ACT Heritage Council

BACKGROUND INFORMATION

John Fowler Road Locomotive 16161

At its meeting of 22 September 2016 the ACT Heritage Council decided that the John Fowler Road Locomotive 16161 was eligible for registration.

The information contained in this report was considered by the ACT Heritage Council in assessing the nomination for John Fowler Road Locomotive 16161 against the heritage significance criteria outlined in s10 of the *Heritage Act 2004*.

HISTORY

For a detailed history and information on primary sources see *John Fowler Locomotive (no. 16161) Conservation Management Plan*, prepared by Rohan Lamb (Lovell Chen Architects and Heritage Consultants) for the Land Development Agency, April 2015. The history, description, and condition assessment as outlined below are based on this document.

The John Fowler Road Locomotive 16161 was manufactured in 1925, and used for road haulage during construction of the Federal Capital Territory. It is one of two such locomotives used in this capacity, the second (serial number 16162) is held by the National Museum of Australia.

The road locomotive was a later refinement of the traction engine. The term 'traction engine' was used during the 1880s to describe an engine suited to prolonged operation over roads undertaking heavy haulage. Traction engines played an important role in the pattern of development of Australia's early agricultural, mining, road transport and sawmilling industries from the late-1870s until the 1940s. Their mobility and power eased manual labour and the need for horses or bullocks. They had a positive economic and social impact in Australia where labour was scarce, and distances great.

Road locomotives typically had three speeds which provided a faster gear for road travel (general purpose traction engines usually had two speeds). They were also fitted with a front belly water tank to provide additional travelling range before refilling, a disc-type flywheel, side motion covers, and larger wheels (see Images 1 and 2 for the anatomy of a road locomotive). These features made road locomotives the most expensive type of engine available. Consequently they were far less common than general purpose agricultural traction engines. In the case of John Fowler & Co (Leeds), one of the major manufacturers of traction engines and road locomotives, most of its road locomotives supplied to Australia were sold to government customers, including shire councils and government departments.

After World War I, tractors and trucks powered by internal combustion engines were taking on the traditional roles of the traction engine. These vehicles were cheaper to purchase, did not require any qualifications to operate, and did not require a waiting time in the morning while raising steam. However there was still a place for steam locomotives, and sales of these were strong in the 1920s with widespread road building programs in place, such as construction of the Federal Capital Territory.

In 1908, the Limestone Plains site was selected as the location for the Federal Capital Territory. Construction of the new Federal Capital Territory was the responsibility of the Department of Home Affairs (DHA). In 1914 a rail line was constructed from Queanbeyan terminating at the Kingston Power House. It was from Kingston that required materials would be hauled and disseminated through the Federal Capital Territory site. Between 1920 and 1927, light rail lines were constructed to link Kingston to Civic. Lines were also built to connect the Commonwealth Brickworks at Yarralumla to construction sites in the emerging capital, including the Power House, Parliament House and Hotel

Canberra.

To aid with construction of the Federal Capital Territory, the first traction engine purchased in 1911 by the DHA was an internal combustion powered vehicle. This was an Australian made tractor by the Caldwell-Vale Motor and Tractor Construction Company Ltd. The tractor was used for carting cement, timber and other materials from the Queanbeyan railway station. This motor traction engine was not as robust as a steam traction engine, and it was soon to experience mechanical trouble. It was discarded and laid up in the store at Queanbeyan only two years after its purchase. This unsuccessful experiment with an internal combustion powered traction engine is likely to have influenced the DHA's decision to use steam powered traction engines for the majority of its haulage work. Given the urgency of construction, the DHA sourced all of the initial fleet of steam traction engines second hand. By September 1913 it had acquired six traction engines and 34 wagons for hauling materials.

During the establishment phase of the Federal Capital Territory the main projects underway included the Kingston Power House and the Cotter Dam, along with road construction and establishing the brickworks. Duties for the traction engine fleet included haulage of wagons filled with crushed rock from the Mugga quarry; transport of cement and pipes to the Cotter dam construction site; road construction; and haulage of timber buildings. Coal was also delivered to the boiler house at the Duntroon Military College.

By May 1924 the Works Director of the Department of Works & Railways (the successor body to the DHA) had completed a review of the condition of the existing steam plant, and found that the purchase of two new traction engines was necessary. The intended function of the new engines was the haulage of construction materials from the railway yard, and bricks from the brickworks out to the various sites. Thus, two John Fowler & Co locomotives with serial numbers 16161 and 16162 were acquired by the Department of Works & Railways. In fact, John Fowler & Co custom made the locomotives to meet the Department of Works and Railways requirements for heavy duty compound steam locomotives.

The firm of John Fowler & Co had its origins in the 1850s when John Fowler, an agricultural engineer and inventor developed machinery for the draining and ploughing of fields. John Fowler & Co was very successful, and dominated the market for ploughing engines. It was a natural extension for the business to expand into building steam locomotives, traction engines, steam rollers, and stationary steam engines. The company's products were exported around the world. The Australian market was significant for John Fowler & Co, with over 450 steam traction engines and road locomotives supplied as well as narrow gauge locomotives and road rollers. In recognition of the importance of the Australian market, John Fowler & Co was one of the only British makers to establish an office in Australia. The office was in Sydney.

John Fowler Road Locomotive 16161 represents the peak of design for road locomotives, for, after the 1920s, John Fowler & Co only sold around 20 engines, as combustion engines became more advanced and gained favour. The engine is made from materials which were of higher quality than those used on earlier engines, reflecting the ongoing improvement in methods of manufacture and understanding of properties of materials compared with earlier engines, as well as evolution of design over time.

John Fowler & Co experienced an increase in steam roller sales until the late 1920s when this ceased, reflecting the transition to internal-combustion engines. During the 1920s, traction engine sales were largely confined to government departments, and the two road locomotives supplied to Canberra were among the last road locomotives to be supplied to Australia.

Locomotives 16161 and 16162 are thought to have been set to work by the second half of 1925. Once they were in service most of the plant originally purchased by the DHA was auctioned. The two John Fowler & Co locomotives were based at the depot at the Kingston Power House. As part of their assigned haulage work, they would tow up to seven wagons at a time, each loaded with 15 tonnes of crushed rock. They performed pile driving, hauled wagons loaded with pipes (see Image 3), and towed a New Era elevating grader to make roadways (see Image 4). Use of the elevating grader resulted in significant savings in time and labour, and was an early form of continuous excavator for large earthworks.

The main period of construction work designated to the locomotives was over by 1927, when the seat of government had been transferred from Melbourne to Canberra, so haulage work, if required, was irregular. As such, the locomotives found uses in stationary applications at the recently established abattoir (near Mugga Lane), then driving the gravel screening plant at the Black Mountain quarry.

At the abattoir one of the locomotives (it is unclear which number) appears to have been used to supply steam for heating which would have been provided via a pipe connected directly to the boiler, and also to drive machinery via a flat belt on the flywheel. The abattoirs were extensively modernised between 1931 and 1932, when electric motors were installed, and the John Fowler & Co engine removed.

The other stationary application recorded was the use of one of the road locomotives (again it is unclear which number, or if both were present) to drive a rock crushing plant at the Black Mountain quarry. The engine was parked in a shed (see Image 5), and drove the jaw crusher and trommel screen via a flat belt from the flywheel.

After this, the two John Fowler & Co road locomotive engines were retained by the Federal Capital Territory Commission and stored at Kingston until the late 1940s. They appear to have been the last two mobile steam engines in government ownership, but saw little if any use.

In January 1947 John Fowler Road Locomotive 16161 was auctioned, and sold to T A Fields of Lanyon Station. After undergoing some repairs, the locomotive was driven out to the property by one of its old drivers, Bill Ginn, with his wife following in a truck carrying extra wood and water to supply the engine. The locomotive aided in clearing yellow box trees on the property, and Bill Ginn commented that the engine also drove a chaff cutter at Lanyon (17).

Once no longer required at Lanyon, the engine was sold to saw miller Mervyn Davis in the early 1950s. Upon purchase of John Fowler Road Locomotive 16161 his mill was moved to Reid's Flat, 170km north of Canberra, enlarged and fitted with two saw benches. These were driven via a countershaft in front of the engine driven by a flat belt off the flywheel of the locomotive.

In 1955 the mill was purchased by Alfred Chown, who ran it with his sons. Here the engine was only ever used at the mill in a stationary capacity. It ceased to work around 1959 due to the failure of its boiler tubes, and was replaced by a tractor. John Fowler Road Locomotive 16161 was purchased from Alfred's son Alan Chown in 1962 by Bob McLeod, from Cowra, NSW. McLeod was 17, and had had an interest in steam since childhood. Over the next year McLeod made the trip from Cowra to Reid's Flat each weekend to prepare the engine to be driven home under steam. The boiler tubes were replaced with second-hand tubes from a railway, the feedwater pipes were repaired, bearings checked and adjusted, and the hand brake gear replaced after the previous owner had removed it. McLeod then drove the engine to Cowra covering the 72km over two weekends.

McLeod was well known around Cowra as an engine collector, and John Fowler Road Locomotive 16161 was a regular feature in street parades through Cowra. In 1972 McLeod advertised the engine for sale, and sold the engine to Doug Wallis. Since then the engine has been stored in sheds, unused. More recently, it has been stored at its present location at Lanyon Homestead.

The Land Development Agency purchased the engine from Doug Wallis in 2014. Mr Wallis was a Sydney based collector, who had housed the engine in secure dry conditions until its purchase by the ACT Government.

John Fowler Road Locomotive 16161 was classified by its manufacturer as a B6 class road locomotive. B6 refers to the sixth and last iteration of the B class boiler, and this type of boiler was used from 1904 until the end of production of road locomotives in the early twentieth century. B6 road locomotives were the most powerful and expensive engines of their type available at the time and epitomized the zenith of their class.

In general the sixth design revision (i.e. the 'B6') superseded previous designs, however in the case of the class B engines there was a seventh boiler design referred to a B7 model. The B7 boiler was a variation of the B6 boiler, and was built in limited numbers.

There are only three other John Fowler & Co road locomotives of the B6/B7 class in Australia. Two of these locomotives are privately owned, with one in poor condition. The third is engine 16162, which is owned by the National Museum of Australia, and is in poor, non-operational condition, with extensive repairs required to the boiler. In addition, there is one locomotive on the ACT Heritage Register, Locomotive No. 1210, however this is a different design and brand of engine, is not a road locomotive, and was used to transport passenger trains on NSW railways.

In March 2016 the ACT Heritage Council and ACT Heritage attended the launch of the ACT and Region Heritage Festival at Lanyon Homestead, launched by Minister Mick Gentleman, which featured the restored and serviced John Fowler

Road Locomotive 16161. The Land Development Agency of the Economic Development Directorate presented the Chair of the ACT Heritage Council with a nomination application for the locomotive.

DESCRIPTION

John Fowler Road Locomotive 16161 is a three-speed, fully sprung, class B6 compound road locomotive. It is a self-propelled, steam-powered engine, otherwise called a traction engine. B6 identifies the model, and reflects the size of the engine. The 'B' indicates an engine of 8 nominal horsepower. Nominal horsepower (NHP) is an historical approximation of the power of an engine.

John Fowler Road Locomotive 16161 and its duplicate (16162) were among the most powerful road locomotives ever built. They were tailored by John Fowler & Co to accommodate conditions in the Federal Capital Territory such as large distances, and a lack of roads and railways. Other key and custom features of John Fowler Road Locomotive 16161 are:

- Boiler of B6 class with long box design (i.e. large firebox, to accommodate low grade coal) and riveted construction, made from steel plate to increase strength.
- Compound configuration engine with a high pressure cylinder of 171 mm and low pressure cylinder of 292 mm diameter.
- Engine fitted with front and rear springs to account for longer distances the locomotive would drive (see Image 6 and Image 7).
- Driving gears 6.35 mm wider than those found on a general purpose B6 engine.
- Rear and front wheels larger than those found on a general purpose B6 traction engine.
- Rear axle of nickel steel with higher strength properties than standard locomotives.

Physical condition and integrity

John Fowler Road Locomotive 16161 is in excellent condition, and is largely intact as built. It was used in its main haulage capacity for around two years, and as such the driving gears are in excellent condition, as is its motion gear. Its boiler, working parts, and wheel treads do not display signs of significant wear. Other features, such as the boiler tubes, ash-pan, pipework, spud pan, timber canopy and bottom of the front water tank, have been replaced during previous preservation works, which were completed to a high standard, consistent with the original design and appearance. Parts of the brake mechanism have been replaced with parts made to the original design. The engine has been restored and the locomotive is in workable order (see Image 8). While it was not in working order, the engine had been stored in a dry environment with the boiler emptied of water to minimise deterioration.

As at 2016 the following maintenance and conservation works have been completed:

- Wheels removed and fitted with rubber, repainted according to original specification.
- Ashpan repainted and fitted with new wedges.
- Lagging timber and steel cladding on the boiler replaced with new materials.
- New bolt fitted to crank shaft.
- Asbestos gland packing removed.
- Asbestos gaskets removed and replaced with rubber gaskets.
- Cosmetic work (i.e. repainting of exterior, including touch-ups of pin-striping and polishing metal see Images 9 and 10).

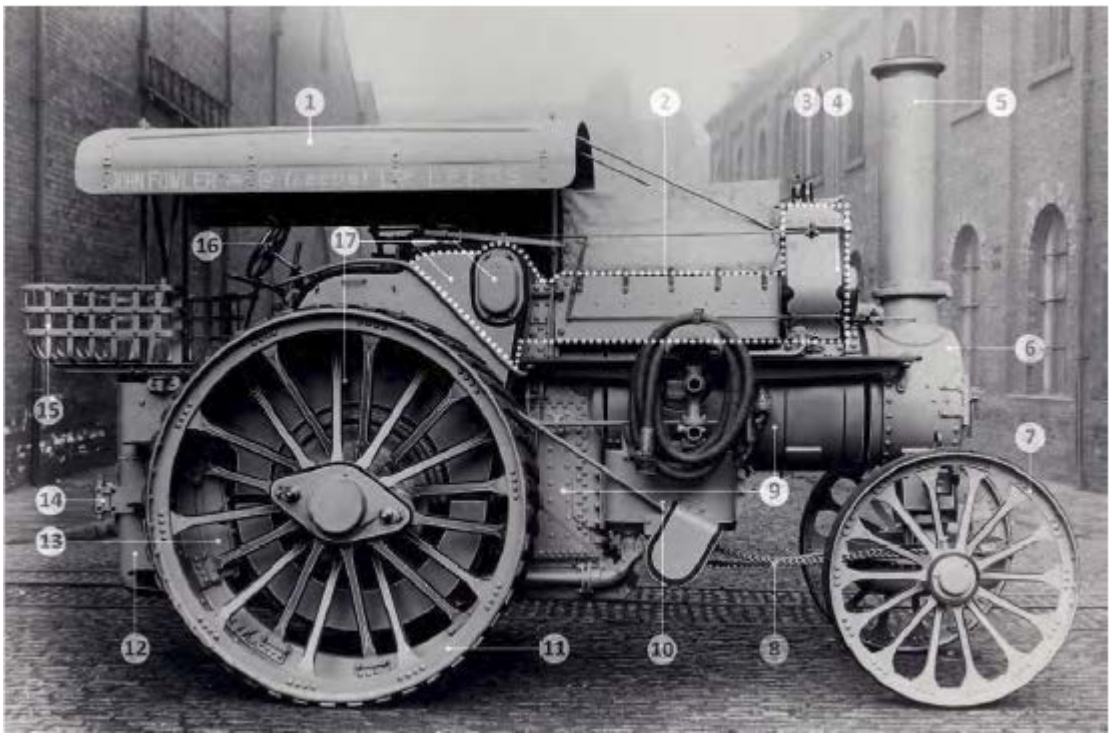

Image 1 Anatomy of a John Fowler & Co Road Locomotive part 1 (Museum of English and Rural Life cited in Lamb 2015)

1. Canopy
2. Engine
3. Safety valve
4. Cylinder
5. Chimney
6. Smokebox
7. Front wheels (steering)
8. Steering chains
9. Boiler (barrel & firebox)
10. Front water tank
11. Rear wheel
12. Rear water tank
13. Rear brake
14. Draw bar
15. Wood basket
16. Steering wheel
17. Gears (under covers)
18. Whistle
19. Motion cover
20. Dust Cover
21. Flywheel
22. Regulator handle
23. Water pump
24. Rear brake handwheel
25. Cable guide rollers
26. Winch drum
27. Ashpan
28. Spud pan

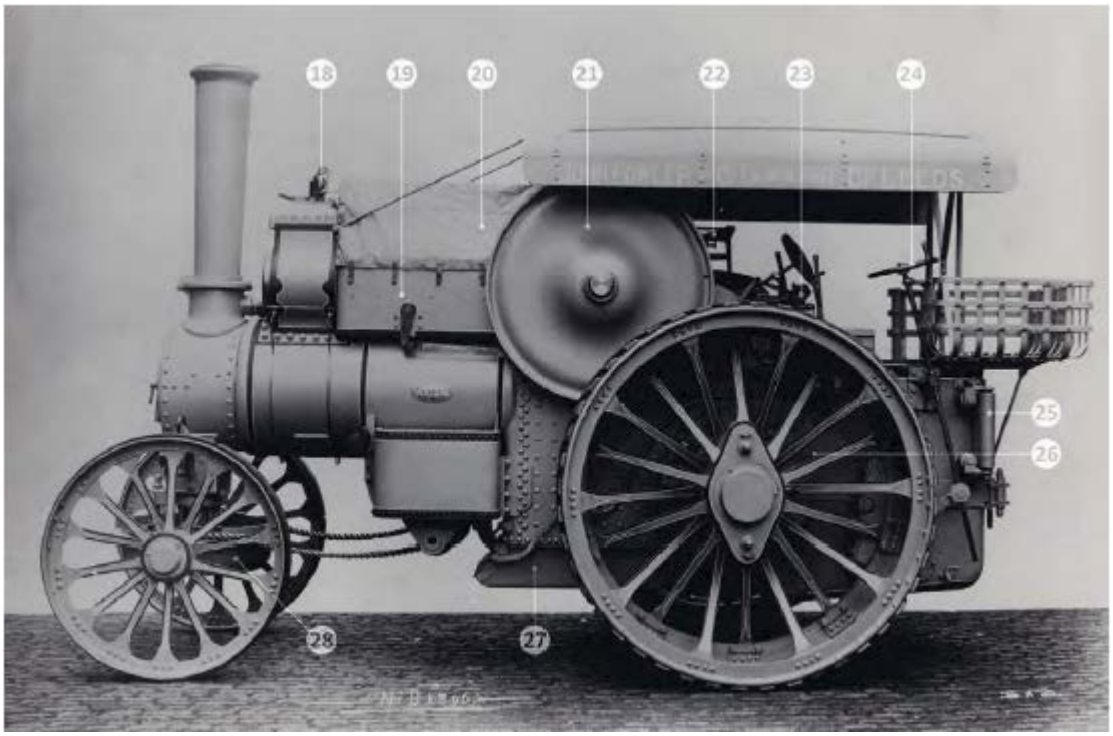

Image 2 Anatomy of a John Fowler & Co Road Locomotive part 2 (Museum of English and Rural Life cited in Lamb 2015)

Image 3 One of the Fowler locomotives hauling wagons with pipes (NLA cited in Lamb 2015).

Image 4 One of the Fowler locomotives towing a New Era grader (Mildenhall Collection cited in Lamb 2015)

Image 5 One of the Fowler locomotives in a makeshift shed at the Mugga Abattoir (TCG Weston cited in Lamb 2015).

Image 6 Front axle leaf spring (Lamb 2015).

Image 7 Rear axle leaf spring (Lamb 2015).

Image 8 John Fowler Road Locomotive 16161 newly driven out of Lanyon machinery shed (ACT Heritage 2016).

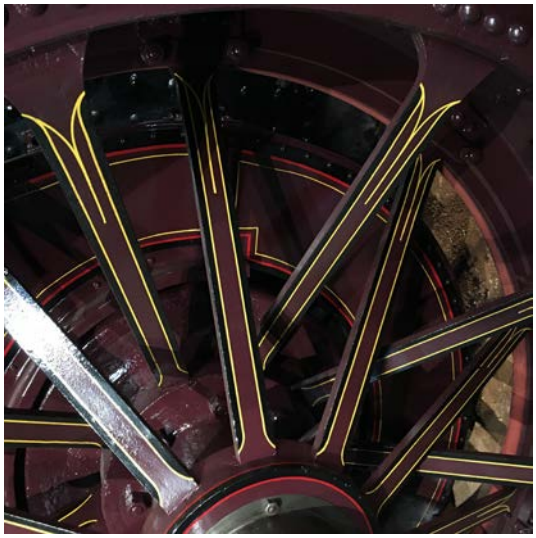

Image 9 Pin striping and new paint on wheel (ACT Heritage 2016).

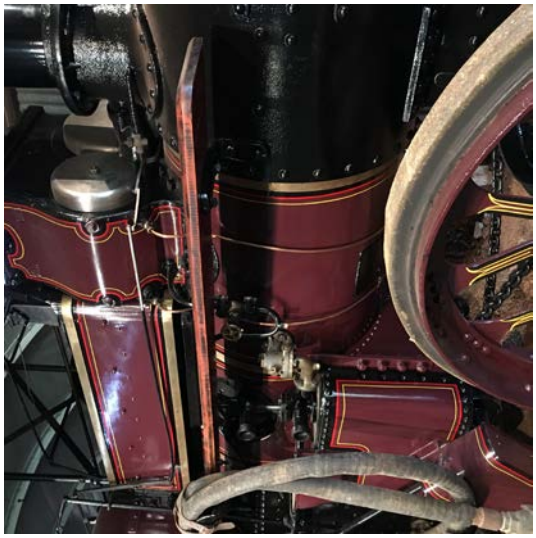

Image 10 new paint, pin striping and polished metal on John Fowler Road Locomotive 16161 (ACT Heritage 2016).

References

K & H Ainsworth Engineering Pty Ltd. (2015). *Locomotive No. 16161 Stage 1 Repair and Condition Report*. Unpublished report for the Land Development Agency.

Lamb, R. (2014). *Condition Assessment of John Fowler & Co. (Leeds). Road Locomotive, No. 16161*.

Lamb, R. (2015). *John Fowler Road Locomotive No. 16161 Conservation Management Plan.* Unpublished report for the Land Development Agency.