“Edison Street Tubes” Presentation Parliament House-9th Aug. 2018

Engineering Heritage Queensland

- **Brian Becconsall- FIEAust.**

Retired Electrical Engineer- 48 years in Qld Electricity Industry, SEAQ, QEGB, QEC and Powerlink, and 2 years Overseas in Canada and USA, specialising in Transmission. Member EA Engineering Heritage Qld since 1988.

- **Stuart Wallace- FIEAust.**

Retired Electrical Engineer- a career of over 40 years mostly spent in consulting in the fields of power generation and transportation across the globe. Member EA Engineering Heritage Qld.

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Brisbane's Electric Power Plants 1882—1888

1- Suttons Foundry 1882

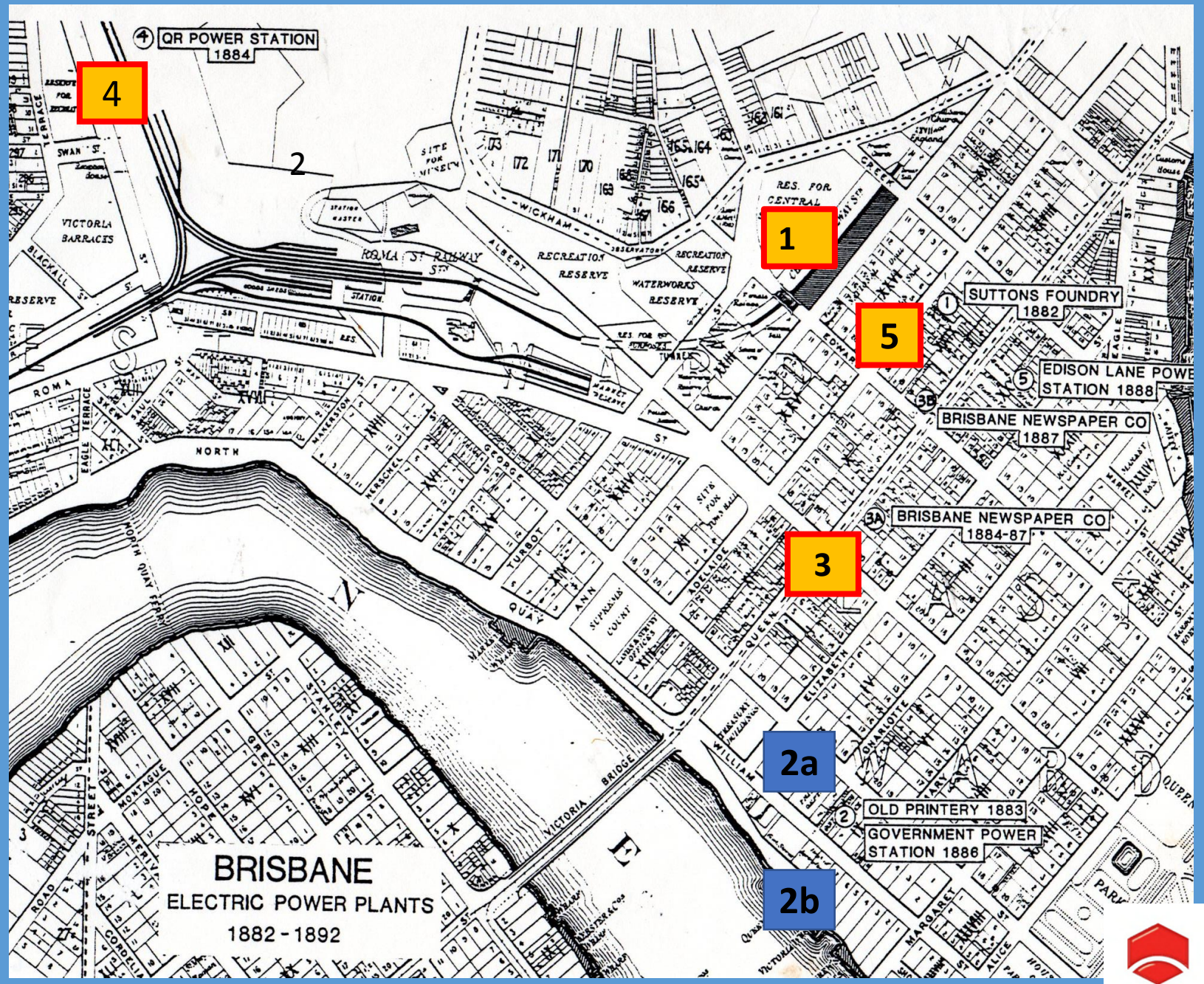
2a-Govt.Printery Trial 1883

3-Brisbane Newspaper 1884

4-QR Roma St Rail Yards 1884

2b- Govt Printery 1886

5- Edison Lane 1888



Edison Street Tubes- William St Brisbane

13 April 1883- Colonial Govt. accepted the Edison quote for £ 2485 pounds
- permanent incandescent lighting of Printery and Parliament House
- 2 Edison H Dynamos 30 kw 110 V DC at Printery
- 500 – 16 cp (60 w) lamps with carbon filaments, fittings, switches and wiring

June 1883- Smellie & Co to supply 2- 40hp Robey Steam Engines, boilers, shafting, belts, pulleys etc. Quote for £ 2747

1883-Andrew Petrie to build a Power station building at Printery £ 13,043

1883- Alfred Shaw (Agents for Edison Co) to fit 50 lights Council Chamber
- supply & install 1200 ft (366m) of two-core 110V DC ***Edison Street Tubes***

Quote for £ 1,000

-Tube order came from Edison's Indian & Colonial Electric Company London
- likely surplus to their first use Jan.1882 Holborn Viaduct scheme, London

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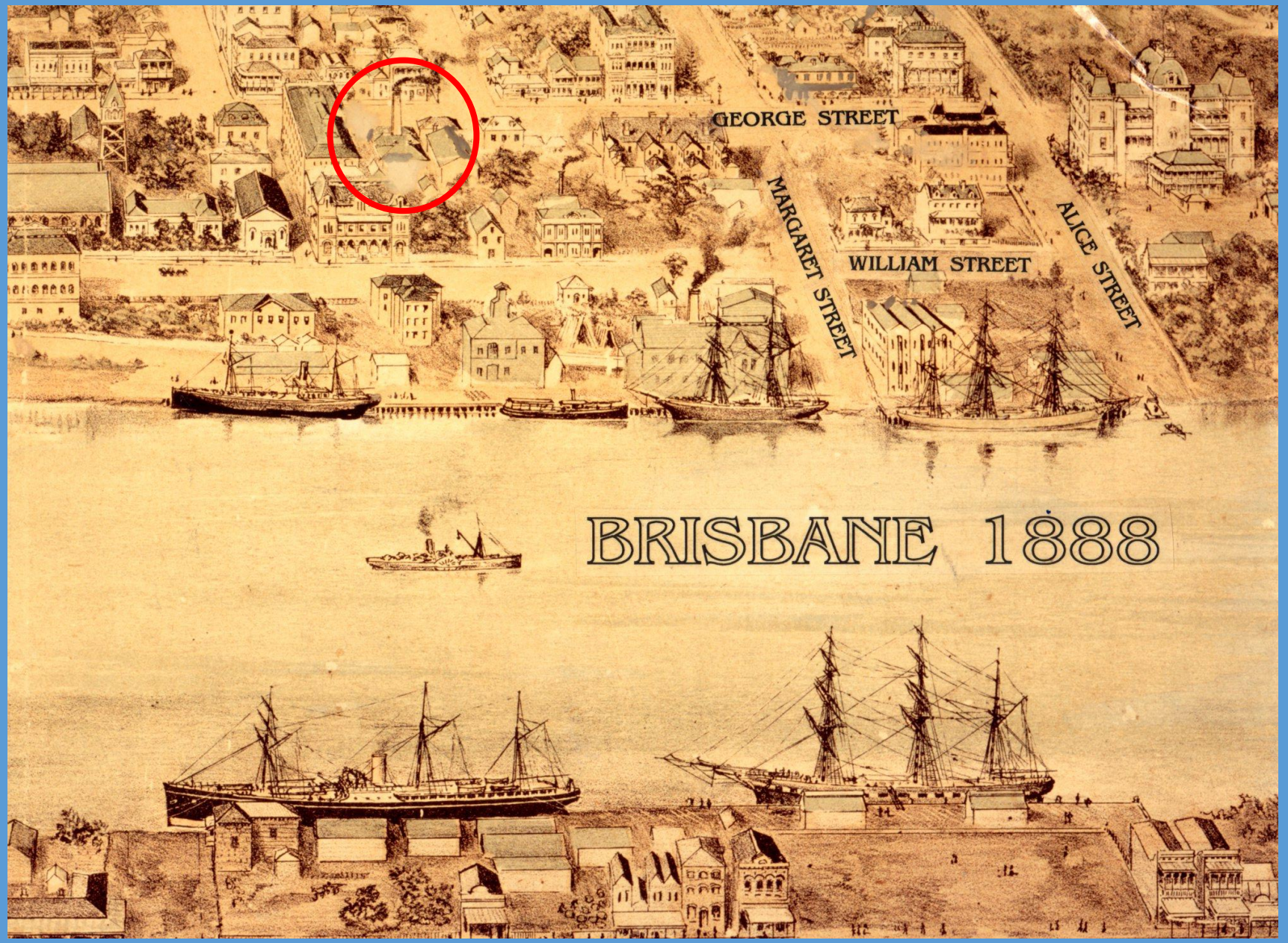
The Government Power Station Project

- 1884- Progress slow- Edison Engineer J. W. Snow died, replacement J. Mathieson was a failure, wiring condemned.
- The street mains trenching and restoration were responsibility of Brisbane Municipal Council, who employed J. Devenish at 17/9 shillings /chain.
- Given 20 working days, trench 12 inch wide and deep for 18 chains, with an 18 x 18 x 18 inch cut every 20 ft. for the joint boxes.
- Route documentation never found-only rediscovered and mapped by Energex/QM in 1992
- Consulting Electrical Engineer Edward Barton appointed to correct and finish work, handing over finished project to Govt Electrician T. Tomlinson
- July 1886 Scheme finally commissioned and operating- Total cost £19,000

Govt sector in 1888 Lithograph of Brisbane.



Artistic Reconstruction of Govt. Printery Power Station 1886 to 1909

- First centralised Power Station and network in Qld. Owned by the Colonial Govt.
- Supplied Govt. printery and Parliament House only with DC
- Total network scheme of Power Station, street mains, switching and lighting est. cost £19,275
- E. Barton appointed Govt. Electrician late 1886, and supervised operations until 1894

FIRST QUEENSLAND GOVERNMENT POWER STATION - 1886

Edward Barton- Pioneer Electrical Engineer

Printery Courtyard - Site of Original 1886 Power Station Photo 1992

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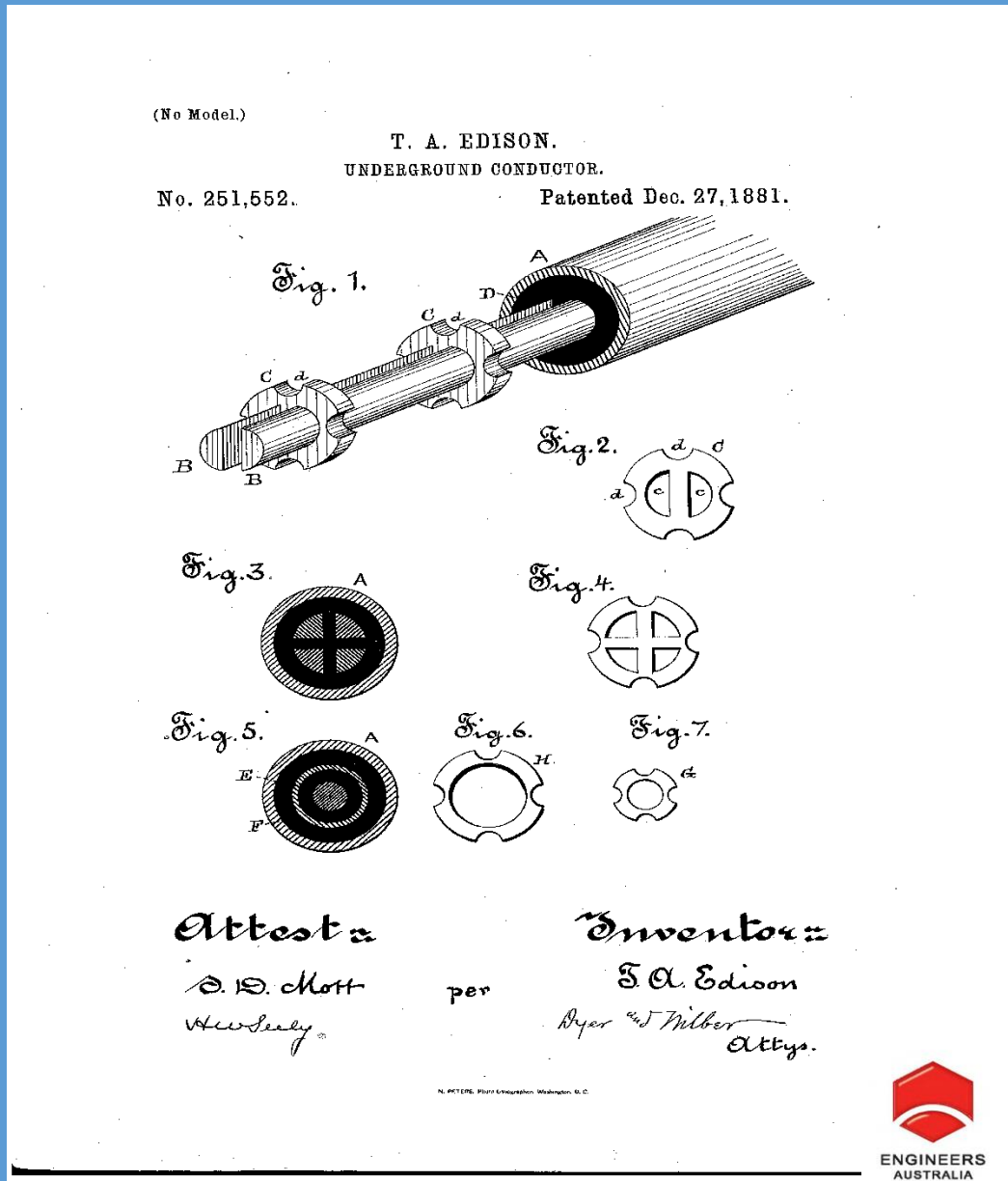
Edison Tube Technology-Two core mains

- The original two-core tube patented by Edison in New York USA in Dec 1881, with 3 types conductors: a 2 & 4 segment, & a 2 concentric
- The 2 segment range had 10 sizes, with a No. 3 used 2 x 0.206 sq inch (2 x 133sq.mm) for William St.-surplus stock from Holborn, London
- Insulation used a compound of refined Trinidad pitch, linseed oil, beeswax, & paraffin wax.
- Manufactured by Edison Electric Tube Co. 65 Washington St New York.
- Brilliant engineer & works manager John Kruesi responsible for developing invention.



(No Model.)

T. A. EDISON.

UNDERGROUND CONDUCTOR.

No. 251,552. Patented Dec. 27, 1881.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Attest:

Inventor:

per

Attys.

Edison Tube Technology-Three core mains

- Three core tube - Edison in 1882 following Dr John Hopkinson 3 wire 220/110 V DC system introduction in England, to reduce voltage drop

- A cheaper/easier design adopted- copper rods wrapped spirally with jute rope- cluster held together by a smaller jute rope- inserted in same iron pipes. .

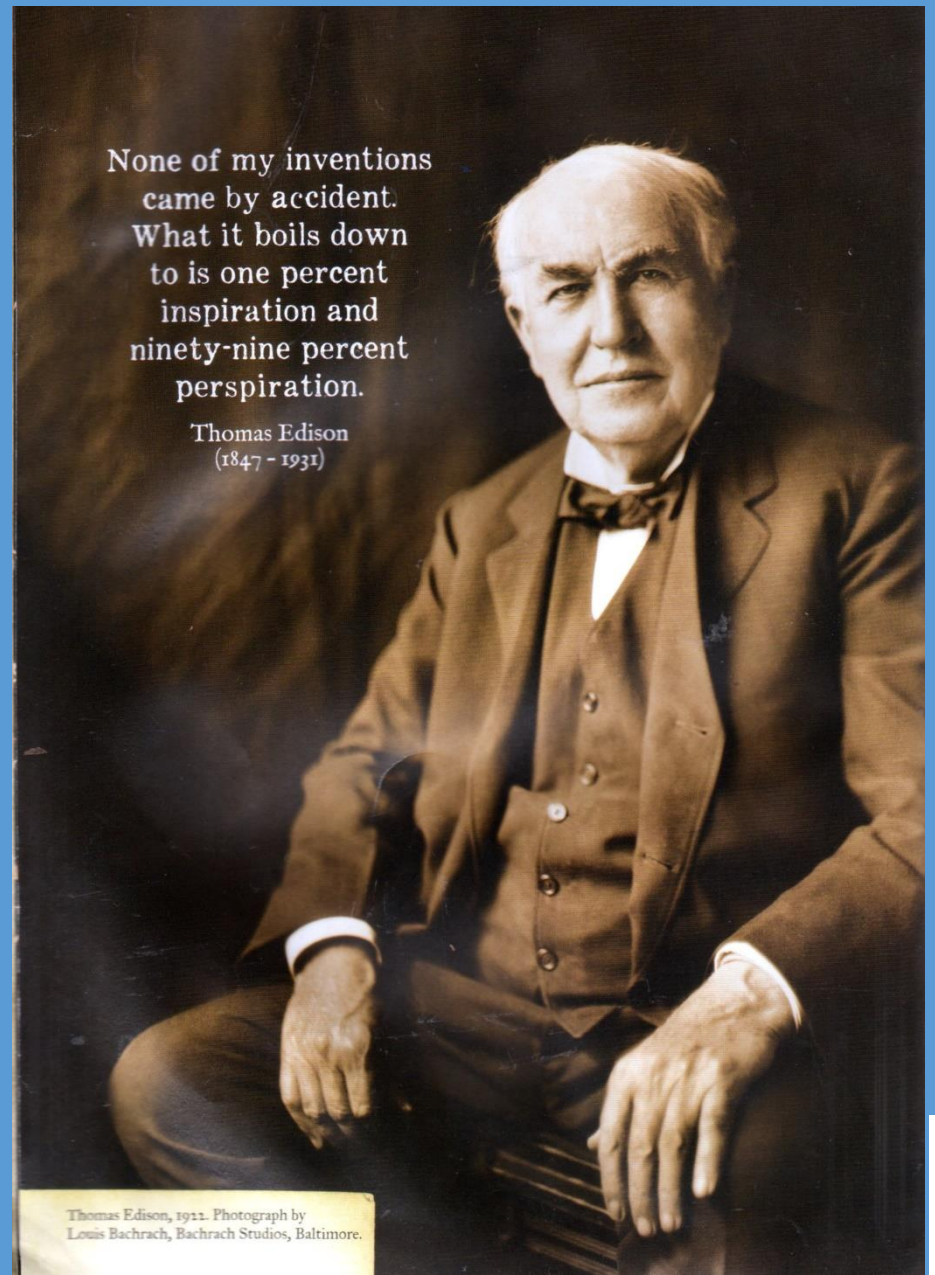
- Order placed in 1891 with Brush Electrical Engineering Co, London (who now held the Edison patents) for 420 yds (384m) at £1 /yard using 3 copper rod conductors each 0.12 sq inch (77 sq.mm) in 20 ft (6.1m) lengths.

- This reduced voltage drop problems by using each of the 3 cores for separate buildings, and paralleling the 2 core for a return circuit.

  Project completed/supervised by Govt. Electrician Edward Barton May 1892

Thomas Edison- The Wizard of Menlo Park.

- Born 1847 in Milan Ohio, USA
- Considered America's Greatest Inventor and Entrepreneur of mass production
- Holder of 1093 patents in USA alone
- Staunch advocate for DC systems versus Tesla/Westinghouse promoting AC.
- Developed the worlds first central electricity network concept-Steam Power Station, Mains, customers-
- Died 18 Oct 1931- At 8.59pm on 21st President Hoover ordered all lights in USA to be switched off for 1 min.



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Electric Power System Developments late 1800's

- 1859- Faraday's first Lighthouse Arc Lighting- Dungeness UK

- 1860-70's- Arc Lighting developed commercial uses only- USA, UK, Europe
  Both DC and AC systems
- 1876- Edison sets up Menlo park, NJ, USA- first Industrial Research Lab

- 1879- Edison (USA) and Swan (UK) develop incandescent light bulb by finally
  "subdividing the electric light"

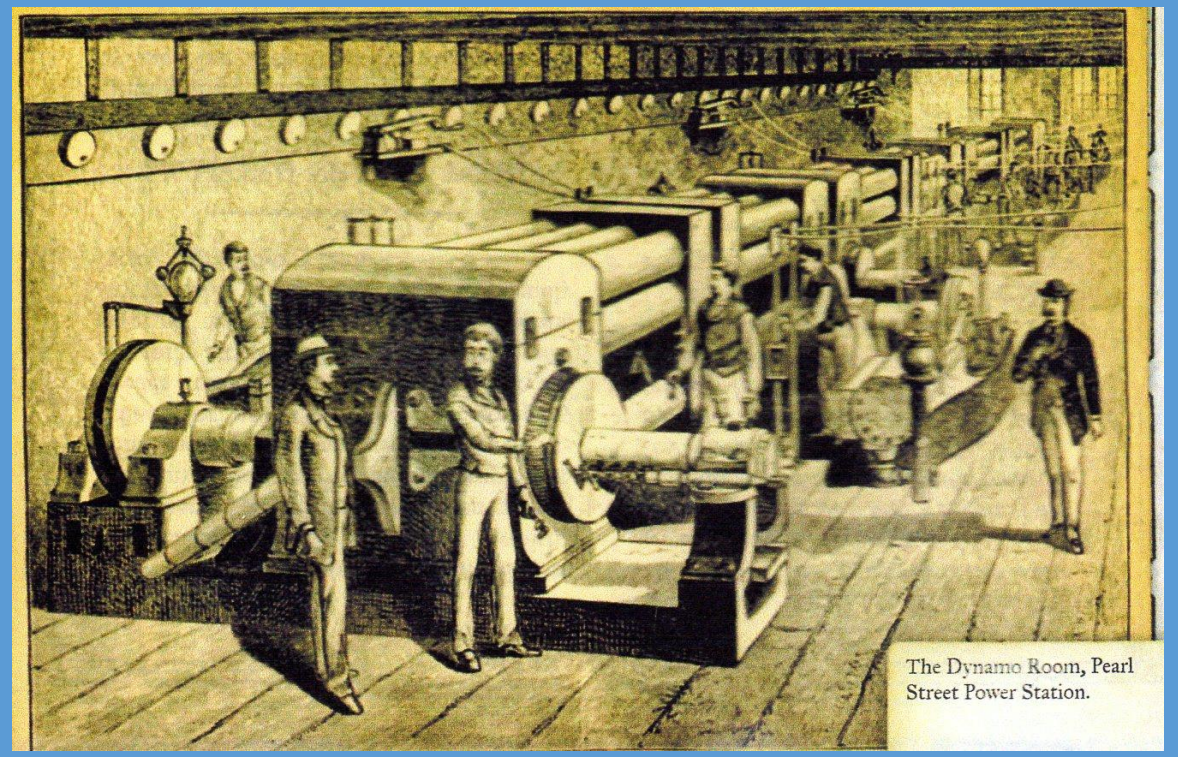
1881- Edison patents his "Electricity Central Station" concept involving
6 for dynamos, 32 for lamps, and 7 for distribution etc

Edison's Pearl St Power Station, NY- Sept 1882

Edison's first permanent Central Steam Station –Pearl St N.Y. USA

6 x 100 kW 110 V DC -a square mile network of Edison street tube ring mains and feeders involving 80,000 ft (24 km) of tubes in streets.

-by end 1882, supplied 193 buildings with 4000 lamps



The Dynamo Room, Pearl Street Power Station.

First Commercial Light Bulbs –Edison and Swan

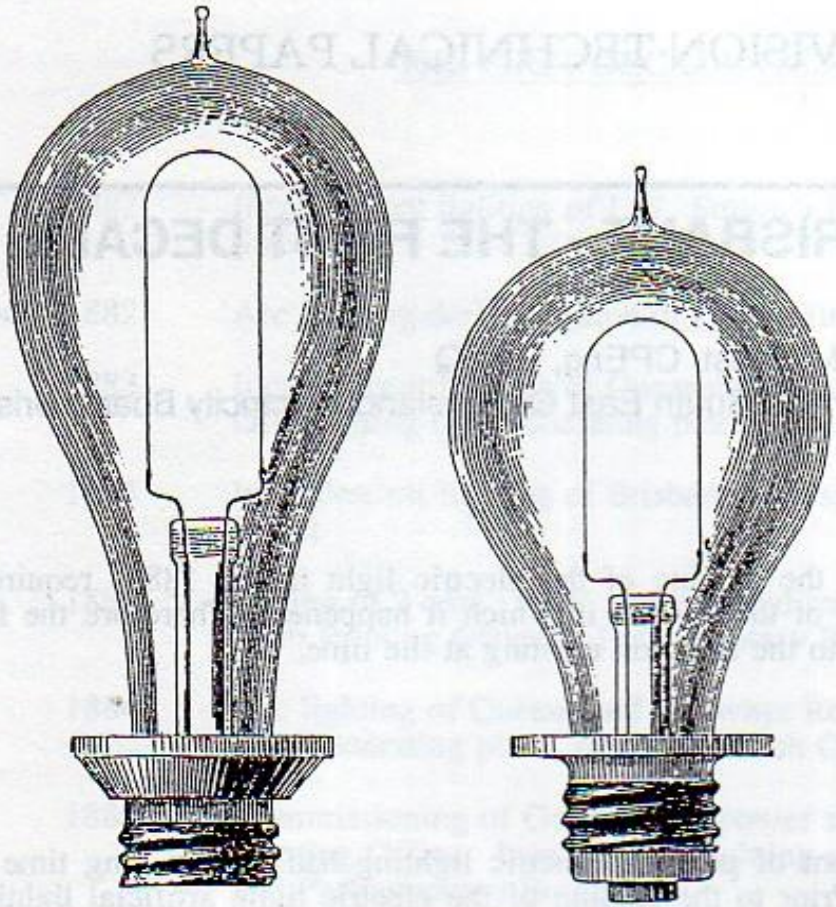


Fig 1 - Edison 16 cp (l) and 8 cp (r) carbon filament lamps, c1882

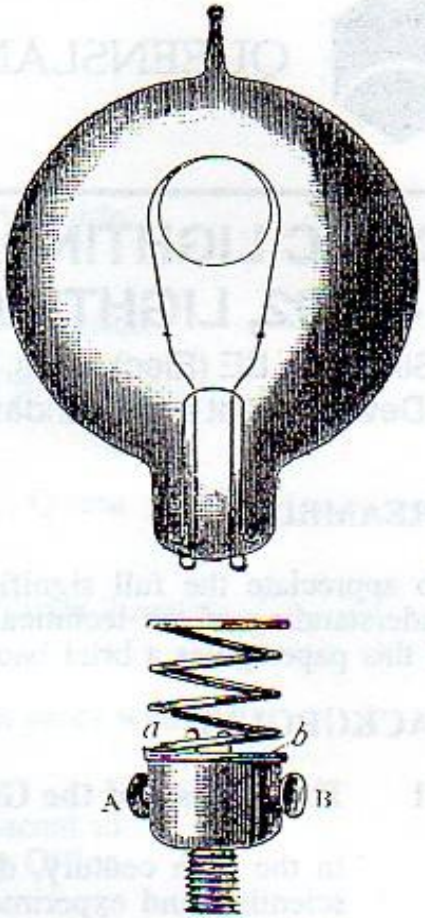
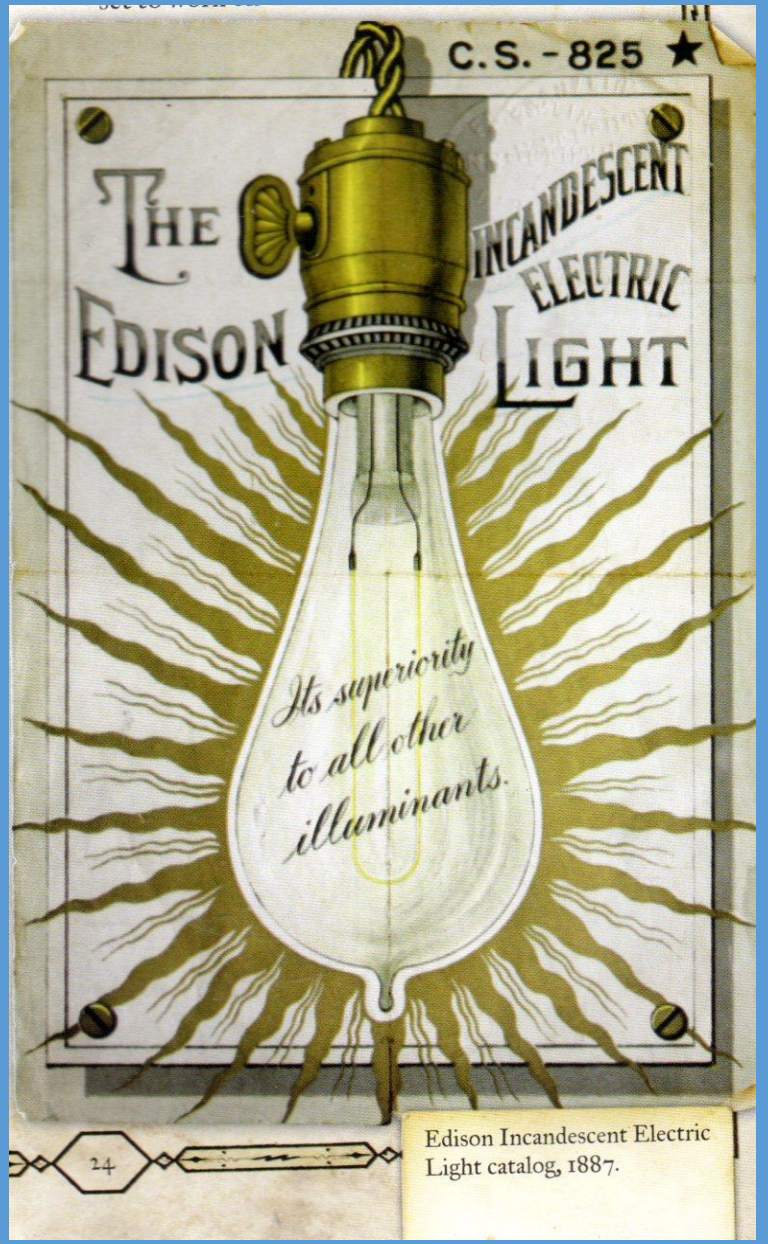


Fig 2 - Swan carbon filament lamp and socket, c1882



Edison Incandescent Electric Light catalog, 1887.

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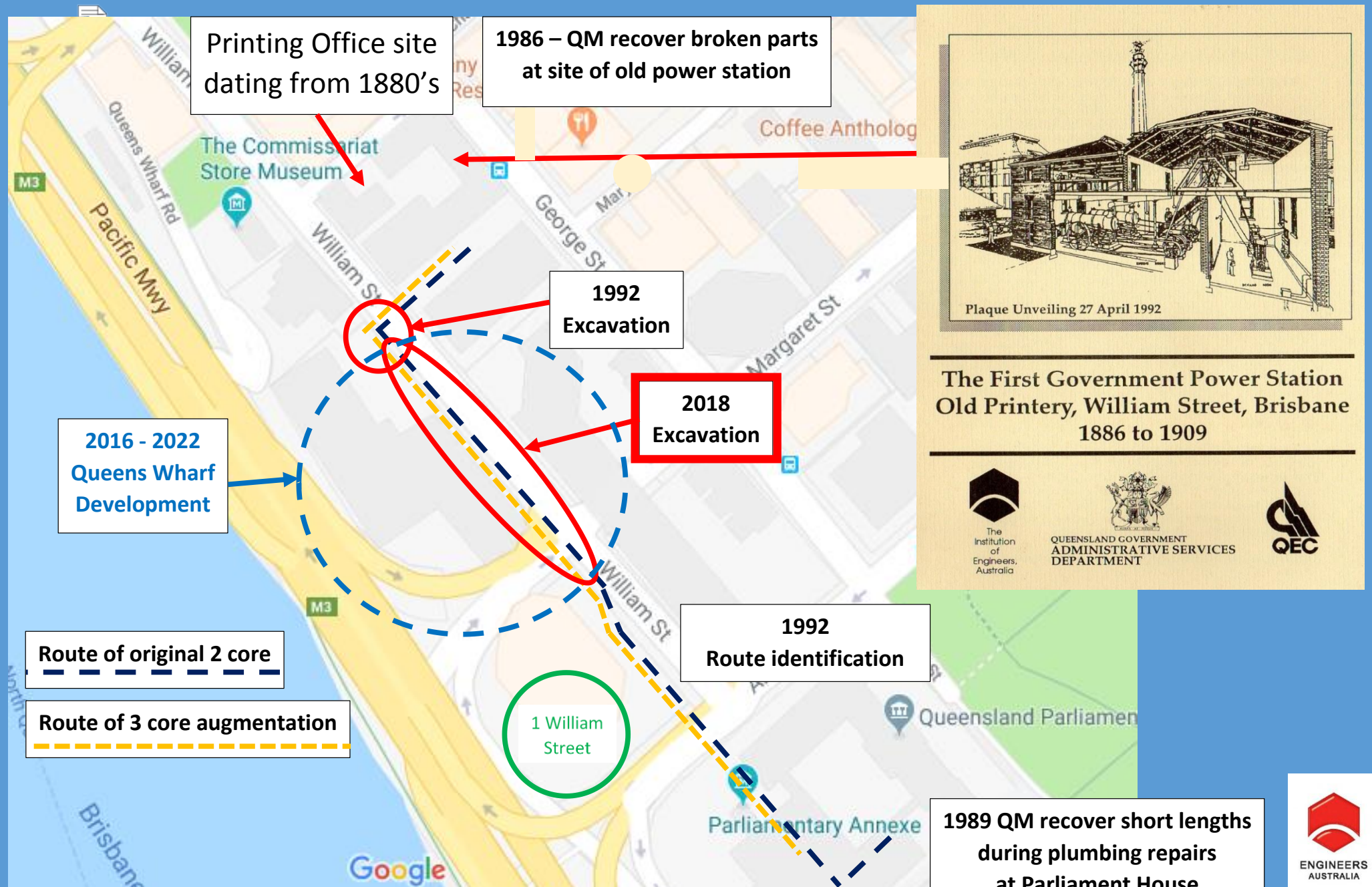
Location of 2018 Recovery



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William Street site prior to 2018 excavation

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Excavation starts Feb 6th 2018

Recovery process – lifting to crates

Archaeologists Cleaning

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Recovery process – all tagged and taken to store

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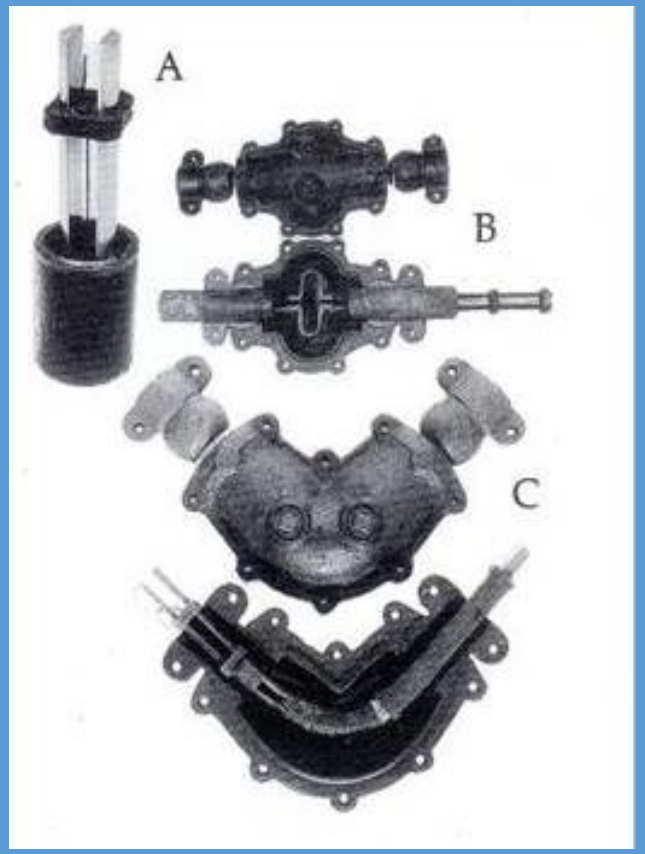
Samples were wire brushed and coated in fish oil

Condition varied but generally surprisingly good

A – 2 core street tube;

B - conductors connected to allow for expansion and movement;

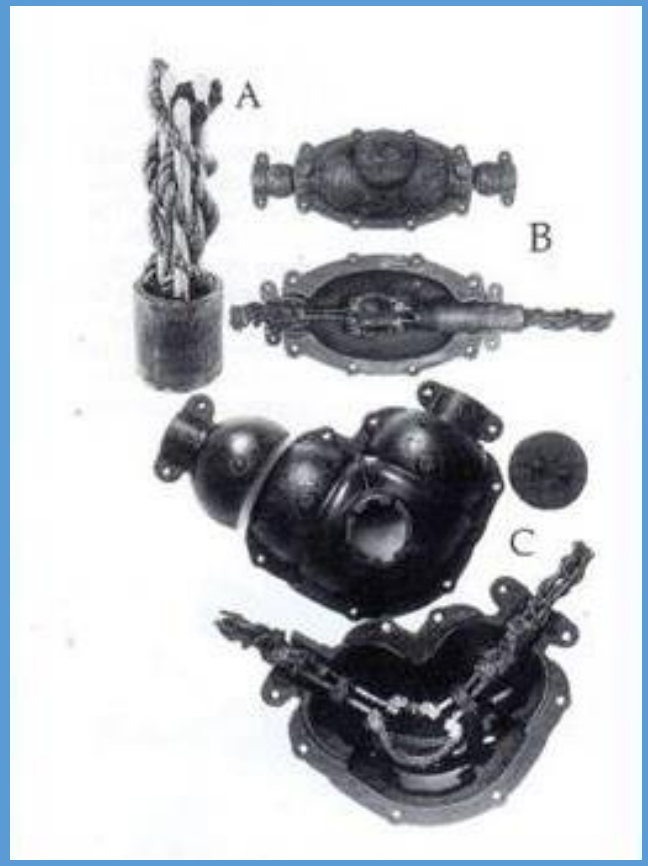
C - conductors connected by single core cable in 1892 as parallel return



A – 3 core street tube;

B – conductors connected with flexible copper braid cable to allow for expansion and movement.

C – as for B but at right angles



Junction “boxes” – cast iron & filled with insulation compound

Rare Intact Full 20’ lengths plus boxes being supplied to…

- Australian museums
  - Highfields, Toowoomba
  - Museum of Applied Arts & Sciences, Sydney
  - Electrical Museum, Tamworth
- Overseas museums
  - Edison Park Museum, NJ, USA
  - IEEE History Centre, NJ, USA
  - Smithsonian, Washington, USA
  - Science Museum, London, UK
- And
- Queensland Parliament House.

Parliament House Dining Room 1912 to 2018

Parliament House Library 1910 to 2018

Room Sign used by Edison for new Electric Lighting