The Nantlle Tramway (Dorothea) Tunnel: a survey, before it collapses.

John Rowlands, March 2024.

Please note that this structure, lying on private property, is protected by law as both a Scheduled structure under the Ancient Monuments and Archaeological Areas Act 1979 and as a Listed Building under the Planning (Listed Buildings and Conservation Areas) Act 1990. It is a criminal offence to injure or deface such a structure. If you visit this site and it remains accessible, please note that, with an enormous mass of slate waste tipped directly above, it is liable to instantaneous collapse without warning and a rescue or recovery can be expected to be impossible. There are definite signs of the walls at the western end of the tunnel structurally failing as of early 2024 and the only sensible course of action is not to enter at all.

This text is in no way an invitation, suggestion or encouragement to enter the structure and no liability shall be accepted for any injury, incident or accident suffered by anyone who does enter.

Partly in a precarious structural state, this tunnel (PRN 61781) is widely-known and visited on a regular basis by members of the public who stumble upon it during weekend visits. Despite this, not very much of an authoritative nature has been written about it, as opposed to the Nantlle Railway in general (for this, see J.I.C. Boyd, *Narrow Gauge Railways in North Caernarvonshire, Vol. I – West*, The Oakwood Press, 1981, but mindful of his contempt of Welsh language matters, typical of English writers of the time and the 10th April *The Guardian* obituary for Boyd, which stated, though without example: "*Although the volume of material he produced will stand the test of time, he did not always distinguish opinion from fact*"). This brief text, therefore, tries to bring as much existing information and original research as possible together before collapses occur – as seem to be not far in the future at the time of writing.

1. *The horse-drawn tramway originally followed the northern, tunnel route (right). Though built to accommodate tipping from above, at some point before 1889, either the tip mass or its extent, or both, rendered the tunnel unusable. It was then diverted ('realigned') slightly to the south (left of image). View from the east of the eastern entrance. Image of 2024 February 25.*

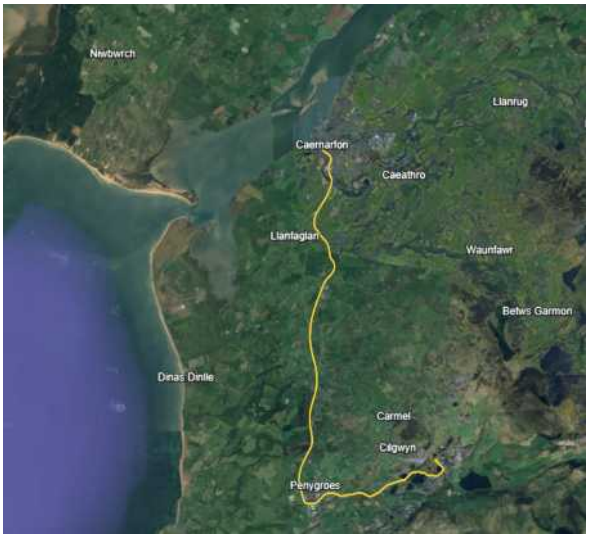
This tramway, of 3'6" gauge, built between 1825 and 1828 ('An Act for making and maintaining a Railway or Tram Road from or near a certain Slate Quarry called *Gloddfarlon*, in the Parish of *Llandwrog* in the County of *Carnarvon*, to the Town and Port of *Carnarvon* in the same County' - Parliamentary Archives, UKLA/Geo4/6/63/) enacted to create the Nantlle tramway, which was granted Assent on 20th of May, 1825. The "probable Expence" given in the Act (at XLIV, p.7) was

£20,000 (in 2023 values, using *measuringworth.com*, about £20 million by the labour cost deflator, or £101 million in terms of share of economic output using the economic cost deflator – the latter a good indicator of the importance of the slate industry at the time). But money ran out before the route could be finished. Legislation - 'An Act for extending the Time for completing the *Nantlle* Railway and other Works connected therewith, in the County of *Carnarvon'* (Parliamentary Archives, HL/PO/PB/1/1828/9G4n99 – Local and Personal Act, 9 George IV, c. lxii), to permit a further five years to complete the route was granted assent on 23rd May 1828 and the line, probably still needing plenty of sloping and earth removal, was opened on July 12th, 1828 (Boyd, op. cit., p.25, source not referenced). The date of building the tunnel is therefore, at present, not known with any certainty because the route area where it came to be built is asserted by Boyd (op. cit. p.7), and probably correctly, to have first operated without a covering, this coming later; there is clear evidence of a ca. 7m-wide cutting above the eastern portal area, much wider than the other cuts in the route, perhaps indicating that arching-over was anticipated, if not conducted, from the outset. Or, the width may indicate additional room was needed within the cut to later build the tunnel. Construction of the tramway was considered by Boyd (op.cit, p.18) as "more likely" to have started at either extremity, though his explanation for this is confused because if this was true, it would require the components of the tramway to be carted by road to the quarries area from Caernarfon Quay – the very thing Boyd claims, with good reason, would need to be avoided! But it is not impossible that the track was started at either end; we just don't know. The Talysarn end was meant to be completed by the end of 1825, financial penalties being payable if it was not. We know that the realigned route, created to bypass the tunnel, appears on the 1889 OS map. The date of abandoning the tunnel would thus seem to be slightly earlier than 1889.

The official notice of Listed Building status (reference 23689) issued by Cadw 21st July 2000 asserts, rather confusingly:

> *"The tunnel itself is a late C19 structure, built in the later C19 to allow waste from the Talysarn Quarry to be tipped above."*

"The late C19" does not necessarily precisely align with the "later C19" (later could be anything from the 1850s or so onwards, whereas the later C19 would tend to suggest perhaps from 1875 or so onwards). Cadw, quite unsatisfactorily for a government heritage body, provide no reference for the origin of this imprecise date range and so we are unable to rely upon it as issued. Enquiries with the Listing Officer at Cadw (reply of 27/02/2024) revealed there were no known references or further notes by the original inspector in relation to the tunnel and so we are left to discover matters for ourselves. Nobody, including Cadw, can now identify the 1866 map that Cadw claim they referred to at the time of the listing. Boyd refers to early maps but yet again providing no specific reference.

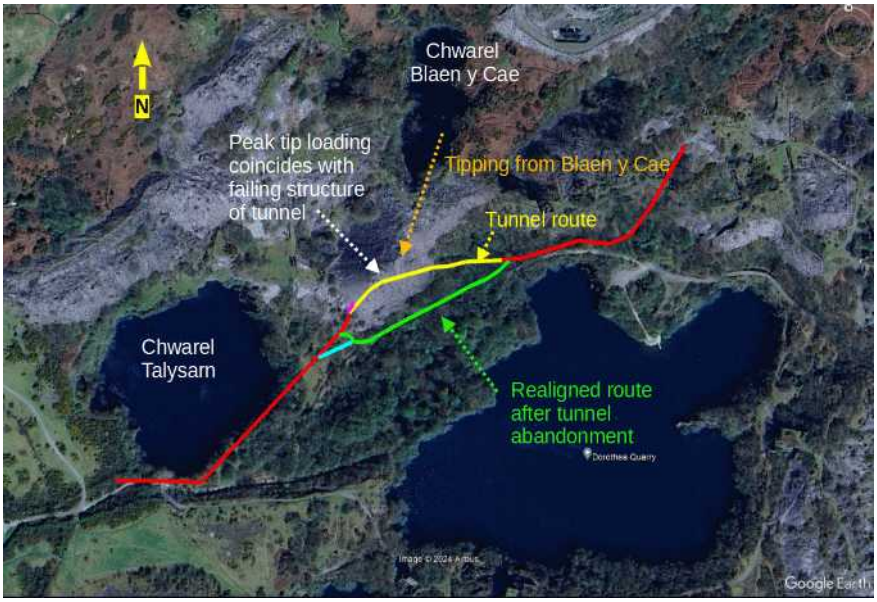


2. *Route of the Nantlle Tramway from the quarries to Caernarfon quay. Length = 15.3km.*

Cadw’s assertion that waste from the Talysarn quarry was the source of the tip above the tunnel is considered suspect; no source is given to defend this claim. The tip that came to overlie the tunnel was, at least in the overwhelming majority, clearly waste discarded – brought up from the pit by a Blondin aerial ropeway aligned with the long axis of the tip – from the Blaen y Cae quarry (NPRN 40530) immediately to the north of the tunnel. This is evident during any site visit, the tip towering over the tunnel region and reaching its peak at its western end. Blaen y Cae did become part of the Talysarn quarry later in its life – Boyd (op.cit, p.243) asserts merely that this was 'latterly', again without a reference, but does give an 1897 date for acquisition of several quarries that seems to have included Blaen y Cae – so this probably happened after the tunnel had been abandoned as a tramway route. The area to the immediate west of the western portal was long a busy incline foot, tracked area with various transport/sorting activities taking place there and so waste from the Talysarn pit seems unlikely to have been deposited here.

Some indication of sequencing of events can be gleaned from comparing the 1889 and 1900 OS maps. At 1889, the tunnel portals are seen to be clear of tip waste and a tracked route leading into and out of them are depicted clearly as intact, if not used structures. The tunnel portals themselves are depicted as distinct blunt terminations, indicating a tunnel mouth, whereas other lines running close to or possibly into (i.e. smothered by) tips are not thus depicted. The realigned (diversion) route is also depicted on the same, 1889 map, showing it had been built at an unknown point but likely just before that year, which may indicate broadly when the tunnel was abandoned. By 1900, the tunnel portals and track leading to them from the outside are no longer depicted. The tip overlying the tunnel is seen not to have expanded by any perceptible degree by 1900 and this did not change for the rest of the area's quarrying life, suggesting that demand for more tipping capacity may not have been the reason for abandoning the tunnel.

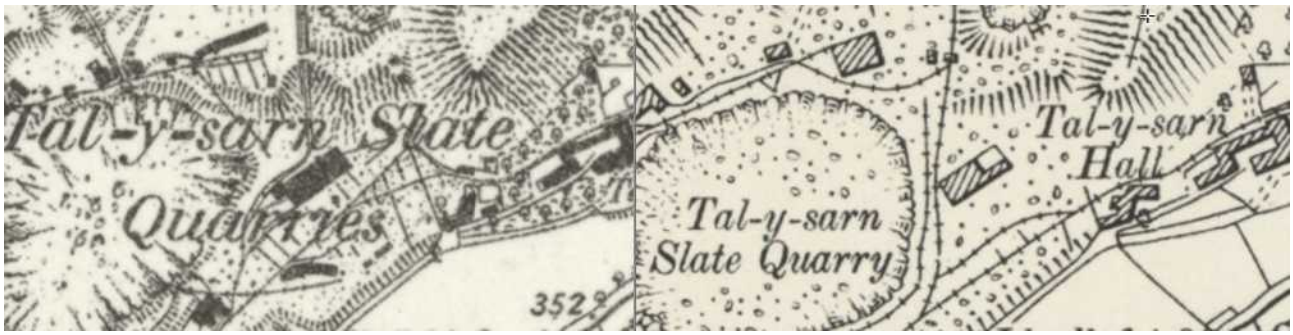
3. *View of Talysarn quarry pit, now flooded and Dorothea, glimpsed at centre right. The tunnel runs under the tip at upper centre. Photo: 2024 March 03.*



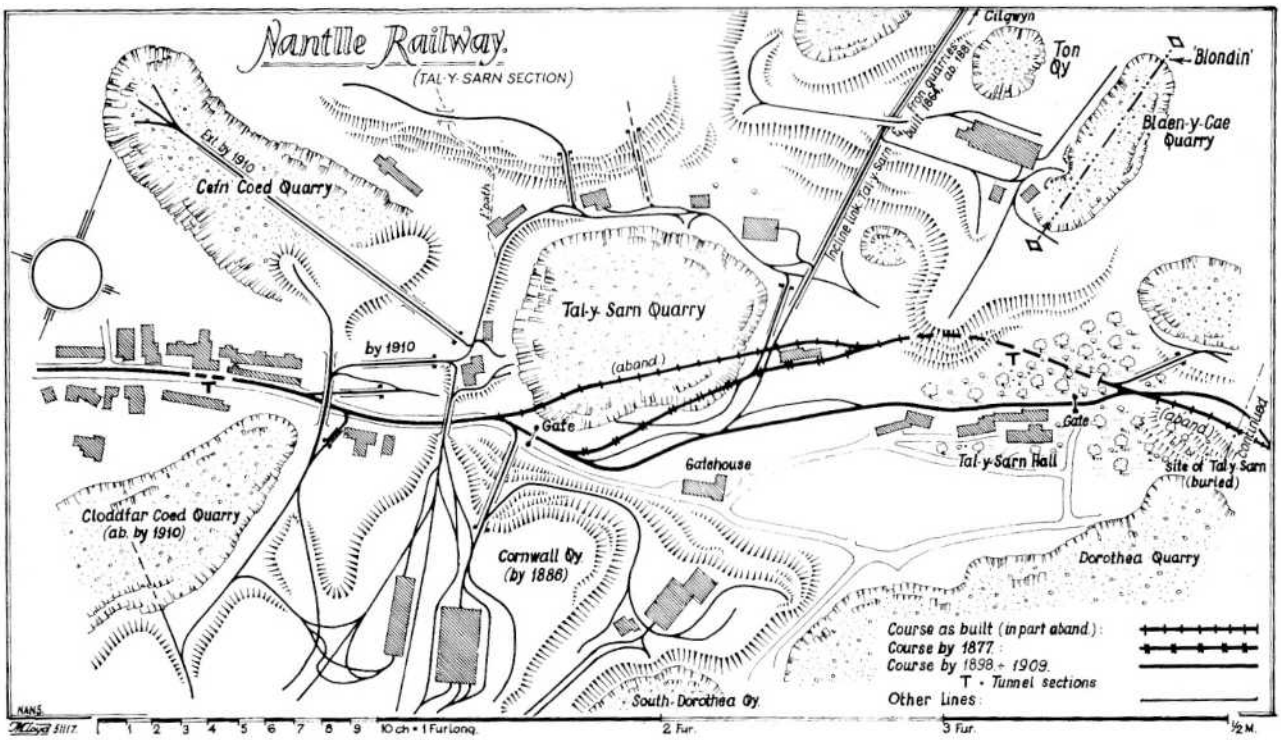
4. *Overview of the central Nantlle quarry area, with the surveyed tunnel route plotted in solid yellow, under the tip, though the tunnel ran at ‘natural’ ground level, and was not a digging into the tip.*

5. *A more detailed view of the Blaen y Cae tip and full tunnel length plotted against the surface view. The western access to the tunnel is tantalisingly close to the edge of the tip's final extent. Because the western end was a busy incline landing area, this adds to the impression that tipping from Talysarn quarry (at extreme left) was unlikely to have taken place here or over the tunnel, though frequent changes to these constrained quarry sites make definitive conclusions difficult.*

6. *OS Six-inch map of 1888 (also surveyed the same year), next to a modern satellite image. The map shows a long straight section of track running from the lower left through the 'i' in 'Quarries' and on to where it appears to have once run under the tip, which would be the western tunnel access point, through the bottom of the 'l' in 'Slate'. The map shows the realigned route by this point, when the tunnel was abandoned. The correspondence of the western access identified by survey – using only a simple sighting compass – and the map's indication of the entrance is satisfyingly good! Left panel reproduced with the permission of the National Library of Scotland. Crown Copyright; Airbus Copyright, 2024.*



7. *OS Six-inch map of 1888 (left panel) compared with the revised map of 1899, published 1901. Changes to the tramway lines are seen to have taken place during the intervening 11 years and there is by the later date no suggestion of any track running towards the interior of the tip and the tunnel route. Reproduced with the permission of the National Library of Scotland. Crown Copyright.*



8. *Central Nantlle quarries region, as depicted by Boyd (op. cit. p.54). The tunnel under the Blaen y Cae tip is shown, centre right, and keyed as 'tunnel sections', though the author, oddly, makes no reference to the tunnel having clearly been built as sections in the body of his text, nor are the slight misalignments of those sections mentioned or shown (which would be almost imperceptible at this scale).*

Eastern tunnel entrance.

This entrance, now the only point of entry, is a simple round arch of slate waste blocks, 13 feet in width at current, somewhat sedimented floor level (Boyd, op. cit, p.84, gave 14 feet), with an arch height of 9ft (Boyd: 10ft). The first 27.5m section has construction that is fairly uniform and of good quality, occasionally incorporating intruding natural slaty rock, notably on its lower southern walling. The walling has extensive lime leaching and, hence, coatings here. The source of the lime would seem to be use of lime in the construction. Short stalactites hang from the roof. A drainage channel (see **9**) is found parallel to the southern entrance wall, formed of single red brick sides and with a base of small slate slabs. Perhaps the later glazed earth drain pipes of 1-foot diameter fed water from a source that is not now clear, but may have been from the outfall of a small slate-built culvert immediately to the NE of the entrance. This outfall now runs to the north wall of the entrance, along a low mound of earth and slate waste, but then partly runs diagonally onto the southern wall. The brick and slate culvert is not evident beyond about 19 metres into the tunnel and it is unclear, partly due to later sedimentation, whether it was ever present further in. If it was not present, the question arises

9.

as to the fate of this water, enough to cover the floor of the tunnel up to about and, in some places above, rail level. It may be that less or no water drained via the tunnel during its active life. A small amount of plant root from the plentiful trees and brambles above, are seen to penetrate into the tunnel cavity, confirming the shallow layer of earth above.

At 27.6m in, there is an interface with a separately-constructed arch that is keyed into the preceding tunnel section but aligned at a very slight angle to it. The misalignment is curious and could have a number of explanations, though there is no particular evidence to support any of them at present. It could have been that natural rock in the cut jutted out slightly more here, though removing this would be unlikely to pose a difficulty to quarrymen. Or perhaps the tunnel, as it superficially appears, may have been built sequentially, with time elapsing between each section's construction. The tunnel construction remains of good quality.

10. *Looking along a 270 degree (magnetic) line (declination at July 2023 (British Geological Survey) was 0 degrees 47 minutes east of grid north) into the tunnel. The interface between the first 27.6m of the tunnel and the next is evident as a lighter section with a displaced, but keyed-in arch. At the entrance, the width is 13 feet exactly at track level but reduces at the offset interface to 10 feet 4 inches. The arch apex is a constant 9 feet but Boyd, perhaps subjected to less sedimentation, gave 10 feet.*

11. *Looking east from ~85 metres inside the tunnel from the eastern portal, showing interfaces and change in alignments between tunnel sections. It is not known why it was built in sections, rather than as a continuous structure. The section shifted to the right seems to have been built to fill between the sections in the fore and background.*

From 35.7m in, the second tunnel section makes a gentle southerly deviation of some 11 degrees and from 53.6m in, it returns to much the same heading, 269 degrees magnetic, as the first section. This part of the tunnel terminates with a facing archway, from which point the next tunnel section makes a slight turn to the south, heading of 258 degrees. At 82.8m, a new arch section begins with a heading of about 257 degrees continues the route, with a slight turn again to the south and a heading of about 256 degrees from 95.1m in.

From at least this point on, it is considered – with good and obvious evidence – that the tunnel, which is bearing the greatest waste tip load, is liable to spontaneous, catastrophic collapse without any warning.

From 105.8m onwards, the tunnel narrows considerably to 83 inches wide – allowing for only a single track – as a secondary, reinforcing arch with a broadly round rampant profile and packing above to complete contact between its outer surface and the inner surface of the original arch – has been built and the walls have been buttressed with slate block from floor level up to around 1.2m. Almost all of this buttressing is in an advanced and, by comparison with 2016 images, clearly continuing state of deterioration. The western end of the secondary arch, at the northern side, is collapsing through lateral movement to the west, probably as a result of compression. Many sections of slate buttressing are bulging out (as opposed to being curved buttressing), with several fallen sections, notably from 119-122.5m in, seemingly recent. The tunnel clearly started to suffer from excessive loads from above at a fairly early stage after its construction.

12. *Looking back upstream in the tunnel (towards the eastern end) with a secondary reinforcing arch and packing above (camera at ~130m in). Low buttressing to ~1.2m up is seen along the northern (left) wall. The left face of the secondary arch and surroundings are missing blocks and slowly working their way to what would likely be a catastrophic collapse. There is room only for one track and only one was mapped as emerging in 1889. The white material at left is 'geocaching' decoration – the most ridiculous reason of all to place oneself at very high risk by being present anywhere near this section.*

From 122.5m in, the tunnel makes a series of turns towards the south-west. Between here and 135.9m, it takes up a heading of 241 degrees (magnetic) and from 135.9m in, 226 degrees. From 153.5m in to the point at which the tunnel is obstructed by waste blocks at 167m, the heading is 203 degrees. It is suspected that the blocks at the end of the tunnel, which reach about 3/4 of the tunnel's height, were deliberately emplaced rather than being infall from the tipping, but this is not certain. The clean tip waste and its slope is clearly evident immediately behind these blocks.

About five metres back from the blocked western end of the tunnel, along its northern wall, a small trapezoidal portal is found, measuring 3'6" tall to its lintel and being 1 foot wide half-way up. A neatly-built slate block culvert, with slate slab roofing leads off roughly parallel with the northern tunnel wall but then making a turn to the north some way in. This is understood, though no evidence other than personal, undocumented accounts by others exists, to have connected-up with the drainage tunnel from Gallt y Fedw quarry to the east. Those who are slight enough to fit inside the culvert, which is 4 feet high and 2 feet wide, report a recent collapse further along. There is a serious risk of becoming trapped in this structure, which only adds to the risk from potential collapse.

13. Western, blocked extremity of the tunnel, considered to be the natural built end, rather than a collapse. Slate blocks part way to the roof may have been deliberately set, but this is unclear. Waste within the tip is clearly visible as clean slate beyond. The tip edge and open air is probably only a few metres away. The culvert portal (see **14**) emerges just in front of the blocking slate, on the right. The round rampant arch profile is very clear here.

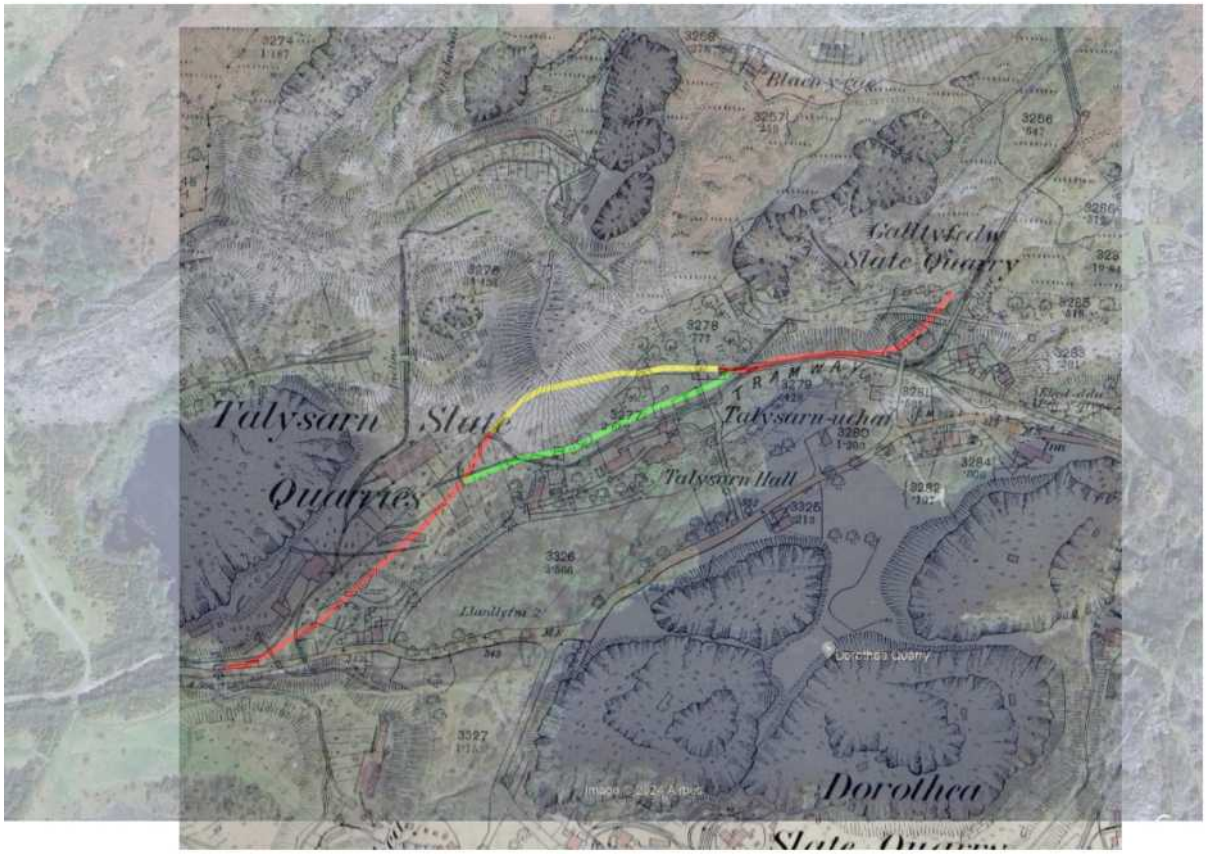
14. *Small trapezoid portal in the northernmost tunnel wall (see main text for dimensions). It turns immediately to run NE, parallel with the tunnel for a few metres before turning north. This portal is only a few metres from the blocked, western end of the tunnel, which survey and the general appearance of which strongly suggest was the western access as built and not a collapsed region. Approximate position: +53.056514°, -04.244125°.*

15. *Looking north-east up the drainage culvert that makes a turn to the north at the far end. Note the slate slab roofing, typical of such culverts throughout the slate belt of north Wales. The camera is positioned at the 90 degree turn where water would emerge into the tramway tunnel. As it would be undesirable to have too much water in a tunnel, the position and indeed presence of this culvert suggests it was very near or at the western entrance to the tunnel – a conclusion that is supported by the route survey. Water in the main tunnel is heard to fall a short distance – more a step – immediately beyond the blocked end and this may well have been the natural drain point from the working tunnel.*

The tunnel route.

The plan attached to the Act of 1825 shows the entirety of the route, where clauses XII and XIV (p.5 (1482)) generally permitted the width to be no more than 20 yards from the indicated line of the route. The scale of the map, however, probably made such accurate determination of extent a challenge! Clauses CVI and CVII permitted the later erection, where considered necessary and with the involvement of local Justices, of structures such as bridges and arches – the latter term probably encompassing tunnels.

A survey of the route, using the basic equipment of magnetic sighting compass and measuring wheel, was undertaken 25/02/2024. Plotting this to the surface as depicted on the 1889 First Edition Ordnance Survey map, available only at the local archive, shows very good, near-perfect alignment with both portal ends. The survey confirms the suspicion from the view inside the western end of the tunnel that this blocked end is the natural, built end and not a collapse and that, further, it is very close to the tip's sloping surface.



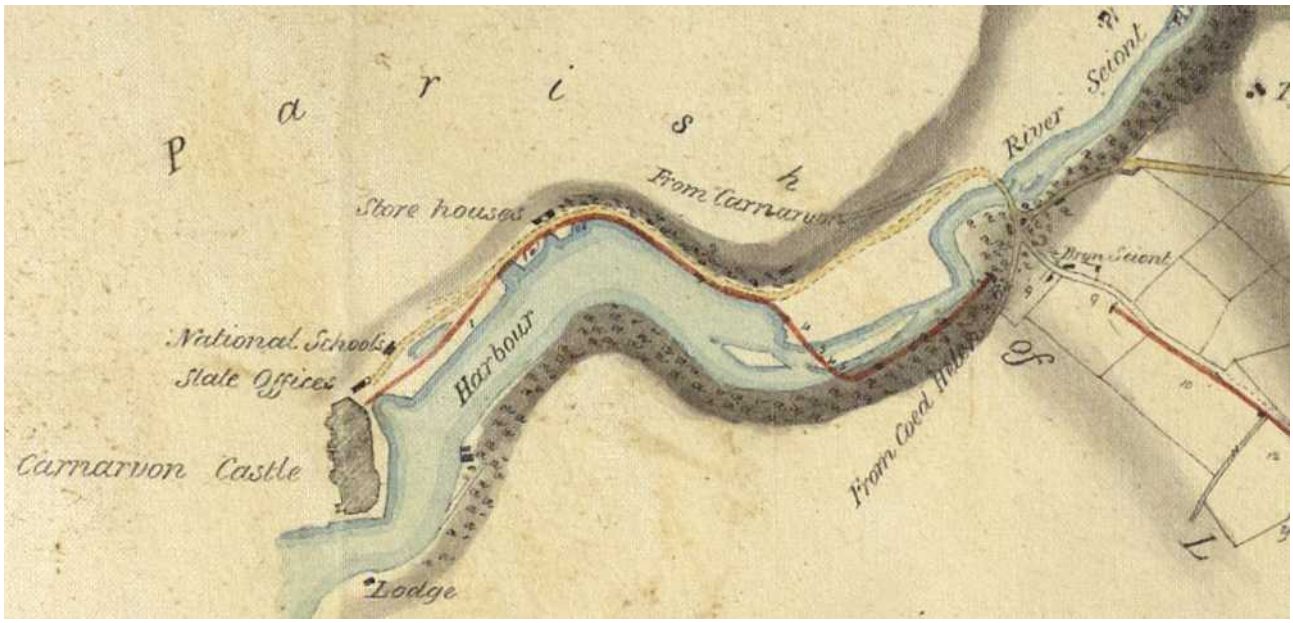
16. *Overlay of 1889 First Edition OS map (Gwynedd Archives) and a modern satellite image with this work's surveyed tunnel route in yellow. The ends of the tunnel as surveyed align nearly perfectly with the tramway as mapped in 1889. The green, realigned route is not precisely aligned due to the difficulty of tracing the route on satellite imagery and dense tree cover. Red lines are also slightly misaligned for much the same reason and the absence of any indication of track at the western end. Crown Copyright; Google Copyright, 2024.*

A feature of the tunnel is that, in 1889, it has two trackways entering the eastern end, but only one at the western end. As earlier noted, reinforcements under the apex of the tip considerably reduced the available floor width at the western tunnel end but there seems to be another explanation as to the absence of a second track at both ends. The second track at the eastern end is clearly that running off the foot of an incline from Gallt y Fedw quarry and Boyd (op. cit, p.7) asserts, with no specified reference (a consistent feature of the text, substantially undermining its value despite being clearly well-researched) to 'the 1888 Siding Book', that there was a loop at this point, so it seems this simply joined a single track some way inside the tunnel. Alternatively, once the realigned route had been built, the incline foot track, which had no room to be adjusted if it was at all to continue in operation, would seem to have had to run briefly into the tunnel and then its wagons shunted eastwards for a few yards before being hauled to market along that new route. However, the tunnel does seem to have been built at least in anticipation of two tracks at the eastern end. It is possible the tunnel was used for relatively minor drainage and/or for storage or other such uses after falling into disuse as a through-tramway.

17. *Extract from the 1889 First Edition OS map, clearly showing the portals of the tunnel (between the 't' and 'e' in 'Talysarn Slate...' and slightly above and to the left of 'T' in 'Tramway'. and the overlying tiptop centre left, to left of 3277. The bypass route is constructed at the time of this map, but the western portal is not yet smothered by waste, but does seem imminently threatened by further tipping or tip slippage. The tip did not grow appreciably, if at all, after this time. Gwynedd Archives: Dorothea 1538f XXI.9; Crown Copyright.*

With the built tunnel route and later realignment demonstrated, we turn to the plan attached to the 1825 Act to consider how this agrees or differs.

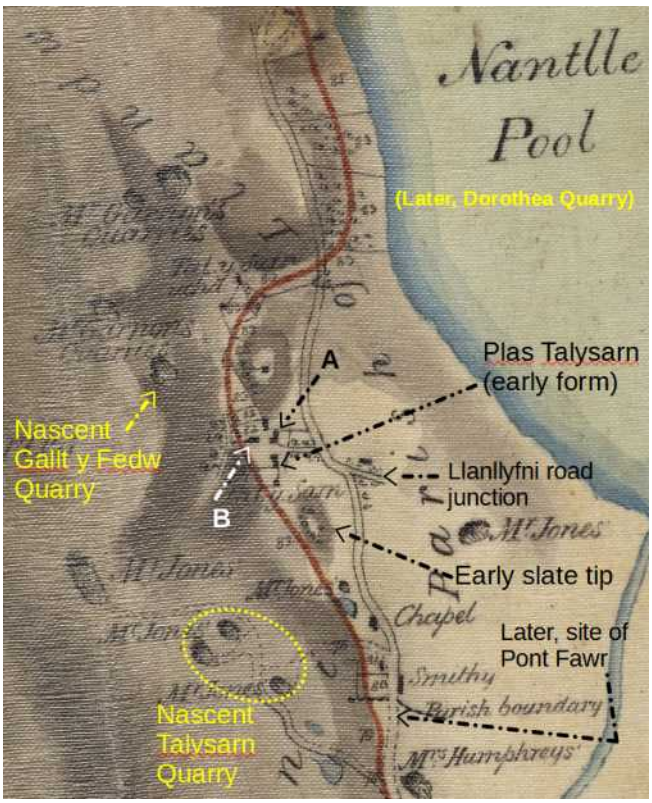
Of note in relation to mapping in the tunnel's vicinity was the presence of Plas Talysarn. This makes locating the tunnel's position relatively straightforward. A tunnel just to the east of Caernarfon quay is clearly depicted as such, the portals being indicated as arches and the route of the tramway within the tunnel 'vanishing' underground and not being indicated at all.



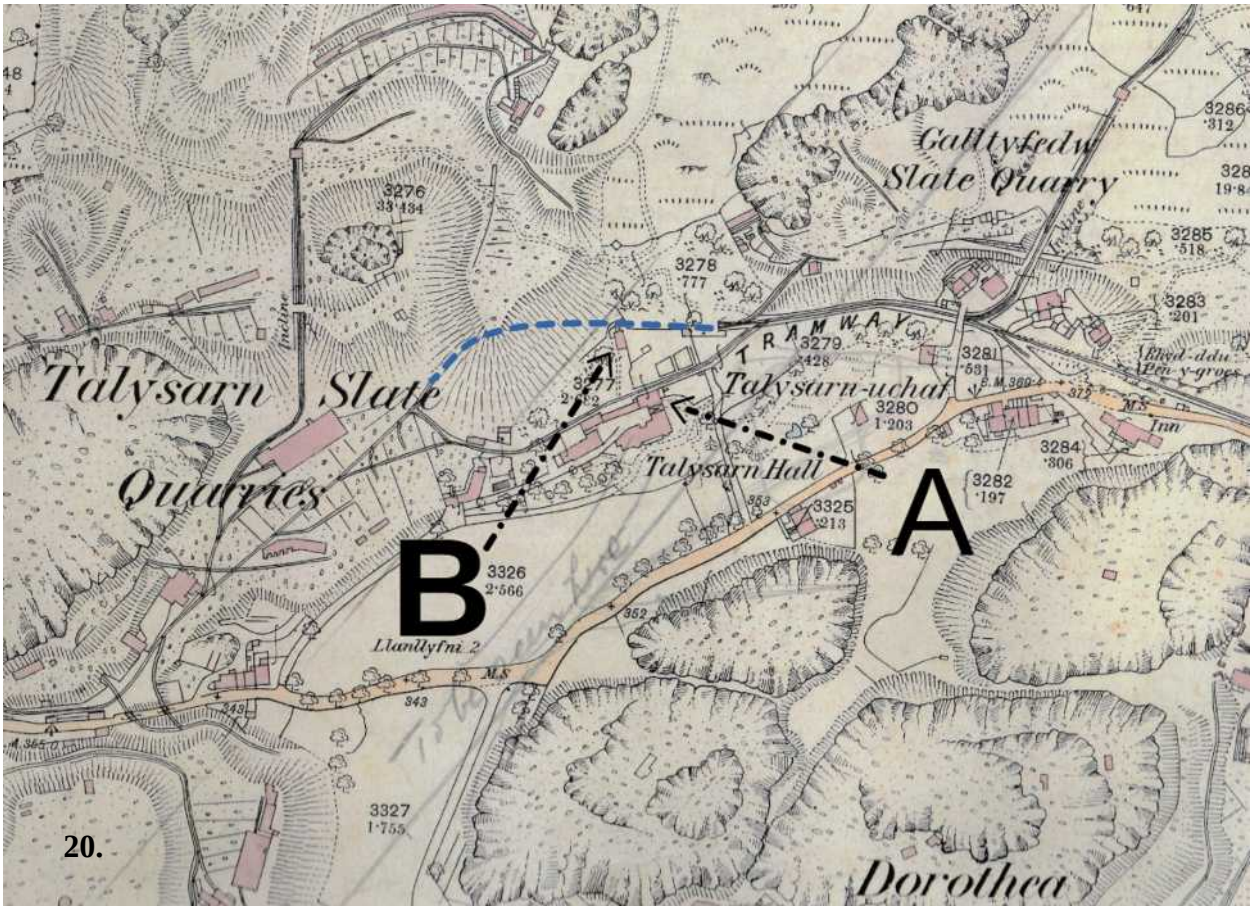
18. *Extract from the plan attached to the 1825 Act (draughted November 1824) to create the Nantlle tramway, showing the Seiont estuary area at Caernarfon town. A tunnel is clearly depicted at centre right, near Bryn Seiont. Copyright, Parliamentary Archives.*

From this, we might expect other tunnels to be depicted in the same way. But there are none, including at the position of the tunnel examined at the Nantlle quarries. We might therefore conclude that the route did not initially intend to build a tunnel though, as already noted, clauses within the Act permitted such works where subsequently considered necessary and there were likely several such modifications to complete the route.

Next, we need to examine the map as it depicts the eastern end of Talysarn through into the central quarrying area and locate the area of the tunnel. Plas Talysarn in its early form is readily identified. Buildings 'A' and 'B' are identifiable in later, much more accomplished mapping, notably the Ordnance Survey 1889 First Edition that reveals the precise route layout. Although the route is somewhat different in its various track radii and heading, it is clear that the intended route adjacent to Plas Talysarn indicated on the 1824 map was that which ultimately became an arched tunnel.



19. Plan attached to the 1825 Nantlle Tramway Act, draughted in November 1824. The red line indicates the intended tramway route. Buildings A and B remain readily-identifiable on the later, 1889 OS First Edition map (**20**) and allows location of the route around what is presumed to be the later arched-over, tunnel area to be established. No tunnel is indicated as being planned here at this time. No record of the indicated Chapel, later consumed be quarry development and presumably once serving Talysarn Uchaf, could be found in our archives searches. 19: Copyright, Parliamentary Archives. 20: Gwynedd Archives.



Abandonment.

The reason why the tunnel was abandoned may seem obvious: the tip blocked its western entrance and/or it became unstable. But further reflection leads to more questions.

For example, the realigned tramway route to the south was built to skirt the very foot of the tip, with no appreciable margin included for future tip growth. This demonstrates quite clearly that there was knowledge at the time of the realignment's construction that the tip would not grow much more, if at all, for it would have quickly rendered the new route redundant – and there were no other options for the route, should this have happened.

Then there is the fact that the tunnel's western access, whilst blocked by the tip, is within touching distance of open air (Boyd notes a strong flow of air through the tunnel "even though no daylight can be seen at the west end"; my own visits identified most of the strong airflow coming from the side drainage culvert, which must be very near or at the surface at some point) and the tip did not then keep growing, once the tunnel had been blocked. This could be coincidental inasmuch as it just happened to be that the Blaen y Cae quarry had reached the end of operations or use of that tip by this point. But it could also suggest that the blocking of the western end was accidental and perhaps explain why the tip then stopped expanding, in recognition that the western tunnel access ought not to have been covered. In that case, perhaps we may have expected the tip to grow in other directions, which doesn't seem to have happened.

The alternative could have been a combination of factors. Certainly, the buttressing and secondary arching beneath the apex of the tip, some of which, such as driving inclined slate block feet into the floor, is rather desperate in how it attempted to prevent movement, shows that overstressing was already evident and a concern within that part of the tunnel. Perhaps this was enough to cause the abandonment. Or perhaps it was this, together with an accidental blocking by tipping or tip slippage, that signalled the end for the route. It seems we will never know for sure.

Examination of the Dorothea quarries archive shows that, whilst the very constrained land situation at this site necessitated and realised considerable cooperation between each quarry. The formation of the Nantlle Tramway Company was a clear example of this, the 1825 Act to create the tramway including detailed clauses (e.g. CIII-CV) with steep penalties – including transportation for up to seven years – for obstructing, interfering or damaging the line by 'any person'. But transgressions that affected the line and other aspects of quarrying did occasionally take place and such were mostly by adjacent quarries, not members of the public that were more within the anticipation of the Act's provisions when draughted. There are references in the Gwynedd archives Dorothea Quarry indexes (individual documents not consulted in this study) to legal cases being threatened or taken by one quarry against another for tipping-related disputes, amongst others. So it would seem that whilst there was a general disincentive to tipping over and otherwise blocking the line – not least as many quarries relied on the same tramway of which they were co-owners – this could and did happen and reliance could not always be put on a speedy, voluntary resolution. Such resolution was essential in an industry which critically depended on continuously shifting volume to market.

On balance, it might seem more likely that it was indeed the structural instability that caused sufficient concern to abandon the tunnel and form a new realignment of the tramway. The entrance would seem to have been blocked by a small amount of tipping or existing tip slippage shortly after it was abandoned. If there had been any deliberate, excessive tipping from Blaen y Cae, then we may have expected some form of legal warning or action to prevent it, but there is no evidence of this where similar incidents elsewhere in Nantlle did trigger such responses. It seems it was simply one of those things that happened in a crowded space and that it was simpler, cheaper and safer to create the realignment and get on with business as usual, notably as there would have been early

signs of decline in this slate industry at this point, mitigating against any expensive legal wrangling and disruption. The route must have been a cause of at least some displeasure and, perhaps, resistance from the occupiers of Plas Talysarn, whose northern elevation now formed the very edge of the line.

21. *A pair of substantial shire horses - 'Prince' and 'Corwen' - pull wagons bearing the distinctive Blaen y Cae identifier in one of several staged photographs taken in 1959 as the line neared closure. National Library of Wales, gch18793, Geoff Charles collection released into the public domain under CC0 1.0.*

Artefacts.

There are very few remains within the tunnel. There are fragments of slate track sleepers with carved-out foot contacts for rail chairs (**22**) and drilled holes for the bolts. The chairs used are illustrated in Boyd (op.cit, p.24).


22.

There is one rail embedded in the northern wall (**23**) which is in good condition, and another nearby which is in an extremely decayed state.


23.

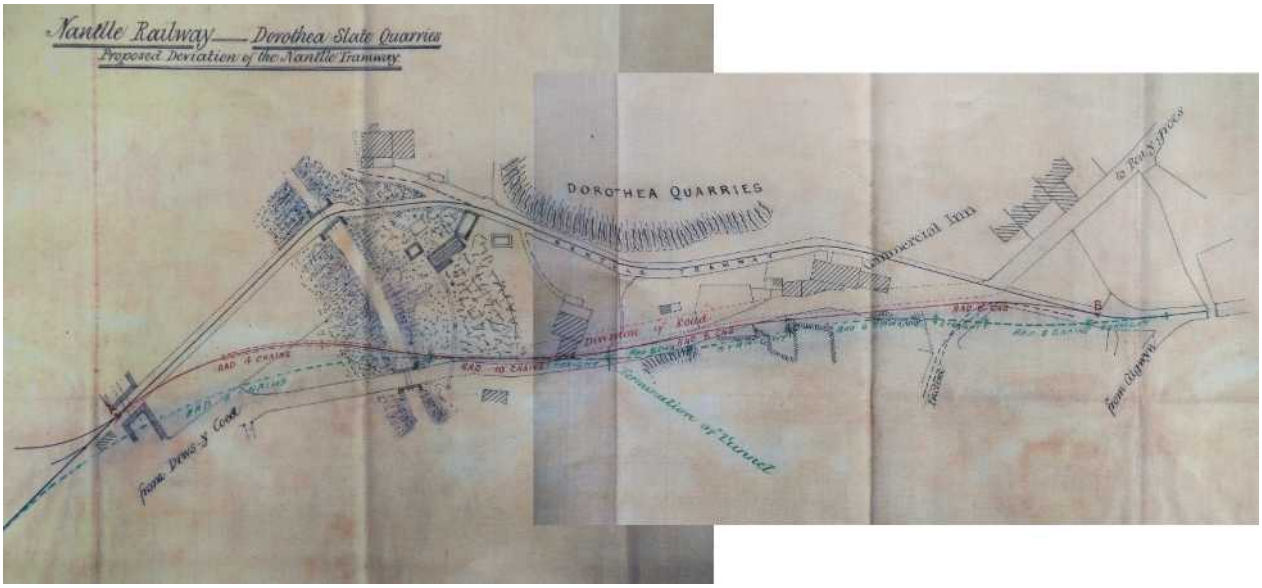
A half-round section of timber with iron bolts (**24**) still embedded is immersed in water immediately to the west of the first embedded rail, though what it was for is not clear. An iron bar of a flattened ellipsoid shape is found a few metres further in and again, its function is unknown.

24. *Half-round, probably pine timber, with bolts at either end. It lies in running water and the timber is in good condition as a result. It seems to be of the quarrying period but whether or not it relates to the tunnel is unknown; it could have simply floated in from outside a long time ago.*

25. *A currently unidentified iron artefact. Initial interpretation might be that it was related to the track system, perhaps a points mechanism.*

Another tunnel.

An undated plan (**26**) of the central Dorothea quarry area (Gwynedd Archives ref: Dorothea 1560) reveals details of a diversion of the Nantlle tramway as Dorothea pit extended to the east. Drawn on draughting linen, with south at top, the plan shows an intention to build a tunnel, 316 feet long, loosely half way between a water wheel-driven pump to the east of Dorothea and the Commercial Inn. Boyd (op.cit. p.58) shows the tunnel as built, though again, there is no specific reference provided for this assertion, though it might appear to be correct.



26, Above: *Gwynedd Archives plan Dorothea 1560, North to bottom, showing intended diversion route. At centre is written "Termination of Tunnel" and its position. Boyd asserts the tunnel was built, with no specific reference, as usual.* **27, *Below* :** *OS 1889 First Edition map capturing the area of the diversion map above. The Commercial Inn building provides a useful orientation point (noting the OS map is north to top).*