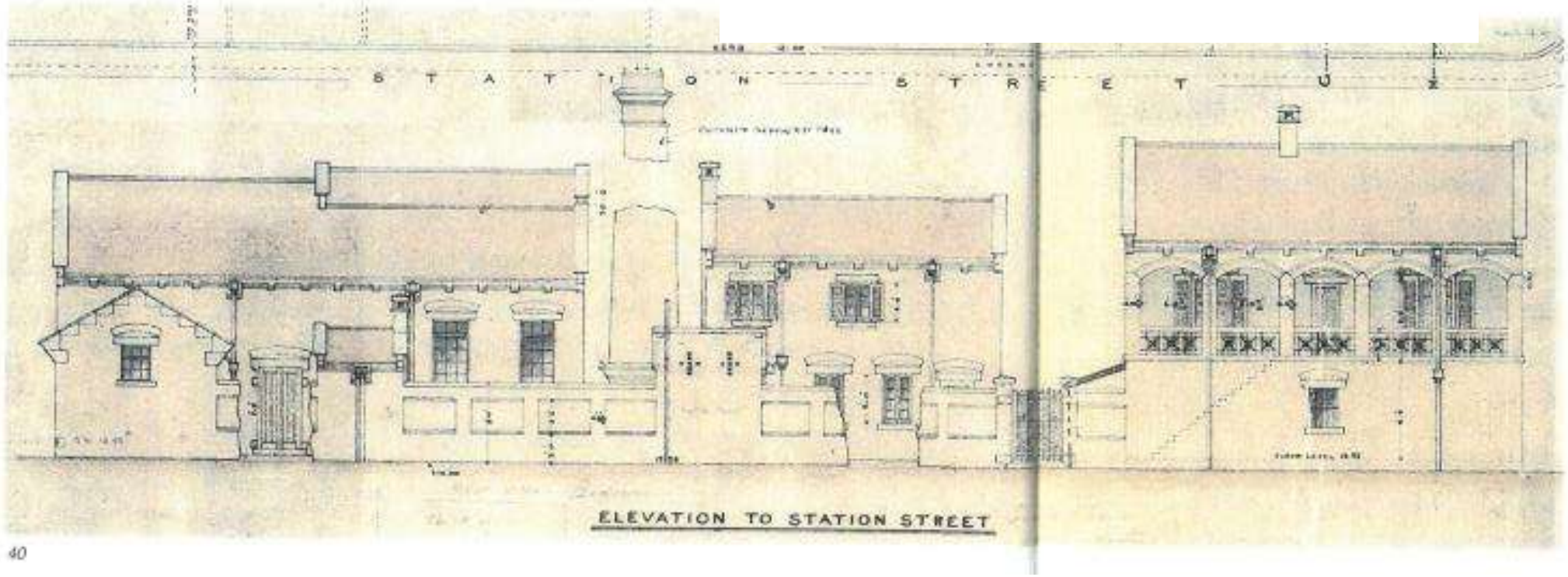
- 3 Wells for 150k g tank @Yau Ma Ti, pumped into distributing mains with 2 S/Rs - Yaumati 160k g, Hunghom 90k g (total 250,000g)
- Finished in Dec 1895
- Estimate for 1902: Pop 44,000 Kln and N.T., [Kln City 2,000 Shamshuipo 1,500, 413, 000g/d], av =9 g/diem
- Planned for 500,000g/d
- Gathering grounds on the back of Kln is very similar to Tytam and PFL
- Option 1 was chosen out of 5 options

P/S and S/R @ YMT/ Hunghom



P/S @ YMT





P/S @ YMT (ceased operation in 1911, KLN Storage Reservoir 1906)

- Chimney demolished in 1912
- 1st Bldg, [engine and boiler house] converted to Post Office 1910s to 1920s, ceased 1967, SA's Street Sleepers' Shelter until end of 1990s
- 2nd Bldg, [workshop G/F, fitters quarters 1/F], Hazardous Goods Store
- 3rd Bldg, [G/F -office, stores, boy/coolie, cook, latrine; 1/F, Overseers' quarters], Hawkers Control Office

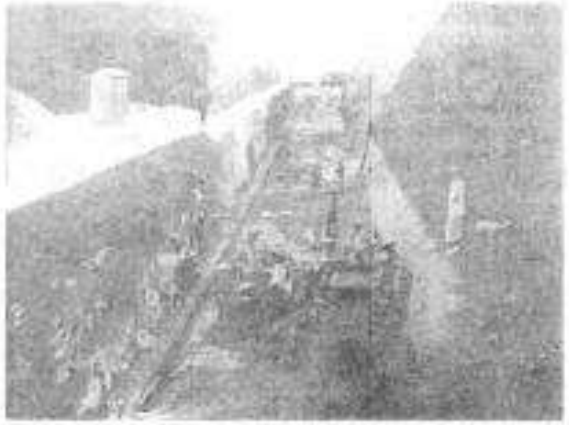
Kowloon Waterworks

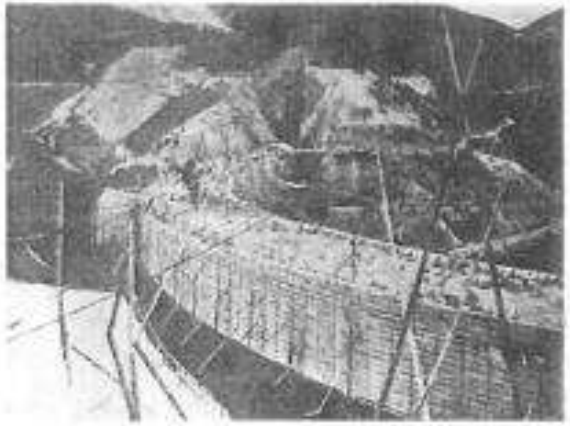
1890年擬議九龍供水計劃

(圖片來源:The Industrial History of Hong Kong Group, 'Hong Kong Water Supply – Kowloon Peninsula', website: https://industrialhistoryhk.org)

1892年擬議九龍供水計劃

(圖片來源:The Industrial History of Hong Kong Group, 'Hong Kong Water Supply – Kowloon Peninsula', website: https://industrialhistoryhk.org)

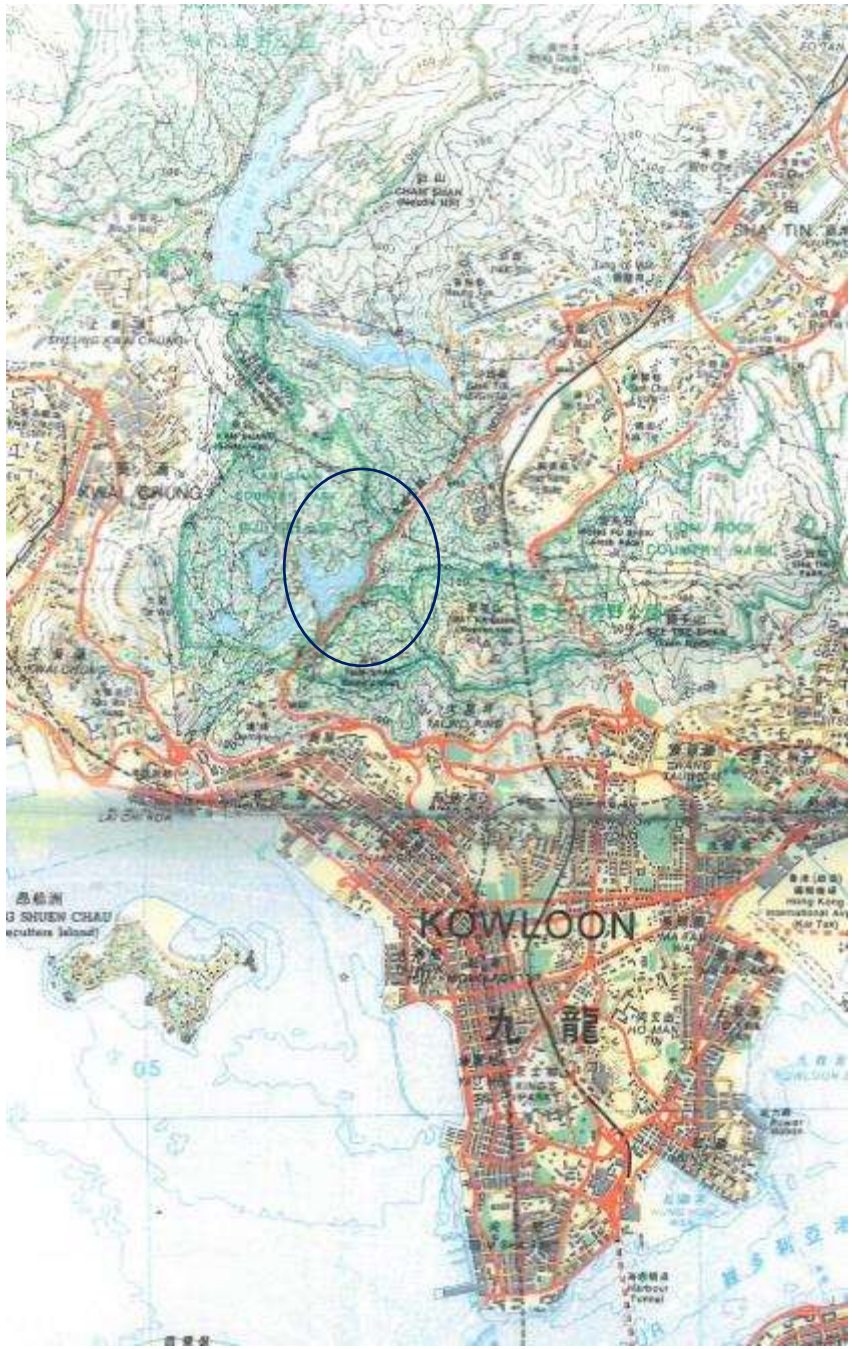




Option 1
Kowloon Reservoir

Required 200 days consumption

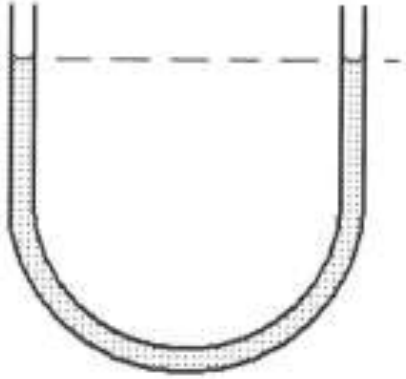
Design 120mg



Kowloon Gravitation Water Supply Scheme

為何九龍供水叫「地心吸力」計劃?

- Kowloon Waterworks Gravitation Scheme
- 重力自流、萬有引力、地心吸力、水向低流
- 1904 年前工務局年報用九龍水務 (Kowloon Waterworks)
- 內部文件兩叫法都有
- 1895/12/24九龍利用泵水工程供應食水
- 1904 年九龍利用部份落成的「地心吸力」計劃工程供應食水
- 1906/12/24停用泵水工程供應食水
- 從「泵」過渡至「無泵」供水



Kowloon Gravitation Water Supply Scheme: Storage Reservoir (100’H, 350mg)

- On the ridge above Cheung Sha Wan
- Originally an earthen dam with puddle wall at centre, fear of lack of good building stone
- On 12 Dec 1900 endorsed by Director of Public Works, change to masonry/concrete dam as good rock was found
- CI pipe in Tai Po Road to S/R on the hill to the north of Kowloon Tong Village
- Water supply extended to Kln City (E), To Kwa Wan/Ma Tau Wai; Yau Ma Ti, Tai Kok Tsui/ Sham Shui Po (W)
- S/R 150’ Dia, 20’ Deep, 2 mg
- Dam contractor - Tsang Keng
- In Kowloon City a small S/R of 150, 000 g was added

Storage Reservoir - Dam

86. (*Item 35.*) *Kowloon Water-works Gravitation Scheme.*—Fair progress has been made on the various sections of this work which is being carried out under the supervision of Messrs. Denison, Ram and Gibbs.

(i.) *Storage Reservoir.*—The concrete work on the main dam was commenced on the 6th January and by the end of the year the dam had been built to 373 feet above Ordnance Datum (the lowest part of foundation being 342 feet). The work done during the year comprises 9,600 cubic yards of cement concrete, 9,200 cubic feet of dressed masonry and 100 cubic yards of rubble masonry.

A commencement was made with the excavation for the bye-wash dam and about 3,000 cubic yards of soil were removed.

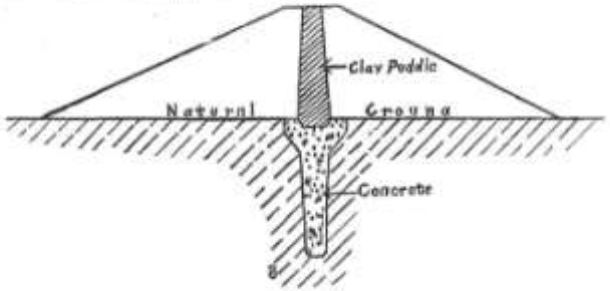
The Bungalow was completed and is now occupied by the Overseer in charge of the work.

A road diversion about 1 mile in length which will take the place of the present path crossing the site of the Reservoir was put in hand and the earthwork completed.

Indents have been prepared and forwarded for the outlet gear for valve well and for the sluices and recording gear for the Bye-wash.

Puddle Trench.

5.—I am of opinion that, unless the most excellent puddle clay is readily obtainable, a concrete stop wall is preferable to a puddle wall. At any rate it is good practice to fill in the puddle trench below ground with concrete, using puddle only in the bank, thus:—



Valve Well and outlet arrangements.

The Dam


1910

Tender for S/R Construction

憲示第七百六十八號

輔政使司梅

為論事現奉

督憲札開所人投接在新界九龍塘處建築供用水塘並安放十二寸

大生鐵喉相通水塘與九龍大廠此地盡可於英十二月十七日即禮

拜三日下午三點鐘由工廠地盤水廠起程前往看驗合約訂明禮拜

日停工所有投標均在本署收至西曆本年十二月二十九

日即禮拜一日正午止如欲投標格式與看圖及討取圖者前

赴田彌臣磐及却士處商可也各憲價列低昂任由

國家乘取或可乘不取亦可等因本此合行出示驗論乃此特示

一千九百零二年　十二月　十二日示

GOVERNMENT NOTIFICATION.—No. 768.

Tenders will be received at this Office until Noon of Monday, the 29th December, 1902, for the construction of a masonry and concrete Service Reservoir near Kowloon Tong, in the New Territory, and for the laying of 12" cast iron pipes to connect the Reservoir with the Kowloon mains.

The site may be inspected on Wednesday, the 17th December, leaving the Pumping Station, Yaumati, at 3 p.m.

No work will be permitted on Sundays.

For Form of tender, specification and quantities apply to Messrs. Dentson, Rae & Gibbs.

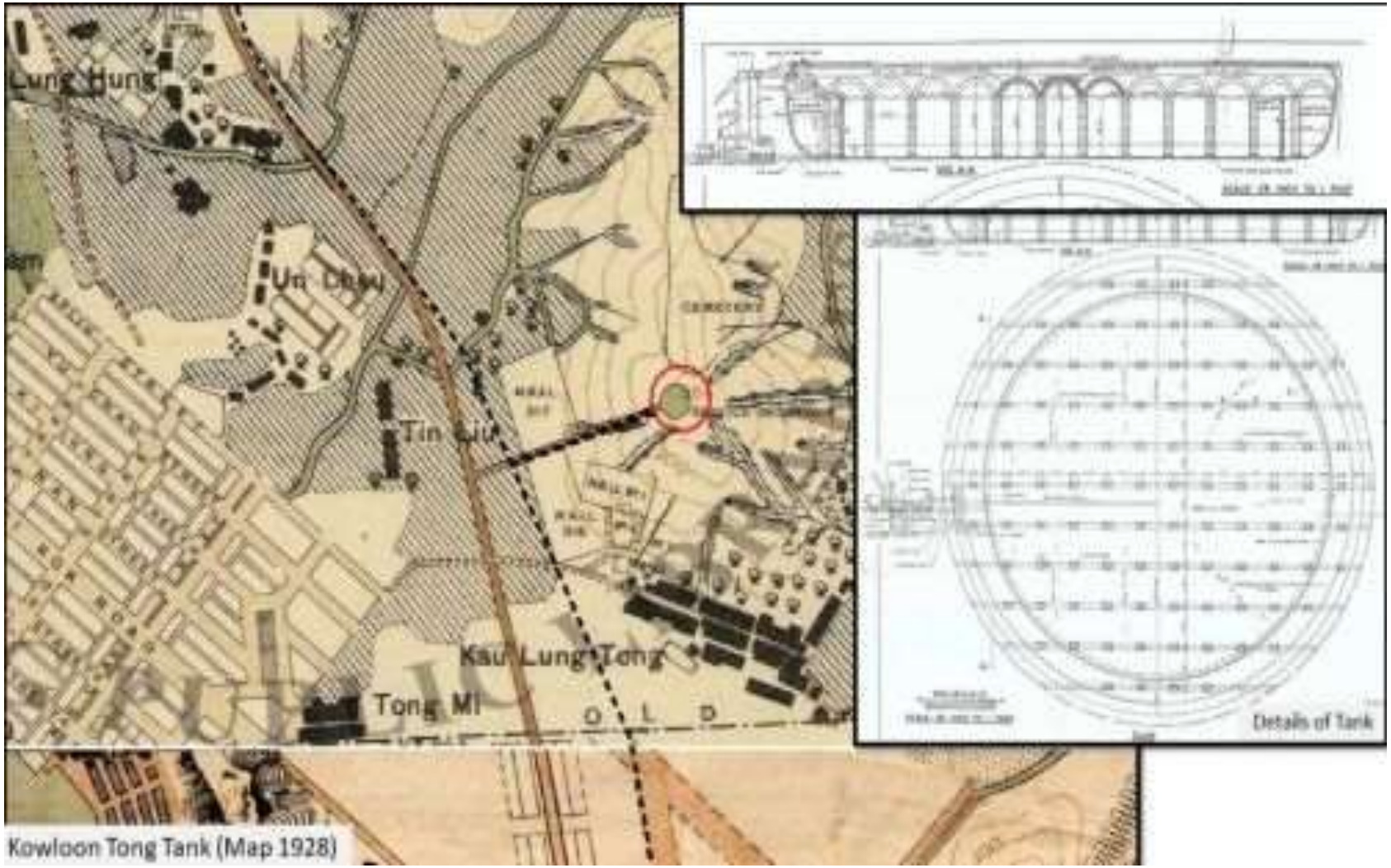
The Government does not bind itself to accept the lowest or any tender.

By Command,

F. H. May,
Colonial Secretary.

Colonial Secretary's Office, Hongkong, 12th December, 1902.

S/R at Kowloon Tong



S/R at Kowloon Tong

No suitable site near the center of the district to be served

(ii.) *Service Reservoir near Kowloon-tong.*—The contract date for the completion of this work was 30th June. A bonus was offered for earlier completion with a view to making use of the reservoir during the summer rains, the offer however did not produce the desired result and the work was not completed till 10th August.

The reservoir is circular, 150 feet in diameter and 20 feet deep, it has a capacity of 2 million gallons, top water level is 255 feet above Ordnance Datum.

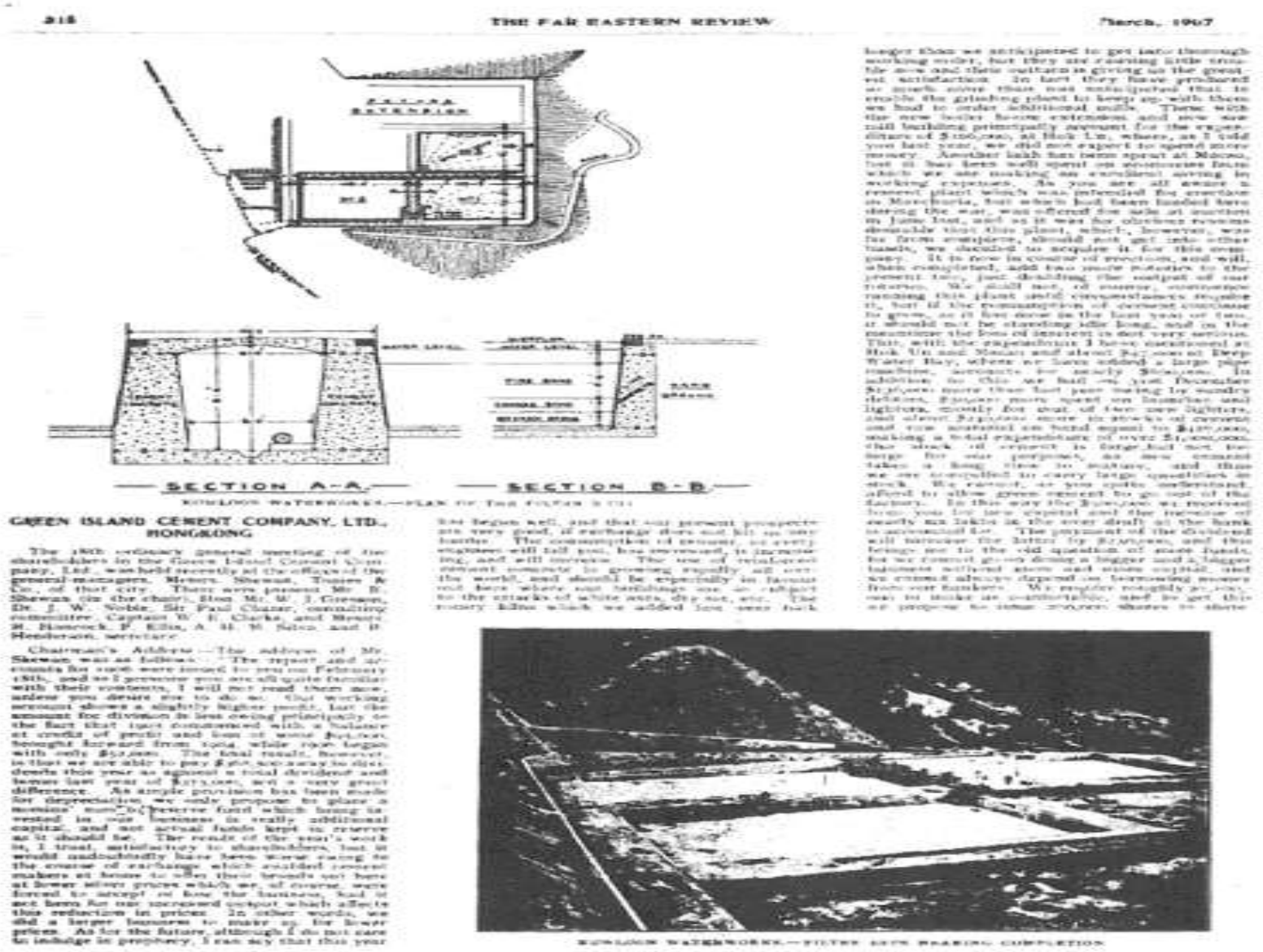
It is now being used in connection with the supply to Kowloon.

In connection with this work a meter-house was built near the Tai Po Road and the Venturi Meter fixed there to measure the whole supply to the Peninsula.

S/R

- Invitation for the tender for the construction dated 12 December 1902
- A masonry and concrete S/R, 12”CI pipe connect to S/R and Kowloon mains.
- Contract was signed with Tung Shing in Feb 1903. The S/R was sunk below ground level and constructed principally of cement concrete with granite pillars and brick arches to support the concrete vaulting which formed the roof.
- By end of the year, half of the brick arches were completed. Water level is 255 feet above Ordnance Datum.
- Reported in 1904, the contract date was 30 June 1904. Bonus was offered for early completion but the S/R was completed on 10 August not before start of the rainy season.

Filter Beds



318 THE FAR EASTERN REVIEW March, 1927

SECTION A-A. SECTION B-B.

KOWLOON WATERWORKS.—PLAN OF THE FILTER BED

GREEN ISLAND CEMENT COMPANY, LTD., HONGKONG

KOWLOON WATERWORKS.—FILTER BEDS NEARING COMPLETION

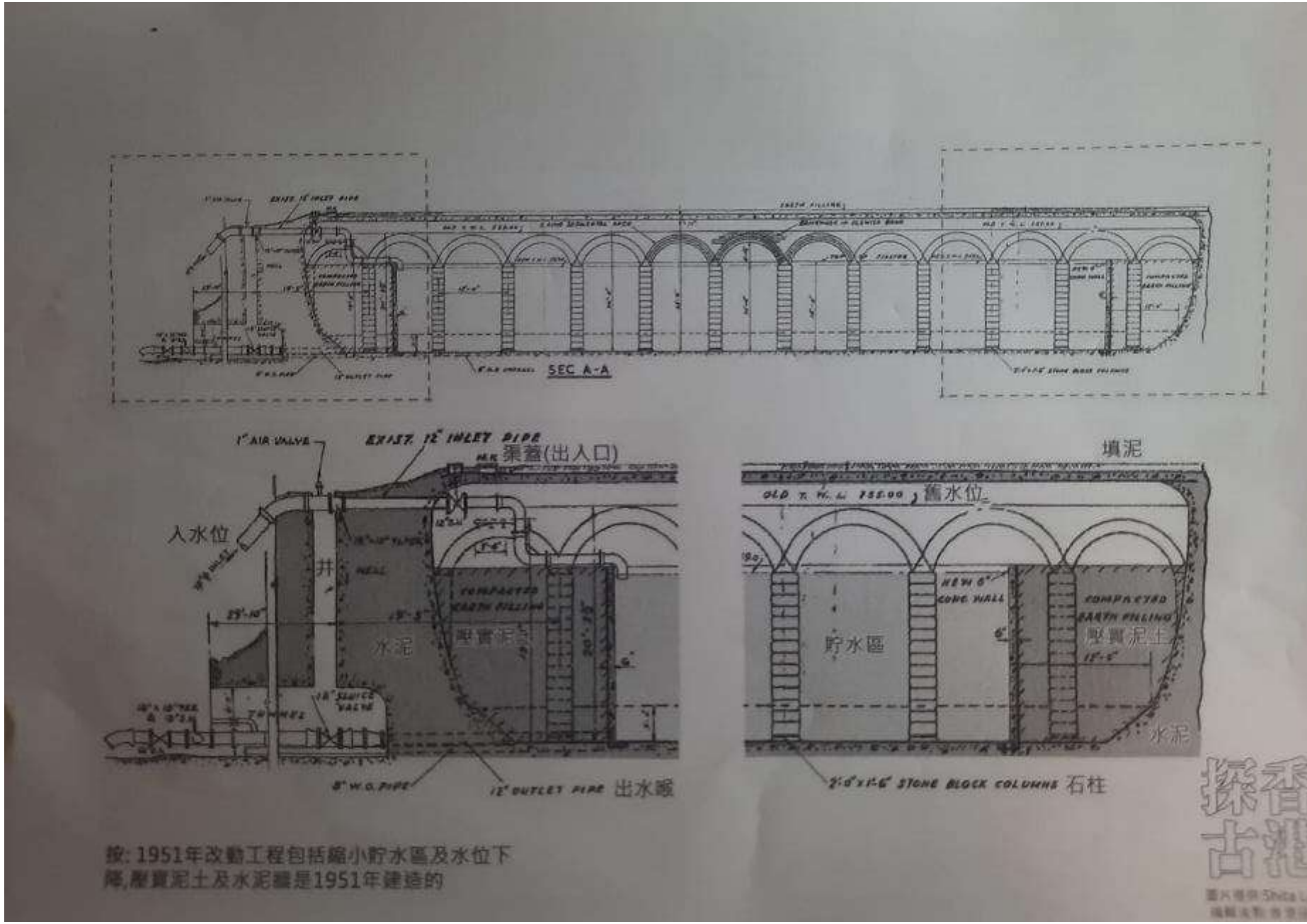
- The S/R is 150 feet in diameter.
- S/Rs - at least two compartments for maintenance without putting the whole reservoir out of service.
- Circular reservoirs are less suitable for subdivision. Circular layout with the least circumference for a given capacity, may be the best to suit the site layout without requiring deeper excavation.

- Drawing dated 1951 (repairs in 1950s) shows the lowering of the water stored and also reduction of storage area. Perhaps due to the compartmentation purpose or leakage from the circular wall. Out of service from April 1984.

Covering and Protection

- Flat roofed concrete reservoirs are usually covered with earth and grass for appearance and temperature insulation.
- Lots of this design can be found from existing S/Rs in Hong Kong.
- The earth cover to the roof should comprise grassed top soil of 150 mm thick, over a fabric filter membrane laid over a drainage layer.

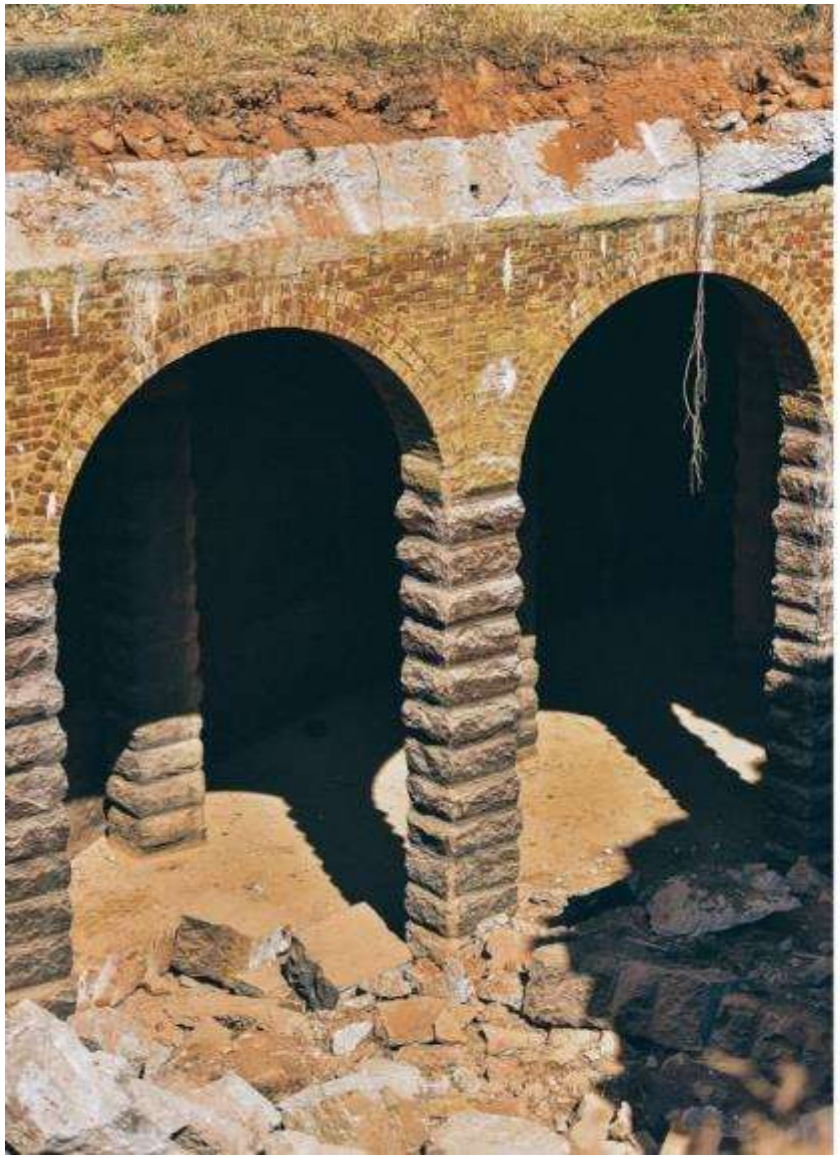
S/R at Bishop Hill

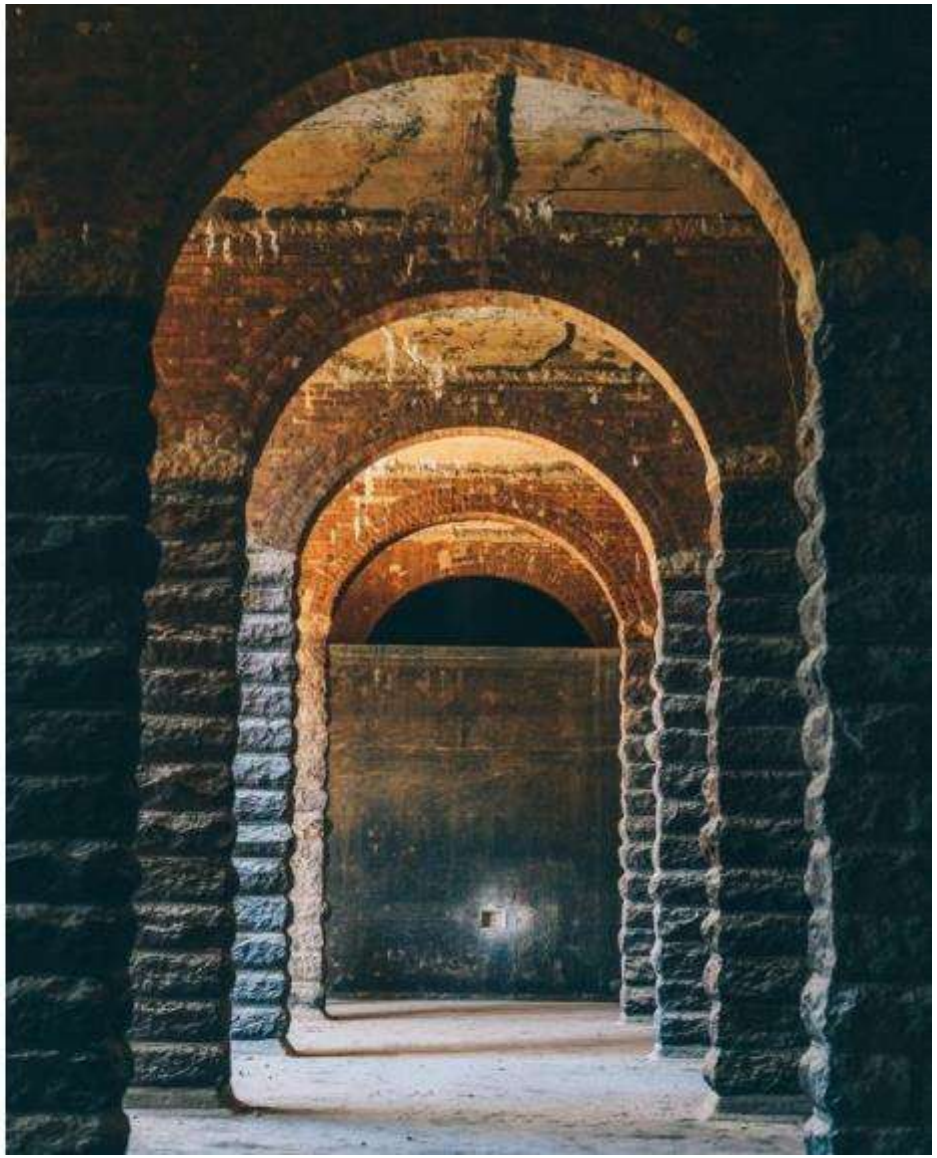


S/R at Yau Ma Tei (1894)

Blue bricks were made in NT for local use. (G.N. Orme's Report on the New Territories 1899 – 1912)

Bishop Hill
Photo: Hong Kong Reminiscence.





Unique in Hong Kong

- Cover
- Circular on plan
- Local materials
- Brick arching
- Piers formed by granite blocks
- Granite blocks, narrower at top and bottom, wider at mid depth
- Skilled craftsmen

S/R at Pokfulam 1869 & 1890 ???

The granite pillar

- Granite has been a common construction material in Hong Kong. Many heritage buildings such as:
- The Tea Pot Museum/Flagstaff House/HQ House(1846)
- The Murray Building originally erected at Admiralty now moved to Stanley (1846)
- The circular columns of the Main Building of HKU (1912)

Design of the Pillar

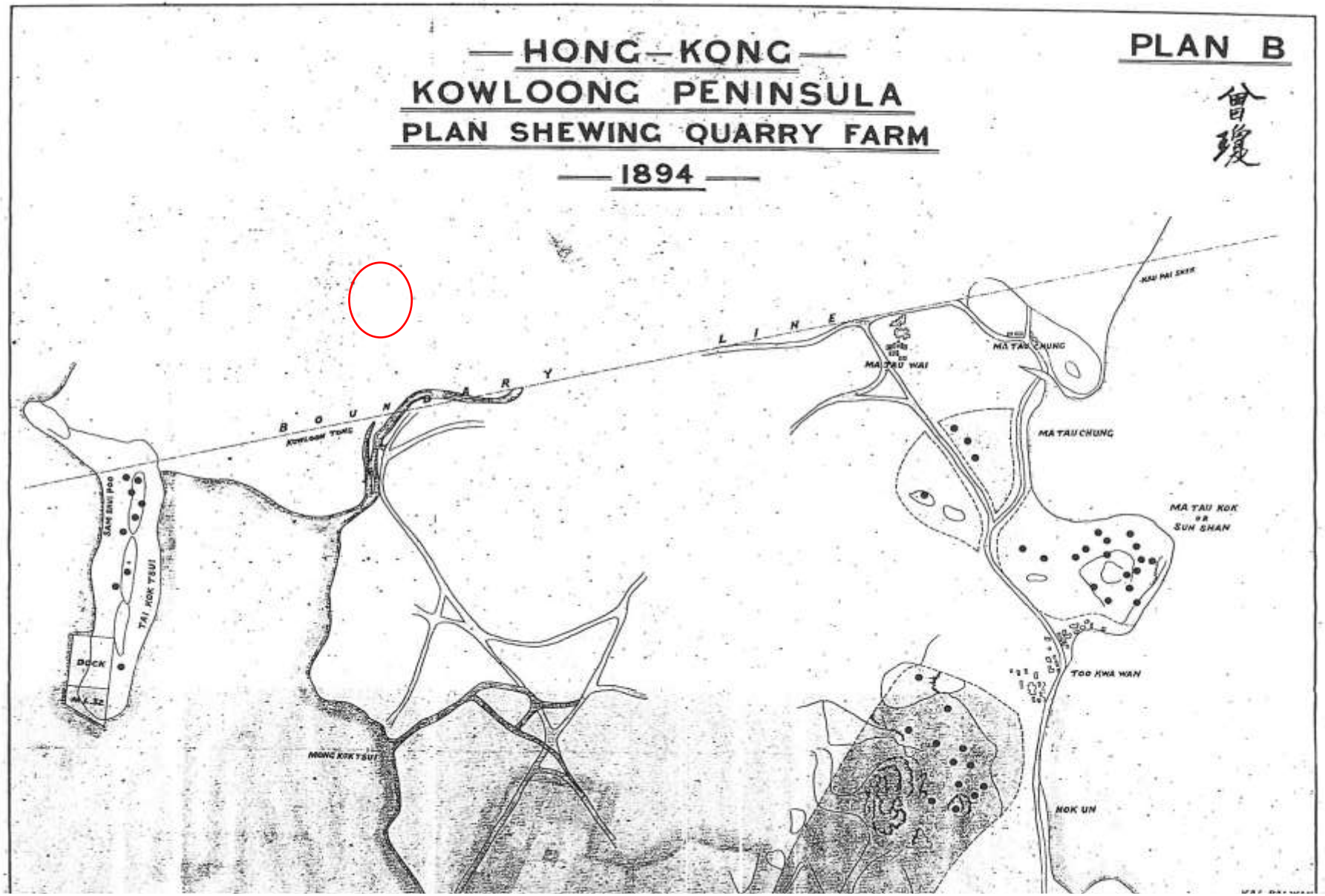
- Unlike examples where granite columns are polished and well dressed, pillars of this SR consist of 13 number of 450 x 600 (measured at the top and bottom) rusted granite blocks.
- The top block of each pillar is thicker to ensure the supports to the brick arches are on the same level.
- The blocks are rough without dressed with larger dimension midway between the top and the bottom of each block, and are bonded by cement mortar. Whether blocks are linked together by any dowels in between remains to be confirmed from the demolished four pillars.

- Such design is quite unique as compared with other known examples granite pillars.

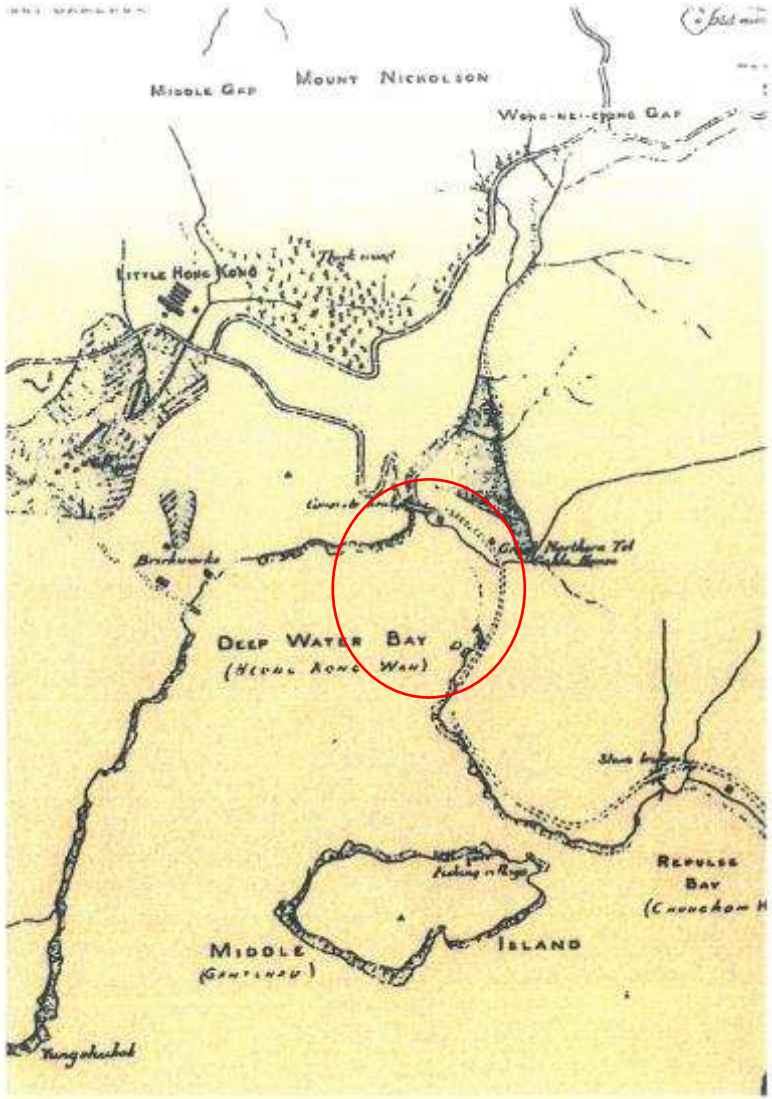
- Similar granite pillars can be seen from the 13 supports to the channel aqueduct of Tai Tam Reservoir built in 1880, but the blocks are finished, erected and jointed to form uniform sized columns, 610 x 940, for the upper half and increasing in size for the lower half.

- The granite blocks should have been cut from a nearby quarry. In the late nineteen century the quarries on Hong Kong island and Kowloon peninsula were predominantly owned by Tsang Keng/Li except in one year by Chan A Tong.

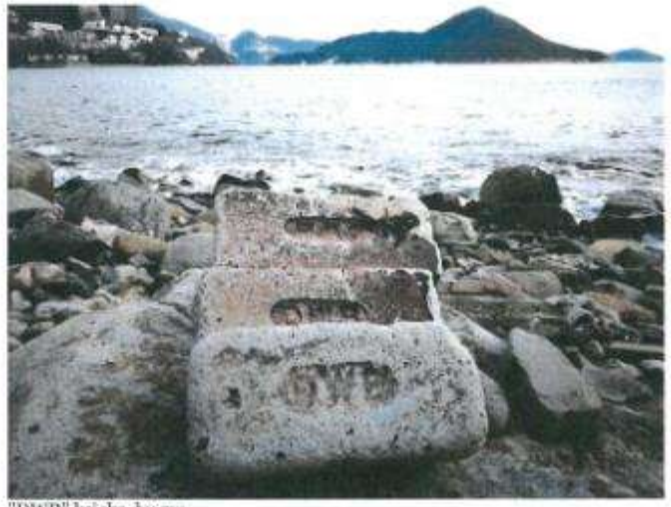
- The nearby quarries as indicated by the drawing dated 1894 were located at Sham Shui Po and Tai Kok Tsui. Further away are from the Quarry Hill and Ma Tau Chung and Ma Tau Kok (Sun Shan).


HONG KONG
KOWLOONG PENINSULA
PLAN SHEWING QUARRY FARM
1894
PLAN B
曾瓊
BOUNDARY LINE
KOWLOON TONG
SAM SHUI POO
TAI KOK TSUI
DOCK
MONG KOK TSUI
MA TAU WAI
MA TAU CHUNG
MA TAU CHUNG
MA TAU KOK
SUN SHAN
TOO KWA WAN
HOK UN

The Hong Kong Brick and Cement Co. / Brick Hill



Deep Water Bay/HK Brickworks/ Green Island Cement



"DWB" bricks, by gw

Secondly, "HKB",...

"HKB" bricks, by gw

...and thirdly, "GIC".

"GIC" brick, by gw

Bricks

- Canton Grey brick/black or blue brick for upper storey supporting the roof

- Locally red bricks for TTTPs, with cement mortar below ground, piers and jambs; and lime mortar for reminder

Conduits

- Canton blue brick in excavation, red bricks for exposed

Gazette 20 April 1889

G GOVERNMENT GAZETTE,

THE HONG KONG BRICK AND CEMENT COMPANY, LIMITED.

THIS Company is now prepared to Manufacture Machine-Pressed Building Bricks of superior quality, in White or Red Clay.

Also specialities, such as Spring Traps, Window Sills, Ridges, Copings, Tiles, Earthenware Drain Pipes, Gullies, Cesspools and other Sanitary Fittings.

Fire Bricks and all descriptions of Fire Clay Goods.

For Terms and other particulars,

Apply to

W. H. WALKER,
Secretary.

Bank Buildings,
Hongkong, 19th April, 1889.

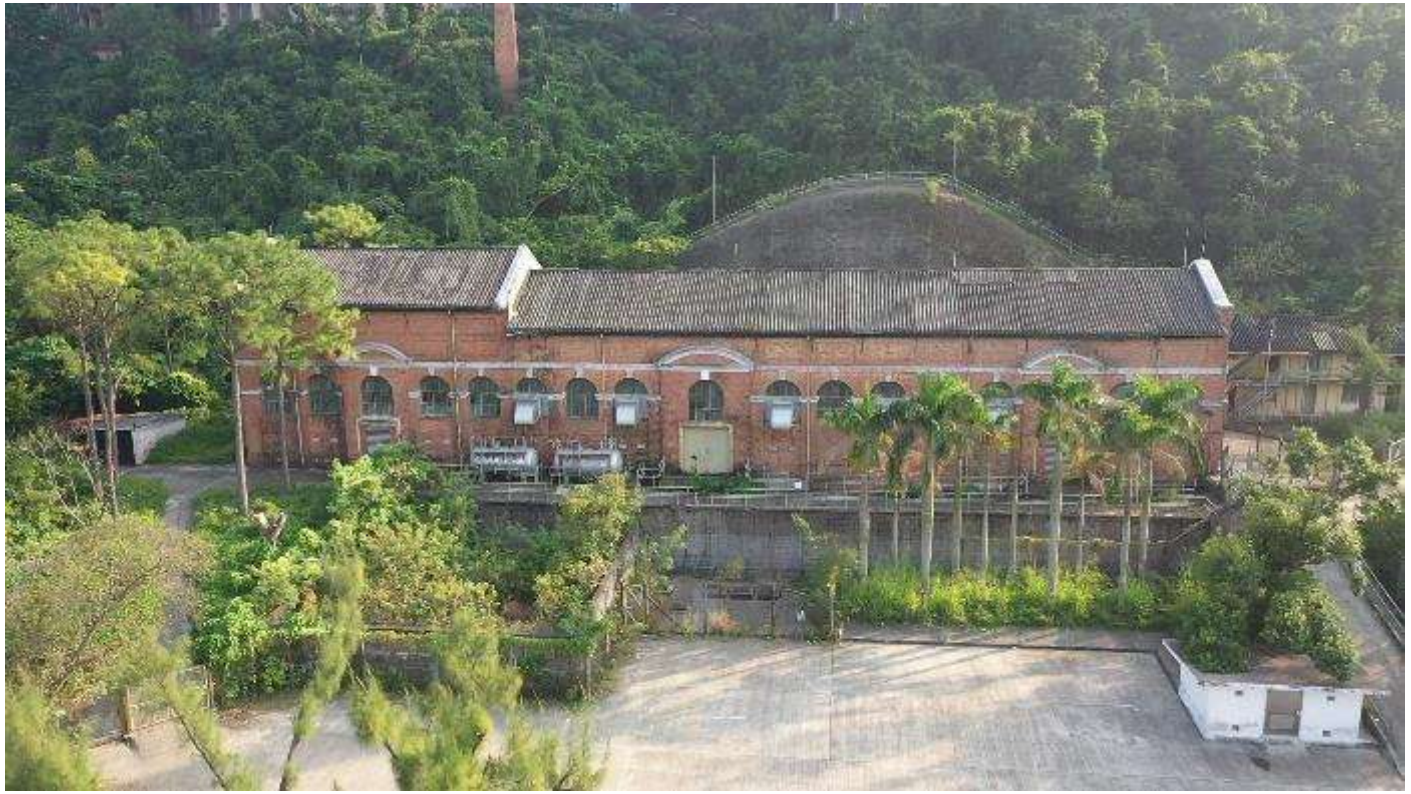
紅毛泥公司告白

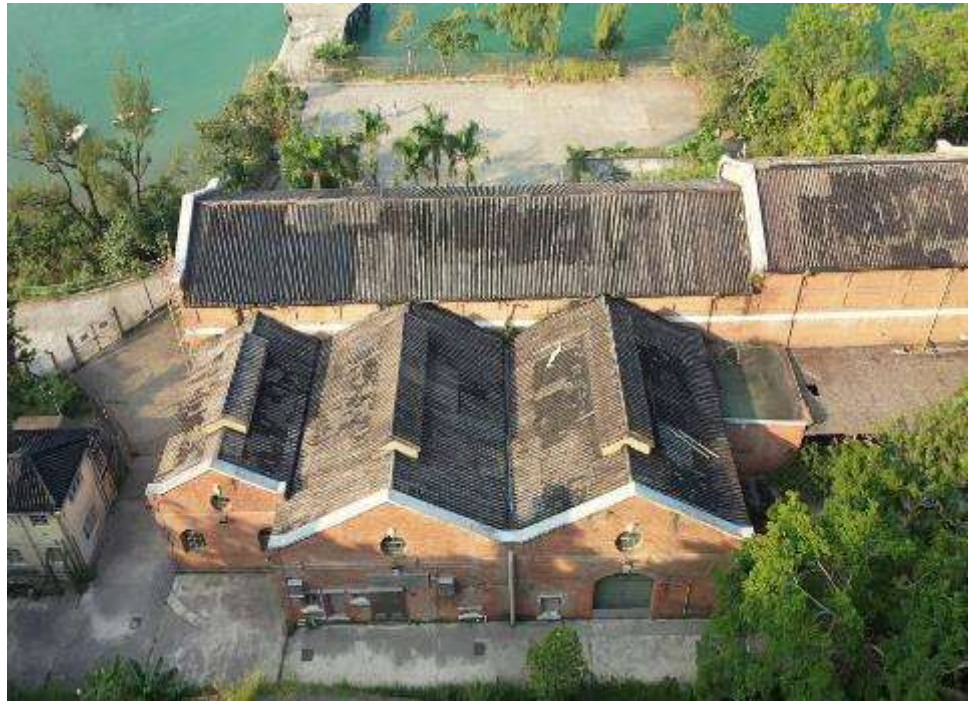
啟者本公司承造紅白泥機器印磚以供建造之用貨色上等另造水道窗門頭瓦脊瓦雷瓦窰器柴筒瓦糟罎井暨別項潔淨地方器皿及爐磚與各等爐泥器具價錢各節請到大道中大酒店對面本公司寫字樓弟與面議可也此佈

一千八百八十九年四月六號

香港磚料公司董事人穫稼謹啟

Tai Tam Tuk Raw Water Pumping Station 1907





Materials

- Cement – Portland cement through Crown Agents for Tai Tam
- Small quantity from the local supplier as emergency (Green Island cement for TTT)

- Concrete for Dam - 1 cement: 2 sand: 2 three quarters of an inch cube: 3 one and half in cube broken stone [1:3:5 Top part of TTT dam]

- Lime concrete- red earth: shell lime (sea shell burnt): broken granite

  Watertight/strong- 1 lime: 1 red earth: 3 half-inch stone

  Ordinary foundation- 1:1:4

- Cement mortar- 1 PC: 3 river sand
- Lime Mortar- 1(1-3) red earth : 1-2 (1) sea shell lime for Wall (conduit)

Puddle –

- To cover earth 18” to 24” thick
- from Whampoa, 80 miles away

Concrete rest on WI/CI joists (TT)

Concrete floor – cement concrete with iron rods (Gap Rock 1892)

Concrete piles – 1” dia steel rods

R.C.C. – first mentioned in 1910 PWD Report “Addition to No.2 Police Station”

R.C. frame in building – Gaol extension in 1914

The tiling of the walls and the erection of the necessary fittings for the poultry killing-room were nearing completion.

1910 Estimates, ... $32,000.00	Total Estimates ... $66,000.00
1910 Expenditure, $28,818.61	Expenditure to 31/12/10, ... 47,373.51

75. *Additions to No. 2 Police Station.*—This work consisted of the demolition to a large extent of the old building, which was two stories in height, and the reconstruction and re-arrangement of it as a three-storied building throughout, a fourth storey being added over a portion of it. Considerable difficulty was experienced in connection with the foundations of the East wall which abutted against the gable wall of the adjoining house. The latter wall, including its foundations, was discovered to be of inferior construction, but its condition was not such as to justify the service of a notice for its demolition and the owners declined to undertake its reconstruction. By modifying the design to some extent and exercising special precautions, the difficulties were overcome and the foundations and wall of the new building were successfully constructed without injury to the adjoining house. The work was nearly completed by the close of the year, only some of the finishings, colourwashing and painting remaining to be done.

The building contains a charge room and 3 cells, quarters for an Inspector, comprising 3 rooms, a kitchen and bath and store rooms, quarters for 3 European Sergeants and 4 European Constables, (3 rooms, kitchen and bathroom), 15 Indian Constables (2 rooms, kitchen and bathroom), 4 Chinese Sergeants (2 rooms) and 15 Chinese Constables (1 room, kitchen and bathroom), besides the necessary latrine accommodation and a room for coolies. Verandahs are provided on all floors on the North front and balconies on the South and West fronts.

Accommodation is provided for 37 extra men over the number who could be housed in the old building.

The walls are built of Canton red bricks, generally in lime mortar, rough-cast externally and plastered internally. The floors of the rooms are of 1¼" hardwood on hardwood joists, which are generally exposed, ceilings being only provided in the case of the Inspector's Quarters, which are situated on the top floor, and of the Charge Room and European Constables' room. The floors of the verandahs, balconies, kitchens and bathrooms are of reinforced cement concrete covered with cement or salt-glazed tiles. The floor of the partial fourth storey is of reinforced cement concrete, covered with asphalt and salt-glazed tiles.

The roof is partly of double pan and roll tiling on hardwood rafters and partly of reinforced cement concrete. The steps of staircase are of granite, the landings of reinforced cement concrete and the handrail and balusters of wrought iron.

The building is lighted throughout with electric light.

1910 Estimates, ... $12,000.00	Total Estimates, ... $18,000.00
1910 Expenditure, $11,424.66	Expenditure to 31/12/10, ... $11,424.66

PUBLIC WORKS DEPARTMENT.

No. S. 68.—It is hereby notified that sealed tenders in triplicate, which should be clearly marked "Tender for the Construction of Reinforced Cement Concrete framed building at Hung Hom", will be received at the Colonial Secretary's Office until Noon of Friday, the 23rd day of February, 1934, for the storage of oil at the Government Store.

No work will be permitted on Sundays.

For form of tender, specification and further particulars apply at this Office.

The Government does not bind itself to accept the lowest or any tender.

R. M. HENDERSON,
Director of Public Works.

9th February, 1934.

Team Members

Dr. Katherine Y. Deng

Ir Dr. S.W. Poon

Ir K.F. Man

Ir K.Y. Ma

Mr. Wilson Wo

Acknowledgement

Paul Zimmerman
Hal Empson “Mapping Hong Kong – A Historical Atlas”
Prof Ho Pui Yin “Hong Kong Water Supply 150 Years”
Hong Kong Reminiscence
HK Maps.HK
CACHe
The Industrial History of Hong Kong Group
KE Impact Project, The University of Hong Kong

Thank you very much