Report No: 2012R066

one and all onen hag oll
CORNWALL COUNCIL

Carmears tramway, Luxulyan Valley, Cornwall

Archaeological recording

Historic Environment Projects

Report No	Report Name	Report Author
2012R066	Carmears tramway, Luxulyan Valley, Cornwall	Nigel Thomas

Event Type

Measured survey	Photo survey	Descriptive survey	

Client Organisation	Client Contact
Friends Of Luxulyan Valley	Chris Tigg

Monuments (MonUID)

Fieldwork dates (From)	(To)	(Created By)	(Create Date)
10 Apr 2012	24 May 2012		

Location (postal address; or general location and parish)

Carmears tramway, Carmears, Luxulyan Valley
Lanlivery civil parish

(Town – for urban sites)	(Postcode)

(Easting) X co-ord		(Northing) Y co-ord	
SX 05722	57117 to	SX 06604	56687

Historic Environment, Cornwall Council is a Registered Organisation with the Institute for Archaeologists

© Cornwall Council 2012
No part of this document may be reproduced, stored in a retrieval system, or transmitted in any form or by any means without the prior permission of the publisher.

The European Agricultural Fund for Rural Development: Europe investing in rural areas

defra Department for Environment Food and Rural Affairs

South West RDA

CORNWALL Development Company

LEADER

Acknowledgements

This study was commissioned by Chris Tigg on behalf of the Friends of Luxulyan Valley. Andy Cook of Cornwall Council's Environment Service created the project brief and provided liaison. Funding for the project was part financed by the European Agricultural Fund for European Development 2007-2013: Europe investing in rural areas, and delivered through the Clay Country Local Action For Rural Communities Programme. Funding was also provided by the Friends of Luxulyan Valley, Cornwall Heritage Trust, St Blaise Parish Council and Councillor Sally Bain (Community Chest funds).

The archaeological work was carried out and managed by Nigel Thomas of Historic Environment Projects, Cornwall Council. Dan Ratcliffe provided on-site help and advice.

Thanks are also due to the site team (of John Sandoe and Sons) for their information and help on site.

The views and recommendations expressed in this report are those of Historic Environment Projects and are presented in good faith on the basis of professional judgement and on information currently available.

Freedom of Information Act

As Cornwall Council is a public authority it is subject to the terms of the Freedom of Information Act 2000, which came into effect from 1st January 2005.

Abbreviations

CC	Cornwall Council
HER	Cornwall and the Isles of Scilly Historic Environment Record
HE	Historic Environment, Cornwall Council
NGR	National Grid Reference
OS	Ordnance Survey

List of Figures

1. Project background

The Luxulyan Valley lies to the north east of St Austell in mid Cornwall. This valley has been formed by the Par River where it has cut a deep channel through a weakness in the local granite. The valley was transformed to become an industrial landscape in the early 19th century by the entrepreneur Joseph Treffry. He ran mines and quarries in the area and created leat systems and tramways to serve his various facilities. The valley is still dominated by the spectacular Treffry viaduct, which supported a tramway and also carries a leat from one side of the valley to the other. The tramway was linked by an incline to a canal basin at Ponts Mill, which gave access to the south coast. In the later 19th century Nicholas Kendall laid out a 10 mile scenic ride or drive to provide views of the various industrial sites, which became known as the Velvet Path. With the closure of the mines and quarries the valley has returned to woodland.

During the 20th century Luxulyan Valley was owned by English China Clays Limited and its predecessors. In 1992 the Treffry viaduct was given to the Cornwall Heritage Trust to ensure its preservation. The remainder of the valley was presented to Restormel Borough Council and Cornwall County Council and was opened as a public amenity, with a series of paths and tracks which allow visitors to explore the valley (http://www.luxulyanvalley.co.uk). It was transferred to Cornwall Council at the creation of the unitary authority in April 2009. The Treffry viaduct is now a Scheduled Monument, and is owned separately and maintained by the Cornwall Heritage Trust.

The Friends of Luxulyan Valley was established in 1997 and is a group concerned with the conservation of the Valley. The objectives of the Friends group are to:

- Promote preservation and protection of the Luxulyan Valley.
- Influence and assist in the management of the Luxulyan Valley.
- Assist with and promote education and the history, natural history and other aspects of the Luxulyan Valley for all interested parties

The Luxulyan Valley forms an important part of the Cornwall and West Devon Mining Landscape World Heritage Site, which was inscribed by UNESCO in 2006.

Cornwall Council and the Cornwall Heritage Trust commissioned a Conservation Management Plan for the valley, and the Plan was produced in 2010 by URS Scott Wilson. The Plan sets out a statement of significance, management principles and guidance for the valley and sets priorities for conservation works, interpretation and improved access.

Amongst other recommendations, the Conservation Plan identified a priority for repair work on the Carmears tramway:

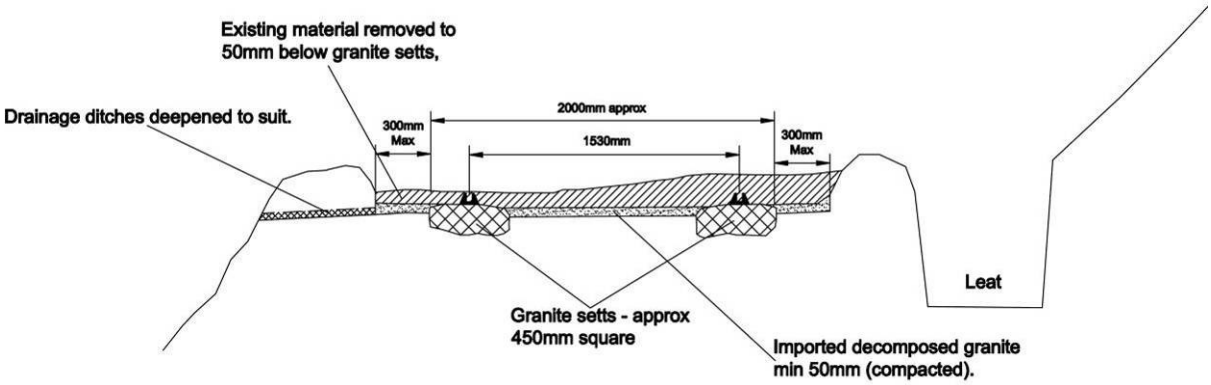
> 6.6.1 The tramway is vulnerable to water erosion and deposition of silts. The recommendation is that drainage channels be introduced.
>
> 6.6.2 It would also be appropriate that the surface of the tramway be reinforced by the introduction of a suitable binding material to provide both a hard wearing surface and a binding to the granite setts. Recent survey work has determined the survival of lengths of in-situ rail and the preservation of the rail and its revealing would significantly enhance the heritage values of the tramway.
>
> 6.6.3 There is clearly a potential for further lengths of rail to be preserved and it is therefore recommended that there be a full survey of the tramway and archaeological monitoring of works so to ensure that heritage values are conserved.

Major silting on the tramway has in large part been caused by periodic clearing of china-clay debris from the adjoining leat channel. Much of this material has been machined out of the leat and then dumped on or alongside the tramway. This activity obscured the

original tramway profile and also interrupted its original drainage. Access by machines to clear the leat has also resulted in disturbance to the tramway line.

The Friends of Luxulyan Valley launched a scheme to conserve the Carmears tramway and to improve the access along this neglected track. This was supported by the Environment Service of Cornwall Council, who undertook project management and also sourced match funding for the work. The aim of the project was to restore the profile of the tramway by removal of the modern silt, and to introduce suitable drainage. The scheme is represented in the drawing below:

LUXULYAN VALLEY - TOP TRAMWAY



TYPICAL CROSS SECTION
Not to Scale

As the tramway lies within the World Heritage Site, archaeological advice was sought by CC from John Smith (a former employee of the Historic Environment Service, CC and author of the 1988 Luxulyan Valley report), as well as Dan Ratcliffe, the local Historic Environment Planning Advice Officer. In the autumn of 2011 Historic Environment Projects were approached by the Environment Service with a view to carrying out recording and archaeological monitoring during the contractor's works.

2. Aims and objectives

The aims of the archaeological study were to

- provide a record of the site before and during works.
- assist with guidance for conservation of the track as appropriate.

3. Working methods

Work commenced in April 2012 once funding was in place. The archaeological study comprised a series of site visits. The first of these took place before the commencement of the contractor's works; later visits were undertaken during the progress of the exposure and conservation of the tramway. Given the linear nature of the site it was not necessary – or indeed economic – to maintain a continuous watching brief.

Recording was undertaken by digital photography (with a minimum of 8 million pixels resolution), descriptive notes on plans and partial measured survey. The latter was undertaken with a total station and comprised a plan of a representative sample of the tramway.

Following fieldwork, digital images were processed and edited using Adobe PhotoShop Elements software and the results filed as 'read-only' JPG format files. The partial measured survey was produced as an AutoCAD file. Descriptive notes were transcribed and incorporated into this report.

4. Site description

The former Carmears tramway is shown in Fig 2. The line was built in 1838 (Smith 1988, 61) and originally ran south-easterly from a junction at Bridges (Luxulyan), crossing the Treffry viaduct to the east side of the Par River. At the south-eastern abutment of the viaduct the tramway continued, following the contour and the line of the Carmears leat. East of the viaduct the tramway formed a junction with a branch running north-easterly to Colcerrow and Carbeans quarries. At this junction, a loop and turnouts (points) were added to the original line before 1907 (Fig 4).

To the east of the loop the tramway has been levelled into the slope by quarrying away part of a low granite cliff. As there is considerable wet ground at the foot of the cliff and the surface of the tramway is mostly obscured by mud, a modern boardwalk has been installed to raise the level of the footpath (Figs 15 and 16). In this area the leat runs south of the tramway, the channel running beneath a granite lintel bridge. Between the tramway and the leat the ground has been considerably disturbed since the time the tramway became derelict, with many overgrown dumped heaps of earth and stone.

East of the cliff and boardwalk the leat re-crosses the tramway by another lintel bridge, and the tramway and leat run parallel for a considerable distance. South of Trethevey Farm the leat re-crosses to the south side of the tramway and ends at the former waterwheel pit, while the tramway continued a few more metres to the head of an incline plane. At the head of the incline the tramway was originally split into two lines, forming a small yard or marshalling area (Fig 17).

The tramway was built to standard gauge (4 feet 8½ inches) and for most of its length the track was laid upon iron brackets (or 'chairs') bolted to granite blocks or setts (Fig 13). At the outset of this study the majority of the tramway surface east of the viaduct was obscured by later silt dumping, carried out by the china clay companies undertaking periodic clearance from the leat. Clay waste was also dumped along the outside edge of the tramway, resulting in a relatively continuous bank being formed (Fig 8). This also impeded the drainage and contributed to the build up of debris on the tramway (Fig 5).

5. Results

The contractor's programme included machine excavation of silt and debris from the tramway surface and exposure of the tops of the granite setts, remaining iron chairs and surviving sections of rail (see Fig 14). This work revealed that the tramway embankment was originally constructed of rab (decayed granite), which is free draining. It is likely that when the tramway was created, the rab was excavated from the hillslope, and a large proportion may have been overburden brought from the nearby quarries.

New drainage channels were cut though the outer bank, and this revealed that the bank is mostly composed of china clay waste (see Fig 8). After removal of the silt, the space between the setts was built up with clean rab, excavated from a small re-opened quarry close to the head of the incline plane (at SX 06657 56632). With the addition of the new material the tops of the granite setts were left more or less level with the surface.

Exposure of the tramway revealed two isolated remaining lengths of rail, still *in situ*, fixed to the iron chairs and granite setts. It is not known why these pieces of rail remained, while all others were removed. In most cases the iron chairs had also been removed during the taking up of the track but several still remain *in situ* and a few others were found re-deposited in the overlying debris.

It is very noticeable that the two lines of granite setts were deliberately fixed at different levels, the inner line being about 100–150mm higher than the outer one, to improve run-off drainage of the embankment.

The part of the tramway closer to the water wheel pit was particularly disturbed at the commencement of the project. Many granite setts have been dug up from this area in the past and several are now scattered around the former marshalling area. Part of an extant turnout (points) rail is a remainder of the track from this section. As the rail is situated adjacent to the line of the main track and appears to be at the wrong level, it is unlikely to be *in situ* (Fig 17). Another piece of turnout rail is extant; this is located on

the loop that once served the Colcerrow branch (Fig 18). Although there are granite setts along the original tramway line below the cliff, the outer loop line was added between c1880 and 1907 and there are no traces of granite setts here (either *in situ* or displaced) so it is suggested that this outer loop of track may have been fixed on wooden sleepers.

The survival of the two turnout rails is interesting, as it strongly suggests that the rails were taken up to be reused elsewhere, whereas the turnout sections were not required and left behind. If the rails had been destined for scrap then all useful and accessible sections will have been removed.

A short length of the tramway passes over a steeper slope of the hill and in this part the trackbed was revetted on the outer side, rather than being a bank of rab. As it is narrower, later material has been piled on the track itself, so one line of granite setts now appears to vanish under this material.

In three places the tramway crosses the Carmears leat by single span granite lintel bridges. The upper surfaces of the granites have been trimmed and rectangular depressions or shallow cut-outs can be seen, to carry the iron chairs to secure the rails (Fig 11). This echoes a similar system on the Treffry viaduct itself, where the tramway is carried directly on granite lintels covering the line of the aqueduct channel (Fig 12).

6. Conclusions and significance

The 2012 works have revealed the survival of the tramway and the granite setts and other features now present the tramway as a far more historically readable site.

It is now very rare (not only within Cornwall but also elsewhere) to find parts of rails still affixed to granite setts. Those which are still extant in the Luxulyan Valley are probably the best surviving examples of an early method of railway track fixing.

7. References

Reports and publications

Cook A, 2011. *Luxulyan Valley – Proposed works to Top Tramway* Cornwall Council

Smith, J R, 1988. *The Luxulyan Valley: An Archaeological and Historical Survey* Cornwall Archaeological Unit, Truro

URS Scott Wilson, 2010. *Luxulyan Valley Conservation Management Plan* Birmingham

Websites

http://www.luxulyanvalley.co.uk Friends of Luxulyan Valley website

http://en.wikipedia.org/wiki/Luxulyan_Valley Wikipedia entry for the Luxulyan Valley

8. Project archive

The HE project number is **146144**

The project's documentary, photographic and drawn archive is housed at the offices of Historic Environment, Cornwall Council, Kennall Building, Old County Hall, Station Road, Truro, TR1 3AY. The contents of this archive are as listed below:

1. A project file containing site records and notes, project correspondence and administration.
2. Electronic drawings stored in the directory R:\Historic Environment (CAD)\CAD Archive\Sites L\Luxulyan Valley Carmears tramway 2012
3. Digital photographs stored in the directory R:\Historic Environment (Images)\SITES.I-L\Luxulyan Valley\Carmears tramway 2012
4. English Heritage/ADS OASIS online reference: cornwall2-136775

This report text is held in digital form as: G:\TWE\Waste & Env\Strat Waste & Land\Historic Environment\Projects\Sites\Sites L\Luxulyan Valley Carmears tramway\Report\Carmears tramway report 2012R066.doc

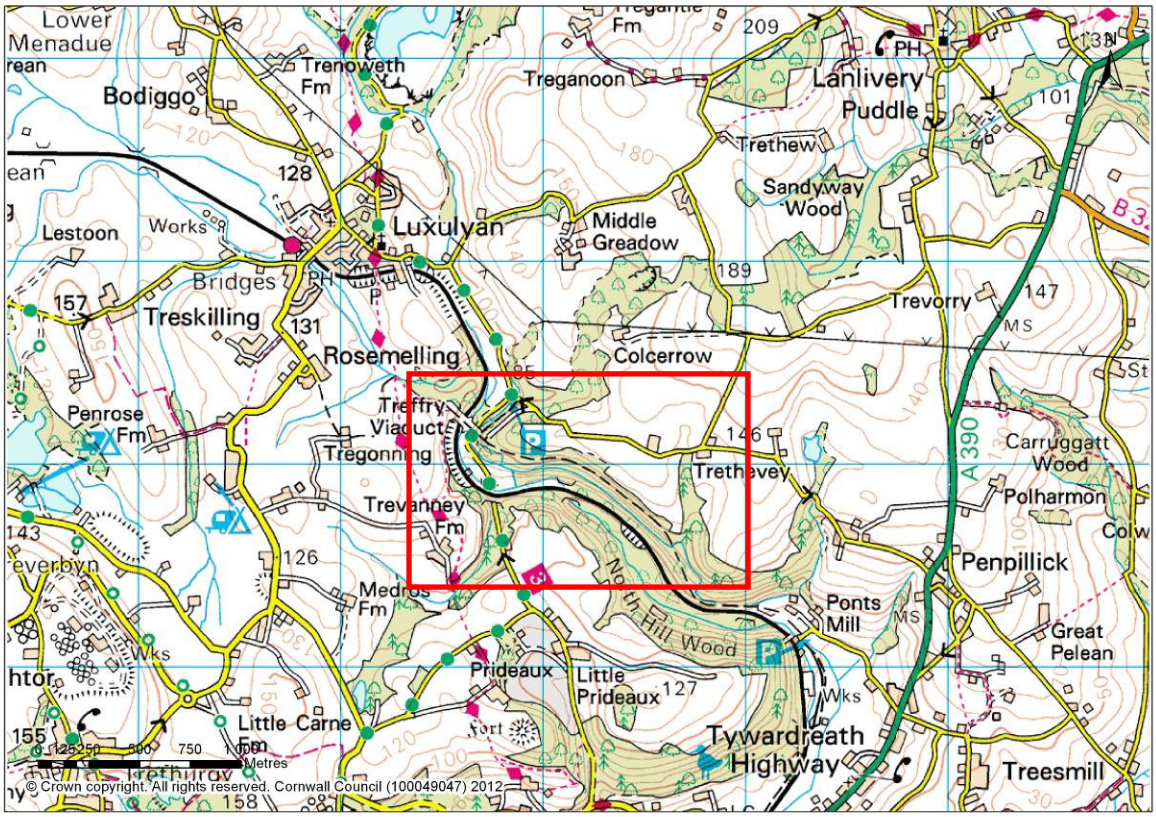


Fig 1 Location map

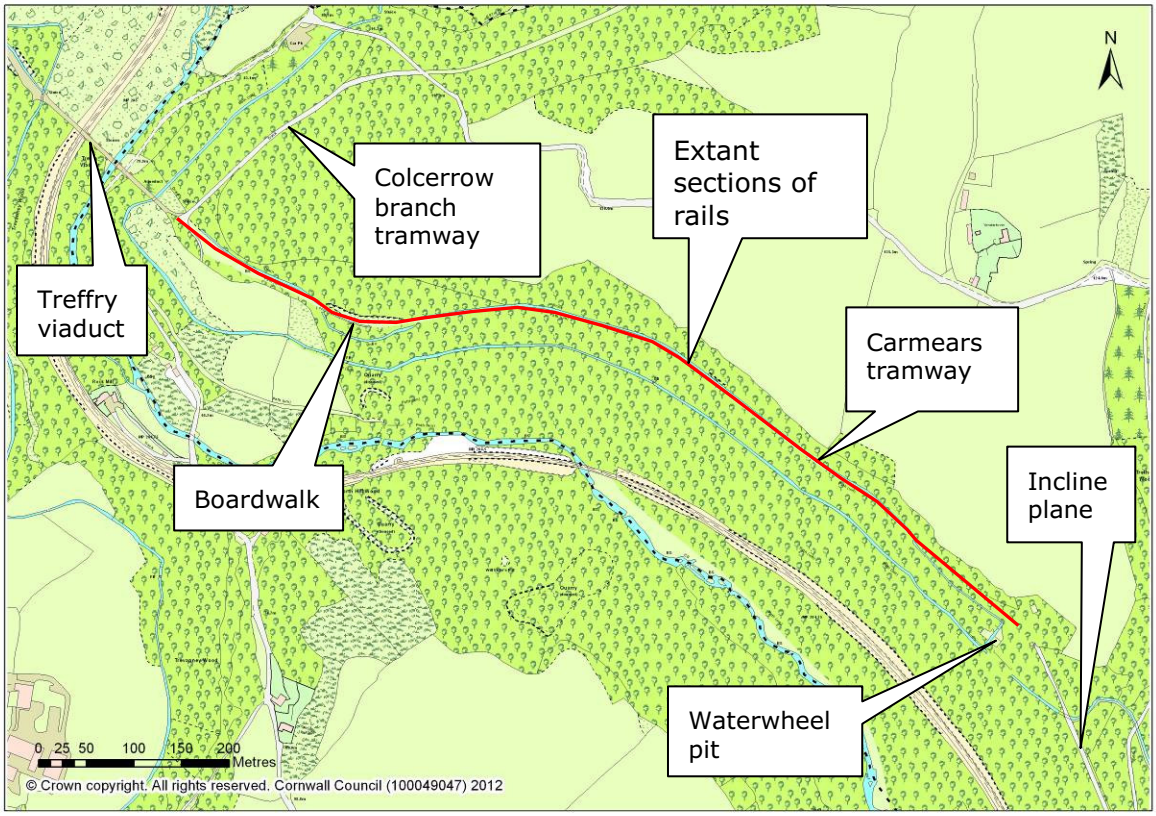


Fig 2 OS Digital mapping of the site and its environs

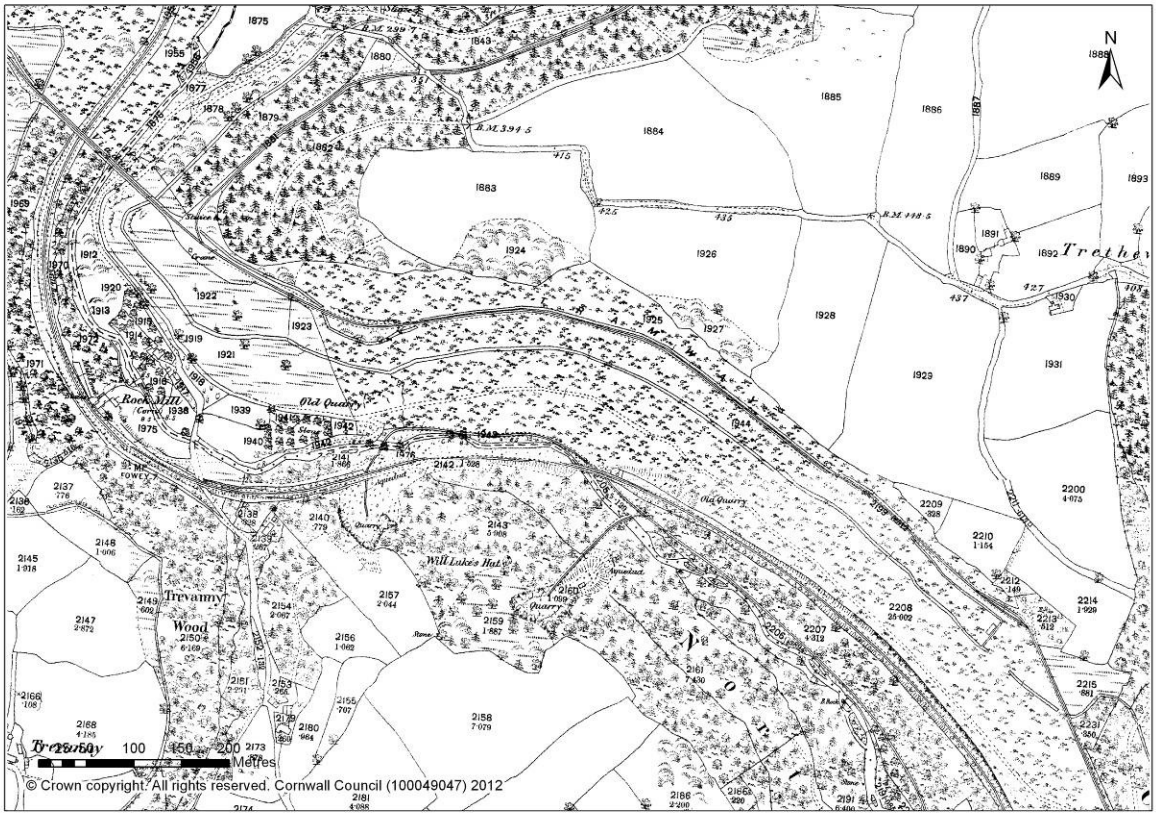


Fig 3 Extract from the First Edition OS 25 Inch Map c1880

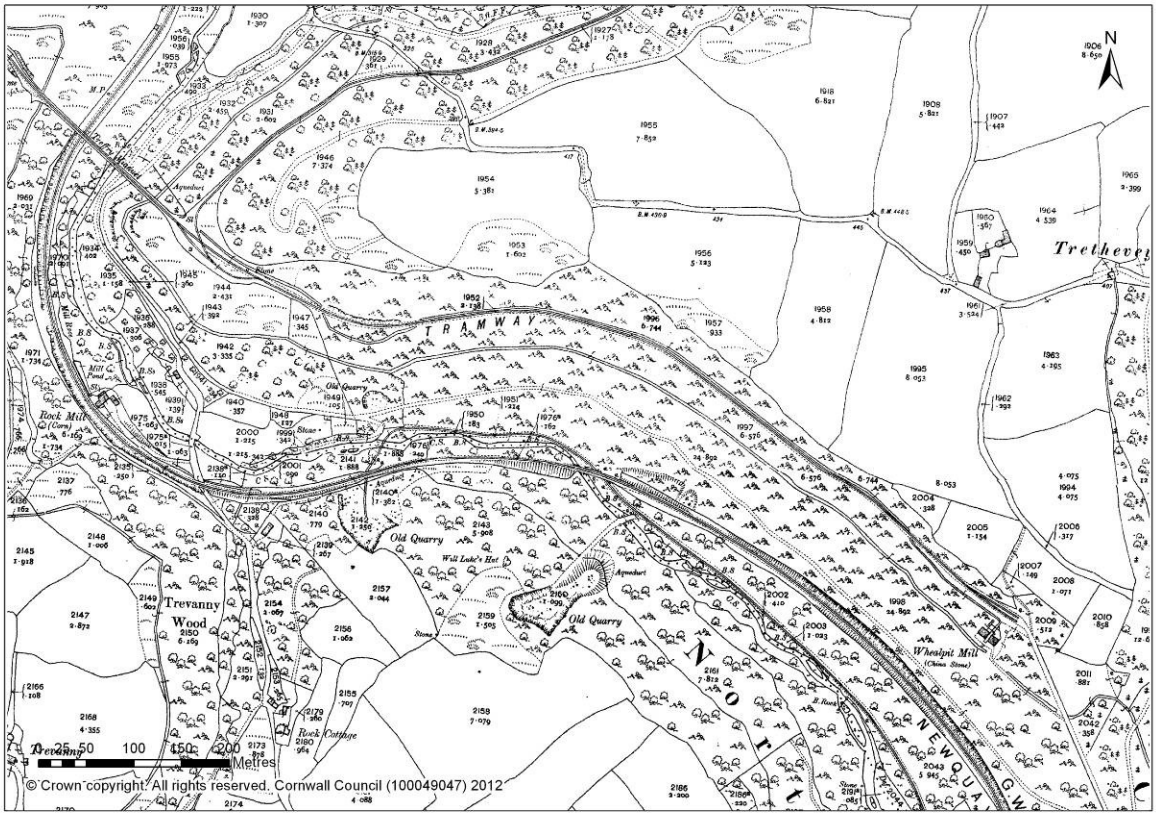


Fig 4 Extract from the Second Edition OS 25 Inch Map c1907

Fig 5 Carmears tramway (left) and leat before commencement of works

Fig 6 A similar view to Fig 5, shown after re-exposure of the tramway

Fig 7 Part of the tramway after initial clearance of debris and creation of drainage gullies

Fig 8 Section through a pile of china clay waste, previously dumped at the side of the tramway

The original tramway embankment of free-draining rab (decayed granite) is clearly visible beneath the dumped material. (Scale: folder = 360mm high)

Fig 9 Dressed rectangular block of granite alongside the tramway, perhaps an access platform or similar feature

Fig 10 A granite boulder lying between the leat and tramway

This had fallen from the opposite leat bank some years previous, and was relocated here (Chris Tigg, pers comm)

Fig 11 Tramway carried on a granite lintel bridge over the course of the Carmears leat

Fig 12 The tramway fixings in Fig 11 echo the arrangements on the Treffry viaduct, where the iron rail chairs were fixed directly to granite lintels above the leat

Fig 13 An example of an iron chair fixed to a granite sett

Note the drill marks on the granite, which indicate 19th century quarrying techniques

Fig 14 Sections of surviving rails within a completed section of conserved tramway

Fig 15 The western end of the tramway is partly covered by a boardwalk, designed to raise the footpath above wet ground below the adjacent cliff

Fig 16 A line of granite setts visible below the boardwalk

The original line of tramway setts is probably still extant throughout this section, although now mostly covered with debris

Fig 17 A turnout rail (points) displaced and abandoned beside the tramway

There were originally two lines at the eastern end of the tramway, above the incline plane

Fig 18 A turnout rail, perhaps still in situ, close to the Treffry viaduct

The c1907 map shows a loop within this area, and a junction with another tramway running northeast of the viaduct

Fig 19 Boundary stone (inscribed T and K on each face) near the Treffry viaduct

Fig 20 The lack of granite setts either in situ or displaced in the area of the tramway loop (right of the boundary stone in the photo) suggests the loop may have had wooden sleepers

Fig 21 Drainage problems at the eastern end of the viaduct, before commencement of works

Fig 22 A similar view to Fig 17, showing re-exposed tramway setts

Fig 23 The continuation of the tramway at the western end of the Treffry viaduct

Beyond the sluice gate the tramway route is now at a higher level; this is due to later dumping from the leat, which has masked the original surface