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Archaeological recording on Catesby Tunnel and other Great Central Railway features at Charwelton, Northamptonshire, 2018

Iain Soden and Joe Prentice

Email: iain@isheritage.co.uk
Tel: 07742 901760
Website: www.isheritage.co.uk

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Summary

The redundant Great Central Railway Catesby Tunnel of 1897 was recorded in accordance with an Historic England Level 2 record, while a nearby related road-bridge due for demolition was recorded to Level 1 equivalent. An archaeological trench uncovered remains of a goods-yard building and the former mainline track-bed with the foundations of the station platform. A former 1897 signal box layout was also excavated.

Introduction

Daventry Aero Research Partnership received planning permission for the creation of a technology park on the site of the former Charwelton Railway Station, Northamptonshire, and for the conversion of the nearby Catesby Tunnel into a high-end aerodynamics testing tunnel, principally for the automotive industry (Application DA/2015/0808).

Both the tunnel and the station were opened in 1897, when they were constructed as part of the Great Central Railway (Fig 1 of 1900). They were closed in 1966 as part of the national rail cuts overseen by Dr Beeching, and the buildings demolished, although the rail-bed was not removed until c1981.

The Planning Application was accompanied by an archaeological Desk-Based Assessment by Iain Soden Heritage Services Ltd, which set out the proposed scheme's archaeological impacts and highlighted any moderating factors, which included the level of attrition the remains had received when the station and railway were decommissioned (Walker 2015).

In accordance with the perceived remaining heritage value of the site, Northamptonshire County Council's Assistant Archaeological Advisor requested in an archaeological condition (25) that there should be some targeted archaeological work within the area of the former station and that building recording equivalent to an Historic England Level 2 record be directed at Catesby Tunnel and a Level 1 record be directed at a nearby road bridge which was to be removed as part of the same works. The scope of the works requirement was set out in an approved Written Scheme of Investigation from Iain Soden Heritage Services Ltd, dated 4 October 2017 and was monitored by Northamptonshire County Council's Assistant Archaeological Advisor.

Fieldwork took place during 3-18 January, 2018 in fine cold weather, but with very wet ground conditions after prolonged winter rain. On the eve of the fieldwork the site had long been made-good as pasture and was given over mainly to sheep-grazing. A variety of scrub and self-seeded

bushes grew liberally across the site, and some mature hedgerow trees. The cutting towards each tunnel mouth was overgrown and bore signs of recent vehicle access, for tunnel inspections, farming access and initial development-led survey and investigations (Figs 2, 3).

The tunnel is surrounded (and covered) by farmland, and the station site has the long-lived A361 as its southern boundary, where both pedestrian and vehicular access to Charwelton Station was formerly gained. The A361 formerly over-sailed the railway tracks but this had been dropped to ground level after the station was decommissioned in the 1960s.

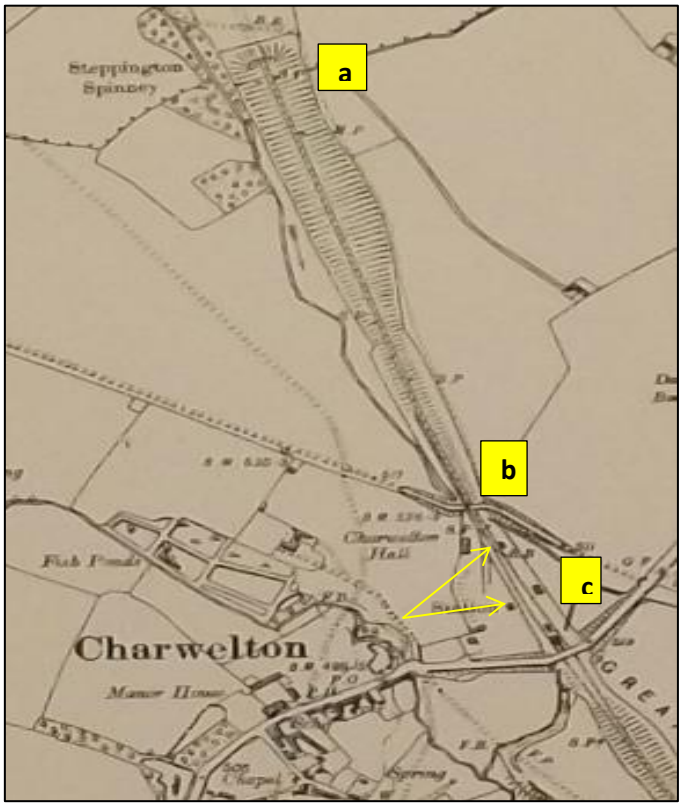

Fig 1: Site location - Extract from the 2nd Edition Ordnance Survey Map 1900, showing the station area, railway cutting and Charwelton tunnel entrance when they were brand new. The topography was little-changed in January 2018: a) tunnel mouth, b) road bridge, c) former station. The present A361 follows almost the same line as in 1900, but has since been dropped to ground level where the railway once ran underneath it. Both of the excavated buildings described in this report can be seen on this map (arrowed).

Fig 2: The abandoned railway cutting looking towards the Charwelton-end tunnel entrance

Fig 3: The abandoned cutting at the Catesby end, looking away from the tunnel mouth

Recording on the tunnel

For a large archive of photographic images showing the tunnel during construction and in-use go to:

www.transportarchive.org.uk ; www.railwayarchive.org.uk ; www.warwickshirerailways.com

Also of note are the National Archives holdings at:

http://discovery.nationalarchives.gov.uk/details/r/C12414

Fig 4: The southern, Charwelton-end mouth of the tunnel, with date-stone 1897.

A recording visit was made to take in the entire 1 mile 1240 yards length of the tunnel and record salient elements on 18 January 2018. The visit commenced at the southern, Charwelton end after walking northwards along the former line of the railway track from the site of the former station there. As it progresses northwards, the former line becomes more obviously set within a cutting. The two mouths of the tunnel were both sealed with steel barriers to prevent unauthorised access. The walk took 1.5 hours as the ground underfoot was very variable and a lot of standing water had to be avoided. In addition there were numerous stops to record the variety of salient features which characterise the tunnel interior. Once more than a hundred metres or so from the southern end daylight rapidly diminished and the remainder of the walk-through was undertaken using artificial hand-held lights and head-mounted torches as back-up. At the tunnel's mid-point, even the pinpricks of light which mark both ends were barely perceptible. Daylight from the five ventilation shafts allows surprisingly little natural light into the structure. The air was very cold and damp, with a high degree of precipitation and mist, making photography at best challenging. The pitch blackness, lightened only by the hand-held lamps, militated against good photographic results.

The tunnel mouths or portals stand between brick buttresses and the junction made with the surrounding land as it ends in a cutting is finished in the ubiquitous Staffordshire blue engineering brick. Parapets are finished off either in stone (millstone grit?) or in engineering bricks moulded to form cappings. The tunnel itself, where it visibly meets a series of three rest cabins, appears to be some seven bricks thick (7 brick bed-widths/c31.5 inches/78.6cm). Naturally 99.99% of the tunnel is not available for such a measurement so it is unknown whether this is a consistent measurement or a localised design at these occasional entrances.

The bed of the tunnel comprises the very churned remains of the track-bed, mostly in hoggin and gravel. In places this was almost entirely dry, in others waterlogged from the ingress of groundwater with extensive ponding. A number of previous investigations have exposed a red brick tubular

culvert which is present positioned down the centre of the entire length of the tunnel for water drainage. This can also be seen both beyond the north and south portals in open ground and can be seen in section on the original engineer's drawing (Fig 6).

Fig 5: a short section of the tubular brick drainage culvert exposed, its vault opened for inspection

The history of the construction of the tunnel is extensively recorded in text and from a resource of contemporary black and white photographs held by a number of railway related on-line archives. The history of its construction has been taken from that on-line resource. A number of original document-copies and later commentaries are also held on disc in the archive to this report.

Catesby tunnel, at 3000 yards, was the longest on the Great Central Railway's route to London, the last of the mainline railways to be built by the Victorians (www.warwickshirerailways.com). The length of line occupied by the present tunnel was originally planned as a cutting, but due to it running through the estate of a wealthy landowner, who objected strongly, the cutting was turned into a tunnel so that the trains could not be seen from the house. The contractor responsible for building this section of the London Extension (Contract No.4, Rugby to Woodford) was T Oliver & Son. It was designed as an 'egg shape' tunnel, 27 feet wide and 25 feet 6 inches high (Fig 6). The tunnel is absolutely straight throughout and on a rising gradient of 1:176 to the south. It is lined with Staffordshire Blue brick, and over 30 million were used in its length. Its creation demanded around 290,000 cubic yards of mining.

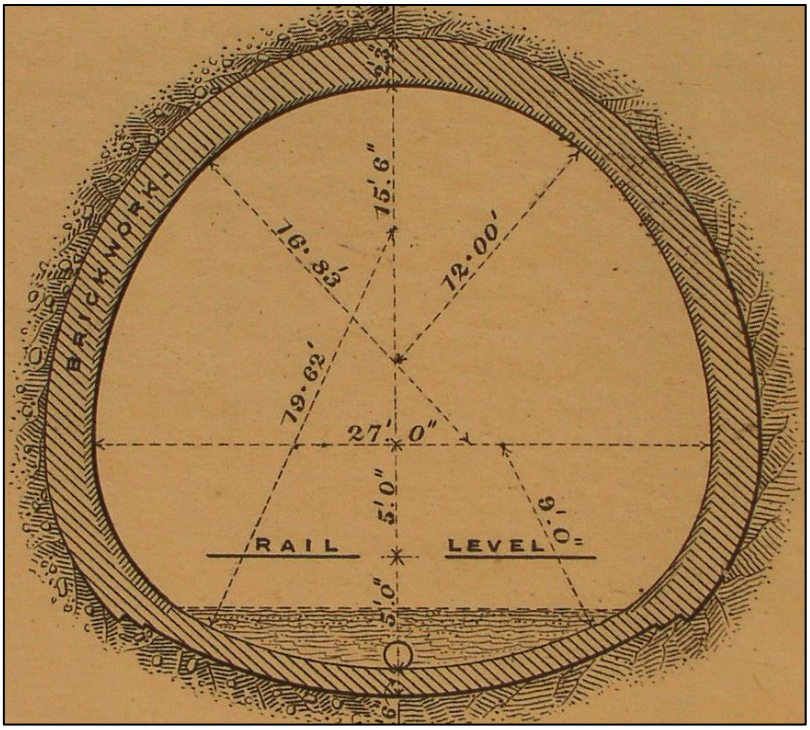

Fig 6: Contemporary c1900 drawn cross-section of the tunnel, dimensions in Imperial. Note the tubular drain below the track-bed.

Fig 7: View along the tunnel from the southern, Charwelton end; 2m scale. A miniscule pinprick of light marks the opposite end, 3000 yards away.

The tunnel was mostly driven from nine construction shafts, each equipped with wooden headgear which was used to lower materials to the men working beneath. Work to sink the first shaft began on 18th February 1895 and the last length was keyed in on 22nd May 1897. Both the north and south portals have prominent date-stones carved with that date. Progress of construction was

greatly accelerated by the use of Ruston steam navvies (cranes). Apparently only short sections at the north and south ends were built using cut-and-cover construction.

The navvies were accommodated in a temporary camp close by which was permanent enough for a while to even be supplied with a chapel.

Once completed, track-workers were relatively well served with regular refuges provided on both sides within the entire length of the tunnel; they are all identical in size and shape (Fig 8). The base of these refuges, ending in a running ledge, indicates the former level of the track bed, now significantly lower than when the tunnel was in use. Each refuge has enough space for one, or two at a squeeze, track-workers to shelter in whilst a train was passing. There are also three rest cabins built into the Up-Side (eastern) wall (Fig 9). The central one is located directly opposite a tablet that marks the 'half way' point. During the tunnel's many decades in operation, both lines were inspected by the local ganger twice a day, so refuges and cabins must have had a great deal of use.

Fig 8: One of the arched refuge niches on the west side of the tunnel. Hard-packed gravel is 'splashed' over its base. 2m scale.

Fig 9: One of the three rest cabins on the east (Up) side of the tunnel, looking east. Here the thickness of the tunnel brickwork can be gauged. 2m scale.

Ventilation along the length of the tunnel was provided by five shafts (Fig 10). Four of these are 10 feet in diameter but the northernmost is 15 feet wide to provide greater air flow. These shafts are indicated, along with the entire route of the tunnel, on Ordnance Survey 25-inch series maps which date from 1899/1900 onwards, and remain as cylindrical brick towers in the landscape in their own right. The length of the tunnel means that three sheets cover the entire length of the tunnel; XLII.12, XLII.16 and XLIX.4. The last sheet also shows the station and its associated buildings close to the village of Charwelton, south from the southern portal.

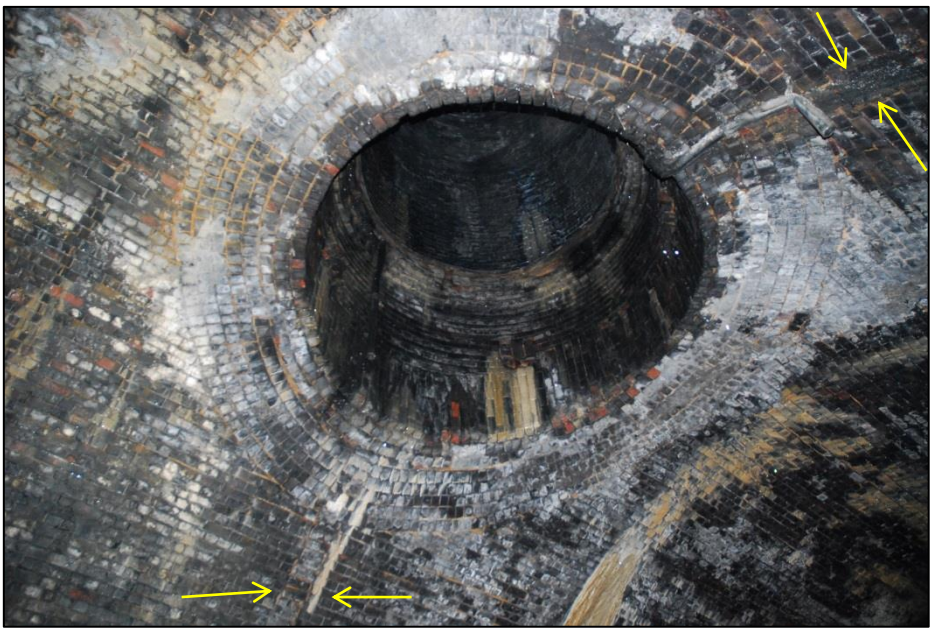

Fig 10: One of the ten-foot wide ventilation shafts; note the elaborate tumbling-in of brickwork to marry up the two different-sized brick cylinders involved. Built-in drainpipes run off each side (arrowed)

Later services were passed along the tunnel on a variety of iron brackets fixed to the brickwork. All were in a very rusted state and little detail could be made out. Some were photographed for archive.

The Great Central Railway, and by default, Catesby Tunnel, ceased operational service on 3rd September 1966 since which time the track has been removed.

Fig 11: The mist-filled mouth of the larger, 15-foot wide, ventilator shaft

Fig 12: The northern (Catesby) end of the tunnel, looking north. Note arched refuge to the left and built-in opposed ledges which elsewhere are mostly covered in gravel.

Fig 13: The northern (Catesby end) mouth of the tunnel, with date-stone 1897, looking south. 2m scale.

Post-abandonment mineral-deposits

At various points along the tunnel, where there was either a concentrated or extensive water ingress over a prolonged period, and sometimes both, there was a cave-like environment, in which the natural salts in the ground, in the bricks and the mortar binding them, had leached through into the tunnel, building up and mineralising as they went, as if they were man-made stalagmites on the floor (Fig 14). The curve of the tunnel promoted a run-down of the salts in suspension and generally militated against the formation of stalagtites as such on the roof, but the deposits down the sides were thick and even had formed the characteristic folds of 'drapery' seen in true cave environments. Iron impurities stained some a garish orange. While these presumably began to form soon after the tunnel's completion in 1897, they would during the life of the tunnel have been prevented from thick build-ups, but they have been unchecked since disuse of the tunnel.

Fig 14a-c: Some of the mineralogical deposits formed in the abandoned tunnel, a by-product of water ingress

The Hellidon road-bridge

The Hellidon road bridge, shown on Fig 1, is of simple riveted plate-girder construction and joins two raised sections of a small road linking Hellidon to the A361 in a single span. It spans the space taken by the up-line and down-line of the former Great Central Railway and has until recently continued to take modern road traffic.

Fig 15: The Hellidon road bridge, looking towards Charwelton from the Catesby Tunnel side

The bridge abutments which tidy the bridge-embankment junction are formed in a manner identical to the portals of the nearby Catesby Tunnel, using Staffordshire Blue engineering brick, the girder-bearers, buttresses and finishing piers formed or capped in millstone grit and the walls capped in Staffordshire blue capping bricks. The brick at the outer surface is laid in alternate courses of headers and stretchers, although this may not be mirrored behind the visible face.

Fig 16: Staffordshire blue engineering brick bridge abutment, looking north-west. Note the principal girder-bearer in stone, matched by the finishing details.

Fig 17: Staffordshire blue engineering brick bridge abutment, looking north-east

Trenching the former Great Central railway main line and a freight-related building

Ground clearance at the start of works uncovered a simple concrete floor surrounded by 1.5-brick wide foundations in red frogged bricks (each 225mm x 110mm x 75mm), relating to a small building which stood in the former goods yard of Charwelton station (Fig 18). The former building, which measured 7m x 6m externally, had a double doorway with small wheel-ramps (and the hinge-fixings in the threshold stone) on the south side and a pedestrian doorway alongside, with (probably) one or two windows in its north wall, for which an iron sash-weight was found nearby (not retained). The building had no interior features and its use is unknown, but its size means it could have been both for storage (hence double doors) and office use (a single door and sash-windows). It appears to have been unheated.

Fig 18: The concrete floor and frogged brick foundations of a small railway building which stood in the Charwelton goods-yard. It is seen in the historic photograph at fig 12 of Walker (2015). Scales 2m and 1m, the latter at a doorway in the south wall

A single trench was dug north-east from this building, measuring 27m long x 1.8m wide, using a 5-ton tracked mechanical excavator, which was fitted with a wide, toothless ditching bucket and working under archaeological control.

Fig 19: Trench with gravelled goods yard in foreground, partly under groundwater. Lias clay lies beneath. Looking north-east towards former platform foundations. Scales 2m and 1m

Within the trench lay the brick foundations of both sides of the former Charwelton Station platform, 6-bricks thick in a mixture of Staffordshire blue engineering brick (outer edges) and red brick elsewhere, both types being featureless, and measuring on average 230mm x 115mm x 85mm. The platform had been 7.7m wide, across the exterior edges of the foundations.

On either side of the platform lay the rubble stone ballast of the track-bed sub-base, which was deeply impressed into the underlying natural clay by many hundreds of tons of trains passing regularly. Further west, between track and the excavated building, lay an area of gravelling, the former goods yard visible in Walker (2015, fig 12). No elements of the station superstructure had survived, even as rubble. Only a few photographs survive of the layout (such as Walker 2015, fig 11), but a 1930s plan shows the former layout, which included ticket office, separate waiting room, separate toilets, all in brick with Welsh slate roofs (Fig 20, below).

Fig 20: The trench looking from the platform foundations (x 2, one on either side). In front and beyond lies the heavy ballast which characterises the sub-base of the track bed to both the up- and down-lines. Scales 2m and 1m.

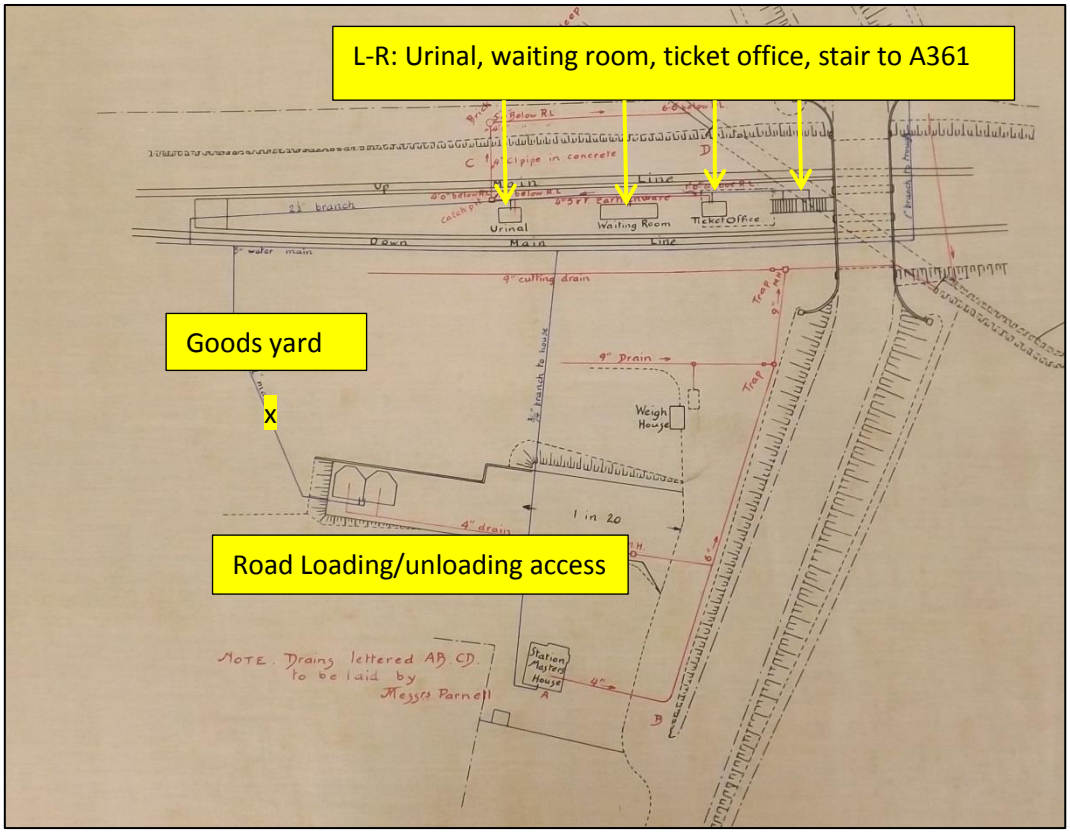

Fig 21: The former station area with platform. Only the Stationmaster's house, at the foot of this plan, survives. The uncovered Goods Yard building is not shown on this plan but stood at about X.

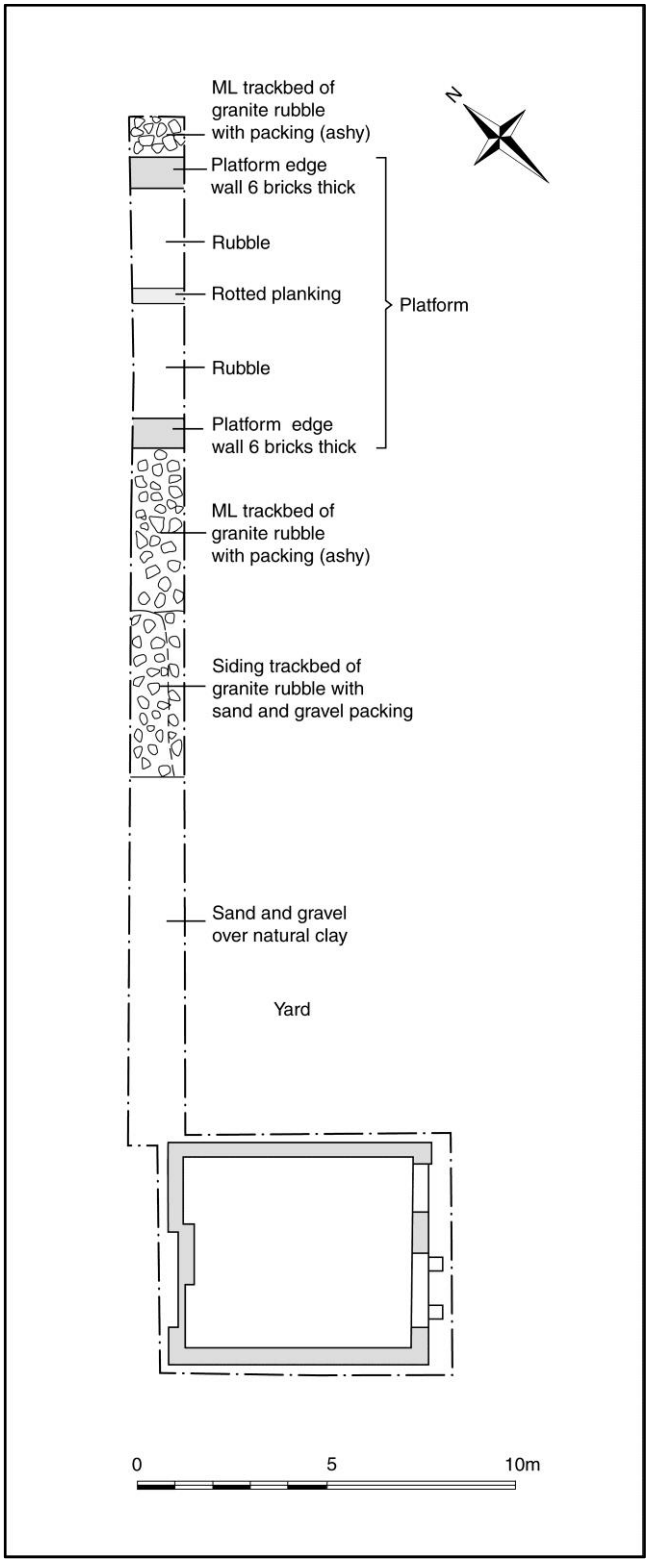

Fig 22: Plan of the freight building and related trench across the main line and platform foundations. For former location of building see historic maps/plans in Figs 1, 21 and 23. (Andy Isham)

A former Great Central Railway signal box

Between the site of the former Charwelton station and the Hellidon Road bridge lay a clump of self-seeded trees, among which were found reduced foundations of a former brick building. Related to historic OS maps, these remains were those of a former signal box which had been built as part of the initial Great Central Railway construction scheme. It may be a type 4 signal box (for which and all other types see Minnis 2012 and generally, Palmer et al 2012, 255-63).

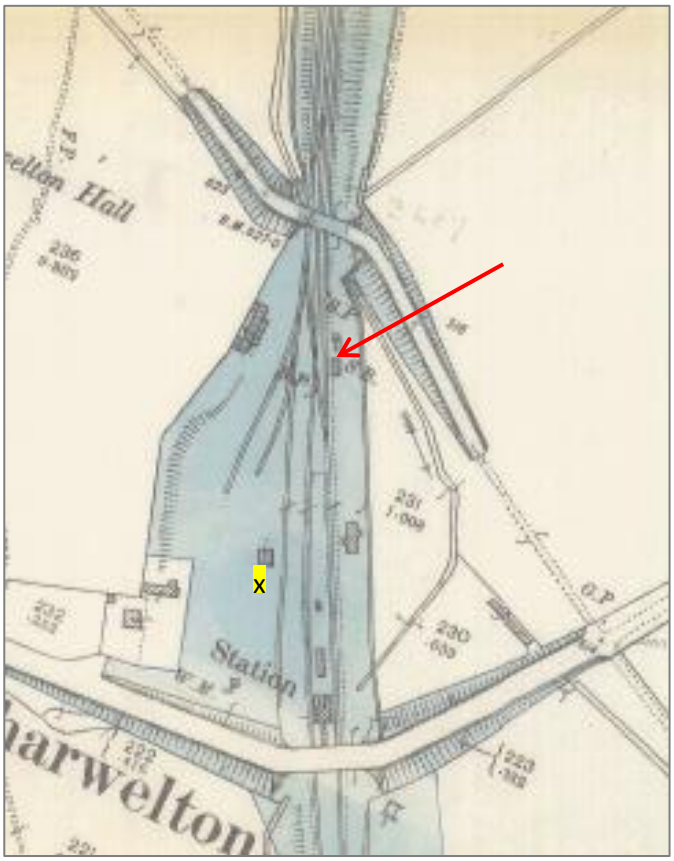

Fig 23: Location of the signal box shown (arrowed) on the 1900 OS map (marked SB). Building in Fig 22 is shown at X.

The first-floor signal box it had supported (containing the signal levers) was probably of timber-frame construction, with a great deal of glass viewing up and down the line, although the ground-floor superstructure, which held the moving signalling equipment may have been of brick (but nothing survived of either. A stone threshold at one end showed where a ground floor door once stood. Pieces of Staffordshire blue engineering ridge tile indicate the roof finish, while pieces of white ceramic insulator betokened the telephone connection it enjoyed.

The signal box was built of plain red brick, and measured 8.6m x 3.7m externally, the foundation walls laid three-bricks thick and where visible appeared to be five courses of stretchers to one of headers. The bricks measured in general 225mm x 116mm x 76mm, and included a few frogged examples with the stamp GIBBS BROS LOUGHBOROUGH. Slots in the long walls showed where former joists had supported the principal joists of the ground floor timber floor; vestiges of joist remained, although much-rotted.

Fig 24: The brick base of the signal box, cleared and cleaned; Scales 2m and 1m

At the mid-point of the east wall lay two brick piers or projections into the room (Fig 25). In a purely domestic context these might have been interpreted as a hearth. Here, however, in the ground-floor signalling equipment-room, no such hearth would be needed -they probably ran all the way up the wall and supported a hearth in the first floor room above. Between them lay a large sheet of copper, with a wire through it. This was probably the ground-plate of the electrical earth which the signal box enjoyed. Just to one side of one of the brick piers were four armoured cables of the former electricity supply, truncated at demolition just above where the timber floor would have been.

Fig 25: The brick piers and probable earth-plate; note disconnected armoured cable ends at left. Scale 1m

Partial excavation of the signal box interior showed that the material inside was builder's infilling, using redeposited natural clay. At its base, below eight courses of foundation walling, lay a clear construction trench in the natural clay for the building of the brick walls (visible in Fig 24, and shown on Fig 26).

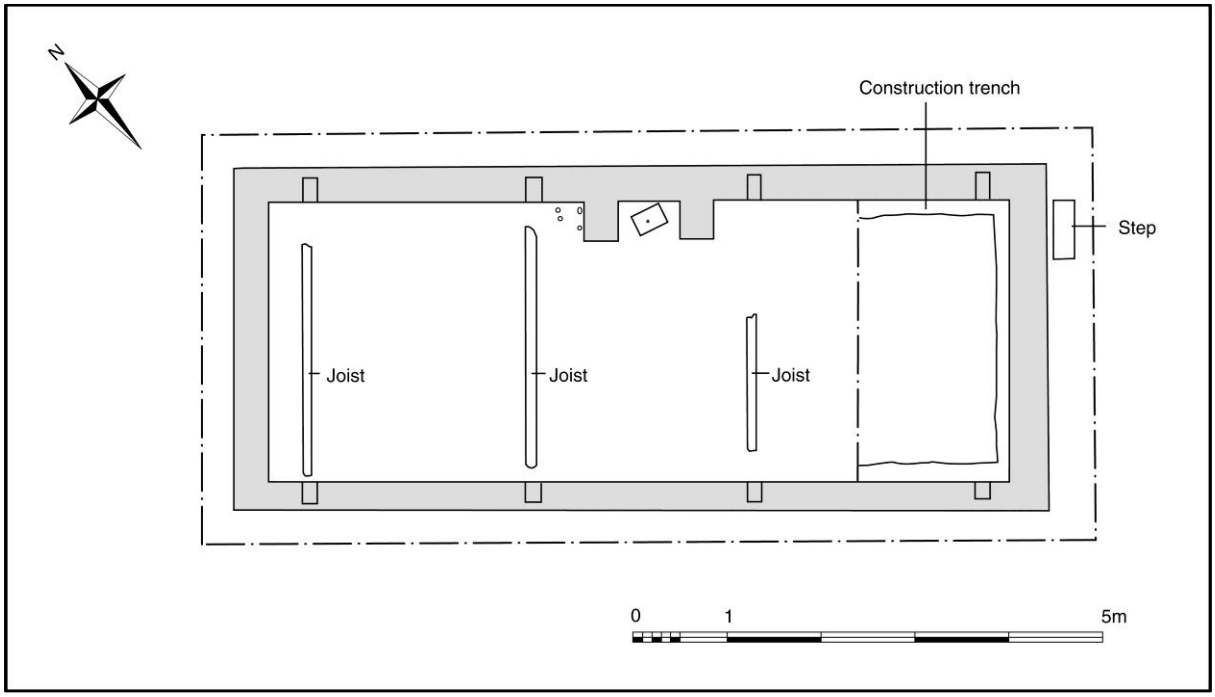

Fig 26: Plan of the signal box remains (Andy Isham)

Conclusions

Following a survey of the proposed impacts of redevelopment (Walker 2015), fieldwork has shown that the huge undertaking of building the Catesby Tunnel in 1895-7 has left a relatively simple structure, if one of huge proportions. Other than the simple tube in the hardest building blocks known at the time (Staffordshire blue engineering brick), the features recorded relate to the personal safety of the railway workers and engineers who kept the tunnel and the tracks in working order and passed along the tunnel twice daily. The ventilation shafts relate to the need to vent the smoke in an age of steam, but also to allow the pressure-waves of the passing trains to begin to dissipate.

No interior tunnel 'furniture' has survived, although some very rusted brackets were still fixed to the wall. There had been widespread build-up of mineral salts from extensive and constant water ingress.

At the site of the former Charwelton station, the engineers who decommissioned the buildings in the 1960s wholly removed the platform and with it the superstructure of the buildings that stood on it. So too the track bed was stripped down to the heavy rubble ballast of its sub-base.

The neat brick foundations and base of a signal box and a small freight-yard building only survived at ground level because they had not stood high up on the nearby (raised) platform. Nothing which had once stood very far above ground –or above the level of the rails, had survived the demolition following Dr Beeching's closure.

Bibliography

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Walker C, 2015 *Proposed Aero Research Facility at Catesby Tunnel - Archaeological Desk-Based Assessment and Impact Assessment*

Appendix
OASIS data

Project Name	Daventry Aero Research facility (Catesby Tunnel)
OASIS ID	iainsode1-337230
Project Type	Building Recording and archaeological trenching
Originator	Iain Soden Heritage Services Ltd
Project Manager	Iain Soden
Previous/future work	No
Current land use	Pasture/derelict 'brownfield' land
Development type	Commercial
Reason for investigation	Planning Condition
National grid reference	SP 524596 to SP 533570.
Start/end dates of fieldwork	3 -18 January 2018
Archive recipient	Northamptonshire Archive
Study area	2ha +

Iain Soden Heritage Services Ltd

19 December 2018