



SPT Welcomes the Institute of Mechanical Engineers 21/1/2016

The Subway - History



Tunnelling commenced in St.Enoch Square in March 1891.

The Glasgow District Subway Co. opened for passenger service on the 14th December 1896.

It closed again the same day due to a car being pulled off the track at Buch. St. & two trains colliding under the Clyde.

It re-opened on the 21st January 1897.



History of the Subway



The Subway is the third oldest in the world.

London – 1863

Budapest – 1896

The system serves 15 stations.

All stations had island platforms.

Two parallel tunnels on 6 ½ mile route. (10.4 km)

Tunnel diameter – 11ft.



History of the Subway



At its peak, the Subway carried 37.3 million passengers in 1949.

Passenger figures remained at over 30 million for the next 9 years.

Patronage remained at over 20 million until 1968.

Trains on average completed 1.3 – 1.5 million miles per annum between '44 – '68.

Today's patronage is around 13 million



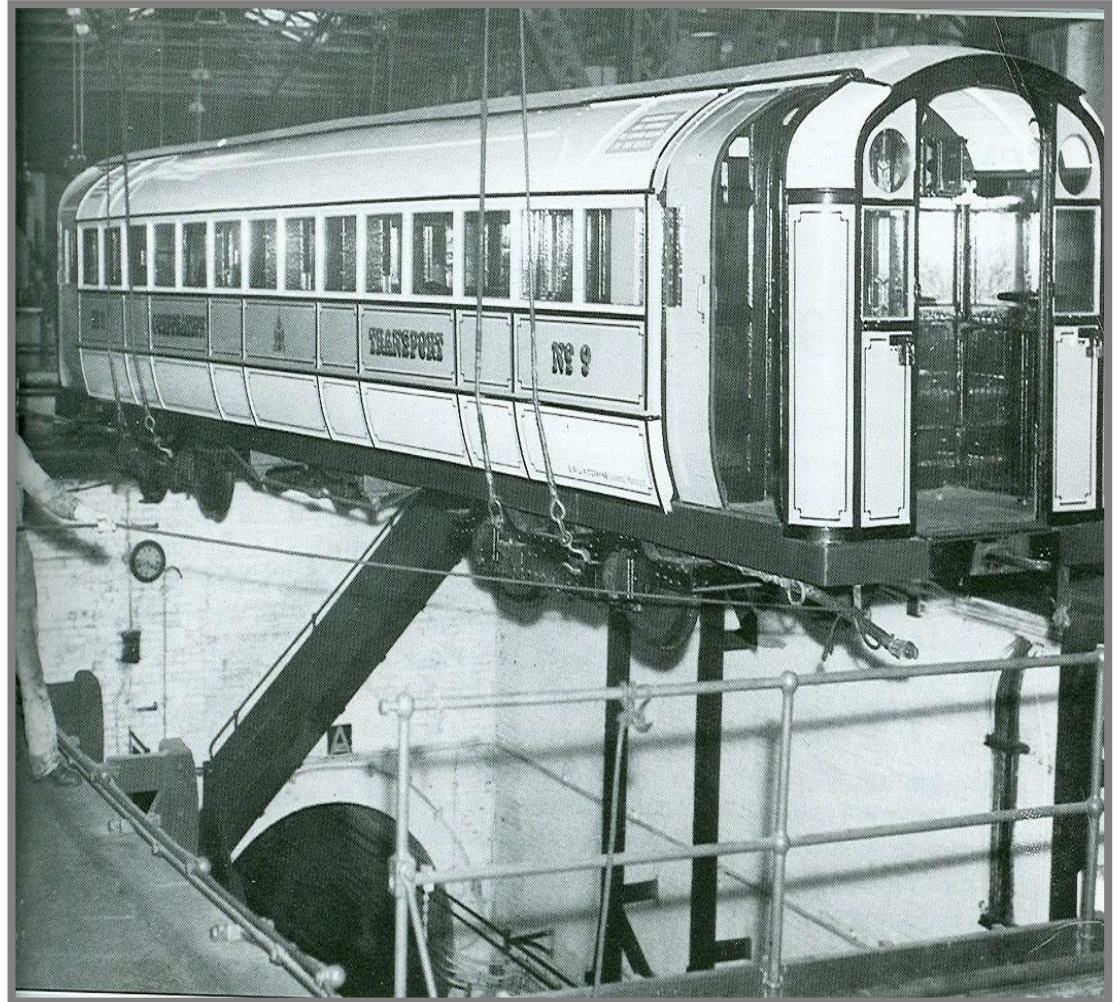
History of the subway



The original subway was entirely underground.

Both Inner & Outer circles never met nor came to the surface until the 70s modernisation.

At the Car Sheds (Broomloan) trains had to be lifted by crane from the tunnels below for routine maintenance and repairs.



Gripper Cars.



30 Gripper cars were ordered from the Oldbury Railway Carriage & Wagon Co.

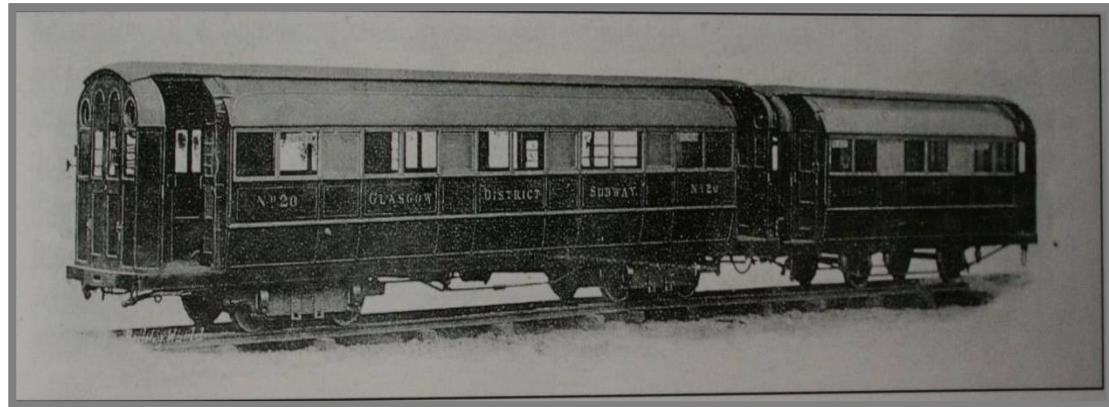
No. 1 - 30.

Lighting was fed from double 'T' bars on the tunnel wall at 230 volts.

Gripper cars could seat 42.

Each Gripper car was

40 ft. 9 ins. Long.



Trailer Cars

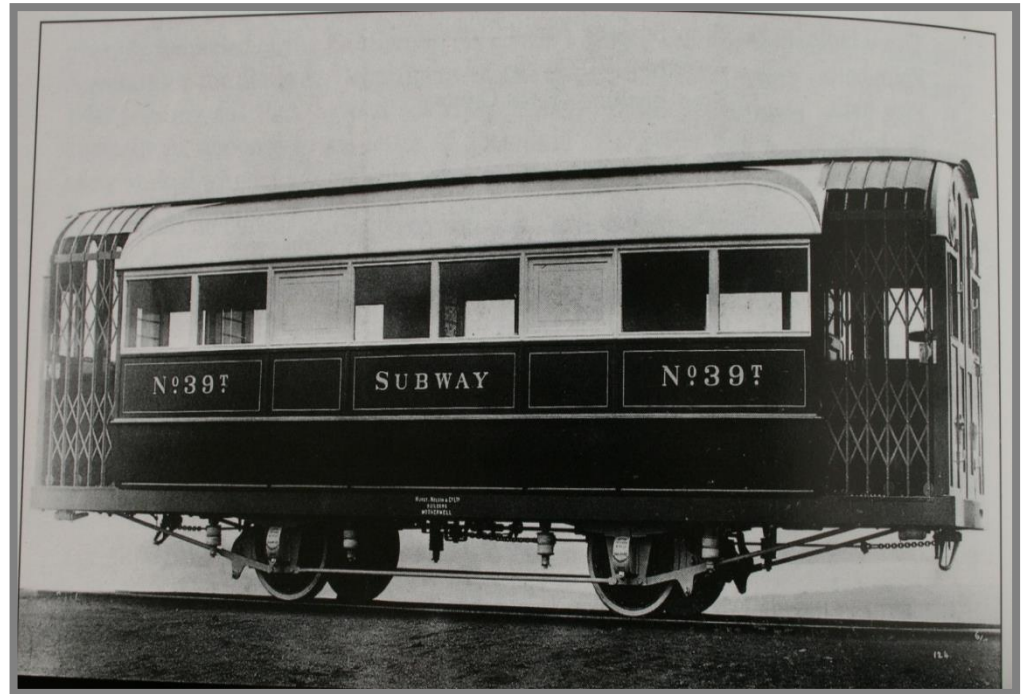


24 trailer cars were ordered from Hurst Nelson of Motherwell in 1897.

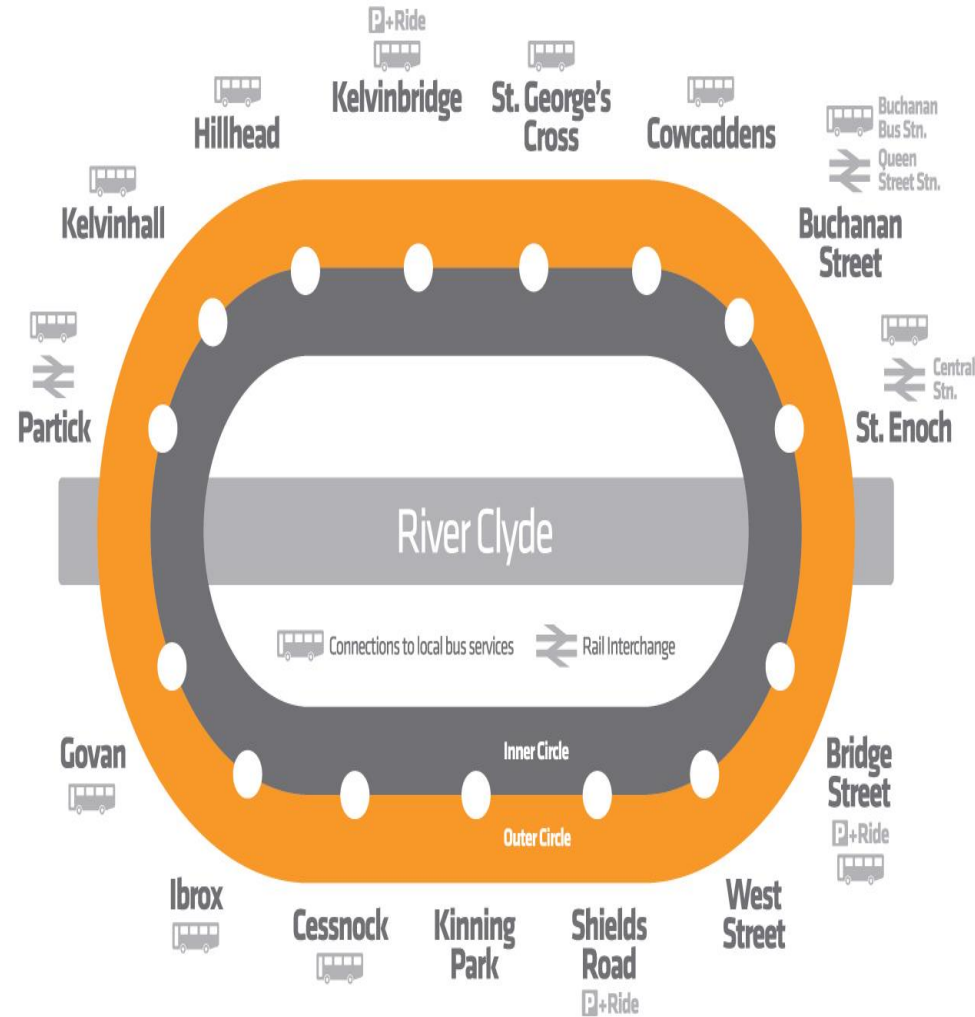
Cars were numbered 31 – 54.

They could seat 24 passengers.

Each car was 25 ft. (8m) long.



Route Map.



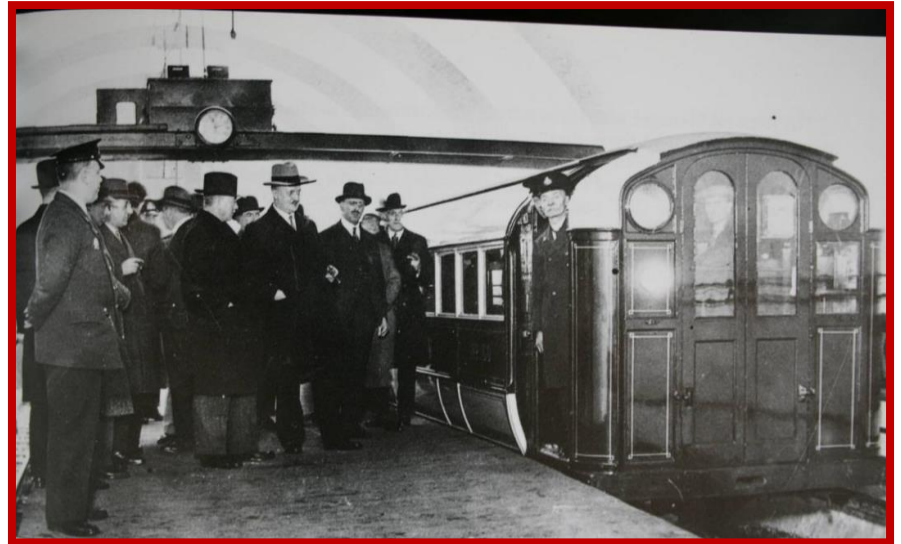
Electrification.



On 1st August 1923, G.C.T. took over the Subway.

In April 1933, the decision to electrify was taken.

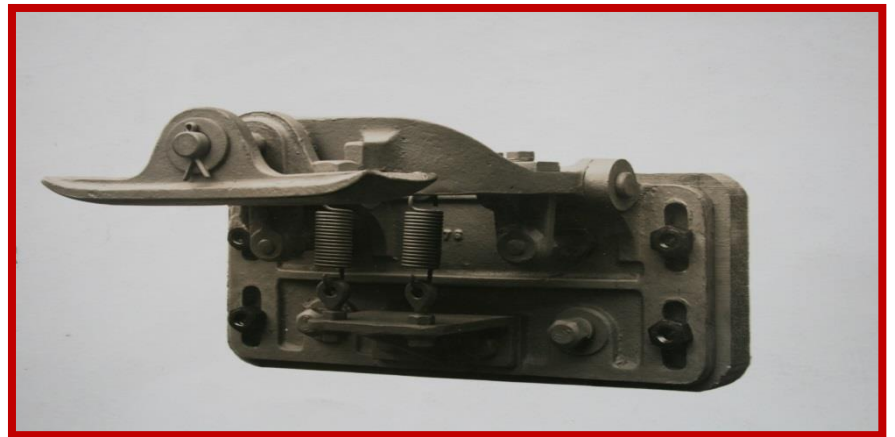
On 26th May 1933, members of the Municipal Transport Committee were given a run on the line between the Car Sheds & Merkland St.



Traction current supplied by a third rail mounted at the side of the running rail.

Power is supplied at 600 Volts dc.

Current Collection was via collector shoe gear mounted on one side of the train only.



1970s Modernisation



Due to many years of neglect and under funding, the Subway had fallen into a state of disrepair.

In 1973, the G.G.P.T.E. took over from G.C.T.

They commissioned a study to see how the Underground (as it was now called) could be modernised.

The last train ran on Saturday 21st May 1977.

One week earlier than planned.

The system was closed from 21st May 1977 – 16th April 1980.

The Subway undertook a major programme of refurbishment during this period.



1970s Modernisation. Rolling stock



Modernisation included:

- New rolling stock
- Remodelled stations
- New ticket equipment
- Introduction of ticket barriers
- CCTV
- Control Room
- New workshop building.
- New sub-stations
- Introduction of fire exits at all stations.
- Ramped Depot Access.
- New Signalling
- Complete track renewal.
- Public Address system.
- Interchanges at Buch.St & Partick.
- Introduction of Escalators



1970s Modernisation. stations



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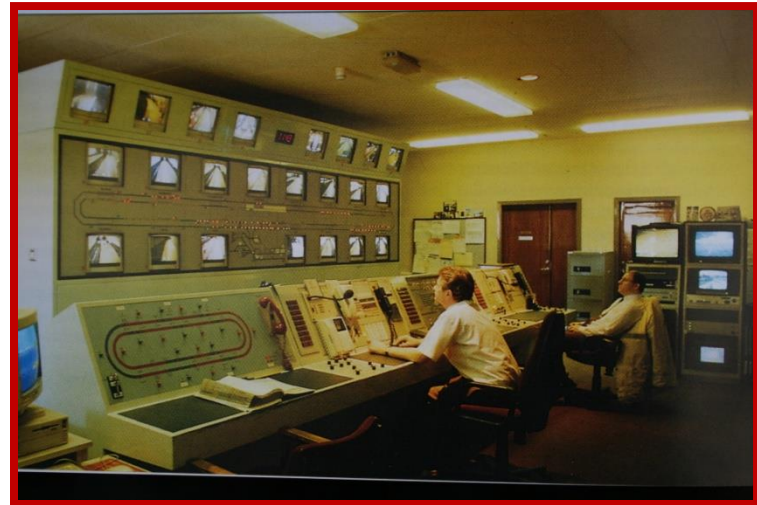


1970s Modernisation. control



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Control Room.



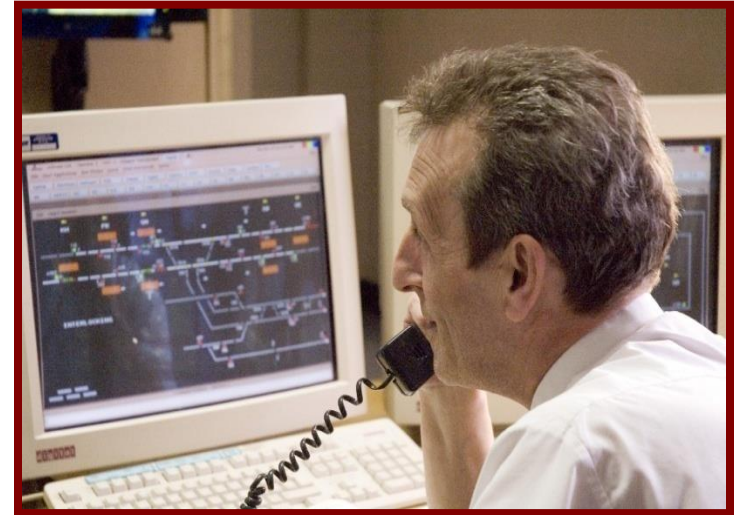
The Subway Control Room is located at Broomloan Depot.

The Control Room is staffed 24 hours a day, 365 days a year.

The Control Officer oversees signalling, traction current, system alarms and is the main point for all communications for the system.

The Control Officer can contact trains via radio and stations through Public Address system.

The Control Room provides CCTV monitoring and recording.



Subway of the 80s.



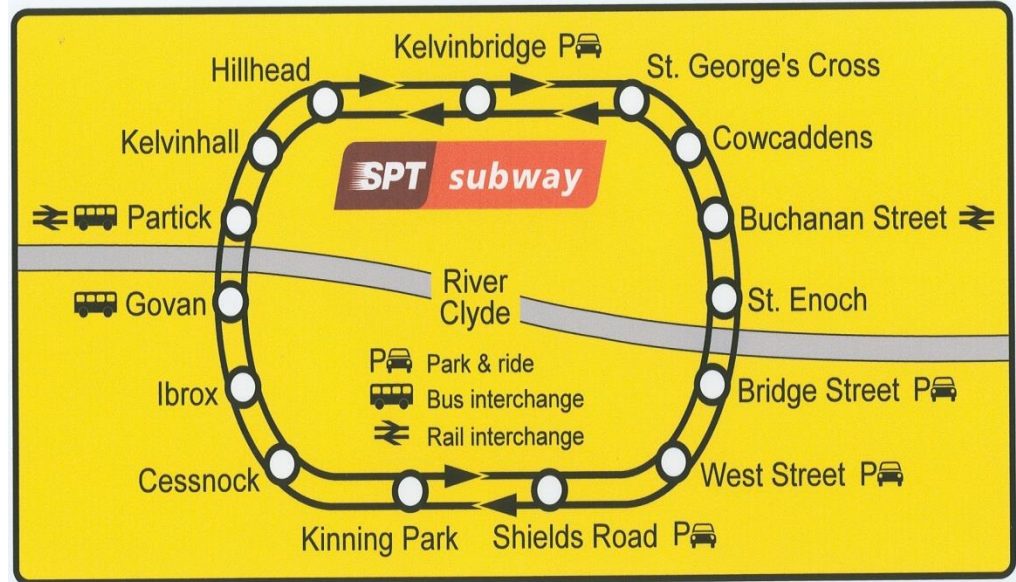
Trains take 24 mins to complete a circle.

Subway carries 14 million passengers per annum.

Over 300 staff are employed on the Subway.

During peak times there are 6 trains per circle giving a 4 minute service.

Off peak (Evening) there are 3 trains per circle giving an 8 minute service.



Rolling stock – Power cars



- Built by Metro-Cammell in 1979
 - 33 Power cars
 - No. 101 – 133
 - Each car is fitted with four 36kw (48hp) motors.
 - Trains mainly operate as three car sets.
 - Governed maximum speed of 54kph.
-
- Each car is approximately 13m long.
 - Each train operates in ATO mode when in passenger service.
 - Each car can carry 36 seated passengers & 54 standing. 270 per train.
 - Power cars were refurbished between 1993 – 1995 by ABB Transportation of Derby.
 - Each power car has a CTS system fitted.



Rolling stock -Trailer Cars



Built by Hunslet TPL in 1992.

Disc brakes with separate blocks for tread conditioning

Trailers No. 201 – 208.

Trailer cars were refurbished in 2009 by Alstom, Glasgow.

Refurbished to comply with DDA regulations

- Contrasting floors
- Bright handrails



Communications – Trains - systems

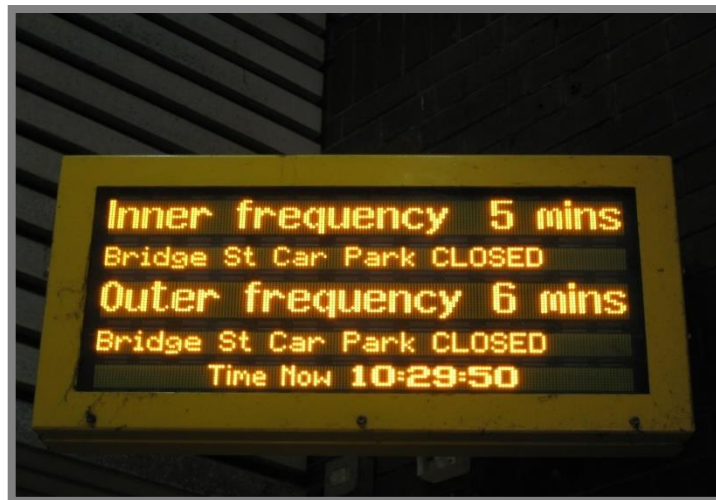


Airwave Radio system (TETRA)

Pressline system (TETS) Allows drivers to remove traction current in an emergency.

Telephones at all station headwalls & at some tunnel locations.

Public Address and information screens



Park & Ride.



SPT Subway has three park & ride facilities.

- Bridge St (158 spaces)
- Kelvinbridge (159 spaces)
- Shields Rd (800 spaces)

West St car park closed in 2008 for the extension to the M74. (74 Spaces)



227 cameras on the Subway.

Cameras cover all public areas of the stations, car parks & Broomloan Depot.

CCTV is monitored from the Control Room and Ticket Offices.

Images are digitally recorded at Broomloan Depot.

All recordings are stored for 28 days.

Images can be archived for police investigation etc.



Broomloan Depot and Yard



Maintenance Depot

Workshop / Paint facility

Stabling Shed

Ramp Tunnel Access

Rail Store



Five sub – stations on the system.

- Byres Rd – Above Hillhead station.
- Dundasvale – Next to Cowcaddens.
- Eglinton St. – Next to Bridge St.
- Cornwall St. – Next to Kinning Park.
- Broomloan – In the depot yard.

Modernisation Projects 2010 and on wards



Station Refurbishments

- New Ticketing system – smartcard
- New Escalators / travelators
- Lift installation (limited stations)

Energy Management

- Yard & Depot – Led lighting
- Tunnel system – Led Lighting
- Use of waste heat (Water/Air)

Infrastructure enhancements

- Track upgrade and replacement
- Coated rail
- New checkrail and baseplate assemblies
- New plant and equipment for rail handling
- Tunnel lining upgrade
- Ramps and turnout replacement
- Sumps and pumps

Train operations

- New trains and signalling system
- New control and communications centre
- Platform screen doors

Station Refurbishment - Hillhead



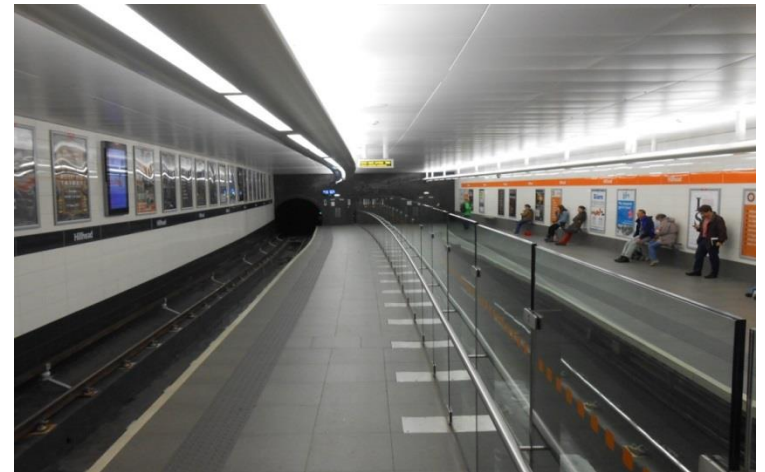
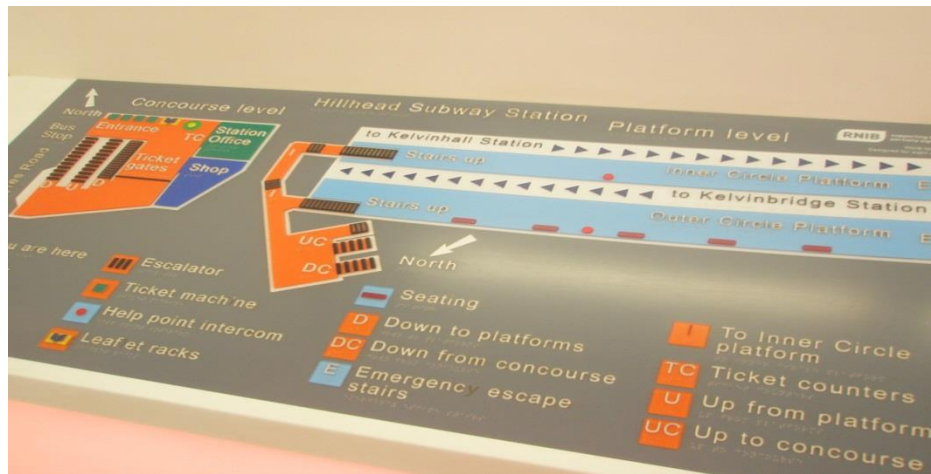
Before exterior refurbishment



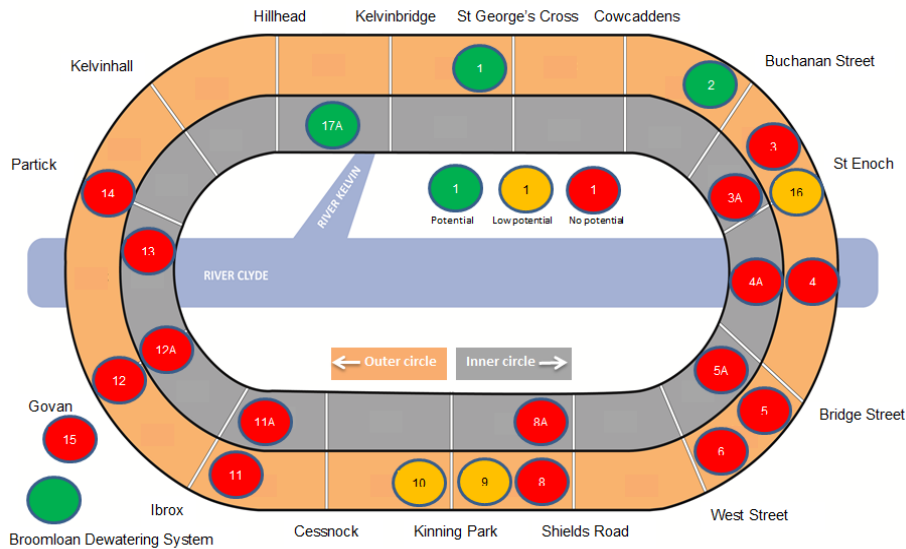
Post exterior refurbishment



Station refurbishment- Hillhead



Energy Management

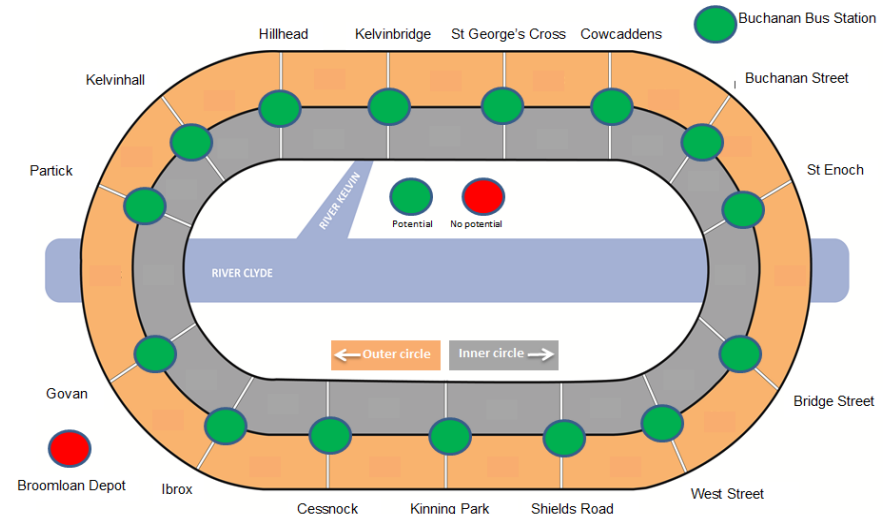


Initial scope to manage the water by investigating the possibility to produce heat energy through this element (April 14)

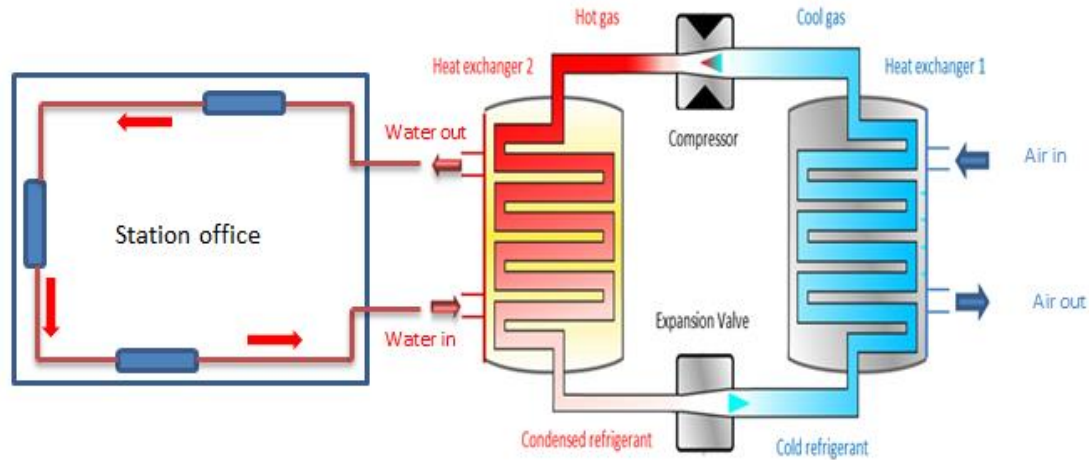
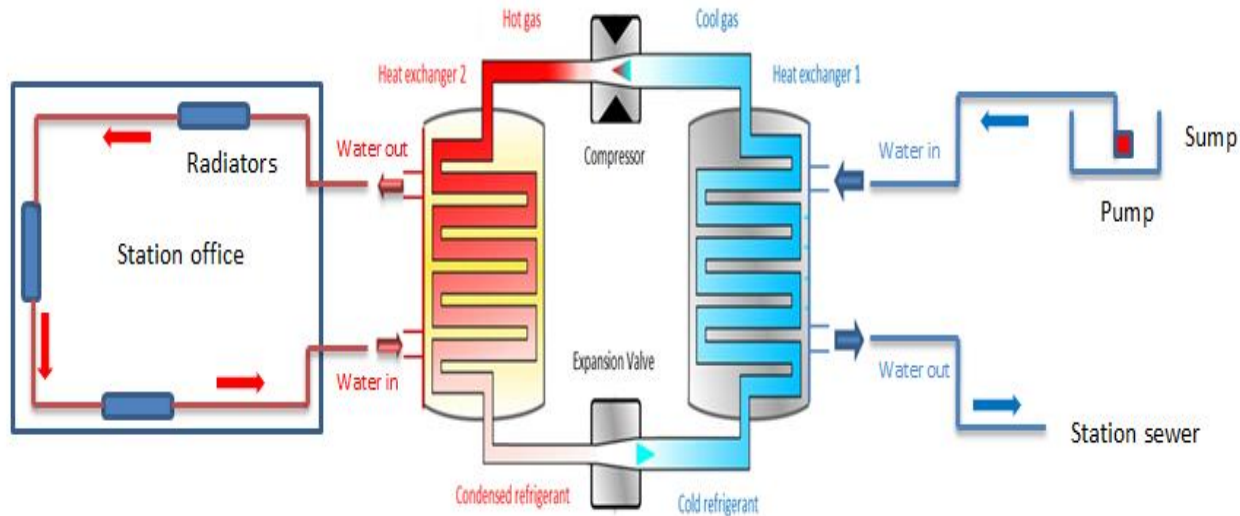
Investigate the possibility to use also the air as an element to produce heat energy (June 14)

Research – measurements – investigation (July to Nov. 14)

Feasibility study & options report for both elements: water & air (Nov. 14)



Energy Management



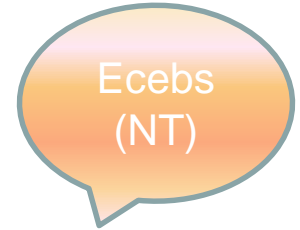
Smartcard Ticketing System



TICKET VENDING MACHINE (TVM)



WEB RETAIL



HOPS

CMS



• TICKET OFFICE MACHINE (TOM)

• COMPONENTS



SLIMLINE AUTOMATIC TICKET GATE (ATG)



The Subway is not without its challenges

