

THE RAILWAYS and LOCOMOTIVES AT CROSSNESS (by Robin Parkinson)

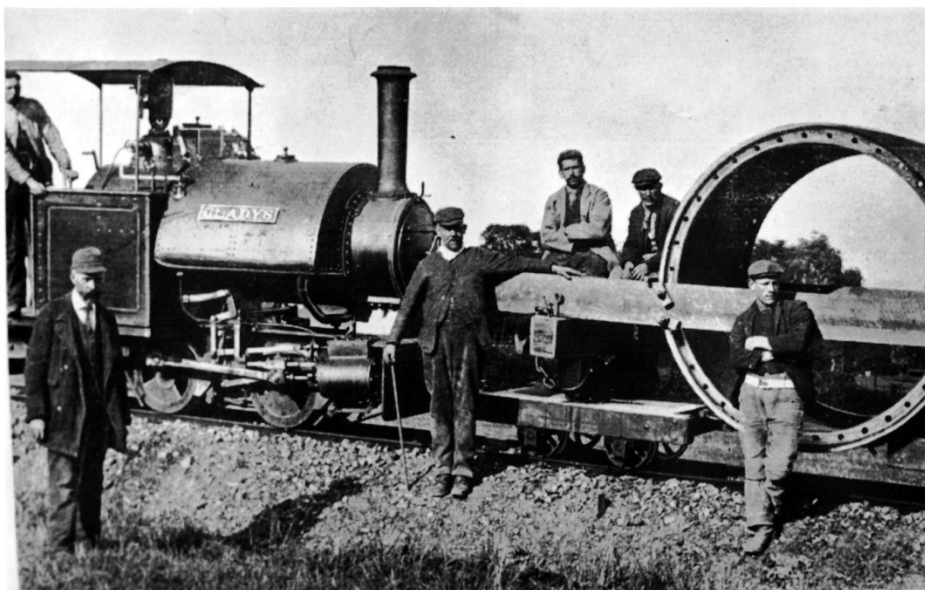
CROSSNESS RAILWAY HISTORY

Since its inception in 1860 Crossness Pumping Station has been supported by rail transport for construction materials to build this masterpiece of engineering. Moving coal and ash removal and it is hoped that within the next two years, another, new track of dual 18"/24" gauge will be achieved, *the first rail to transport passengers* at Crossness. Planning permission has been granted by The London Borough of Bexley in conjunction with the approval of site owners Thames Water Plc. to lay a 700 meter track which almost follows the alignment of the former temporary contractors railway of 1904 built to assist the construction of the sewage works during the late nineteenth century, running from the mainline of the South Eastern & Chatham Railway at Plumstead station.

The Southern High Level Sewer construction of 1904/06 used this original alignment to bring in the materials for the construction of this majestic sewer from Catford and further west. It is believed that this standard gauge contractor's line has been laid and lifted at least three times. The construction of the first railway by Lucas & Aird in the 1860's has not been confirmed by current research, however it is proven that this Plumstead – Crossness contractors line did not join into the metals of the South Eastern & Chatham Railway Company, stopping some 200 yards north of their tracks, with a loading platform, head shunt, engine shed and water cistern, clearly shown on the 25" scale Ordnance Survey map of 1867/69.

When the "Additional Pumping Power Contract" of 1912/14 was awarded to the contractor Dick Kerr & Co. and during this works at least two or maybe three short standard gauge lines were laid around the Beam Engine House for steam cranes used in excavation. In addition following the conventional fashion of those days a narrow gauge railway was installed to carry away the spoil. Motive power here was by WG Bagnall (0-4-0ST) 2 foot gauge # 1740 of 1903, **GLADYS**, which had previously been with Wrexham & East Denbighshire Water Works, was first acquired by Dick Kerr in 1912, so yet another new gauge (24in.) had been introduced to the site, which RANG are about to re-produce in 2017.

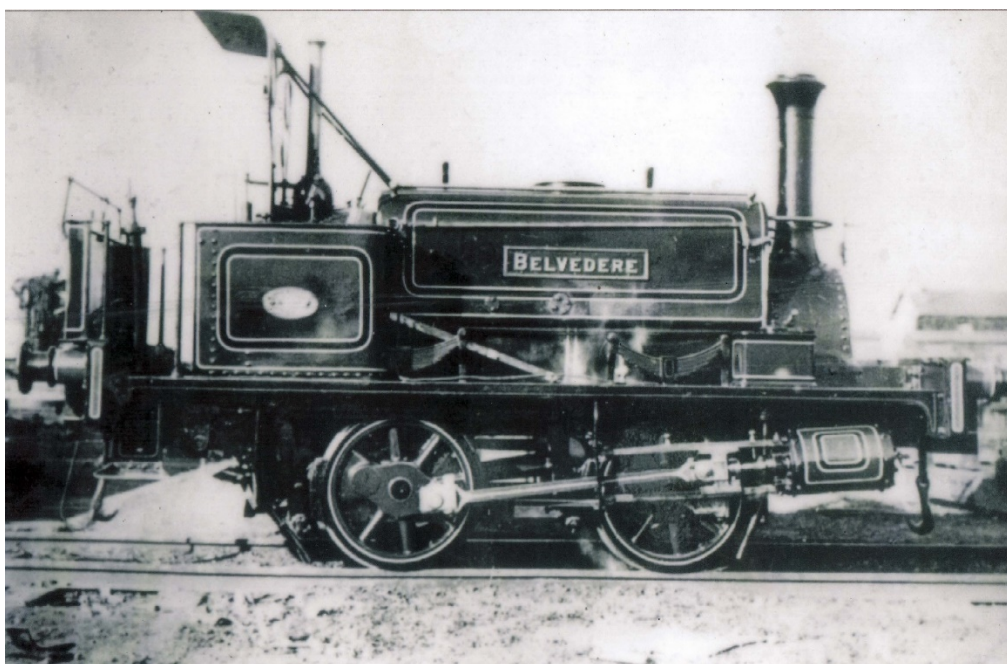
GLADYS - WG Bagnall (0-4-0ST) Wks. #.1740 of 1903 v



From the catalogue of W.G.BAGNALL Ltd., Castle Engine Works, Stafford.
(Library of ACBKR8)

One of the early maps by London County Council titled **CROSSNESS OUTFALL WORKS date 1893**, shows the whole pumping station site complex with 19 points/turnouts within its own, busy tramways of 3ft. 0in. gauge, these for delivering coal from the barges (5000 tons/year) and removing ash and clinker to waiting lighters on the river's edge, some of these tramways are shown as running inside a larger tramway of 4' 8", possibly installed for the heavy lift riverside Hydraulic Crane. Although no photographs exist it is believed that the motive power for the 36" tramway was by horse and this is backed up by stables shown on a map of the eastern flank of the site, although from the complexity of the points and curves would have been tricky to navigate with an "Equine Rail Tractor".

Manning Wardle Locomotive – BELVEDERE Wks. # 1318 built 1895 (makers photograph)

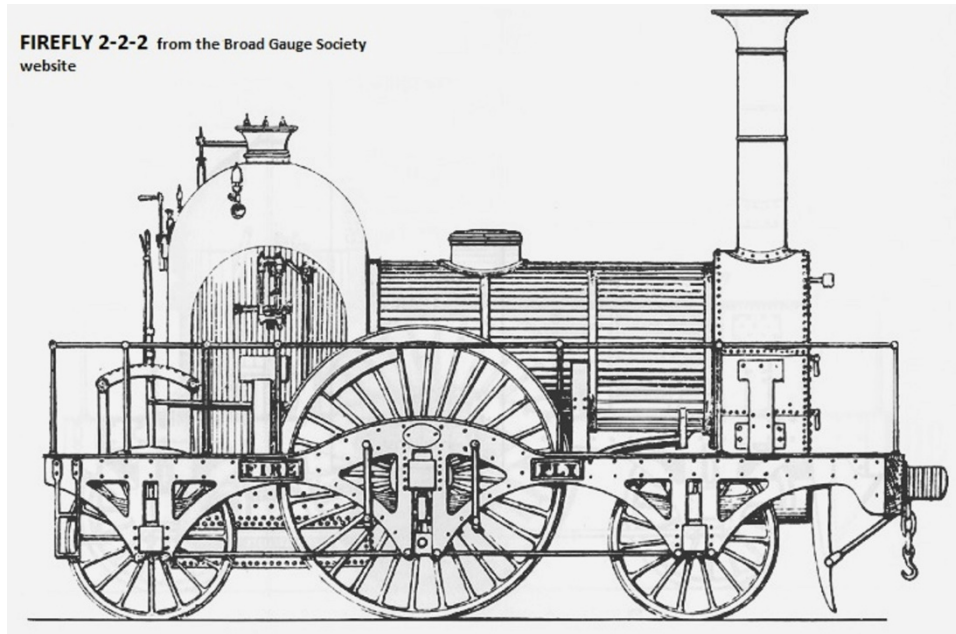


Manning Wardle 0-4-0ST Wks. # 1318 BELVEDERE @ Crossness Doc. 02/017

BELVEDERE Manning Wardle locomotive Works # 1318 of 1895 was one of the first standard loco's on site, this 'D' Class (8"Ø x 14"stroke) was originally named as BOLTON ABBEY after being delivered to Bolton for J. Green & Son 15th October 1895 (presumably a contractor) The locomotive was later returned to Manning Wardle and resold to London County Council, being delivered through Abbey Wood station on the 29th July 1896 to be used on the first phase of the building work on the No.2 Outfall Sewer at crossness. At the end of the contract she was sold in 1909 to W.R. Cunis Ltd., at Rainham Marsh Rubbish Shoot where she worked hauling rubbish trains until the start of World War Two, and was finally scrapped in 1939.

FIREFLY Broad Gauge Engines In 1878 a Metropolitan Board of Works minute calls for Additional Power at Crossness to cope with any stoppage of the main engines or excessive rainfall. This "Additional Power" was to take the form of two ex-Great Western Railway broad gauges engines, they were from the marvellously wide Brunel Railway to Bristol of gauge 7ft. 0¼in. The renowned original **FIREFLY** class is said to have covered the 30.75 miles (49.49 km) from Twyford to London Paddington in 37 minutes, an average speed of 50 miles per hour (80 km/h), which in 1840 was unprecedented speed. Between 1840 and 1878, 62 of this class were built which only confirms they were of a proven & successful design.

Their wheels were 2-2-2 configuration with massive 7ft. 0in. dia. driving wheels, and 4ft. dia. leading and trailing wheels, cylinders of 14in.dia. X 18in. stroke. A brass domed boiler that would need a gallon of Brasso to clean, weighing in at 24 tons 4 cwt. Horn blocks hung in beautifully fabricated horn suspension frames combining strength, lightness and symmetry. Operating with a boiler pressure of 120 lbs. per sq. inch. A truly beautiful locomotive stationary, it must have been a sight to behold in steam! (A replica now runs in steam @ Didcot)



FIREFLY CLASS (2-2-2) LOCO – Grace's guide British Industrial History.

Converted into stationary engines, mounted on foundations so as to drive four centrifugal pumps, two for each engine. The engines and pumps were set up in what we know as today, the Valve House, which was originally called the Auxiliary Engine House and is shown as such on the earlier site plan. The engines and pumps would lift the incoming sewage into the internal sewage system. Moving 6,500 cubic feet of sewage to a height of 28 feet, the pump impellers being 50" in diameter.

This really was a great example of early 19th century re-cycling.

The two locos that were obtained for Crossness by the Metropolitan Board of Works in 1879 were:-

CHARON built by Fenton, Murray & Jackson as wks. # 25 – delivered to Great Western Railway May 1840, Re-built at Swindon Works 1863, ceased rail working June 1878. Ex. Xness 1903.

LETHE built by Fenton, Murray & Jackson as wks. # 45 - delivered Great Western Railway April 1842, Re-built at Swindon Works February 1862, ceased rail working October June 1878. Both were apparently worn out at Crossness by 1903.



Credit David Dawson (The "Other" Engines at Crossness)

CROSSNESS Andrew Barclay Locomotive (0-4-0ST) Wks. # 994 built 1904 was delivered on 9th March of that year to London County Council, Works Department @ Abbey Wood through the South Eastern & Chatham Railway there. She was to haul building materials for construction of the second phase No.2 Southern Outfall Sewer at Crossness Water Treatment Works, which is now referred to as the High Level Sewer.

That contract complete she was transferred in 1909 to the LCC Asylums Committee for use on the Horton Estate Light Railway in Epsom when she arrived wearing a livery of dark green (with a No. 61 small back plate on the tender), here she joined Manning Wardle HOLLYMOOR. In 1903 the London County Council had decided to build a new hospital @ Horton Lane, near Epsom. The contractor Forster & Dicksee experienced utmost difficulty moving building materials along what was just a mud lane just over a mile long, and applied to the Board of Trade to build a standard gauge line from the LSWR station at Ewell West to the hospital site.

On this short but busy 1½ mile line the first locomotive employed was a Manning Wardle HOLLYMOOR, Wks. # 1519 of 1901, also known by the locals as "Puffing Billy" as it always took off in a cloud of steam and a multitude of running boys, HOLLYMOOR was sadly involved in a pedestrian fatality running down a partially deaf 64 year old Mary Tobin at the Hook Road crossing. In 1907 HOLLYMOOR was sold to the Austin Motor Company in Birmingham leaving **CROSSNESS** in sole command and very busy, hard work and maybe not full attention to maintenance she gradually wore out and a Manning Wardle (0-6-0) HENDON Wks. # 2046 of 1926 saddle tank was obtained from C. J. Wills & Son. Ltd, St Helier (Epsom) to help out #994 with operations.

Sadly the last seen pieces of #994 **CROSSNESS** remained on site for some years, where she was lying after being cut up by Fraser & Co. in 1935 by the Engine Sheds.

AVONSIDE LOCOMOTIVE “WOOLWICH” now the 21st century newcomer.

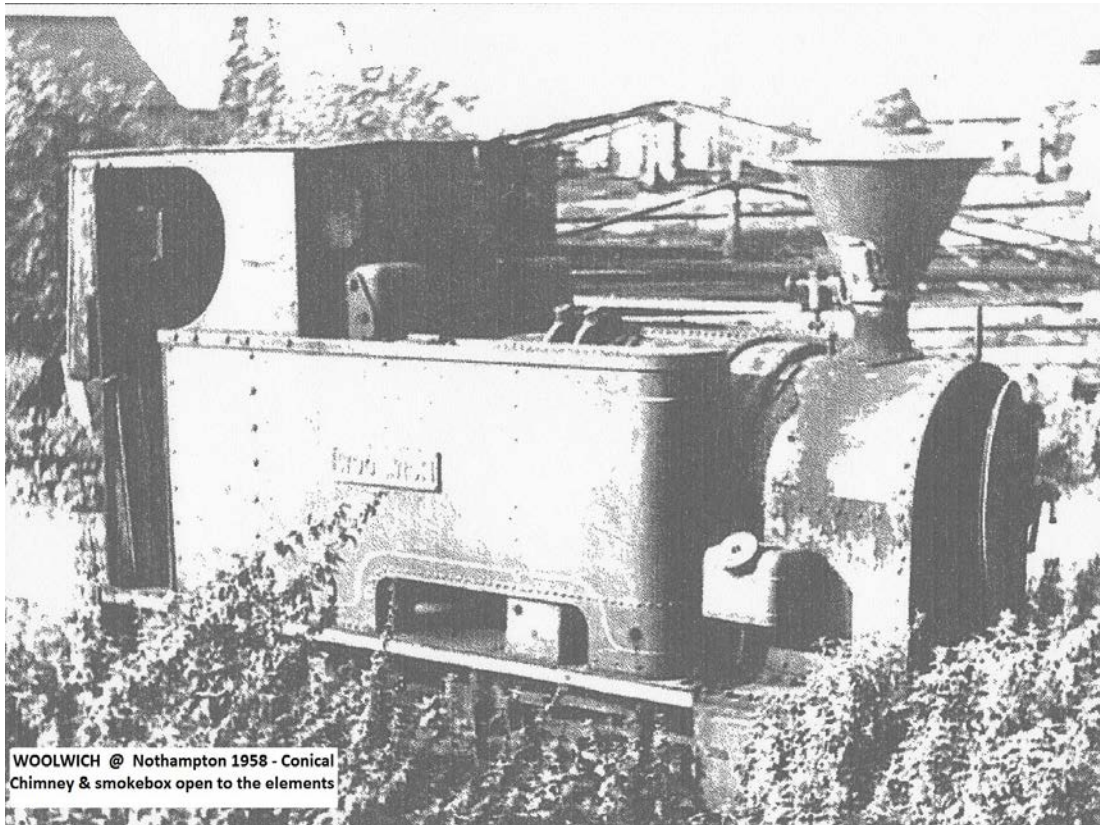
The sturdy, reliable and much liked Avonside Locomotives of the ‘**Charlton**’ Class were introduced first to the RAR (Royal Arsenal Railway) in 1915, **WOOLWICH** Wks. #1748 of 1916, **is the only remaining example** of her class and now on long term loan from the Waltham Abbey Royal Gunpowder Mills, Essex. To RANG Railway.

Realising War was brewing in Europe, knowing that armaments in huge quantities were going to be sought, in 1915 the Ministry of Munitions placed an order with Avonside Engine Company for sixteen locomotives of the **Charlton** Class (O-4-OT). These were to be the last class of narrow gauge steam locomotive bought and used on the Royal Arsenal Railway. A product of the Avonside Engine Co. Ltd. at Fishponds, Bristol, specialists in strong and dependable Industrial and Shunting Locomotives. The first company was founded in 1838 by Henry Stothert to supply the ever-expanding market caused by the expansion of the Great Western Railway; the original Avonside Ironworks factory was in the St. Philips district of the city. In 1841 the company's technical expertise was boosted when Edwin Slaughter – one of Brunel's Assistant Engineers from the Great Western Railway - joined as a partner, the new firm of Stothert and Slaughter became well known at home and abroad. It was re-named The Avonside Engine Company in 1864 and prospered, only to become bankrupt by the end of the decade, due to a failure to adapt to the changes in industry. In 1882 Edward Walker of Fox Wheeler Locomotives set up a new '*Avonside Engine Company*' and it remained a respected name for a further fifty years, moving in 1905 to new premises at Fillwood Road, adjoining Fishponds station on the outskirts of Bristol. In 1934 the business was taken over by the Hunslet Engine Company of Leeds and the Fillwood Road works closed, only a few years short of the centenary of the start of locomotive engineering in Bristol.

Arriving at the Royal Arsenal, the first six locomotives, **BRISTOL, GLASGOW, LIVERPOOL, NEWCASTLE, DERBY** and **WOOLWICH** were oil-fired and allocated to work in what were classified as “Danger Buildings” such as the Magazine and Filling Factories. The remaining ten coal fired locos were allocated to duties in Non-Danger areas such as coal and passenger haulage. All of this class were fitted with Conical Spark Arrestors but there were other subtle physical differences. Initially rear sandboxes were fitted below the footplate then moved to the tank tops, on **MANCHESTER** and **ENFIELD** the front sand boxes were fitted on tank tops although these look ungainly. The first four units had small water tank cut outs; on later units this was made longer. On **SHEFFIELD, CHARLTON** and **DERBY** a wooden toolbox was mounted on the left tank top, which may have been an RAR in-house modification.

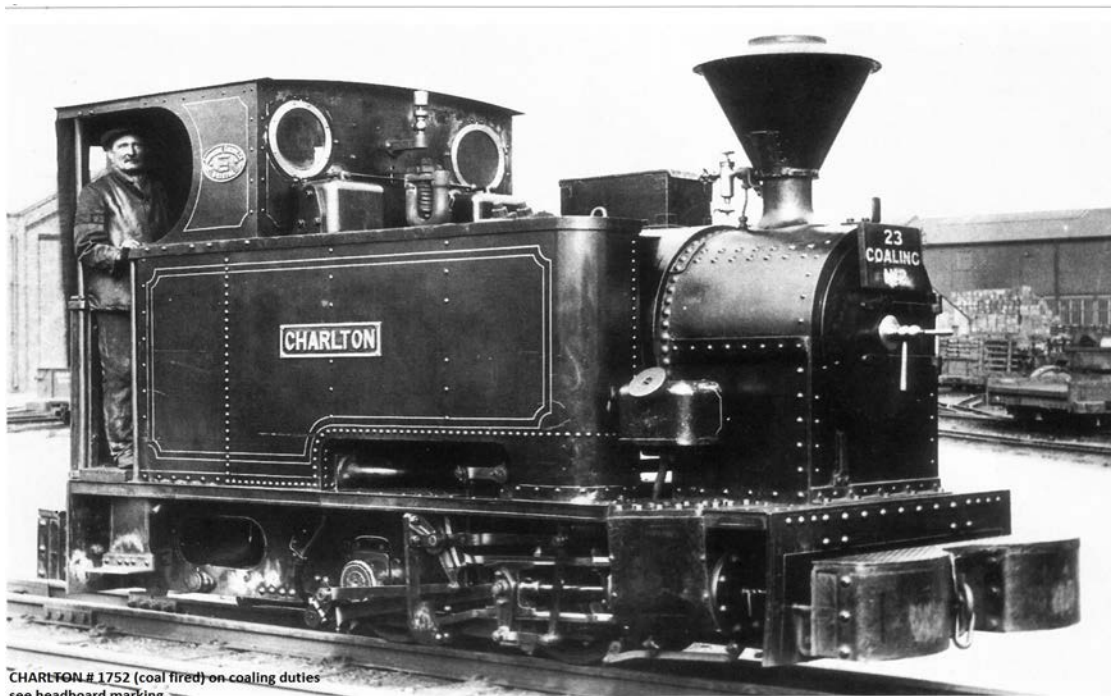
All the Class were constructed with outside frames to accommodate the 25in wheels, set at the Arsenal gauge of 18in. and the now standard axle's centres of 3ft. 3in. which allowed curves as tight as 30ft. radius to be taken. Operating at a steam pressure of 160 lbs/sq. in. Walschaerts valve gear was employed to feed the 8½ dia. by 12in. stroke cylinders. The oil-fired units had a side tank water capacity of 260 gallons, a balance pipe connecting the two tanks, boiler feed by two Gresham & Craven Type #3 injectors. The rear portion of each water tank was sectioned off for 50 gallons [actually a separate tank] of light fuel oil, which was preheated via a steam coil before atomisation through a Kermode burner. When fuel shortages demanded, alternatives of heavy fuel oil, Bitumen by-products and Creosote were trialled. Creosote was mixed 75% with ordinary fuel oil, a Ministry surplus of over **400,000** tons was stored on site, however this was not without its problems as often large quantities of naphalene crystals formed choking the nozzles of oil burners. It is presumed that on the coal fired units; the 'oil tanks' would have served as coalbunkers. Overall the **Charlton's**

were a sturdy and presentable locomotive, with a tractive effort of 4,980 lbs. they were quite happy to work around curves of 35ft. radius and could even manage a tight bend of 30ft. if required and were well liked by all drivers.



The railway system that operated at the Royal Arsenal from 1824 to the early 1960's, comprised 18 inch gauge, 4ft. 8½in. standard gauge, dual gauge, and a track of 24 inch for Col. Beaumont's Experimental Compressed Air locomotives. The RAR at its height of operation ran on a colossal 120 miles of track. By the start of World War 1, with the 1,300 acre site, stretching from, the present day Woolwich Swimming Baths to almost the front gates of Crossness STW of Thames Water Plc. At the tail end of the First World War, in the winter of 1917 the Arsenal employed 72,700 personnel, working it is believed two 12 hour shifts, which gives some idea as to the size of this major munitions factory.

After the Second World War the 18-inch system of the RAR saw declining use, with the arrival of more modern powerful standard gauge locomotives of both steam and diesel, for the increasingly heavier loads. Many of the last remaining narrow gauge steam loco's were sold off or scrapped. **WOOLWICH** received major boiler works which were completed in D.59 the Arsenal Blacksmiths Shop in 1956, we have photos of the bare boiler, complete with conical chimney, integral smoke box and steam manifold fitted, probably just after final inspection pressure test, **No.1748** was then put into storage in 1956.



CHARLTON # 1752 (coal fired) on coaling duties
see headboard marking

This was confirmed by a visitor to Crossness three years ago. This gentleman had just finished his apprenticeship at that time in 1956 and one of his first tasks was to roll the angle rings seen wrapping the boiler at either end, these support the lagging outer metal skin.

Why she alone was saved one will never know for certain, was it an archaeological decision, or one of sympathy, likely that her name (Woolwich) alone saved her from the scrappers cutting torch, she having helped to save London from invasion.

In 1958 she was sold off to dealers E. L. Pitt of Northampton, during her time in the East Midlands yard the conical spark arrestor chimney was replaced with one of conventional design and in April 1962 she was put back into steam, on blocks by J & W. Gower (engineers) of Bedford, prior to sale. Sold and moved to Devon on 11th April 1962. There she was to assist with track laying and run on the newly constructed 18" gauge line at The Bicton Woodlands Railway. Her [believed] original RAR livery of apple green lined out in yellow was changed to very dark blue, then apple green, then mid blue. During the forty years in Devon, air braking was installed to conform to the New HMRI regulations, fed by a small Stuart steam compressor mounted on the external cab back plate. To accommodate the air reservoir the rear cab wall and roof had been extended back some 6" from original. Frankly an untidy and inefficient addition to her simple and pleasing style. She operated happily for nearly forty years although maintenance records show a heavy consumption of brake shoes.



WOOLWICH @ Bicton Woodlands Railway - Circa 1966

Then in 1999 she was advertised for sale, being replaced by, modern, efficient, switch on/off diesel being the “new in thing @ BWR” and **WOOLWICH** was purchased by Waltham Abbey Royal Gunpowder Mills, arriving in Essex in September 2000 to tie in with the opening of this iconic heritage site with its own history of 18” railways dating from 1920’s. Sadly at the Mills she was braked on track outside for 11 years. Her 10 year boiler ticket expired in 2002. However a cosmetic restoration some 8 years ago helped somewhat to protect the loco externals, whilst the Mills explored the various options for building an 18 inch line, this hampered by the conflicts of EH, Planning, Health & Safety, SSI site impact and of course funding for a large undertaking. In May 2011 by joint agreement it was decided that Crossness Engines Trust would maybe undertake the major restoration and possibly return her to steam to operate on a proposed new 18” track planned to carry CET visitors to the Bazalgette Working Steam Museum.

Since 2012 the loco has been stripped right down to the frames. 100 years of paint and corrosion removed, steelwork treated, primed and finished black. The wheelsets re-profiled and many other parts repaired or restored. The boiler has been stripped of 76 boiler tubes and an insurance inspection completed, which has highlighted repairs, estimated at around £22,000. The current ongoing restoration is awaiting funds or grant aid assistance and are estimated at £47,000 – 52,000 to complete the project. It is likely that 100 years of working steam will be witnessed yet again to celebrate the durability of British Engineering in the post Victorian era.