





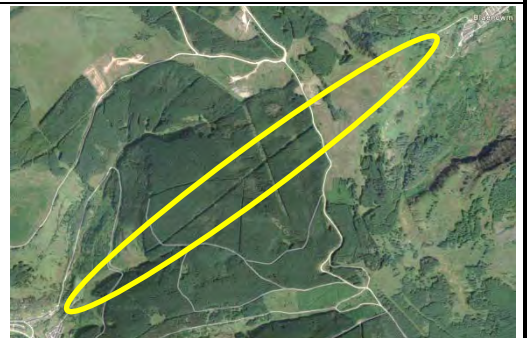

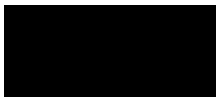

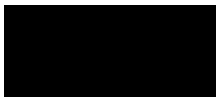

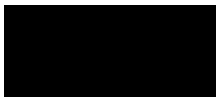
The Rhondda Tunnel

Detailed Tunnel Examination Report

26th April - 18th May 2018

THIS PAGE IS INTENTIONALLY LEFT BLANK

ELR:	RSB	Structure No:		Mileage:	1m 48c	Examination date:	26/4-18/5/18
Route:	Rhondda and Swansea Bay Line					OS ref:	SS 915 986
Name:	The Rhondda Tunnel					Type:	Tunnel

<p>Cover Picture: The access shaft near the Blaengwynfi (Country End) portal</p> 	<p>Location map</p>  <p>Aerial View</p> 								
<p>A Detailed Examination of this structure has been carried out to establish the condition, identify the nature, severity and extent of defects, ascertain the rate of deterioration by reference to the previous examination reports and identify the scope, extent and urgency of any remedial actions required to ensure the continued safety and long-term integrity of the structure.</p>	<table border="1"> <tr> <td>Examiner:</td> <td></td> <td>Signed:</td> <td></td> </tr> <tr> <td>Date:</td> <td>6/7/18</td> <td></td> <td></td> </tr> </table>	Examiner:		Signed:		Date:	6/7/18		
Examiner:		Signed:							
Date:	6/7/18								

Access Hazards: The tunnel is buried at both ends making both portals inaccessible. The track formation was reached using a hoist system located at the existing tunnel shaft near the Blaengwynfi end of the tunnel. All examination operations were undertaken under the safe system of work provided by a Confined Spaces Rescue Team (Mines Rescue Services Ltd.)

Summary of Recommendations: (*detailed recommendations are included in a separate report – “Recommendations, Budget Costings and Specifications for Repairs”*)

- Repair large areas of section losses (rib areas) by carefully removing timber laggings then either:
 - i) Undertake like-for-like masonry repairs supported by cleaned up ribs, with new concrete footings acting as temporary works.
 - or,
 - ii) Sprayed, mesh reinforced concrete with ribs removed sequentially as concrete works progress.
- Remove all timber support at the Cwg area and install a remote monitoring system to record potential movements at the major hinge fracture. System installed should allow data to be viewed and analysed from an office desk top computer.
- Install a further monitoring system in suspected area of flattening of arch at the Blaengwynfi end of barrel.
- Remove 2.1m thick mass concrete diaphragm wall near shaft and make good remaining edges.
- Remove remainder of imploded shaft chimney currently lying in the formation.
- Install water management system to deal with large flows from crown and sidewalls at the Blaencwm end of tunnel.
- Replace missing guttering and water management goods.
- Prove, refurbish and maintain existing track drainage.

Signed by Examining Engineer:



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26/4-18/5/18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

Type of construction	Tunnel is of mixed construction: see key plan for details
No. of sections	The tunnel was marked in 20m sections with intermediate 10m (+) sections. The diaphragm wall at the Blaencwm (London) End of the tunnel was used as the zero point. The tunnel was therefore divided into 156No. sections of 20m and a final section of 12m, giving a total of a 3132m as the measured length. (Please note that this length differs from that published, being 12m shorter: however, this level of accuracy (99.7%) is deemed adequate for the identification and resolution of the defects found.
Details of shafts	A single shaft is located approximately 100m from the Blaengwynfi portal and is located in the crown of the tunnel though slightly off-set from the centre line.
Details of manholes and drains	As noted (where seen) in the report. No intrusive investigation was undertaken.

General Notes (continued on Page 4)

Method: The Rhondda Tunnel was examined between 26th April and 18th May 2018. Various methods of examination were used: long tapping poles at the generally “good” areas, mobile access scaffold for the rib areas and ladders for the Cwg area and other discreet defects. The shaft at the Blaengwynfi end was examined using a working harness and the rescue winch employed for the safe system of work

Limitations of the examination: The following limitations apply:

No examination of the track drainage (located on the Up, north, side of the formation) was undertaken and its condition is not included in this report (other than general notes regarding flow levels).

No examination of the foundations was made.

In the two main rib areas, large sections of the barrel were obscured by life-expired timber laggings. These were generally left in situ due their poor condition with just small areas removed to gain an understanding of the masonry condition behind. Whilst we are confident that the main areas of section loss are all recorded, we recognise the high potential that other defects may be hidden behind undisturbed laggings. This must be taken into consideration when planning and risk assessing any barrel repair works.

The Cwg area was examined visually (no access) except in the gaps between the three sections.

The sidewalls and lower haunches at the Blaengwynfi end were obscured over 25m.

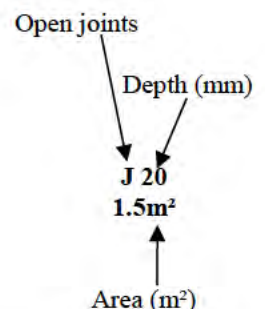
Walkover Survey: with The Rhondda Tunnel being largely constructed beneath a mountain, a walkover survey was undertaken only within the immediate environs of each buried portal. The ground condition above the area between the shaft and the Blaengwynfi (CE) portal is found saturated, following the recent shaft cap works and is a hindrance to the access to the shaft, especially in wet weather.

Examined By:	Appointees Engineer	[Redacted]	Date of exam
	Appointees Examiner	[Redacted]	26/4/18 -18/5/18

Symbols Used in Tunnel Diagram:

BWK	Brickwork	W	Wetness
CJ	Construction Joint	WD	Water dripping
R	Refuge	WR	Water running
S	Spalling	FL	Flattening of Arch
F	Fracture	B	Bulging
J	Open Joints	STLG	Stalactites
H	Hollow/Drummy	CLCT	Calcite Growth
ST	Soot Deposits	L	Leaching

Example





The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26/4-18/5/18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Name of Part:	General Condition	Worst Condition	Summary of Poor Conditions Found <i>(relating to the worst case conditions examined and not the overall condition of each element type)</i>
	G-good F-fair P-poor	G-good F-fair P-poor	
Main Girders	N/A	N/A	P(1) Severe losses of section, up to 250mm deep to crown in the rib areas between 78m-198m and 807m-1014m. Major hinge fracture (pre 1968) to DS crown between 1942m-1968m.
Cross Girders	N/A	N/A	
Crown	G	P(1)	
Haunches	G	P(2)	P(2) Severe losses of section to 200mm deep to haunches (particularly DS) in rib sections as above.
Sidewalls	G	F	
Arch Face Rings to Portal	G	G	P(3) Lateral bracing elements (metal angles and flats) widespread severe corrosion and local failures at connections.
Headwalls	N/E	N/E	
Spandrels	N/E	N/E	
Arch Support Ribs	F	P(3)	P(4) Timber cwg frameworks are in poor condition, with local failure of elements and potential instability. The rotting timber creates a further health and safety risk due to gas emissions.
Temporary Timber Supports	P	P(4)	
Wing & Retaining Walls	N/E	N/E	P(5) Timber laggings in poor condition and require removal. Laggings may also mask further loss of section to the barrel in the rib areas.
Pointing	F	F	
Parapets & Pilasters	N/E	N/E	
Columns & Cylinders	N/A	N/A	P(6) Historic areas of severe water ingress, particularly at London end
Ballast plates/Boards	N/A	N/A	
Longitudinal timbers (Rib Areas)	F	P(5)	P(7) Trapped water at Country end (enclosed by backfill and concrete diaphragm wall). Isolated areas of waterlogged formation.
Waterproofing	F	P(6)	
Drainage	F	P(7)	
Gutters & Downpipes	F	P(8)	P(8) Missing to shaft and at Country end.
Handrails and Fencing	G	G	
Painting	P	P(9)	P(9) No protective coating remains to any rib metalwork.
Track/Road Condition	F	F	
Foundation	N/E	N/E	
Vegetation	G	G	
Bridge Number/ Mileage	N/A	N/A	

TICK AS APPROPRIATE		Notes/Comments:
Change of Construction	Y	-As noted within the key plan
Tell Tales	Y	-Historic survey pins noted around Cwg area
Inaccessible Parts / Restrictions	Y	-Areas of the repaired barrel were obscured by rotting timber lagging over approx. 100m. The Cwg area could, in general, only be examined visually, except where there were gaps in its structure were present.
		Foundations were not examined: evidence of historic deformation due to local foundation failure was noted in the Cwg area (large hinge fracture).



ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26/4-18/5/18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

General Notes (continued from Page 2)

Findings and Actions:

The Rhondda Tunnel was found in very good condition for over 90% of its total length: generally the barrel profile is found good and firm to hammer. This characteristic includes areas suffering from heavy water penetration. The typical and repeated minor defects in these generally good areas can be addressed as a secondary priority and managed on the normal maintenance cycle. Addressing these defects is not critical for the reuse of the tunnel.

Efforts to restore the tunnel to a useable condition, therefore, will need to concentrate on the remaining areas detailed in the summary on the front cover of this report. The most critical of the priority areas is the attention required to the losses of section found in the rib areas which are the biggest concern for both the potential instability and long term durability of the tunnel. Efforts to undertake like for like masonry replacement (our preferred method) or introduced strengthening have to be the first priority. These repairs must be carefully designed and staged as the temporary instability of the barrel in these areas is a key risk.

Mainly at the Blaencwm end, several discrete areas of heavy, and anecdotally historic, water ingress were noted. The water here needs to be managed into the existing track drainage system which clearly works at some capacity as the water ingress is large but the waterlogging is relatively minor. It is expected that the proving and minor maintenance of the track drainage will increase its effectiveness still further.

Similarly the “lake” created by the construction of the diaphragm wall at the Blaengwnfi end should be relatively easy to drain. The diaphragm wall itself needs to be removed.

The Cwg area provides its own unique health and safety challenges being largely rotten and in the early stages of failure. Specialist removal will be required to address both temporary stability issues during removal and the management of health risks posed by its disturbance. We believe that the Cwg has served no structural strengthening function throughout its life: there is no evidence of any packing timber at the soffit (compare this to the widespread remaining laggings in the rib area which generally pre-date the Cwg). The Cwg’s profile today still matches the distorted soffit profile around its entire circumference and, in our opinion, becomes a good template of evidence that the soffit has suffered no significant movement since the Cwg was installed.

However, we must respect the severe hinge fracture that is present in the Cwg area and it is essential that a monitoring system is set up to both gather data in support of our theories above and to set trigger levels in the unlikely event that we are proved to be wrong.

Conclusion:

In conclusion, we see no reason, from an engineering perspective, as to why the defects noted within this report cannot be satisfactorily rectified and managed.

We are happy to recommend that the Rhondda Tunnel Society put all their efforts into securing the funding to achieve the ultimate goal of the reopening and reuse of this great asset for the benefit of both the local and wider communities.

[Redacted signature area]

Balfour Beatty Rail

6th July 2018



ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
Blaencwm End (London end)						
0	<i>Diaphragm wall is 0m chainage (P1)</i>					0
	<i>W</i>	<i>W</i>	<i>Access pipe through wall (P2)</i> <i>W</i>	<i>W</i>	<i>J (Isol.)</i> <i>70 to 200</i> <i>(P4)</i>	
	<i>W</i>	<i>WD</i>	<i>WD</i> <i>(P5)</i>	<i>WD</i>		<i>WR (P3)</i>
20	<i>See expanded view detail</i> <i>Pages 5a and 5b</i> <i>(including photos 6-13)</i>					20
40						40
60						60
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
	 <i>Drainage</i> <i>flowing at full</i> <i>capacity (P14)</i> <i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
80	<div style="border: 1px solid black; padding: 5px; margin: 0 auto; width: 80%;"> <p><i>78m – 198m Masonry sidewall & barrel supported by 132no metal ribs at centres</i></p> <p style="text-align: center;"><i>See expanded view detail</i> <i>Pages 5c -5e</i> <i>(including photos 15-25)</i></p> </div>					80
	<i>See expanded view detail</i> <i>Pages 5c -5e</i> <i>(including photos 15-25)</i>					



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April - 18th May 2018

ELR: RSB	Structure N ^o :	Mileage: 1m 48ch	Examination Date: 26 / 04 / 18
ROUTE: Rhondda and Swansea Bay Line			OS Ref: SS 915 986
NAME: Rhondda Tunnel - Expanded View Detail - 20 m to 60 m			Type: Tunnel

BLAENCWM END

	Sidewall		Haunch		Crown		Haunch		Sidewall
20m	L.O.S. 440H x 510W x 600D J150 (24m ²)		WD		GOOD		GOOD		L.O.S. 450H x 550W x 750D
	DRAINAGE FLOWING AT FULL BORE 		WD		WR		WD		J100 (350MAX) (50m ²)
40m			WD		GOOD		GOOD		
	W/S J50 TYPICAL		GOOD		GOOD		GOOD		J100 (10m ²)
			GOOD		WR		W		WR
60m			GOOD		WR (FULL BORE)				L.O.S. 800H x 450W x 250D



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April - 18th May 2018

ELR: RSB	Structure N ^o :	Mileage: 1m 48ch	Examination Date: 26 / 04 / 18
ROUTE: Rhondda and Swansea Bay Line			OS Ref: SS 915 986
NAME: Rhondda Tunnel - Expanded View Detail - 60 m to 75 m			Type: Tunnel

BLAENCWM END

	Sidewall	Haunch	Crown	Haunch	Sidewall
60m	<p>DRAINAGE FLOWING AT FULL BORE</p>	CORRUGATED METAL SHEETING			
			11 & 13		
		14	GOOD	WD	GOOD
80m					
	RIBBED SECTION - SEE SHEET C				
100m					



The Rhondda Tunnel
 Detailed Tunnel Examination Report
 26th April - 18th May 2018

ELR: RSB	Structure N ^o :	Mileage: 1m 48ch	Examination Date: 26 / 04 / 18
ROUTE: Rhondda and Swansea Bay Line			OS Ref: SS 915 986
NAME: Rhondda Tunnel - Expanded View Detail - 78 m to 88 m			Type: Tunnel

BLAENCWM END

	Sidewall		Haunch		Crown	Haunch		Sidewall	
Rib 1 (78m)									
Rib 2									
Rib 3	GOOD		GOOD			GOOD		GOOD	
Rib 4									
Rib 5									
Rib 6									
Rib 7									
Rib 8	GOOD		GOOD			GOOD		GOOD	
Rib 9									
Rib 10									
Rib 11									



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April - 18th May 2018

ELR: RSB	Structure N ^o :	Mileage: 1m 48ch	Examination Date: 26 / 04 / 18
ROUTE: Rhondda and Swansea Bay Line			OS Ref: SS 915 986
NAME: Rhondda Tunnel - Expanded View Detail -		88 m to 97 m	Type: Tunnel

BLAENCWM END

	Sidewall	Haunch	Crown	Haunch	Sidewall
Rib 11 (88m)					
Rib 12					
Rib 13	GOOD	GOOD		GOOD	GOOD
Rib 14					
Rib 15					
Rib 16					
Rib 17					
Rib 18	GOOD	GOOD		GOOD	GOOD
Rib 19					
Rib 20					
Rib 21					



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April - 18th May 2018

ELR: RSB	Structure N ^o :	Mileage: 1m 48ch	Examination Date: 26 / 04 / 18
ROUTE: Rhondda and Swansea Bay Line			OS Ref: SS 915 986
NAME: Rhondda Tunnel - Expanded View Detail - 97 m to 118 m			Type: Tunnel


BLAENCWM END

	Sidewall	Haunch	Crown	Haunch	Sidewall
Rib 21 (97m)					
Rib 22					
Rib 36	GOOD	GOOD		GOOD	GOOD
Rib 37					
Rib 38					
Rib 39					
Rib 40					
Rib 41	GOOD	GOOD			GOOD
Rib 42					
Rib 43					
Rib 44					



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
100	 <i>Drainage running full but low flow (P48)</i>			↑		100
120	<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: auto;"> <p><i>Masonry barrel supported by metal ribs at approx 915 at centres See expanded view detail Pages 6a to 6e (including photos 26-47 and 67-77)</i></p> </div>					120
140						140
160						160
180						180
198m				↓		198m



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April - 18th May 2018

ELR: RSB	Structure N ^o :	Mileage: 1m 48ch	Examination Date: 26 / 04 / 18
ROUTE: Rhondda and Swansea Bay Line			OS Ref: SS 915 986
NAME: Rhondda Tunnel - Expanded View Detail -		118 m to 146 m	Type: Tunnel

BLAENCWM END

	Sidewall	Haunch	Crown	Haunch	Sidewall
Rib 44 (118m)		LAGGING PREVENTS EXAMINATION OF SOFFIT TO MAJORITY OF AREAS BETWEEN RIB 44 & 52. BRICK REPAIR NOTED BETWEEN RIBS 50 & 51. SOUND WHEN TAPPED.			
Rib 52					
Rib 53					
Rib 54	GOOD	GOOD	GOOD (WHERE SEEN)	GOOD	GOOD
Rib 55					
Rib 56					
Rib 57		S75 0.5m ²			
Rib 58					
Rib 64	GOOD	GOOD			GOOD
Rib 74					



LOOSE MATERIAL REMOVED. 200 DEEP OVER 3m²

L.O.S. 1000 WIDE x 300 DEEP MAX OVER 8 BAYS

300 WIDE LOOSE SECTION TO CROWN TO 150 DEEP (GENERAL) 250 DEEP (MAX) OVER 10 BAYS



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April - 18th May 2018

ELR: RSB	Structure N ^o :	Mileage: 1m 48ch	Examination Date: 30 / 04 / 18
ROUTE: Rhondda and Swansea Bay Line			OS Ref: SS 915 986
NAME: Rhondda Tunnel - Expanded View Detail -		146 m to 172 m	Type: Tunnel

BLAENCWM END

	Sidewall	Haunch	Crown	Haunch	Sidewall
Rib 74 (146m)			WR 31		
Rib 79					REPAIR TO HAUNCH SEPARATION IN ROUGH CONCRETE 32 & 33
Rib 80					L.O.S. 300W x 300 DEEP 34
Rib 81	GOOD				L.O.S. 900W x 500 DEEP (TO NATURAL ROCK) 35 & 36
Rib 91	DEFECTS SIMILAR TO OPPOSITE BUT OF MUCH LOWER SEVERITY 45				
Rib 92					
Rib 93	GOOD				300W x 700 DEEP 37
Rib 94					GOOD
Rib 103	GOOD				GOOD
Rib 104					
Rib 105					

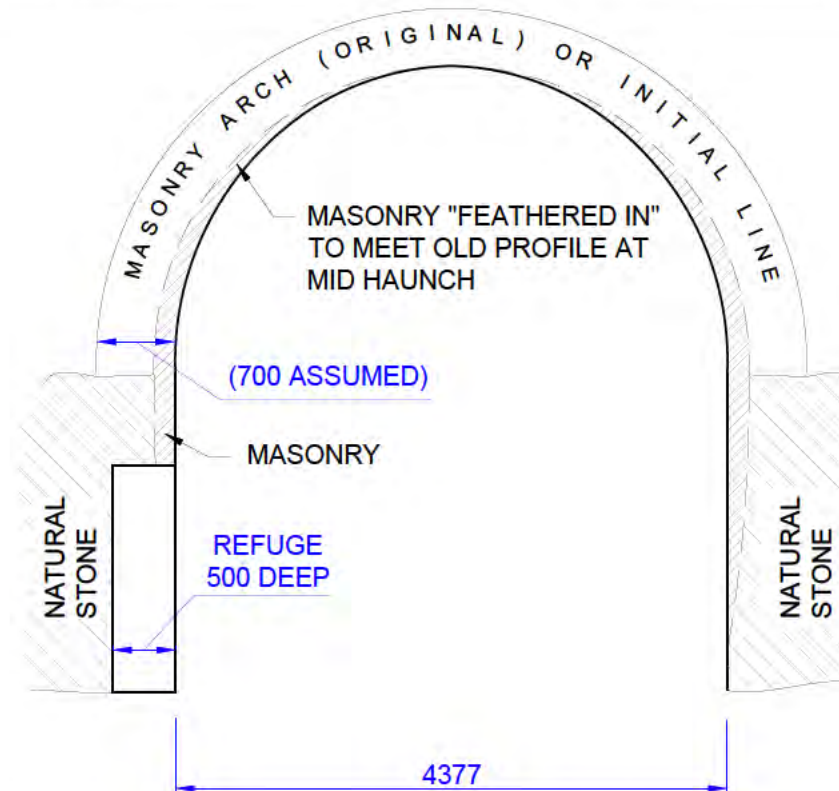
SOFFIT BETWEEN RIBS 79 - 105 APPEARS TO HAVE BEEN ORIGINALLY BUILT OFF NATURAL STONE SIDEWALLS. THIS WAS SUBSEQUENTLY FACED, WITH FURTHER MASONRY BEING FEATHERED INTO MID HAUNCH. THE THICKNESS OF THE MASONRY TAPERS ALONG THE DEFECT LINE. SEE SKETCH LG8 & 39 TO 44

LINE OF MISALIGNMENT VISIBLE FROM G.L. 38



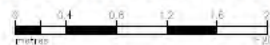
The Rhondda Tunnel
 Detailed Tunnel Examination Report
 26th April - 18th May 2018

ELR: RSB	Structure N ^o :	Mileage: 1m 48ch	Examination Date: 30 / 04 / 18
ROUTE: Rhondda and Swansea Bay Line			OS Ref: SS 915 986
NAME: Rhondda Tunnel - Expanded View Detail - 150 m to 174 m			Type: Tunnel
BLAENCWM END			
Sidewall	Haunch	Crown	Haunch Sidewall



PROFILE OF TUNNEL BETWEEN 150m & 174m CH

(RIBS OMITTED FOR CLARITY)





The Rhondda Tunnel
 Detailed Tunnel Examination Report
 26th April - 18th May 2018

ELR: RSB	Structure N ^o :	Mileage: 1m 48ch	Examination Date: 30 / 04 / 18
ROUTE: Rhondda and Swansea Bay Line			OS Ref: SS 915 986
NAME: Rhondda Tunnel - Expanded View Detail -		189 m to 198 m	Type: Tunnel

BLAENCWM END

	Sidewall			Haunch			Crown			Haunch			Sidewall		
Rib 121 (189m)															
Rib 122															
Rib 123															
Rib 124															
Rib 127															
Rib 128															
Rib 129															
Rib 130															
Rib 131															
Rib 132															

L.O.S.
 375 H
 550 W
 550 D

46

L.O.S.
 400 H
 500 W
 600 D

47

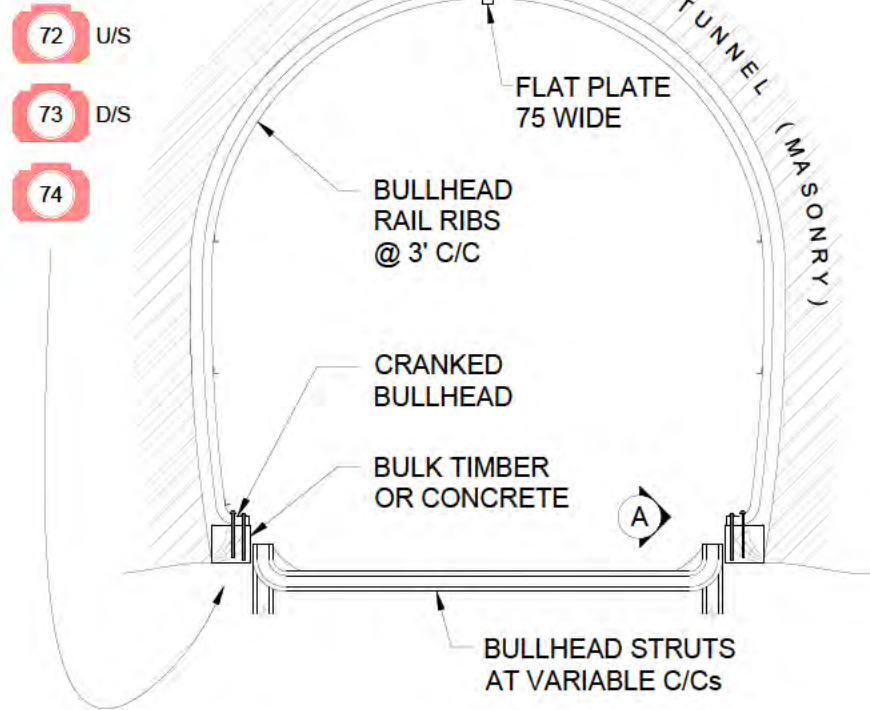
FINAL RIB @ 198m



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April - 18th May 2018

ELR: RSB	Structure N ^o :	Mileage: 1m 48ch	Examination Date: 30 / 04 / 18
ROUTE: Rhondda and Swansea Bay Line			OS Ref: SS 915 986
NAME: Rhondda Tunnel - Expanded View Detail -		78 m to 198 m	Type: Tunnel

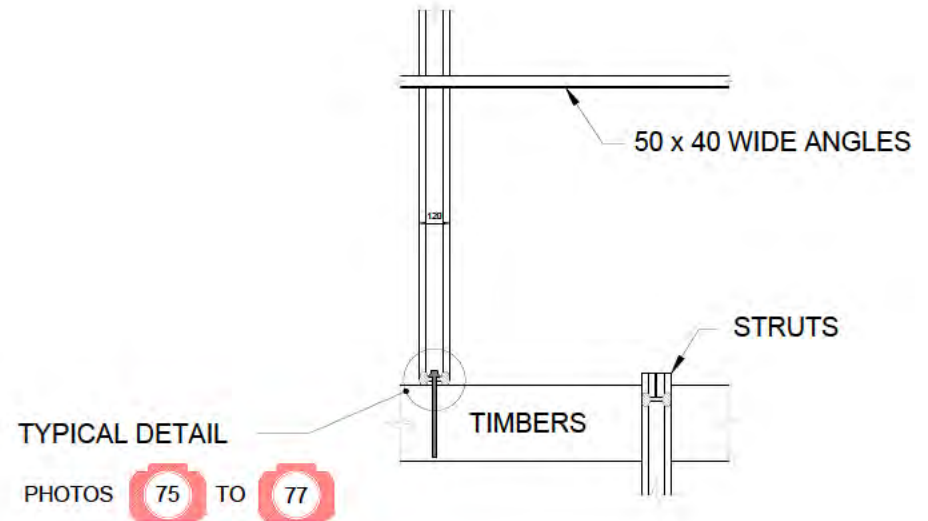
ON U/S & D/S (BURIED)
CONCRETE REPLACES
BULK TIMBER B/W RIB
107 & 124.



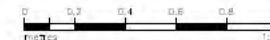
**RIB STRENGTHENING
TYPICAL SECTION**



PHOTOS 67 TO 71 FOR DETAILS






ELEVATION 'A'





The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
200	<i>Good</i>	<i>Good</i>	 <i>Minor L.O.S to crown 75 deep</i>	<i>Good</i>	<i>Good</i>	200
	<i>Good</i>	<i>WD</i>	<i>WR (P50)</i>	<i>WD (P49)</i> <i>Good</i>	<i>Redundant concrete beam at base of sidewall (P52, 53)</i> <i>Good</i>	
220	<i>Good</i>  <i>Drain full Low flow (P54)</i>	<i>Good</i>	<i>Good</i>	<i>WR (P51)</i>	<i>Good</i>	220
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
240	<i>WR</i>	<i>W</i>	<i>W</i>	<i>W</i>	<i>W</i>	240
	<i>WR</i>	<i>W</i>	<i>W</i>	<i>W</i>	<i>W</i>	
260	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	260
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
280	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	280
	<i>Good</i>	<i>Good</i>	 <i>Brick repair Firm to hammer (P55)</i>	<i>Good</i>	<i>Good</i>	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
300	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	300
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
320	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	320
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
340	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	340
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
360	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	360
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
380	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	380
	<i>Relieving arches heavily spalled due to poorly compacted concrete (P56-59)</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Relieving arches heavily spalled due to poorly compacted concrete (P56-59)</i>	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
400	↑	<i>Good</i>	<i>Good</i>	<i>Good</i>	↑	400
	<i>Loose and friable mass concrete to sidewalls</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Loose and friable mass concrete to sidewalls</i>	
420		<i>Good</i>	<i>Good</i>	<i>Good</i>		420
		<i>Good</i>	<i>Good</i>	<i>Good</i>		
440	↓ ↑	<i>Good</i>	<i>Good</i>	<i>Good</i>	↓ ↑	440
		<i>Good</i>	<i>Good</i>	<i>Good</i>		
460	↓ <i>Odd areas of loose concrete</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	↓ <i>Odd areas of loose concrete</i>	460
		<i>Good</i>	<i>Good</i>	<i>Good</i>		
480		<i>Good</i>	<i>Good</i>	<i>Good</i>		480
	↓	<i>Good</i>	<i>Good</i>	<i>Good</i>	↓	



ELR:	RSB	Structure No:		Mileage:	1m 48c	Examination date:	26.4.18- 18.5.18
Route:	Rhondda and Swansea Bay Line				OS ref:	SS 915 986	
Name:	The Rhondda Tunnel				Type:	Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
500	↑	<i>Good</i>	<i>Good</i>	<i>Good</i>	↑	500
	█ ←	<i>Large section of a relieving arch CE face removed (P60, 61)</i>	<i>Good</i>	<i>Large section of loose concrete removed to sidewall</i> <i>Remainder hollow above for 5m² (P62)</i>	█	
520		<i>Good</i>	<i>Good</i>			520
						R
	<i>Odd sections of very loose/ friable concrete particularly to lower sections of relieving arches with some areas hollow</i>	<i>Good</i>	<i>Good</i>	<i>Odd sections of very loose/ friable concrete particularly to lower sections of relieving arches with some areas hollow</i>		
540		<i>Good</i>	<i>Good</i>	<i>Good</i>		540
		<i>Good</i>	<i>Good</i>	<i>Good</i>		
560		<i>Good</i>	<i>Good</i>	<i>Good</i>		560
	↕	<i>Good</i>	<i>Good</i>		↕	
580	<i>Sidewall dull to hammer in places</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Sidewall dull to hammer in places</i>	580
		<i>Good</i>	<i>Good</i>	<i>Good</i>		
	↓	<i>Good</i>	<i>Good</i>	<i>Good</i>	↓	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
600	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	600
	■ ←		<i>Deep recess to sidewalls (retrofit) (P63)</i>		→ ■	
620	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	620
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	⬡ R
640	<i>Good</i>	■ <i>Good</i>	<i>Retrofitted holes to mid haunch 200 x 250</i>	■ <i>Good</i>	<i>Good</i>	640
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
660	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	660
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
680	■ ←		<i>Deep recess to sidewalls (retrofit)</i>		→ ■	680
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
700	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	700
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
720	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	720
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
740	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	740
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
760	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	760
	<i>Good</i>	<i>Good</i>	<i>Good (P64)</i>	<i>Good</i>	<i>Good</i>	
780	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	780
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>B100 to lower Sidewall b/w 793m & 797m fractured to CE (P65,66)</i>	



ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
800	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	800
	807m ↑	<i>Generally masonry to rear of ribs appears in good condition. Isolated spalling to DS haunch to 100 deep in places</i>				
	Ribs					
	813m ↓					
	818m					
	↑					
820		<i>123no ribs supporting masonry at approx 915 centres Generally form of masonry is good (except where noted in large sections) Examination restricted by rotten timber laggings which were not removed (P78) Ribs show typical corrosion of 1mm Parent metal good Photo Details (P67 – 77) See expanded view detail page 6c and 6e.</i>				820
840						840
		<i>Ribs 37 – 46 See expanded view detail on page 13a (Photos 78 – 90)</i>				
860						860
		<i>Ribs 53 - 57 See expanded view detail on page no 13b (Photos 91 – 97)</i>				
		<i>Ribs 58 - 123 Barrel appears in good condition where seen (examination restricted by old timber laggings)</i>				
880						880
	To 925m ↓					



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April - 18th May 2018

ELR: RSB	Structure N ^o :	Mileage: 1m 48ch	Examination Date: 30 / 04 / 18
ROUTE: Rhondda and Swansea Bay Line			OS Ref: SS 915 986
NAME: Rhondda Tunnel - Expanded View Detail -		851 m to 860 m	Type: Tunnel

BLAENCWM END

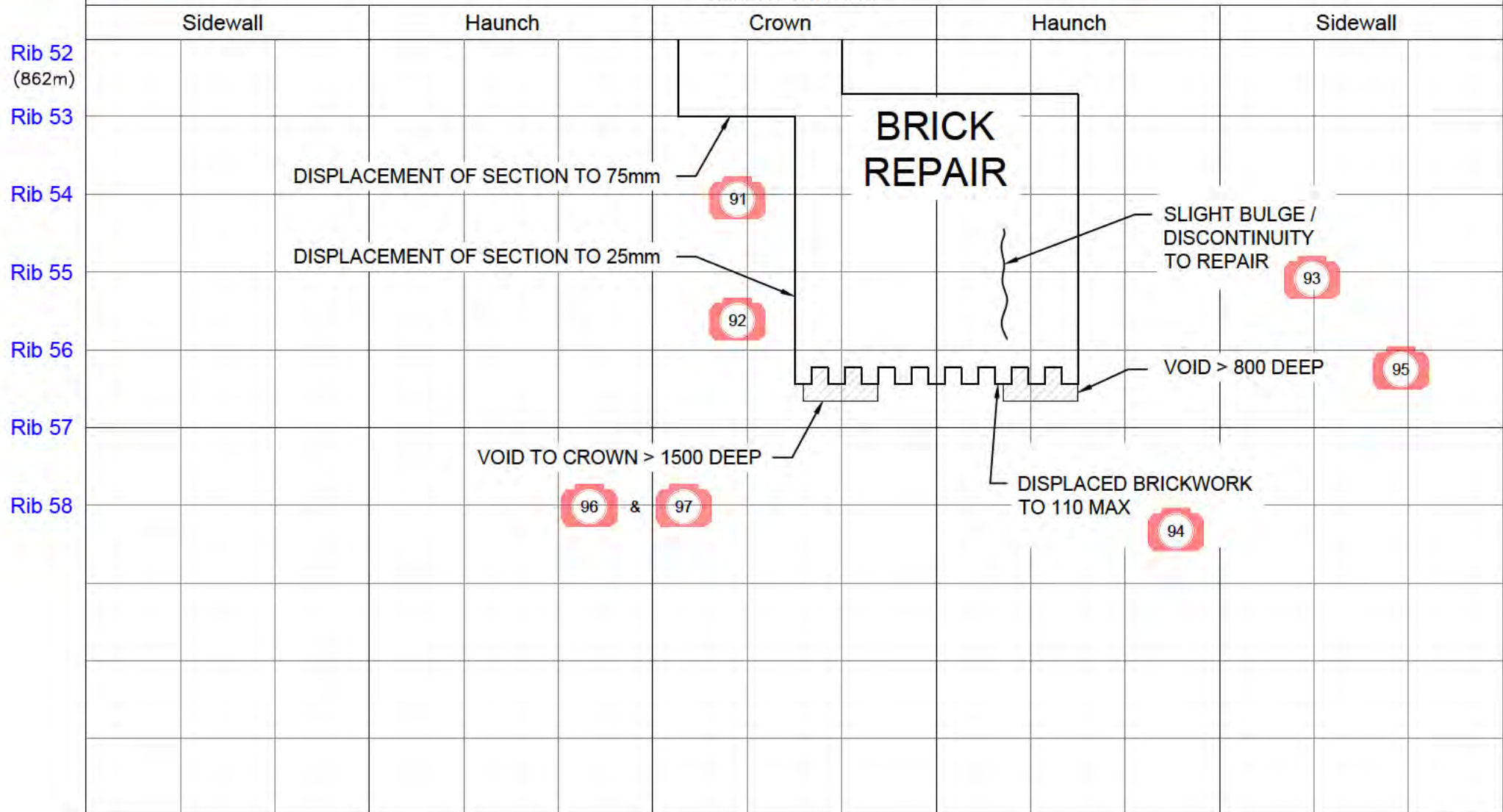
	Sidewall	Haunch	Crown	Haunch	Sidewall
Rib 37 (851m)			S120	S250	
Rib 38	GOOD	GOOD	S150	GOOD	GOOD
Rib 39			S250 1m WIDE	S250 1.1m WIDE	
Rib 40	GOOD	GOOD	S120 500 WIDE	GOOD	GOOD
Rib 41		ODD AREAS ADJACENT TO LOSSES OF SECTION ARE DRUMMY	S130 400 WIDE		
Rib 42			S50		
Rib 43	GOOD	GOOD	S130 750 WIDE	GOOD	GOOD
Rib 44		LOOSE "FEATHERED IN" REPAIR TO TOP OF U/S HAUNCH & U/S CROWN 400W x 150D x 180 LONG			
Rib 45	GOOD			GOOD	GOOD
Rib 46					



The Rhondda Tunnel
 Detailed Tunnel Examination Report
 26th April - 18th May 2018

ELR: RSB	Structure N ^o :	Mileage: 1m 48ch	Examination Date: 30 / 04 / 18
ROUTE: Rhondda and Swansea Bay Line			OS Ref: SS 915 986
NAME: Rhondda Tunnel - Expanded View Detail - 862 m to 869 m			Type: Tunnel

BLAENCWM END





ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
900	818m ↑					900
920	925m ↓	<i>End of rib sections</i>		(P98)		920
940	942m	↑				940
<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: auto;"> <p><i>80no ribs supporting masonry at approx 915at centres Generally form of masonry between laggings is good Ribs show typical corrosion of 1mm but parent metal is sound beneath</i></p> </div>						
960						960
<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: auto;"> <p><i>For masonry between ribs no 42 and 46, see expanded view detail Page 14a (including photos 99 – 103)</i></p> </div>						
980						980
	To 1013m	↓			<i>Minor spalling to DS haunch (P104, 105)</i>	

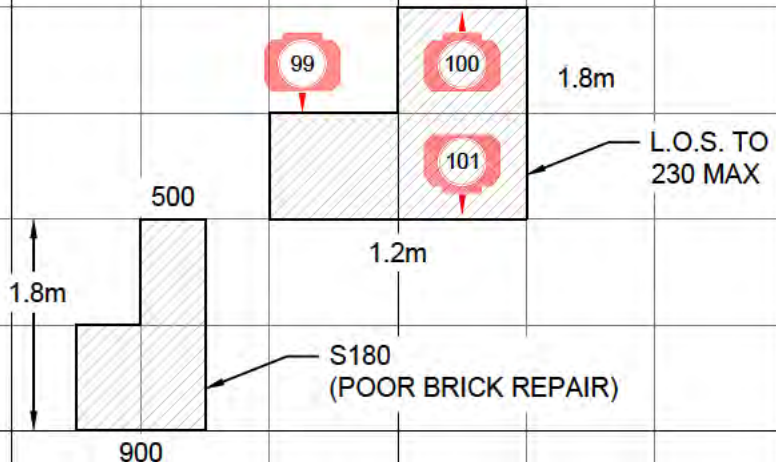


The Rhondda Tunnel
 Detailed Tunnel Examination Report
 26th April - 18th May 2018

ELR: RSB	Structure N ^o :	Mileage: 1m 48ch	Examination Date: 30 / 04 / 18
ROUTE: Rhondda and Swansea Bay Line			OS Ref: SS 915 986
NAME: Rhondda Tunnel - Expanded View Detail - 979 m to 983 m			Type: Tunnel

BLAENCWM END

	Sidewall			Haunch			Crown			Haunch			Sidewall		
Rib 41 (979m)															
Rib 42															
Rib 43															
Rib 44															
Rib 45															
Rib 46															
Rib 47															





The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
1000						1000
		<div style="border: 1px solid black; padding: 5px; display: inline-block;">Section supported by metal ribs 942m to 1013m</div>				
	D			<i>Vertical step joint fracture open 5mm to refuge rear wall with loose brickwork adjacent 900 long (P106, 107)</i>		
1020						1020
	D			<i>Single fractured unit to DS quoin open 3mm (P108)</i>	<i>Bulged area (P109-113)</i>	
	D					
1040						1040
	D					
	D					
1060						1060
	D					
	D					
1080						1080
	D					
	D					



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
1100	Good	Good	Good	Good	Good	1100
	Good	Good	Good	Good	Good	
1120	Good	Good	Good	Good	Good	1120
	Good	Good	Good	Good	Good	
1140	Good	Good	Good	Good	Good	1140
	Good	Good	Good	Good	Good	
1160	S140 D, flow, 500L to R/A (P122)		Good	Good		1160
	<i>Note: relieving arches to sidewalls b/w 1160m and 1232m (P120) are in good condition. However the pier quoins have widespread areas of loose rough concrete (poorly compacted). Larger defects are noted individually.</i>			<i>Note: relieving arches to sidewalls b/w 1600m and 1232m are in good condition. However the pier quoins have widespread areas of loose rough concrete (poorly compacted). Larger defects are noted individually. (P121)</i>		
1180		Good	Good	Good		1180
		Good	Good	Good		
	To 1232m				To 1232m	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
1200	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1200
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
1220	<i>S90 0.1m² to relieving arch (P123)</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>S90 0.1m² to relieving arch (P124)</i>	1220
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
1240	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1240
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
1260	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1260
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
1280	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1280
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
1300	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1300
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
1320	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1320
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
1340	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1340
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
1360	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1360
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
1380	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1380
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	

2no vertical fractures to relieving arch pier 1m long open 10mm on either side of pier (P126)

2no vertical fractures to relieving arch pier 1m long open 5mm on either side of pier (P127)

Good

S40 0.25m² (P128)

S50 0.1m² to RA soffit (P129)



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018


ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
1400	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>S40 0.1m² to relieving arch surrounding soft (PI30)</i>	1400
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
1420	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1420
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
1440	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1440
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
1460	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1460
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
1480	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1480
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018





ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
1500	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1500
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
1520	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1520
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
1540	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1540
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
1560	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1560
		<i>Wider section at mid-point of tunnel ("Church") All areas good (P131, 132)</i>				
1580	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1580
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
1600	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1600
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
1620	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1620
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>S50 to refuge quoin at base (P133)</i> 	R
1640	 <i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1640
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i> 	
1660	 <i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1660
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
1680	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1680
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
1700	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1700
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>S30 to relieving arch pier quoin (PI34)</i>	
1720	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>1m long Typical for several spans)</i>	1720
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
1740	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1740
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
1760	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1760
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
1780	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1780
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

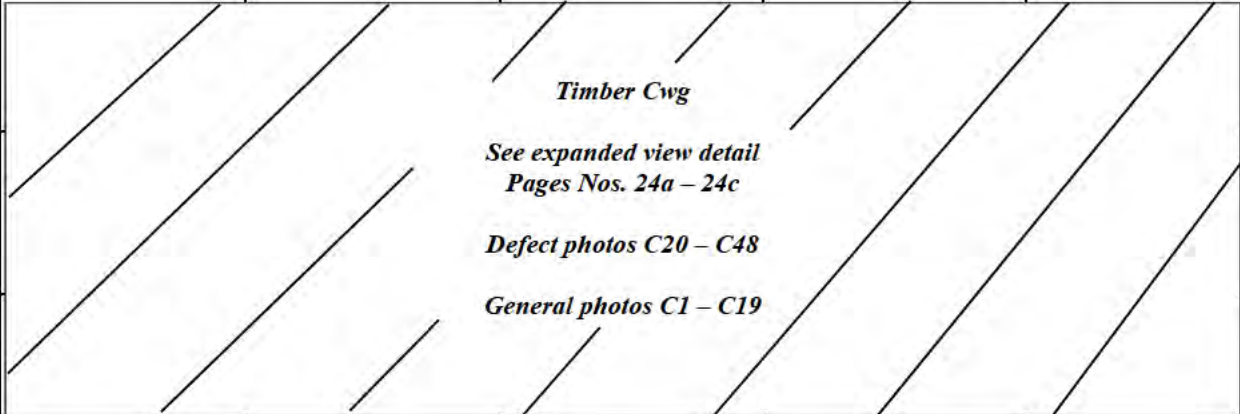
	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
1800	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1800
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
1820	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1820
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
1840	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1840
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
1860	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1860
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
1880	(P135) <i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1880
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	(P136) <i>Good</i>	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

Balfour Beatty
Rail

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

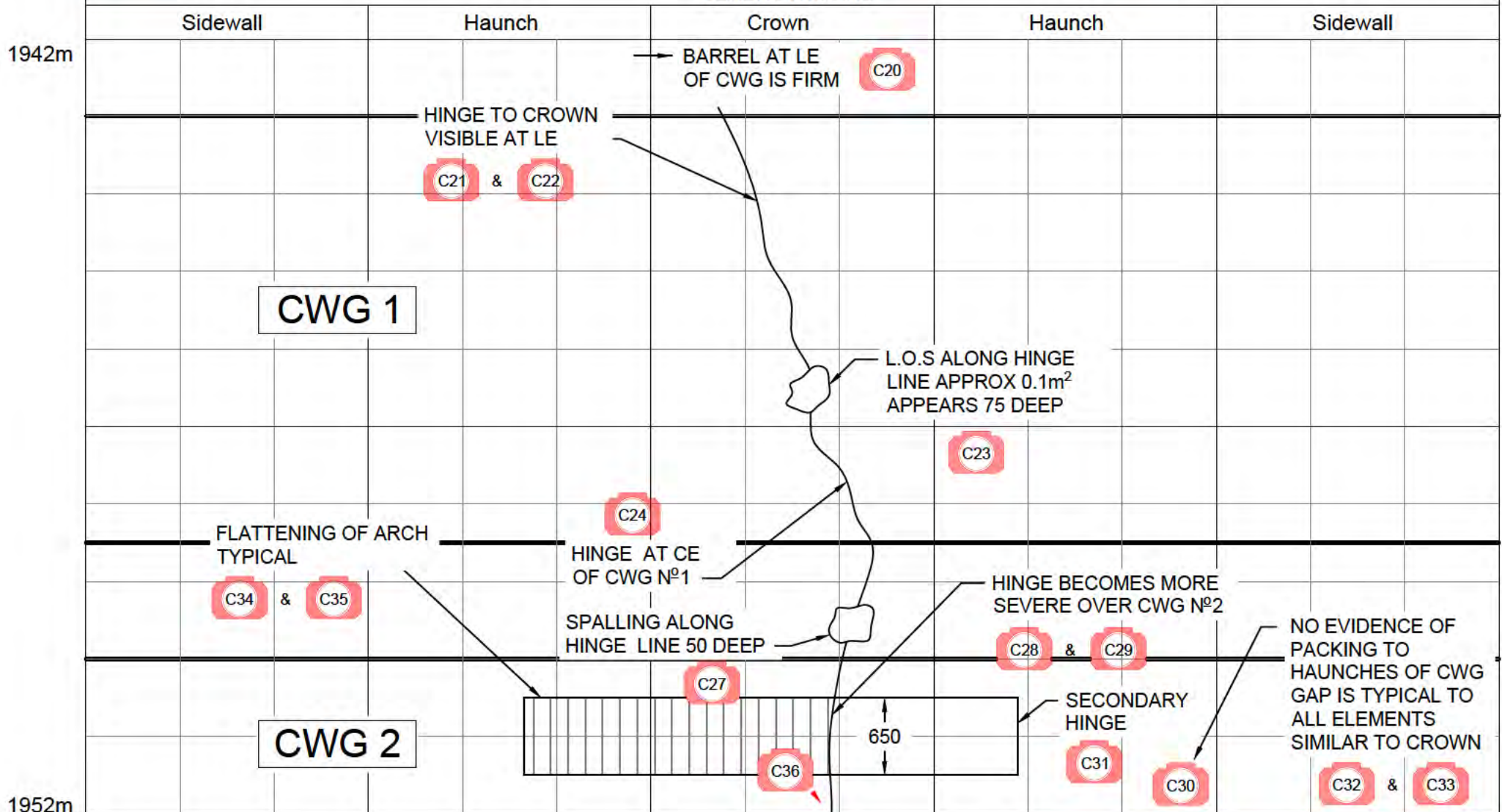
	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
1900	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1900
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
1920	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1920
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	R
1940	 <p><i>Timber Cwg</i></p> <p><i>See expanded view detail</i> <i>Pages Nos. 24a – 24c</i></p> <p><i>Defect photos C20 – C48</i></p> <p><i>General photos C1 – C19</i></p>					1940
1960	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1960
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
1980	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	1980
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April - 18th May 2018

ELR: RSB	Structure N ^o :	Mileage: 1m 48ch	Examination Date: 01 / 05 / 18
ROUTE: Rhondda and Swansea Bay Line			OS Ref: SS 915 986
NAME: Rhondda Tunnel - Expanded View Detail - 1942 m to 1952 m			Type: Tunnel

BLAENCWM END

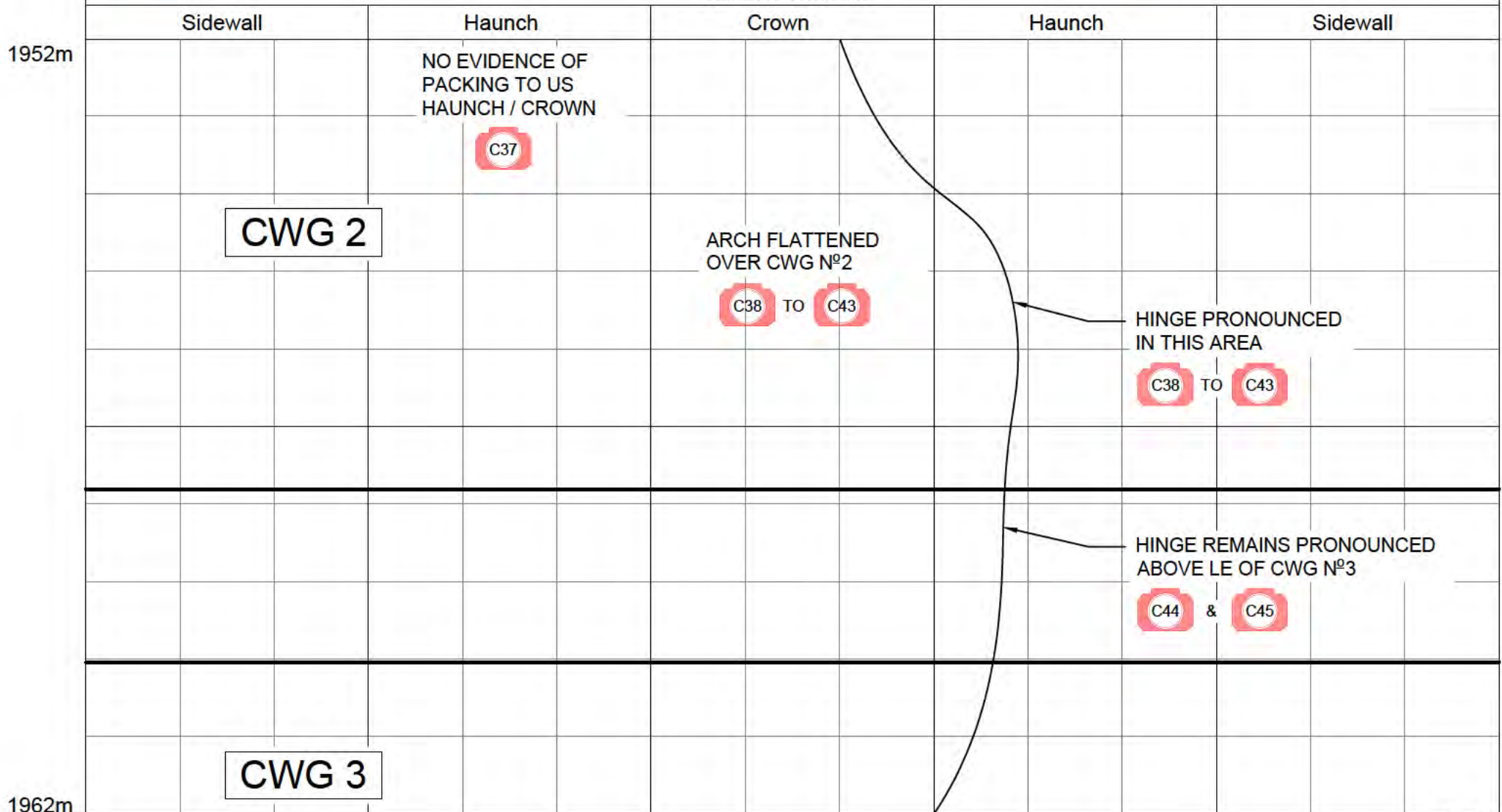




The Rhondda Tunnel
 Detailed Tunnel Examination Report
 26th April - 18th May 2018

ELR: RSB	Structure N ^o :	Mileage: 1m 48ch	Examination Date: 01 / 05 / 18
ROUTE: Rhondda and Swansea Bay Line			OS Ref: SS 915 986
NAME: Rhondda Tunnel - Expanded View Detail -		1952 m to 1962 m	Type: Tunnel

BLAENCWM END





The Rhondda Tunnel
 Detailed Tunnel Examination Report
 26th April - 18th May 2018

ELR: RSB	Structure N ^o :	Mileage: 1m 48ch	Examination Date: 01 / 05 / 18
ROUTE: Rhondda and Swansea Bay Line			OS Ref: SS 915 986
NAME: Rhondda Tunnel - Expanded View Detail -		1962 m to 1967 m	Type: Tunnel

BLAENCWM END

	Sidewall			Haunch			Crown			Haunch			Sidewall		
1962m															
1967m															

CWG 3










FORM OF BARREL ONLY SLIGHTLY
 HINGED AT CE OF CWG 3

C46 TO C48



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018



ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
2000	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	2000
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i> 	
2020	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	2020
		<i>Good</i>	<i>Good</i>	<i>Good</i>		
2040		<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Soft render around refuge</i> 	2040
	<i>Soft render around refuge</i> <i>(P137, 138)</i> 	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Soft render around refuge</i> 	
2060		<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	2060
		<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
2080	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Softy render around refuge</i> 	2080
		<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
2100	<i>W</i>	<i>WD</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	2100
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
2020	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	2120
	<i>W</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
2140	 <i>LOS to rear of refuge 300Hx450Wx100D (P139)</i>	<i>WD</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	2140
	<i>Good</i>	<i>WD</i>	<i>Good</i>	<i>Good</i>	 <i>Good</i>	
2160	<i>Good</i>	<i>D</i>	<i>W</i>	<i>D</i>	<i>Good</i>	2160
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
2180	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	2180
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018






ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
2200	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	2200
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
2220	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	2220
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
2240	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	2240
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
2260	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	2260
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
2280	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Typical views of relieving arches (P140)</i> <i>Good</i>	2280
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018















ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
2300	 <i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	2300
	<i>W</i>	<i>W</i>	<i>W</i>	<i>Good</i>	<i>Good</i>	
2320	 <i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	2320
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
2340	 <i>W</i>	<i>WD</i>	<i>W</i>	<i>D</i>	<i>D</i>	2340
	<i>W</i>	<i>WD</i>	<i>W</i>	<i>D</i>	<i>D</i>	
2360	 <i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	2360
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
2380	 <i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	2380
	<i>Sporadic soft concrete repair areas</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>S50 to DL quoin (P141)</i>	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018














ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
2400	 <i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	2400
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i> 	
2420	<i>S to refuge quoin at sidewall</i>  250Dx1000Hx 580W (P142, 143)	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	2420
	 <i>To</i> <i>2390m</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i> 	
2440		<i>Good</i>	<i>Good</i>	<i>Soft concrete repair to surface slightly "H" to above 5m²</i>  (P144)		2440
	<i>Sporadic soft concrete repair areas</i> 	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
2460		<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i> 	2460
		<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i> <i>Soft concrete repair to surface (P145)</i> 	
2480	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i> 	2480
	 <i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018









ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
2500	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i> 	2500
	 <i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
2520	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i> 	2520
	 <i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
2540	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i> 	2540
	 <i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
2560	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i> 	2560
	 <i>D</i>	<i>D</i>	<i>D</i>	<i>W</i> <i>Failing brickwork repair 2500Wx 1330Hx200D (P146 147)</i> 	<i>W</i> 	
2580	<i>W</i>	<i>D</i>	<i>D</i>	<i>D</i> <i>Failing brickwork repair 2000Wx 850Hx140D with 1m2 of H above (P148)</i> 		2580
	<i>W</i>	<i>W</i>	<i>W</i>	<i>W</i>	<i>W</i> 	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018









ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18		
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986		
Name: The Rhondda Tunnel			Type: Tunnel		

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
2600	 W	W	W	W	W	2600
	 WD	W	W	W	W	
2620	↑ W	WD	W	W	W	2620
	↓ W	W	W	W	W 	
	<i>Widespread areas of soft mortar to sidewalls (where wet) – underlying content sound (P149)</i>					
2640	 Good	Good	Good	Good	Good	2640
	Good	Good	Good	Good	Good 	
2660	 Good	Good	Good	Good	Good	2660
	Good	Good	Good	Good	Good	
2680	Good	Good	Good	Good	Good	2680
	 Good	Good	Good	Good	Good 	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018







ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
2700	 <i>D</i>	<i>D</i>	<i>D</i>	<i>D</i>	<i>D</i>	2700
	<i>W</i>	<i>D</i>	<i>D</i>	<i>D</i>	<i>W</i>	
2720	<i>W</i>	<i>W</i>	<i>W</i>	<i>WD</i>	<i>W</i>	2720
						
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
2740	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	2740
						
	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>	
2760	<i>D</i>	<i>D</i>	<i>D</i>	<i>D</i>	<i>D</i>	2760
	 <i>W</i>	<i>W</i>	<i>WD</i>	<i>W</i>	<i>W</i>	
2780	<i>W</i>	<i>W</i>	<i>W</i>	<i>W</i>	<i>W</i> 	2780
	 <i>W</i>	<i>W</i>	<i>WD</i>	<i>WD</i>	<i>W</i>	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018











ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
2800	W	W	W	W	W	2800
	 W	WD	WD	WD	W	
2820	 W	WD	W	W	W	2820
	W	W	W	W	W 	
2840	 W	W	W	W	W	2840
	W	WD	WD	WD	W	
2860	W	WD	WD	WD	W 	2860
	 W	WD	W	WD	W	
2880	D	D	D	D	D	2880
	W	W	WD	W	W	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
2900	W	W	W	W	W	2900
	 W	W	W	W	W	
2920	 W	W	W	W	W	2920
	W	W	WD	W	W 	
2940	 W	W	WD	W	W	2940
	W	W	WD	W	WD 	
2960	W	W	WD	W	W	2960
	 W	W	WD	W	W	
2980	W	W	WD	W	W 	2980
	CJ		(P152)		CJ	
	 LOS 400Wx 350Wx500D (P155) W	W	W	W	LOS 450Wx 280Hx 230D  (P153,  154) W	



ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
3000		↑				3000
		<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 0 auto;"> <p><i>See expanded view details Pages Nos. 35a -35e (including photos 154 - 183)</i></p> </div>				
3020						3020
			↓			
3040			↓			3040
		<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <p><i>New hole drilled through concrete wall</i></p> </div>				
		<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <p>Blockwork & concrete diaphragm wall</p> </div>		↓	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <p>Blockwork & concrete diaphragm wall</p> </div>	
		↑				
3060						3060
		<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 0 auto;"> <p><i>See expanded view details Pages 35f – 35h (including photos 184 – 205)</i></p> </div>				
3080						3080
		↓				



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April - 18th May 2018

ELR: RSB	Structure N ^o :	Mileage: 1m 48ch	Examination Date: 02 / 05 / 18
ROUTE: Rhondda and Swansea Bay Line			OS Ref: SS 915 986
NAME: Rhondda Tunnel - Expanded View Detail - 2990 m to 3030 m			Type: Tunnel

BLAENCWM END

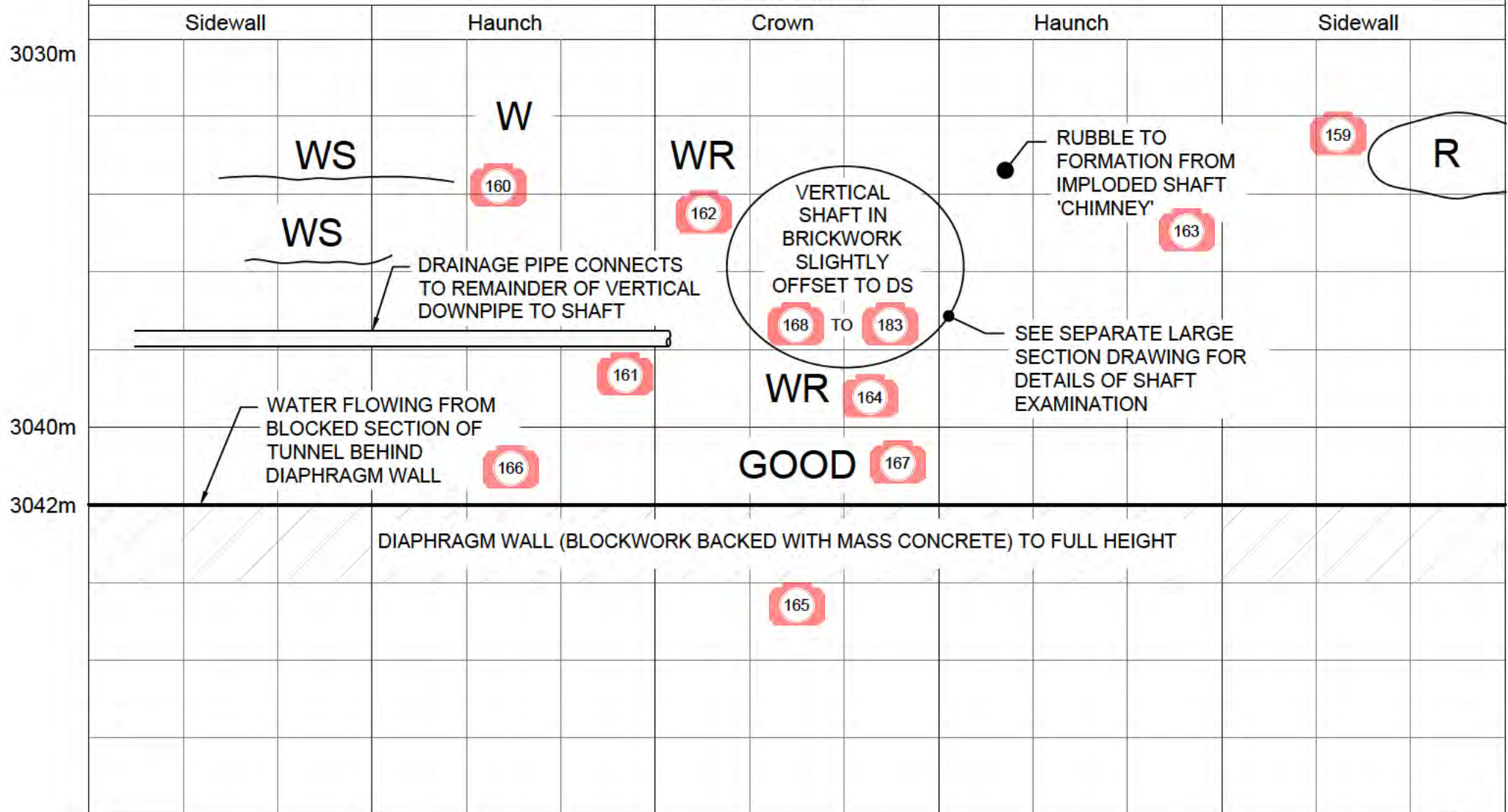
	Sidewall		Haunch			Crown			Haunch			Sidewall	
2990m													
		L.O.S. 400W x 350H x 500D		W					W			L.O.S. 450W x 280H x 230D	
	W												
		L.O.S. 600W x 400H x 850D		W		W			W				
3010m			WD									L.O.S. 750W x 450H x 725D	
		GOOD		W		W			W				
								STLG					
	GOOD												GOOD
				D		D			D				
				D									
						STG							
3030m													



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April - 18th May 2018

ELR: RSB	Structure N ^o :	Mileage: 1m 48ch	Examination Date: 02 / 05 / 18
ROUTE: Rhondda and Swansea Bay Line			OS Ref: SS 915 986
NAME: Rhondda Tunnel - Expanded View Detail - 3030 m to 3042 m			Type: Tunnel

BLAENCWM END

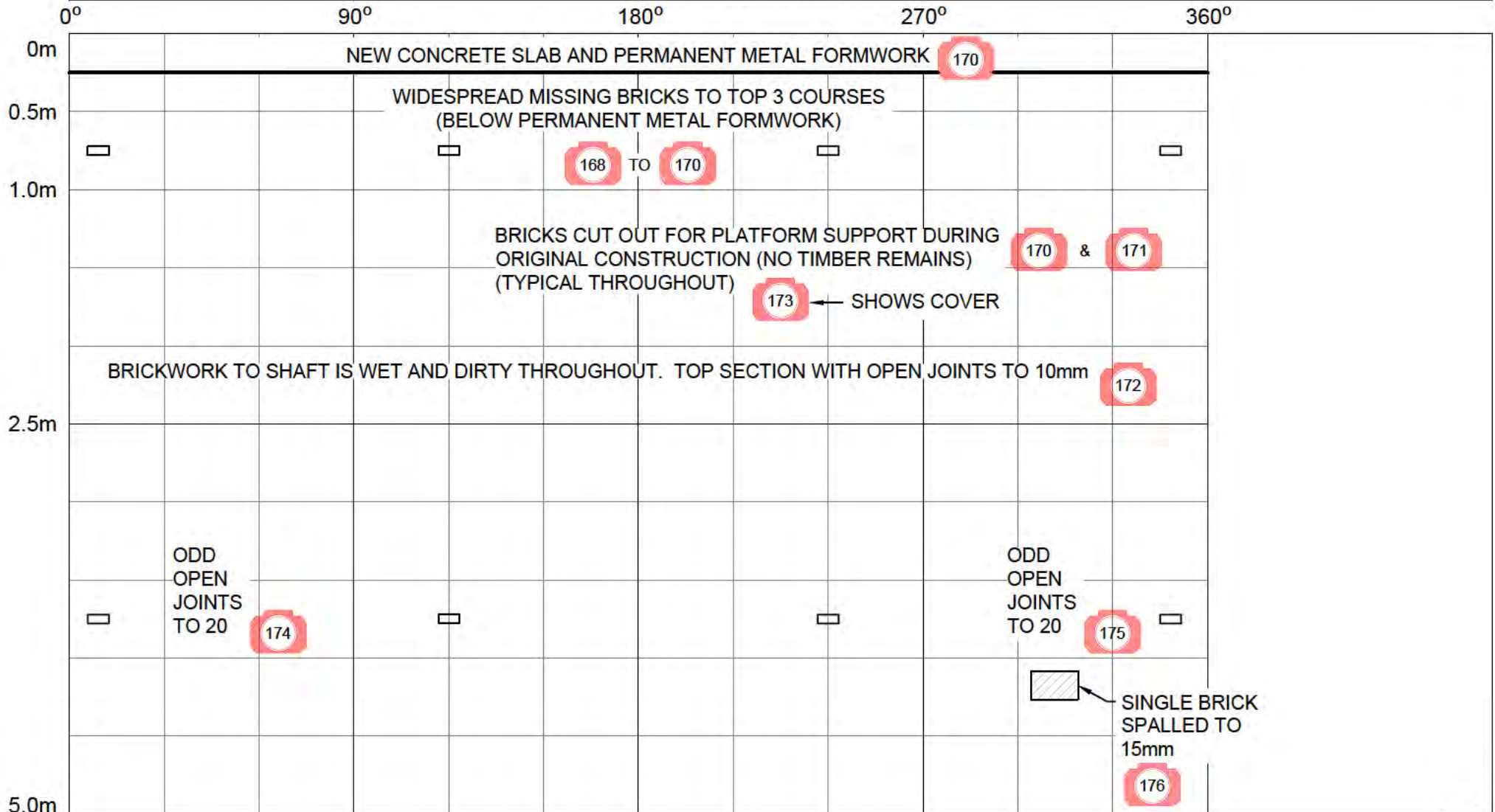




The Rhondda Tunnel
 Detailed Tunnel Examination Report
 26th April - 18th May 2018

ELR: RSB	Structure N ^o :	Mileage: 1m 48ch	Examination Date: 02 / 05 / 18
ROUTE: Rhondda and Swansea Bay Line		OS Ref: SS 915 986	
NAME: Rhondda Tunnel - Shaft Details		0 m to 5 m	Type: Tunnel

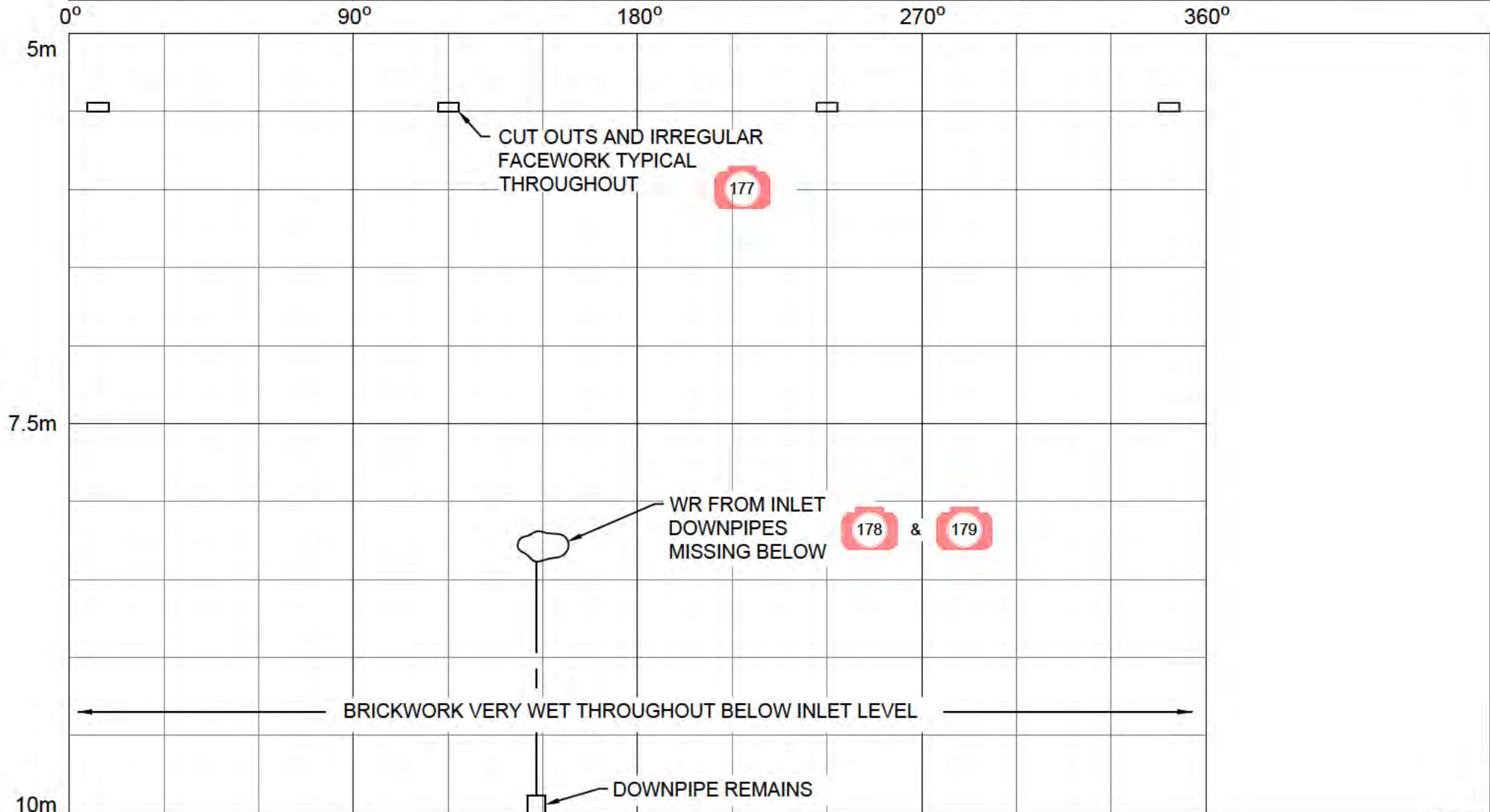
NEW SLAB LEVEL 0.00M (AT TOP)





The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April - 18th May 2018

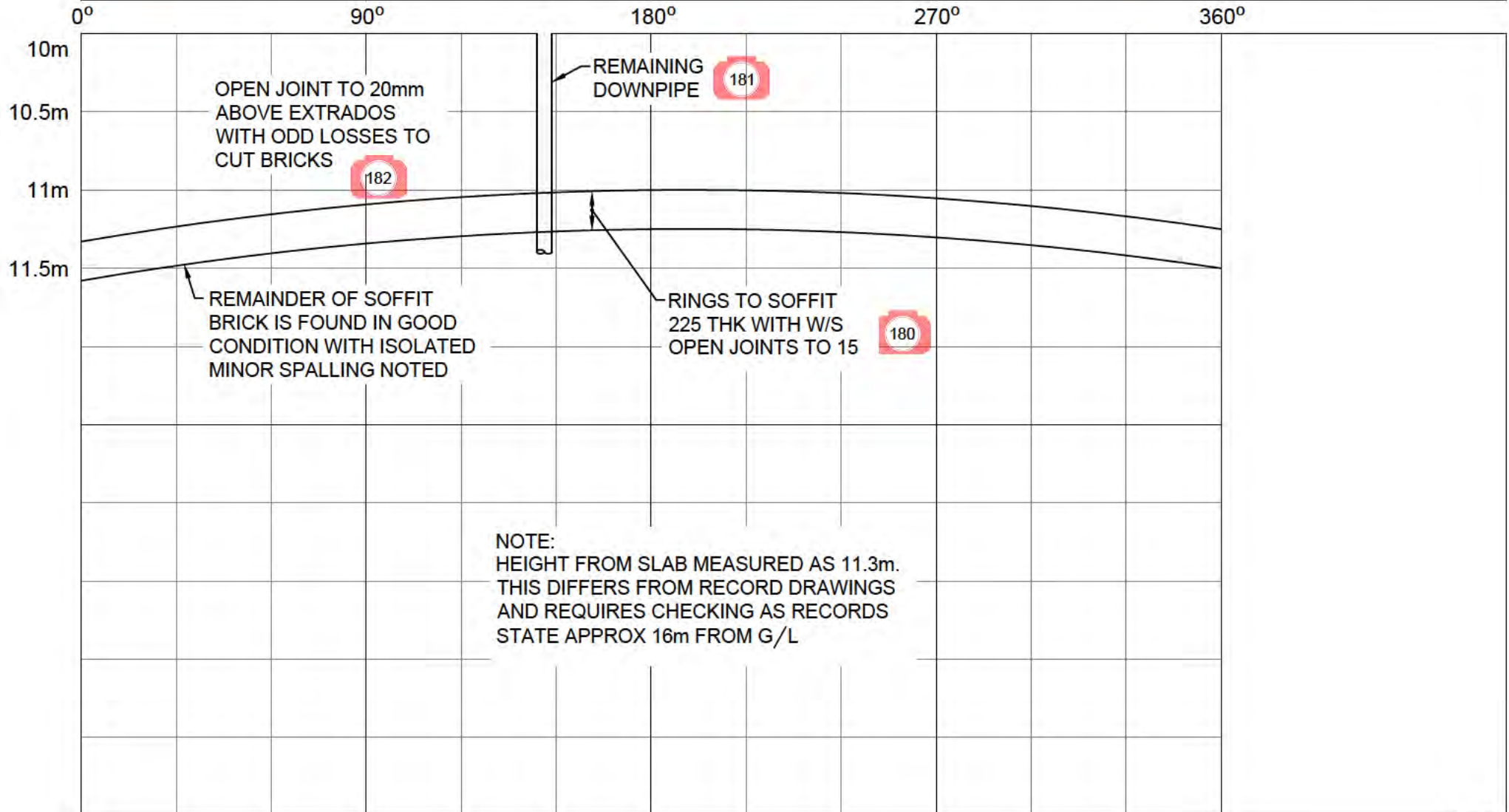
ELR: RSB	Structure N ^o :	Mileage: 1m 48ch	Examination Date: 02 / 05 / 18
ROUTE: Rhondda and Swansea Bay Line			OS Ref: SS 915 986
NAME: Rhondda Tunnel - Shaft Details		5 m to 10 m	Type: Tunnel
MEASURED FROM NEW SHAFT - SLAB LEVEL 0.00m			





The Rhondda Tunnel
 Detailed Tunnel Examination Report
 26th April - 18th May 2018

ELR: RSB	Structure N ^o :	Mileage: 1m 48ch	Examination Date: 02 / 05 / 18
ROUTE: Rhondda and Swansea Bay Line			OS Ref: SS 915 986
NAME: Rhondda Tunnel - Shaft Details		10 m to 11.5 m	Type: Tunnel





The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April - 18th May 2018

ELR: RSB	Structure N ^o :	Mileage: 1m 48ch	Examination Date: 18 / 05 / 18
ROUTE: Rhondda and Swansea Bay Line			OS Ref: SS 915 986
NAME: Rhondda Tunnel - Expanded View Detail - 3040 m to 3060 m			Type: Tunnel

BLAENCWM END

	Sidewall	Haunch	Crown	Haunch	Sidewall
3040m			NEWLY CORED ACCESS HOLE (MAY 2018)		
3042m			↓ 184		
	DIAPHRAGM WALL (MASS CONCRETE)		800	2.09m	
			STLG 185		
	W	W	W	W	W
3050m	R 186	188	METAL DRAINAGE HOPPER AND DOWNPIPE 187	W	W
		WD	WD	WD	W
	DOWNPIPE APPEARS FUNCTIONAL 189	W	WD	W	L.O.S. 1000W x 500H x 650L 191
	L.O.S. 860W x 500H x 500D 190		STLG	W	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April - 18th May 2018

ELR: RSB	Structure N ^o :	Mileage: 1m 48ch	Examination Date: 18 / 05 / 18
ROUTE: Rhondda and Swansea Bay Line			OS Ref: SS 915 986
NAME: Rhondda Tunnel - Expanded View Detail - 3060 m to 3080 m			Type: Tunnel

BLAENCWM END

	Sidewall	Haunch	Crown	Haunch	Sidewall
3060m					
		THE LINES OF SEVERAL DEFUNCT DRAINAGE PIPES ARE VISIBLE TO THE BARREL AS MARKED	OLD TIMBER PACKS TO DRAINAGE LINE		R
	W	HAUNCH SECTIONS ARE FOUND WITH VERY SOFT TIMBER FIXINGS ESPECIALLY TO HAUNCH		W	
		WATER RUNNING TO LINES OF OLD DOWNPIPE IN SEVERAL AREAS AS NOTED	OLD DRAINAGE LINE	OLD TIMBER PACKS TO DRAINAGE LINE	WR
3070m					
	R	W	W	WR	W
		WR	OLD DRAINAGE LINE	WR	ODD OPEN JOINTS 120 DEEP
	W	W	W	W	W
			OLD DRAINAGE LINE		
3080m					



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April - 18th May 2018

ELR: RSB	Structure N ^o :	Mileage: 1m 48ch	Examination Date: 18 / 05 / 18
ROUTE: Rhondda and Swansea Bay Line			OS Ref: SS 915 986
NAME: Rhondda Tunnel - Expanded View Detail -		3080 m to 3100 m	Type: Tunnel

BLAENCWM END

	Sidewall		Haunch			Crown		Haunch			Sidewall	
3080m												
							STLG 200				199	
	D		W			W			W		D	R
	W		W			W			W		D	
3090m	SOFT MATERIAL (TIMBER) NOTED TO HAUNCHES AT SITES OF PREVIOUS DOWNPIPE FIXINGS. SOME CALCITE ALSO PRESENT											
							202	(TYPICAL)				
							203	(TYPICAL)				
	R						WR 201					
							STLG 204					
3100m	POSSIBLE DEFORMATION OF CROWN (MAY HAVE DROPPED BY 50-100 : - FIRM TO HAMMER) 205											



ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

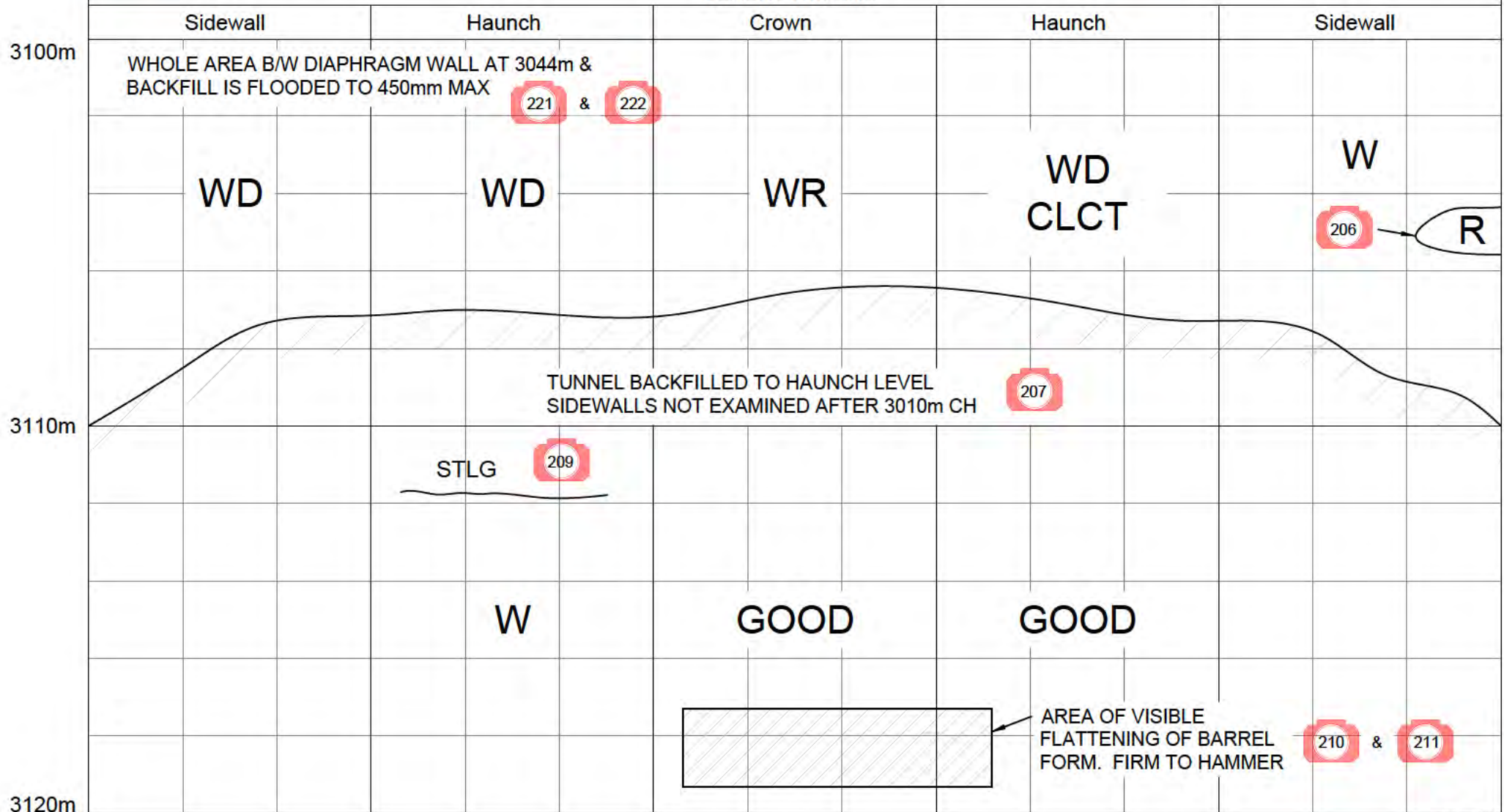
	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
3100						3100
		<p><i>See expanded view details</i> <i>Pages 36a and 36b</i> <i>(including photos 184 – 222)</i></p>				
3120						3120
	<p>Blaengwynfi Portal (Country end)</p>					



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April - 18th May 2018

ELR: RSB	Structure N ^o :	Mileage: 1m 48ch	Examination Date: 18 / 05 / 18
ROUTE: Rhondda and Swansea Bay Line			OS Ref: SS 915 986
NAME: Rhondda Tunnel - Expanded View Detail - 3100 m to 3120 m			Type: Tunnel

BLAENCWM END





The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April - 18th May 2018

ELR: RSB	Structure N ^o :	Mileage: 1m 48ch	Examination Date: 18 / 05 / 18
ROUTE: Rhondda and Swansea Bay Line			OS Ref: SS 915 986
NAME: Rhondda Tunnel - Expanded View Detail - 3120 m to 3132 m			Type: Tunnel

BLAENCWM END

	Sidewall	Haunch	Crown	Haunch	Sidewall
3120m				W OTHERWISE GOOD	
		GOOD	GOOD	GOOD	
		TUNNEL BACKFILLED TO HAUNCH LEVEL SIDEWALLS NOT EXAMINED.		W OTHERWISE GOOD	
3130m		VOUSOIRS TO HAUNCH IN VERY GOOD CONDITION	TUNNEL KEYSTONE IN GOOD CONDITION	VOUSOIRS TO HAUNCH IN GOOD CONDITION	
		W ↓ 213 & 214	↓ 215	↓ 216 & 217	
<p>LINE OF BLAENGWNFI PORTAL (COUNTRY END) MEASURED AT APPROX. 3132 (FROM BLAENCWM DIAPHRAGM) (RECORDS STATE TUNNEL IS 3145 LONG)</p> <p>FILL NOTED TO REAR OF PORTAL VOUSOIRS. ORIGINAL BLOCKWORK DIAPHRAGM WALL WAS BUILT TO SPRINGING LEVEL AND MAY REMAIN BURIED BENEATH 213 TO 217</p>					

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 1:
Diaphragm wall at 0m chainage (Blaencwm end)



Photograph no 2:
Access pipe through wall at Blaencwm end

ELR:	RSB	Structure No:		Mileage:	1m 48c	Examination date:	26.4.18- 18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



Photograph no 3:
Water running at 5m D/S sidewall



Photograph no 4: D/S sidewall at 5m
Isolated joint loss 70mm to 200mm

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 5:
Water dripping at crown at 10m



Photograph no 6:U/S sidewall at 25m
Loss of section 440 high x 510 wide x 600 deep

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 7: DS sidewall at 25m
Loss of section 450 high x 550 wide x 750 deep



Photograph no 8: U/S sidewall at 35m
Drainage flowing, all full bore (uncovered)

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 9: Crown at 45m
Water running



Photograph no 10: D/S sidewall at 45m
Water running

ELR:	RSB	Structure No:		Mileage:	1m 48c	Examination date:	26.4.18- 18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



Photograph no 11: Crown at 56m
Water running (full bore)
Corrugated metal sheeting to rear



Photograph no 12: D/S sidewall at 52m
Loss of section 800 high x 450 wide x 250 deep

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 13: Corrugated metal sheeting at 64m



Photograph no 14: U/S sidewall at 65m
Drainage flowing at full capacity

ELR:	RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 15: Ribs 6 – 8
 Loss of section 600 wide x 180 x 75 deep
 Removed



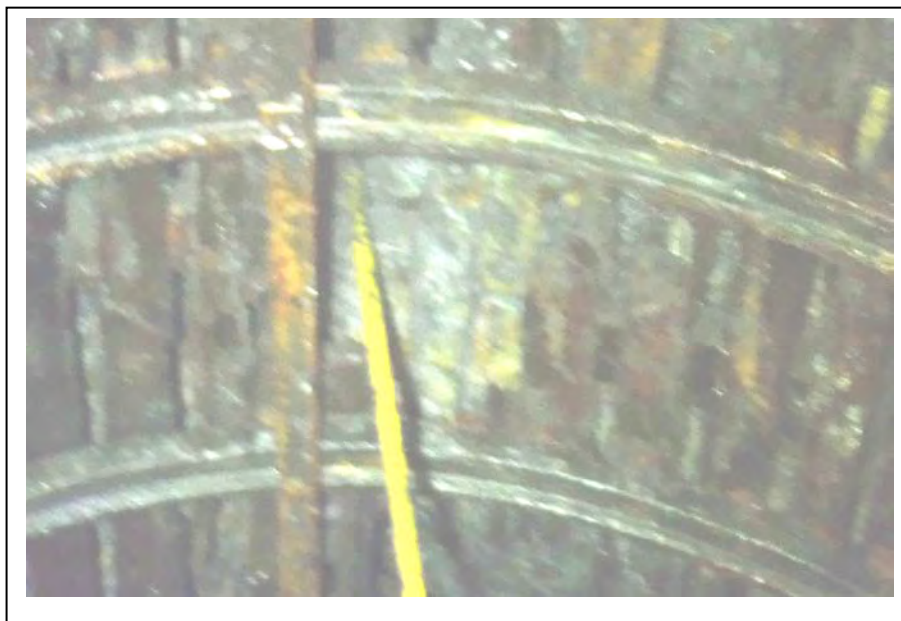
Photograph no 16: As photo 15

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 17: Crown between ribs 18 and 19
Loss of section 600 wide x 200 max deep



Photograph no 18: As photo 17

ELR:	RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



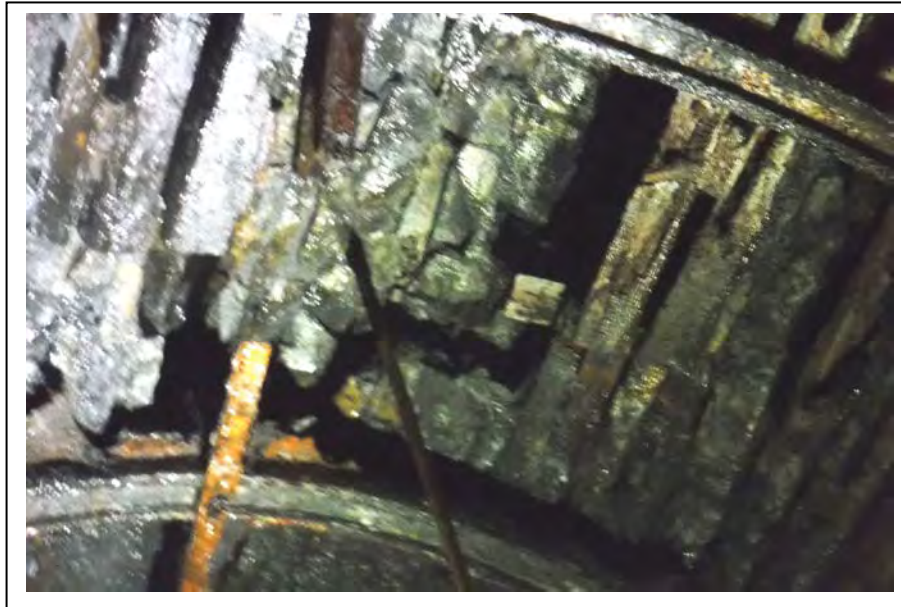
Photograph no 19: Crown at 94m (Ribs 19-20)
 Loss of section 600 wide x 340 deep max



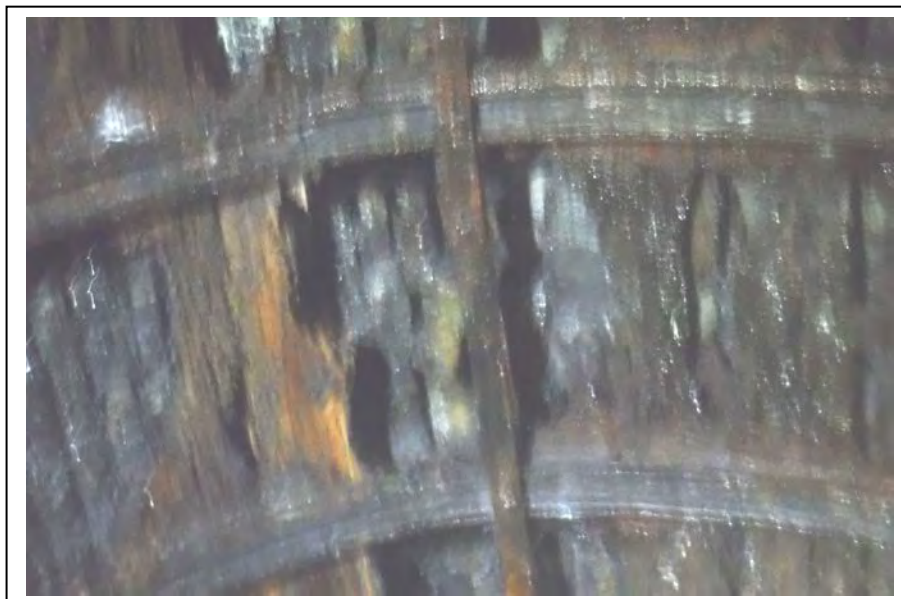
Photograph no 20: Crown at 97m (Ribs 20-21)
 Loss of section 1.1m wide x 300 deep max

ELR:	RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 21: As photo 20



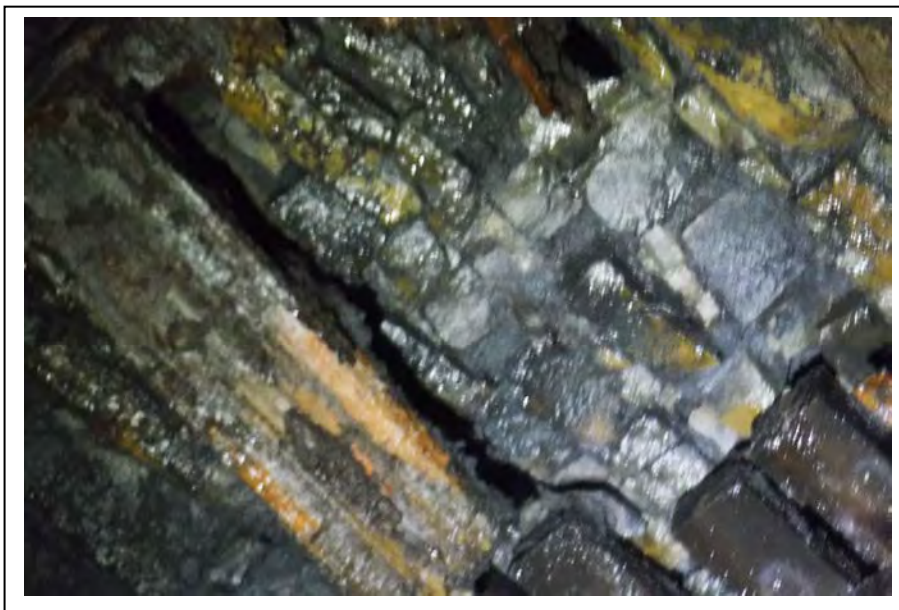
Photograph no 22: Crown at 100m (Ribs 21-22)
Loss of section/ loose material behind rotten laggings
Generally 400 wide x 150-200 deep (typical view)

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 23: Crown at 112m
Deep loss of section to DS crown 350 deep



Photograph no 24: Crown at 118m
Loose area removed to DS crown 200 deep

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 25: As photo 24



Photograph no 26: Crown at 124m
Brick repair noted between ribs 50 & 51
Sound when tapped

ELR:	RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



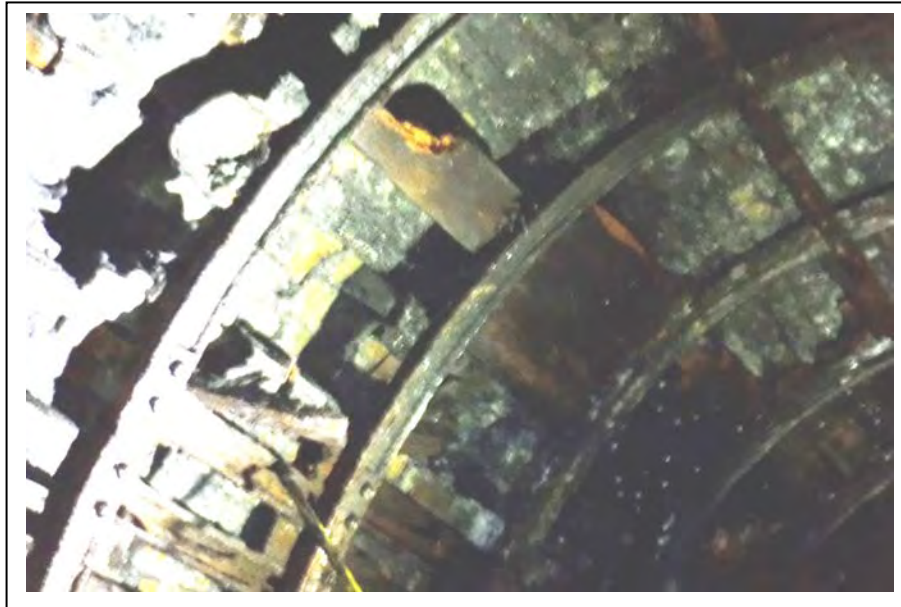
Photograph no 27: D/S haunch at 126m (Ribs 52-53)
Loose material removed 200 deep over 3m²



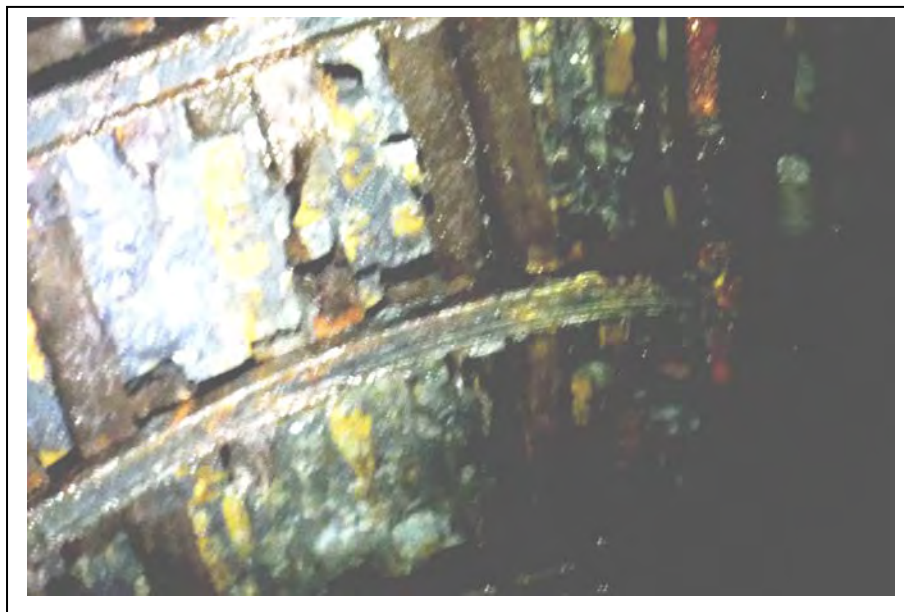
Photograph no 28: U/S haunch at 129m (Ribs 56-57)
Spalling to 75 x 0.5m²

ELR:	RSB	Structure No:	Mileage:	1m 48c	Examination date:	26.4.18- 18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986	
Name:	The Rhondda Tunnel			Type:	Tunnel	

Photographs of structure



Photograph no 29: DS Crown and haunch at 129m – 136m (Ribs 56-64)
 Loss of section 1000 wide x 300 deep max over 8 bays



Photograph no 30: Crown at 137m – 146m (Ribs 64-74)
 500 wide loose section to crown to 150 (general) 250 (max) over 10 bays

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 31: Crown at 146m
Water running



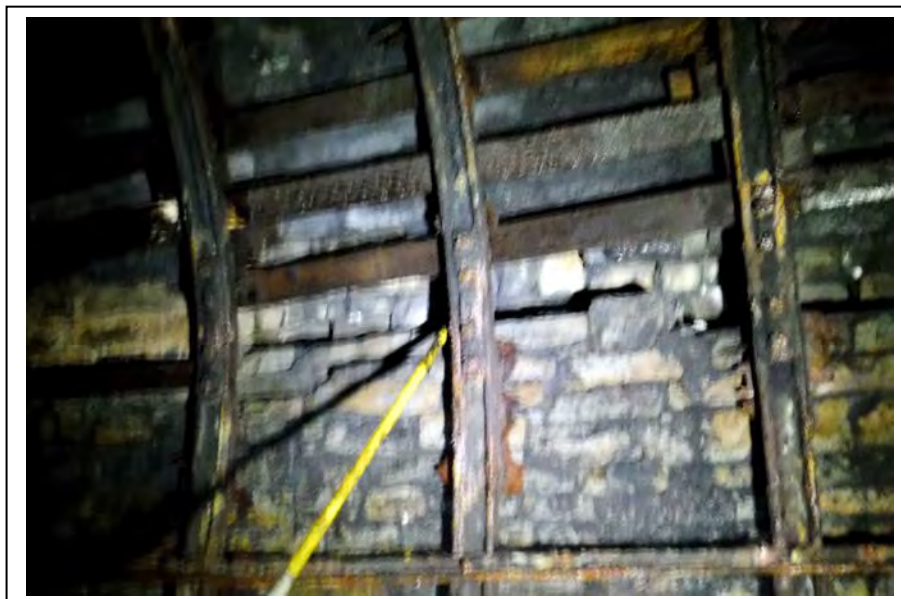
Photograph no 32: DS haunch at 148m (Ribs 79-80)
Repair to haunch separation in rough concrete

ELR:	RSB	Structure No:	Mileage:	1m 48c	Examination date:	26.4.18- 18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986	
Name:	The Rhondda Tunnel			Type:	Tunnel	

Photographs of structure



Photograph no 33: As photo 32



Photograph no 34: D/S haunch at 148m (Ribs 79-80)
Loss of section 300 wide x 300 deep

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



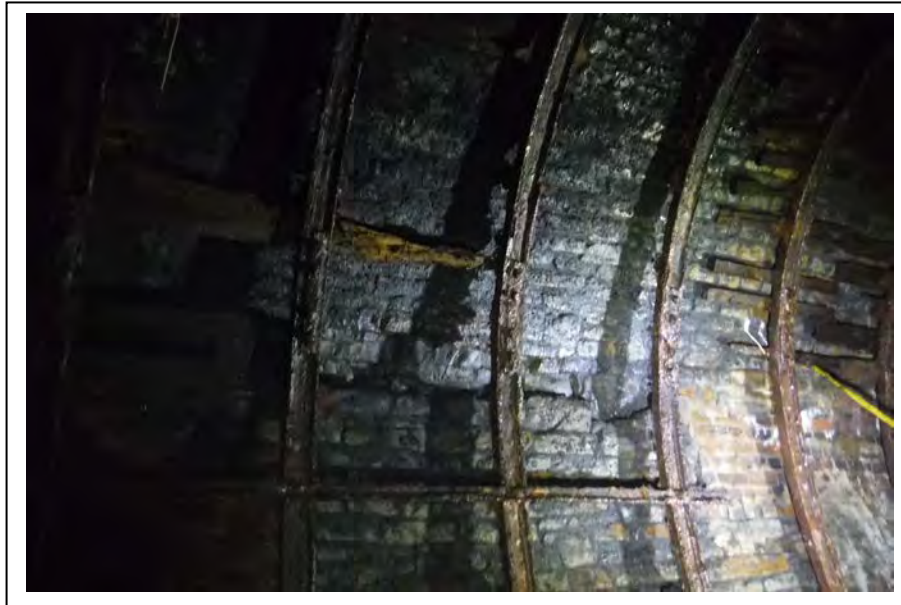
Photograph no 35: D/S haunch at 152m (Ribs 80-81)
Loss of section 900 wide x 500 deep (to natural rock)



Photograph no 36: As photo 35

ELR:	RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 37: D/S haunch at 152m – 172m (Ribs 81-105)
 Loss of section 300 wide x 700 deep



Photograph no 38: D/S haunch at 160m (Ribs 92-95) (shown)
 Line of misalignment visible from ground level

ELR:	RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Line of
“feathered”
masonry

Photograph no 39: Soffit between ribs 79 and 105 appears to have been originally built off natural stone sidewalls. This was subsequently faced with further masonry being feathered into mid haunch. The thickness of the masonry tapers along the defect line. See sketch LG8.



Photograph no 40: As photo 39

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure

Line of
“feathered”
masonry



Photograph no 41: As photo 39



Photograph no 42: As photo 39

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 43: As photo 39



Photograph no 44: As photo 39

ELR:	RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 45: U/S haunch at 148 – 172m
Defects similar to D/S haunch
Separation of feathering is of much lower severity (typical view)



Photograph no 46: D/S sidewall at 190m (Ribs 122-123)
Loss of section 375 high x 550 wide x 550 deep

ELR:	RSB	Structure No:	Mileage:	1m 48c	Examination date:	26.4.18- 18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986	
Name:	The Rhondda Tunnel			Type:	Tunnel	

Photographs of structure



Photograph no 47: U/S sidewall at 195m (Ribs 127-128)
 Loss of section 400 high x 500 wide x 600 deep



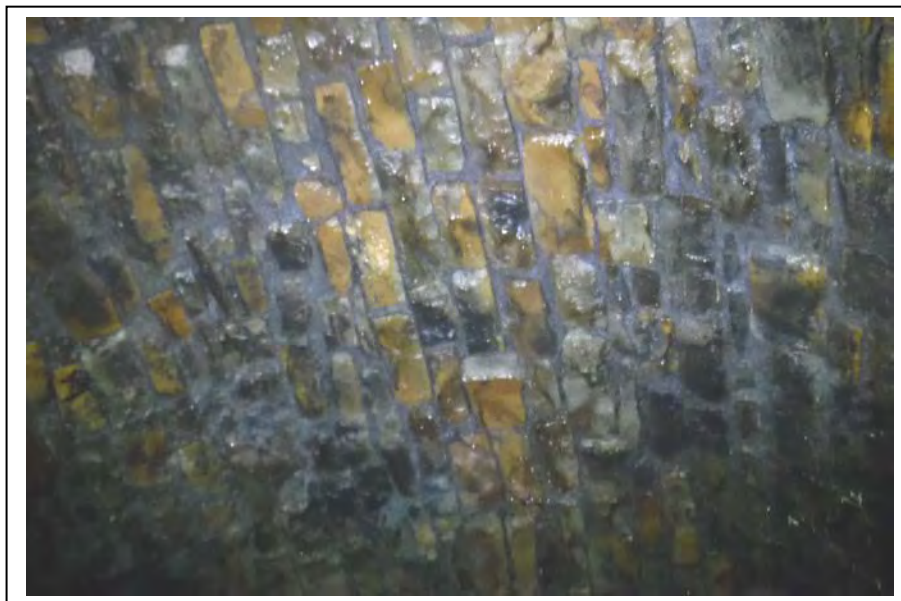
Photograph no 48: U/S sidewall at 100m
 Drainage running full but low flow

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



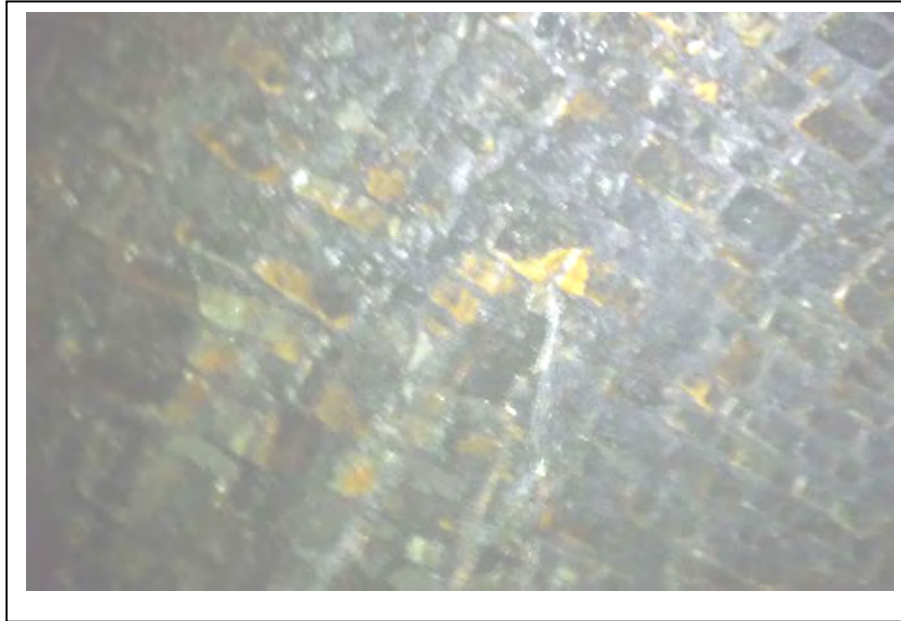
Photograph no 49: D/S haunch at 196m
Water dripping



Photograph no 50: Crown at 210m
Water running

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 51: D/S haunch at 220m
Water running



Photograph no 52: D/S sidewall at 210 – 225m
Redundant concrete beam at base of sidewall

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 53: As photo 52



Photograph no 54: U/S sidewall at 230m
Drainage full low flow

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 55: Crown at 290m
Brick repair firm to hammer



Photograph no 56: Relieving arches heavily spalled due to poorly compacted concrete
(Typical view)

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 57: Relieving arches heavily spalled due to poorly compacted concrete
(Typical view)



Photograph no 58: Relieving arches heavily spalled due to poorly compacted concrete
(Typical view)

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 59: Relieving arches heavily spalled due to poorly compacted concrete
(Typical view)



Photograph no 60: sidewall at 515m
Large section of relieving arch CE face removed

ELR:	RSB	Structure No:		Mileage:	1m 48c	Examination date:	26.4.18- 18.5.18
Route:	Rhondda and Swansea Bay Line				OS ref:	SS 915 986	
Name:	The Rhondda Tunnel				Type:	Tunnel	

Photographs of structure



Photograph no 61: As photo 60



Photograph no 62: D/S sidewall at 520m
 Large section of loose concrete removed to sidewall
 Remainder hollow above for 5m²

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



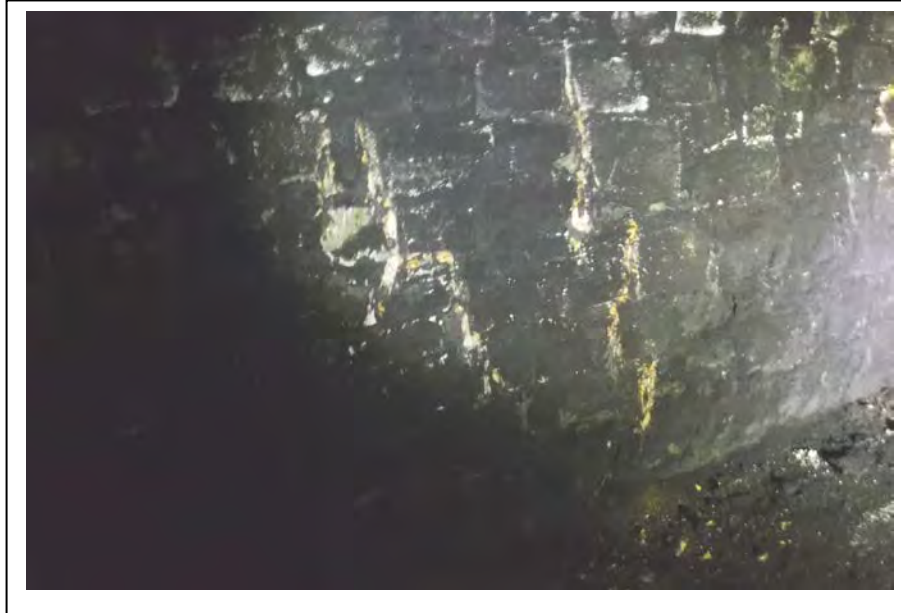
Photograph no 63: Sidewalls at 615m
Deep recess (retrofit)



Photograph no 64: Barrel towards CE at 775m

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 65: D/S sidewall
Bulging to lower sidewall between 793m and 797m
Fractured to CE



Photograph no 66: As photo 65

ELR: RSB	Structure No:	Mileage: 1m 48c	Examination date: 26.4.18- 18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 67: Typical rib section



Photograph no 68: Typical rib and vertical pile support (below ground)

ELR:	RSB	Structure No:		Mileage:	1m 48c	Examination date:	26.4.18- 18.5.18
Route:	Rhondda and Swansea Bay Line				OS ref:	SS 915 986	
Name:	The Rhondda Tunnel				Type:	Tunnel	

Photographs of structure



Photograph no 69: Typical view of ribs and horizontal bracing



Photograph no 70: Typical vertical pile support with stiffener plate

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line				OS ref:	SS 915 986	
Name:	The Rhondda Tunnel				Type:	Tunnel	

Photographs of structure



Photograph no 71: Base of strut and column support (typical)



Photograph no 72: Bulk timbers to base of rib support

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line				OS ref:	SS 915 986	
Name:	The Rhondda Tunnel				Type:	Tunnel	

Photographs of structure



Photograph no 73: Bulk timber supports at base of ribs



Photograph no 74: Bulk timber supports at base of ribs

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 75: Cranked rib showing connection at base



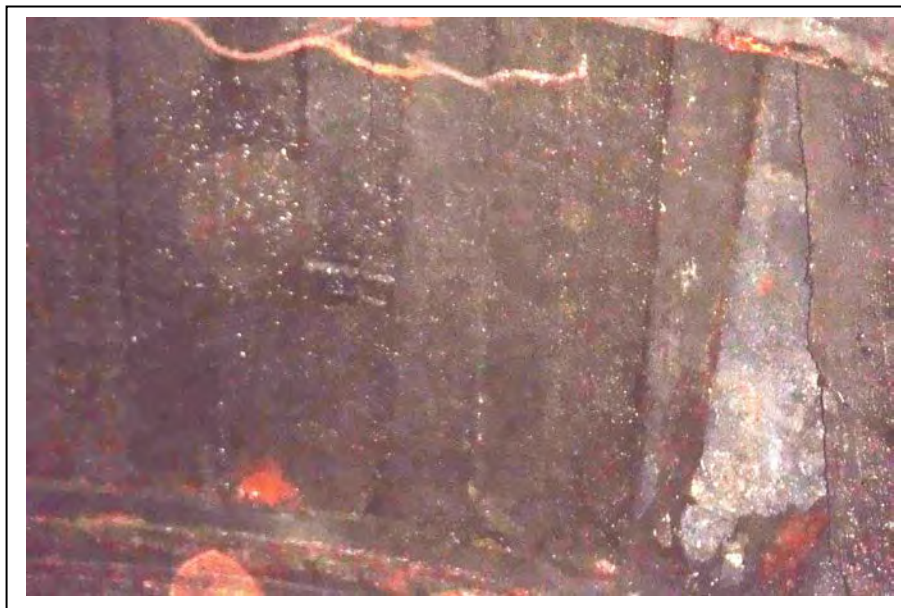
Photograph no 76: Cranked rib showing connection at base

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line				OS ref:	SS 915 986	
Name:	The Rhondda Tunnel				Type:	Tunnel	

Photographs of structure



Photograph no 77: Cranked rib showing connection at base



Photograph no 78: 820m - 925m
Examination restricted by rotten timber laggings which were not removed

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 79: Crown at 851m (Ribs 37-38)
 Spalling to 250 deep



Photograph no 80: Crown at 852m (Ribs 38-39)
 Spalling to 150 deep

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



Photograph no 81: Crown at 853m (Ribs 39-40)
Spalling to 250 deep x 1.1m wide



Photograph no 82: Crown at 854m (Ribs 40-41)
Spalling 250 deep x 1m wide

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



Photograph no 83: Crown at 854m (Ribs 40-41)
Spalling 120 deep x 500 wide



Photograph no 84: D/S crown at 853m (Ribs 39-0)
Spalling to 250 deep x 1.1m wide

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line				OS ref:	SS 915 986	
Name:	The Rhondda Tunnel				Type:	Tunnel	

Photographs of structure



Photograph no 85: Crown at 854m (Ribs 40-41)
Spalling 120 deep x 500 wide



Photograph no 86: Crown at 855m (Ribs 41-420)
Spalling 130 deep x 400 wide

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 87: Crown at 856m (Ribs 42-43)
Spalling 130 deep x 400 wide



Photograph no 88: Crown at 857m (Ribs 43-44)
Spalling 130 deep x 750 wide

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line				OS ref:	SS 915 986	
Name:	The Rhondda Tunnel				Type:	Tunnel	

Photographs of structure



Photograph no 89: Crown at 857m (Ribs 43-44)
Spalling 130 deep x 750 wide



Photograph no 90: Loose "feathered in" repair to top of U/S haunch/ U/S crown at 858m
400 wide x 150 deep x 180 long

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 91: Crown at 863m (Ribs 53-54)
Displacement of section to brick repair



Photograph no 92: Crown at 866m (Ribs 55-56)
Displacement of section to brick repair

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 93: Crown at 864m – 866m (Ribs 54-56)
 Slight bulge/ discontinuity to repair



Photograph no 94: D/S haunch at 866m (Ribs 56-57)
 Displaced brick work to 100 max

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



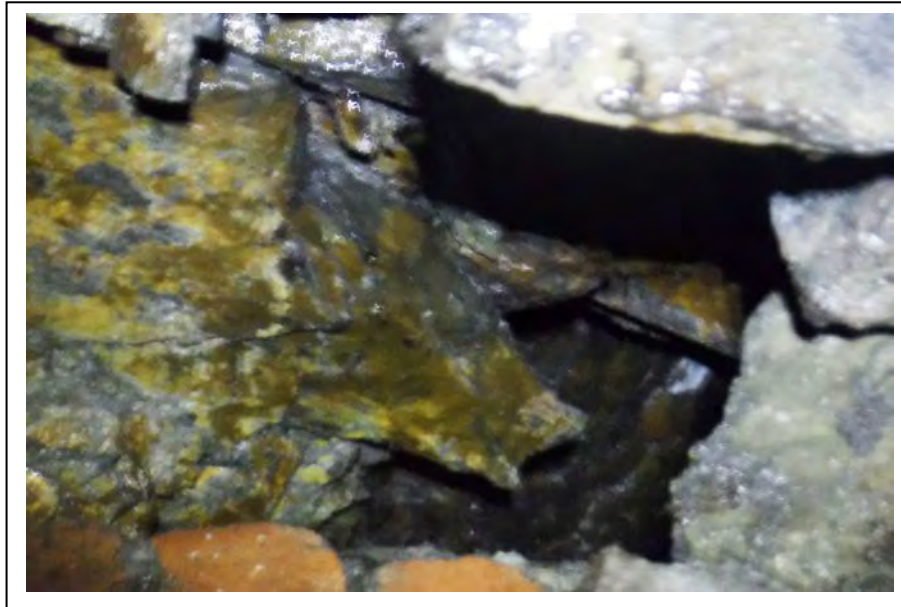
Photograph no 95: D/S haunch at 866m (Ribs 56-57)
Void > 800 deep



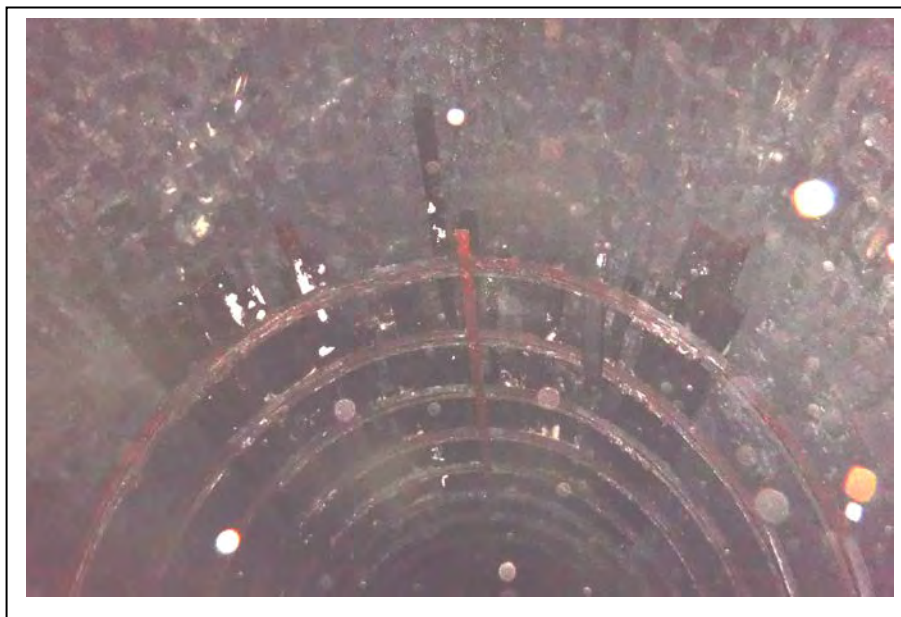
Photograph no 96: Crown at 866m (Ribs 56-57)
Void > 1500 deep

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



Photograph no 97: As photo 96



Photograph no 98: End of rib section at 926m
Looking to LE

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 99: Crown at 981m (Ribs 42-43)
Loss of section 1m² to 230 max



Photograph no 100: D/S haunch at 980m – 982m (Ribs 42-44)
Loss of section 3m² to 230 max

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 101: D/S haunch at 980m – 982m (Ribs 42-44)
 Loss of section 3m² to 230 max



Photograph no 102: U/S upper haunch at 982m (Ribs 44-45)
 Loss of section 0.5m² x 180 deep max

ELR:	RSB	Structure No:	Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986	
Name:	The Rhondda Tunnel			Type:	Tunnel	

Photographs of structure



Photograph no 103:U/S crown at 981m – 983m (Ribs 44-46)
 Loss of section 1m² x 180 deep max



Photograph no 104: Minor spalling to D/S haunch at 1000m

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 105: As photo 104



Photograph no 106: D/S refuge at 1020m
 Vertical step joint fracture to refuge rear wall with loose brickwork adjacent 900 long

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 107: As photo 106



Photograph no 108: Refuge at 1020m
 Single fractured unit to D/S quoin open to 3mm

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line				OS ref:	SS 915 986	
Name:	The Rhondda Tunnel				Type:	Tunnel	

Photographs of structure



Photograph no 109: D/S haunch at 1020m
Bulged area



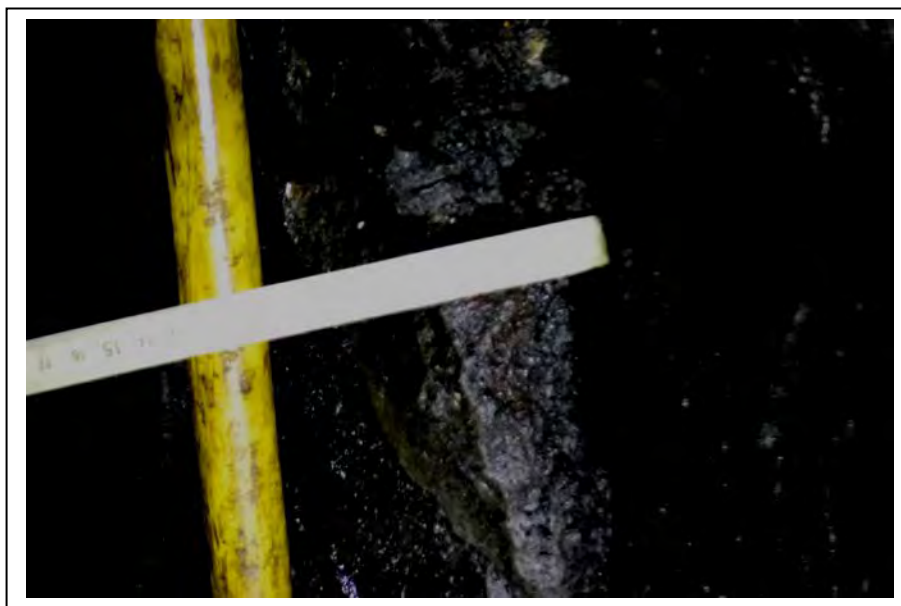
Photograph no 110: As photo 109

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line				OS ref:	SS 915 986	
Name:	The Rhondda Tunnel				Type:	Tunnel	

Photographs of structure



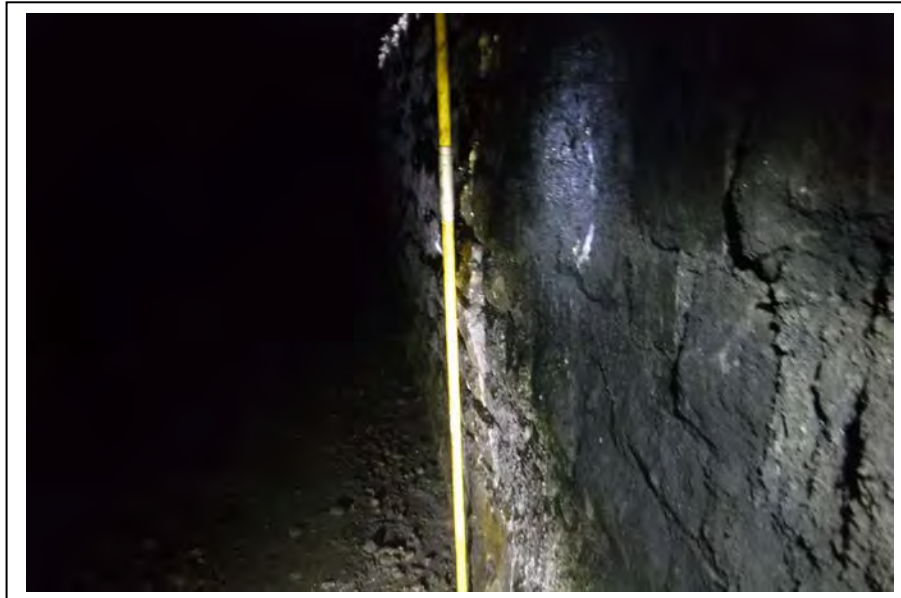
Photograph no 111: As photo 109



Photograph no 112: As photo 109

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



Photograph no 113: As photo 109



Photograph no 114:D/S refuge at 1040m:
Missing stone to D/S quoin

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 115: D/S refuge at 1040m

Masonry has vertical fractures below missing stone: 125 long (from G/L) open 12mm max, H/L at base



Photograph no 116: D/S refuge at 1040m

Masonry fracture runs to 1.8m high into intrados

ELR:	RSB	Structure No:	Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986	
Name:	The Rhondda Tunnel			Type:	Tunnel	

Photographs of structure



Photograph no 117: D/S refuge at 1040m
 Intrados is also fractured to 10mm



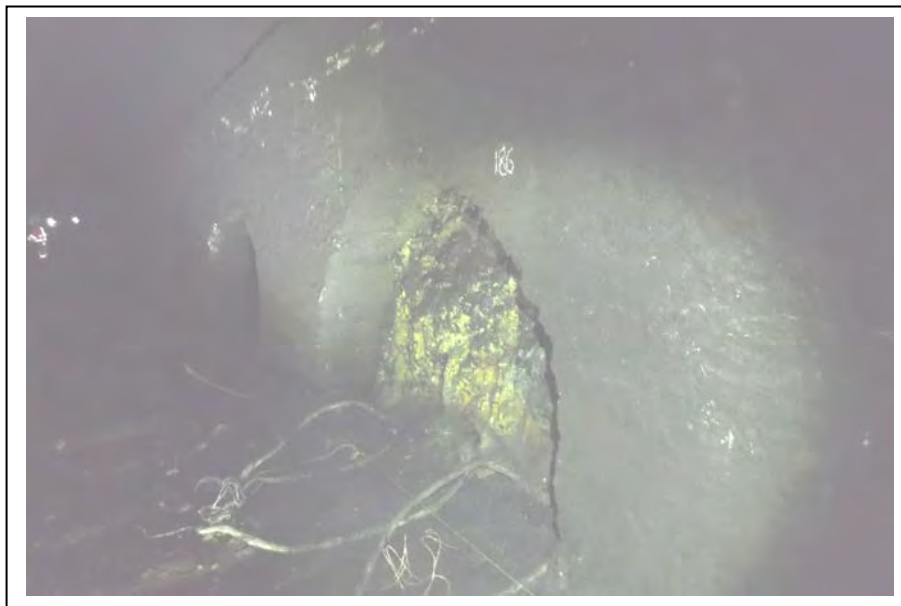
Photograph no 118: U/S refuge at 1050m
 CE quoin fractured on both faces 1.8m long open 5mm to sidewall

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 119: U/S refuge at 1050m
2m long (to crown) of 5mm to refuge



Photograph no 120: Relieving arches to U/S sidewall between 1160m and 1232m are in good condition
However, the pier quoins have widespread areas of loose rough concrete (poorly compacted)
Larger defects are noted individually

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 121: Relieving arches to D/S sidewall between 1160m and 1232m are in good condition
However, the pier quoins have widespread areas of loose rough concrete (poorly compacted)
Larger defects are noted individually



Photograph no 122: U/S refuge at 1160m
Spalling 140 deep x 120 wide x 500 long to relieving arch

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



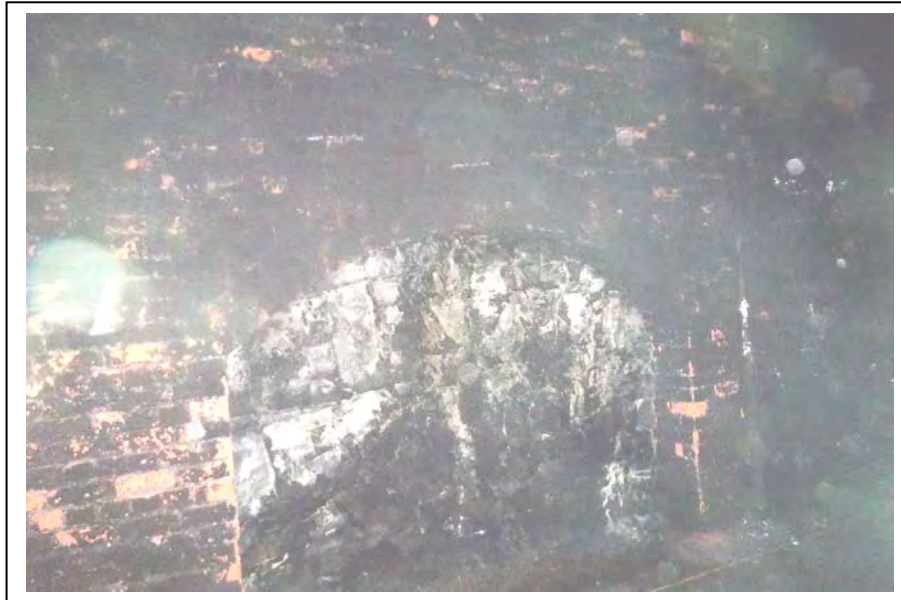
Photograph no 123: U/S at 1220m
Spalling 90 x 0.1m² to relieving arch



Photograph no 124: D/S at 1225m
Spalling 90 x 0.1m² to relieving arch

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 125:D/S sidewall at 1300m to 1400m
 Good condition



Photograph no 126: Relieving arch at 1365m
 2no vertical fractures to relieving arch pier open 10mm on either side of quoin

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 127: D/S relieving arch at 1370m
2no vertical fractures to relieving arch pier open 5mm on either side of quoin



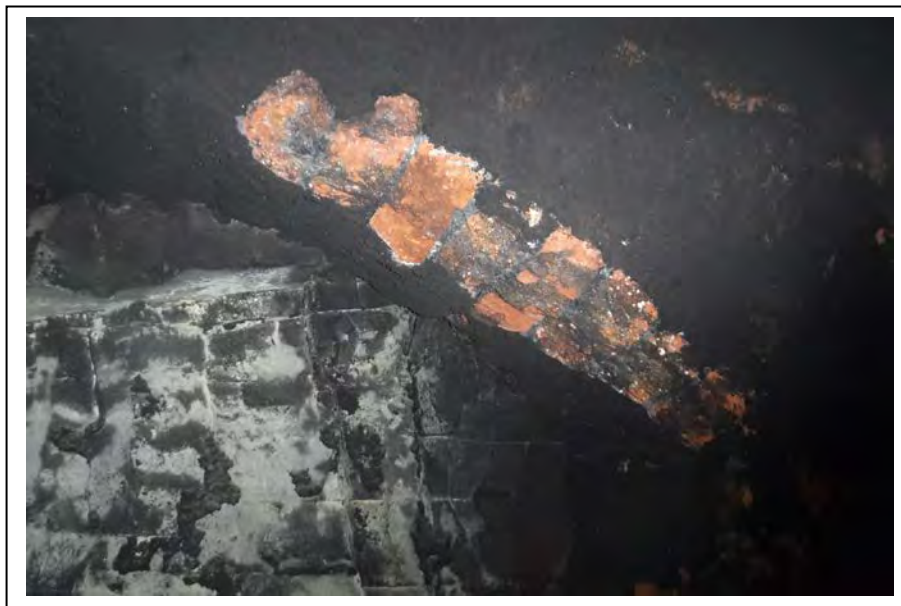
Photograph no 128: D/S relieving arch at 1385m
Spalling 40 x 0.25m²

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



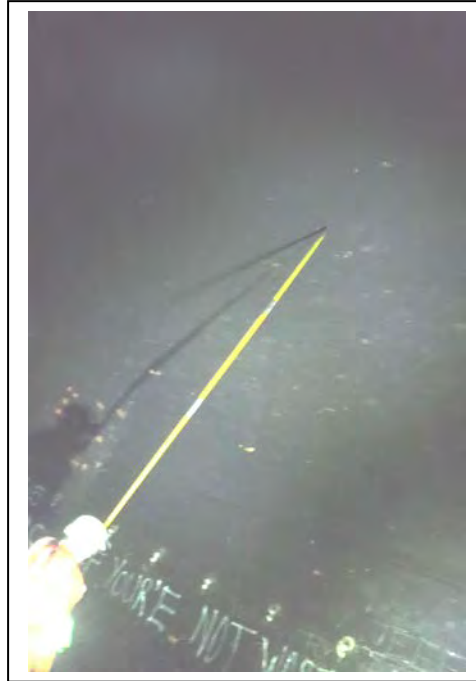
Photograph no 129: D/S relieving arch at 1385m
 Spalling 50 x 0.1m² to soffit



Photograph no 130: D/s relieving arch at 1400m
 Spalling 40 x 0.1m²
 Surrounding area soft

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



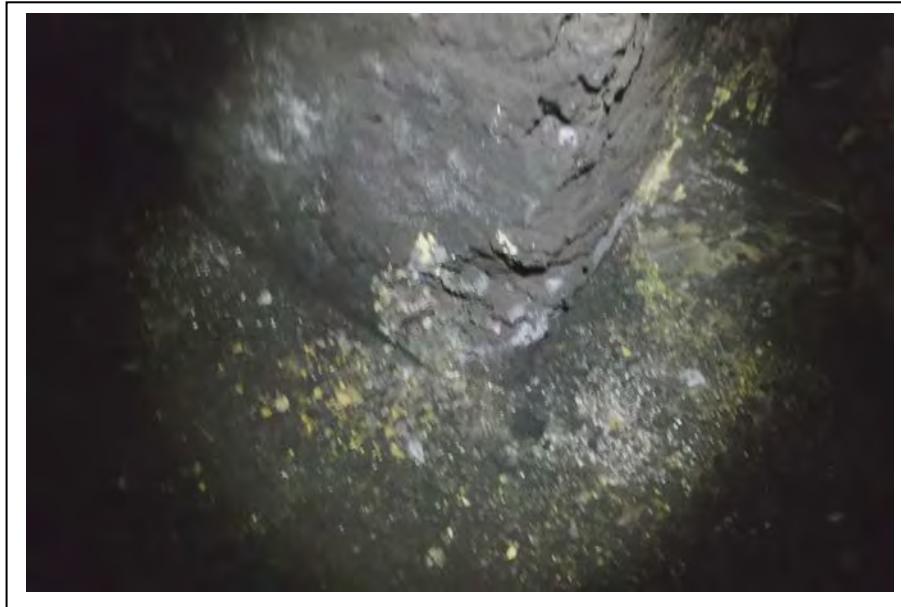
Photograph no 131: Wider section at mid-point of tunnel (Church)
All areas good



Photograph no 132: as photo 131

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 133: D/S refuge at 1635m
 Spalling 50 to refuge quoin at base



Photograph no 134: D/S sidewall at 1720m
 Spalling 30 to relieving arch pier quoin 1m long
 (Typical for several spans)

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line				OS ref:	SS 915 986	
Name:	The Rhondda Tunnel				Type:	Tunnel	

Photographs of structure



Photograph no 135: U/S sidewall at 1875m
Good condition



Photograph no 136: D/S sidewall at 1890m
Good

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line				OS ref:	SS 915 986	
Name:	The Rhondda Tunnel				Type:	Tunnel	

Photographs of structure



Photograph no 137: U/S refuge at 2060m
Soft render around refuge
(Typical)



Photograph no 138: As photo 137

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 139: U/S refuge at 2140m
Loss of section to rear of refuge 300 high x450 wide x 180 deep



Photograph no 140: Typical views of relieving arches
Taken at 2285m

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 141: D/S refuge at 2395m
 Spalling 50 to DL refuge quoin



Photograph no 142: U/S refuge at 2430m
 Spalling to quoin and sidewall 250 deep x 1000 high x 580 wide

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



Photograph no 143: As photo 142



Photograph no 144: D/S sidewall at 2440m
Soft concrete repair to surface slightly hollow to above 5m²

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



Photograph no 145: D/S sidewall at 2475m
Soft concrete repair to surface



Photograph no 146: D/S sidewall at 2575m
Failing brickwork repair 2500 wide x 1330 high x 200 deep

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 147: As photo 146



Photograph no 148: D/S sidewall at 2585m
 Failing brickwork repair 2000 wide x 850 high x 140 deep with 1m² hollow above

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



Photograph no 149: U/S sidewall 2600m – 2665m
 Widespread areas of soft mortar to sidewalls (where wet)
 Underlying concrete sound



Photograph no 150: D/S haunch at 2725m
 Isolated linear loss of section to 60mm

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line				OS ref:	SS 915 986	
Name:	The Rhondda Tunnel				Type:	Tunnel	

Photographs of structure



Photograph no 151: As photo 150



Photograph no 152: Crown at 2980m
Construction joint

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 153: D/S sidewall at 2995m
Loss of section 450 wide x 280 high x 230 deep



Photograph no 154: As photo 153

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line				OS ref:	SS 915 986	
Name:	The Rhondda Tunnel				Type:	Tunnel	

Photographs of structure



Photograph no 155: U/S sidewall at 2995m
Loss of section 400 wide x 350 high x 500 deep



Photograph no 156: D/S sidewall at 3015m
Loss of section 750 wide x 450 high x 725 deep

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 157: U/S sidewall at 3005m
Loss of section 600 wide x 400 high x 850 deep



Photograph no 158: D/S haunch at 3020m
Stalactites

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



Photograph no 159: D/S refuge at 3035m



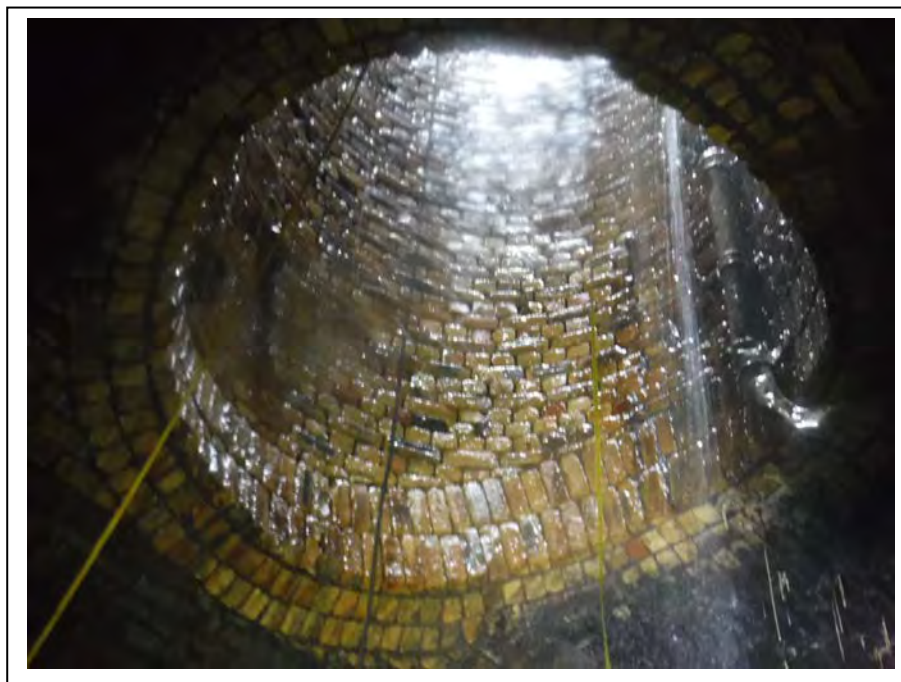
Photograph no 160: D/S sidewall and haunch at 3035m
Water staining

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



Photograph no 161: D/S sidewall to crown at 3037m
Drain-pipe to shaft



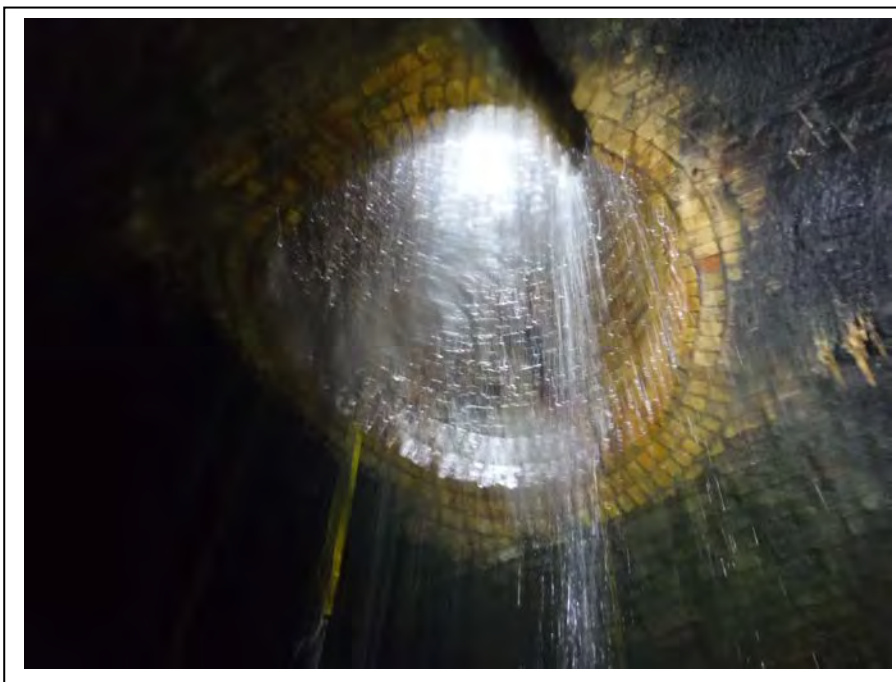
Photograph no 162: Shaft at 3034m
Water running

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



Photograph no 163: D/S haunch at 3034m
Rubble to formation from imploded shaft "chimney"



Photograph no 164: Shaft at 3034m
Water running

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



Photograph no 165: Diaphragm wall at 3042m (blockwork backed with mass concrete)
To full height
(Coring in progress)



Photograph no 166: Water flowing from blocked section of tunnel behind diaphragm wall

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



Photograph no 167: Crown at 3040m
Good



Photograph no 168: Shaft
Widespread missing bricks to top 3no courses (below permanent metal formwork)

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 169: New slab level - 0.5m
Widespread missing bricks to top 3no courses (below permanent metal formwork)



Photograph no 170: New slab level - 0.75m:
Bricks cut out for platform support during original construction (no timber remains)

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 171: New slab level - 0.75m
 Bricks cut out for platform support during original construction (no timber remains)
 Typical throughout



Photograph no 172: New slab level - 2m
 Brickwork to shaft is wet and dirty throughout
 Top section with open joints to 10

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



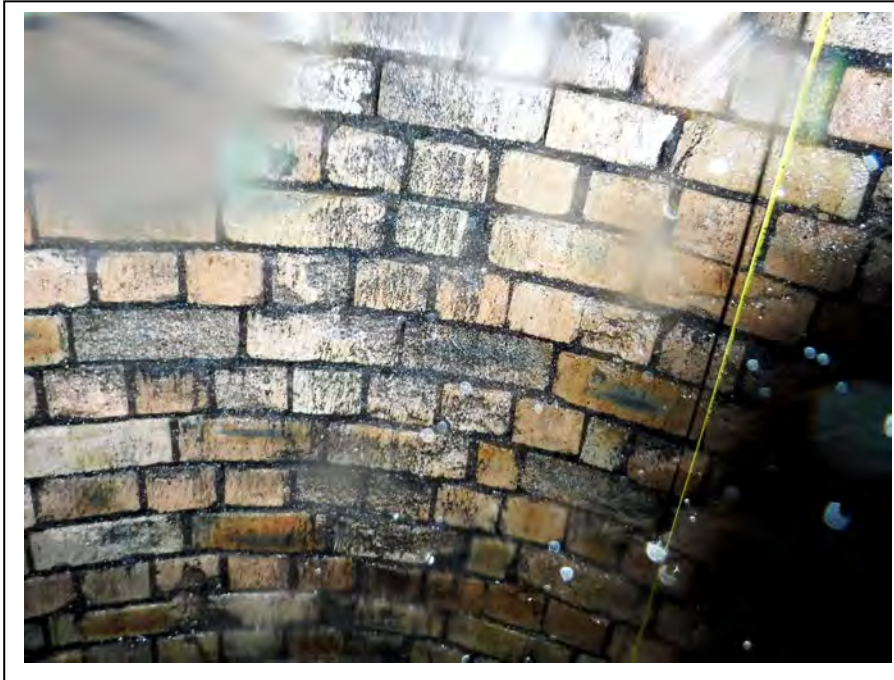
Photograph no 173: New slab level - 2.25m
Bricks cut out for platform support during original construction
Lower shown



Photograph no 174: New slab level at 3.75m
Odd open joints to 20

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



Photograph no 175: New slab level - 3.75m
Odd open joints to 20



Photograph no 176: New slab level at 4.75m
Single brick spalled to 15

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 177: Measured from new shaft slab level - 10.0m
Cut outs and irregular facework typical throughout
Example shown at 5.5m



Photograph no 178: Water running from inlet at 8.5 – 10m
Down-pipes missing below
Brickwork very wet throughout below inlet level

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 179: Water running from inlet at 8.5 – 10m
Down-pipe remains to lower section
Brickwork very wet throughout below inlet level



Photograph no 180: Rings in soffit at 11m below shaft level 225 thick with water staining
Open joints to 15

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 181: Remaining down-pipe to lower section of shaft



Photograph no 182: Shaft at 11m
 Open joints to 20mm above extrados with odd losses to cut bricks

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



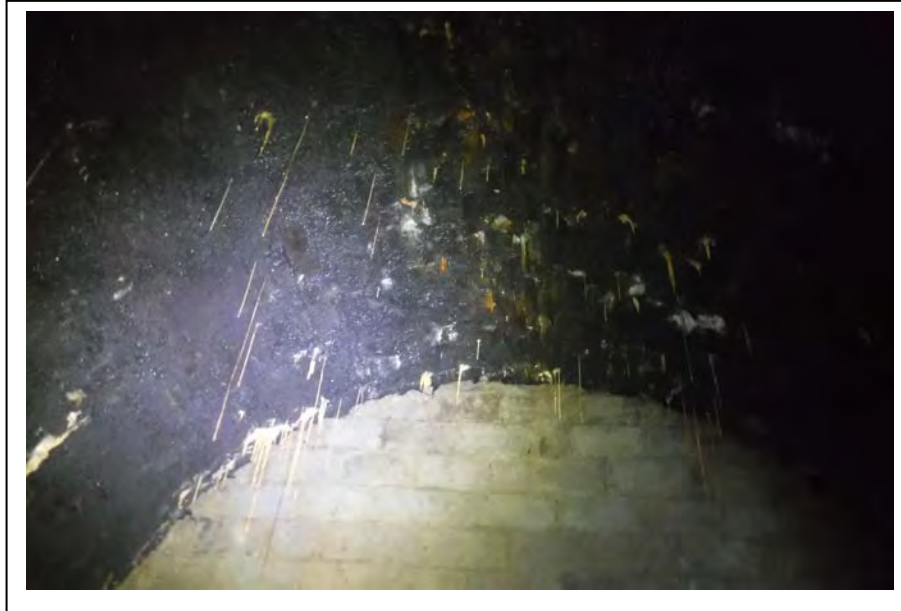
Photograph no 183: Base of shaft/ tunnel barrel



Photograph no 184: Crown at 3042m
Newly cored access hole (May 2018)

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



Photograph no 185: Crown at 3043m
Stalactites



Photograph no 186: U/S refuge at 3050m

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 187: Crown at 3052m
Metal drainage hopper and down-pipe



Photograph no 188: U/S sidewall to crown at 3052m
Down-pipe

ELR:	RSB	Structure No:	Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986	
Name:	The Rhondda Tunnel			Type:	Tunnel	

Photographs of structure



Photograph no 189: Down-pipe appears functioning



Photograph no 190: U/S sidewall at 3056m
Loss of section 860 wide x 500 high x 500 deep

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



Photograph no 191: D/S sidewall at 3056m
Loss of section 1000 wide x 500 high x 650 deep



Photograph no 192: D/S refuge at 3062m

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



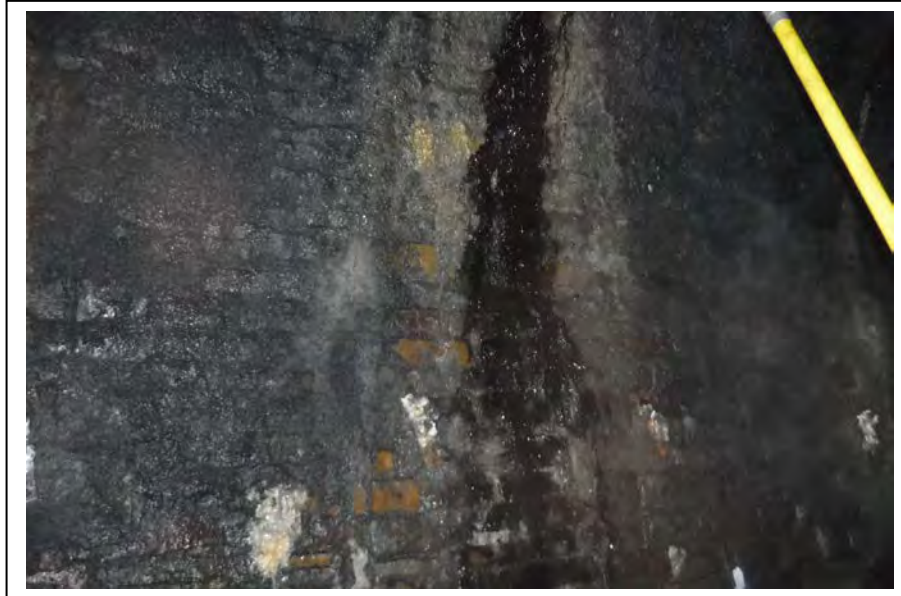
Photograph no 193: D/S haunch at 3061m
Old timber packs to drainage line



Photograph no 194: D/S haunch at 3069m
Old timber packs to drainage line

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



Photograph no 195: D/S sidewall at 3069m
Water running



Photograph no 196: D/S haunch at 3074m
Water running

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



Photograph no 197: U/S haunch at 3074m
Water running at line of old drainage



Photograph no 198: D/S sidewall at 3074m
Odd open joints 120 deep along old drainage line

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



Photograph no 199: D/S refuge at 3082m



Photograph no 200: Crown at 3082m
Stalactites

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



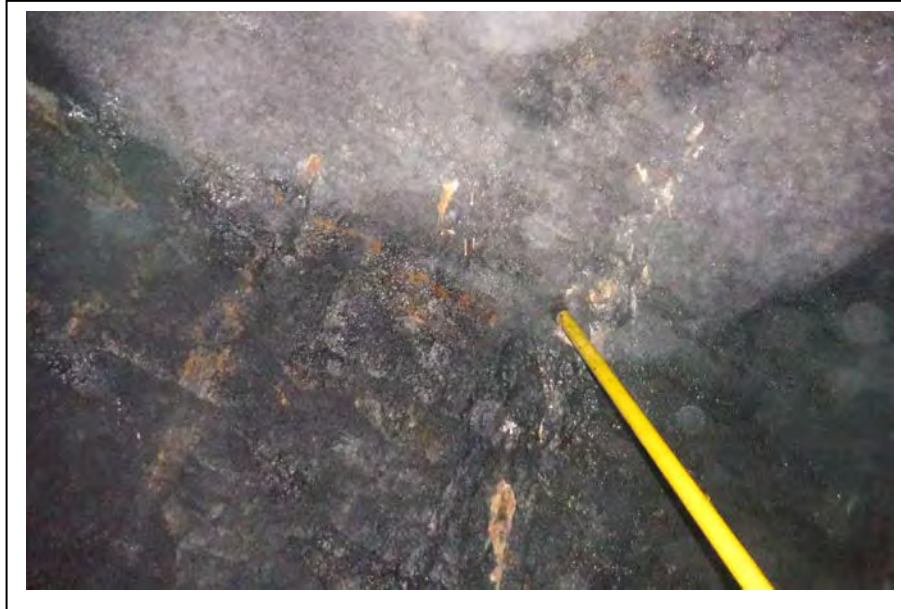
Photograph no 201: Crown at 3096m
Water running



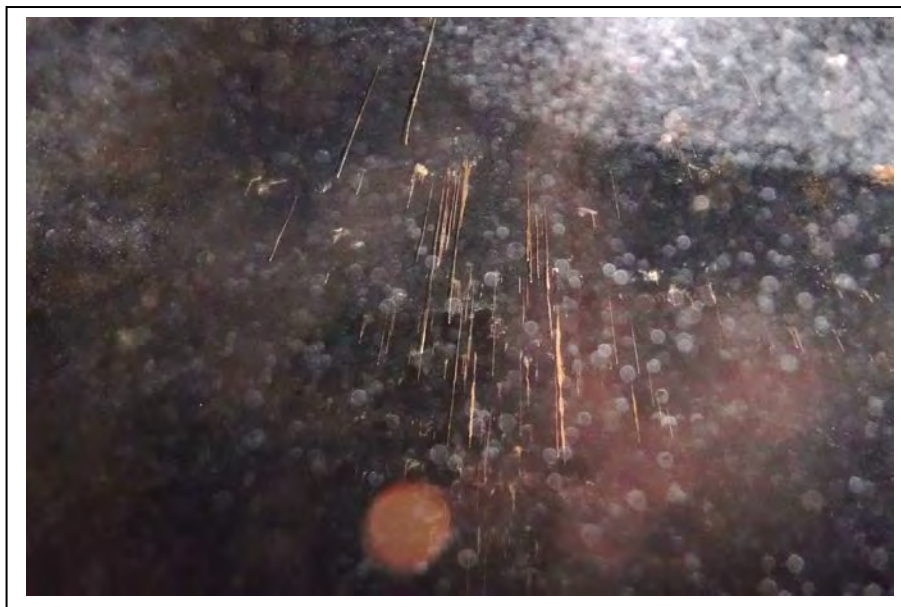
Photograph no 202: Soft material (timber) noted to haunches at sites of previous down-pipe fixings
(typical)

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



Photograph no 203: Soft material (timber) noted to haunches at sites of previous down-pipe fixings (typical)



Photograph no 204: Crown at 3097m
Stalactites

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



Photograph no 205: Haunch to haunch at 3100m
Possible deformation of crown (may have dropped 50-100)
Firm to hammer



Photograph no 206: D/S refuge at 3103m

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



Photograph no 207: Tunnel back-filled to haunch level
Sidewalls not examined after 3010m



Photograph no 208: Water running to U/S haunch at 3104m

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



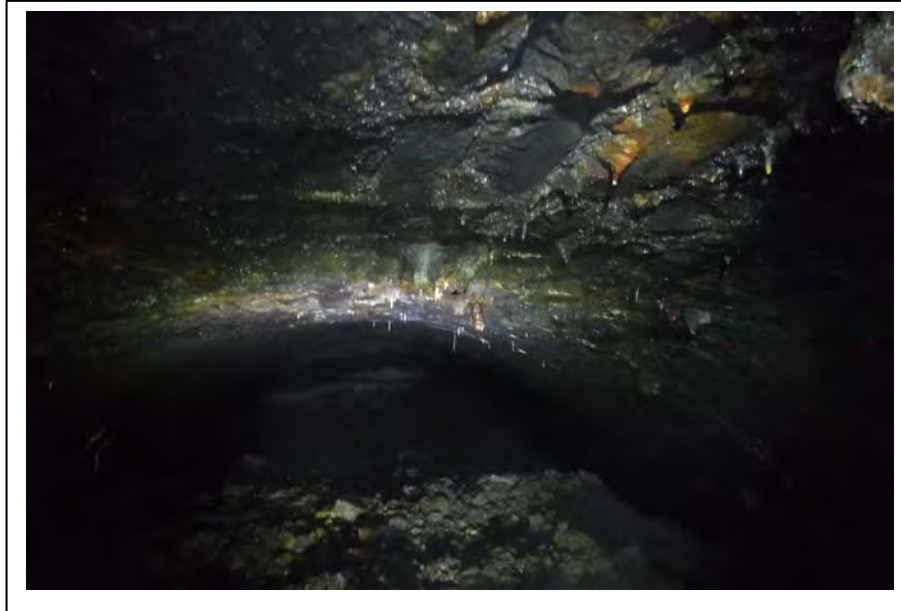
Photograph no 209: U/S haunch at 3012m
Stalactites



Photograph no 210: Crown to D/s haunch at 3018m
Area of visible flattening of barrel form
Firm to hammer

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



Photograph no 211: Crown to D/S haunch at 3018m
Area of visible flattening of barrel form
Firm to hammer



Photograph no 212: Crown to D/S haunch at 3018m
Area of visible flattening of barrel form
Firm to hammer

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



Photograph no 213: U/S voussoir haunch at 3132m
Voussoirs to haunch in very good condition
Wet



Photograph no 214: As photo 213

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 215: Crown at 3132m
Tunnel keystone voussoir in good condition



Photograph no 216: D/S haunch at 3132m
Voussoirs in good condition

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line				OS ref:	SS 915 986	
Name:	The Rhondda Tunnel				Type:	Tunnel	

Photographs of structure



Photograph no 217: As photo 216



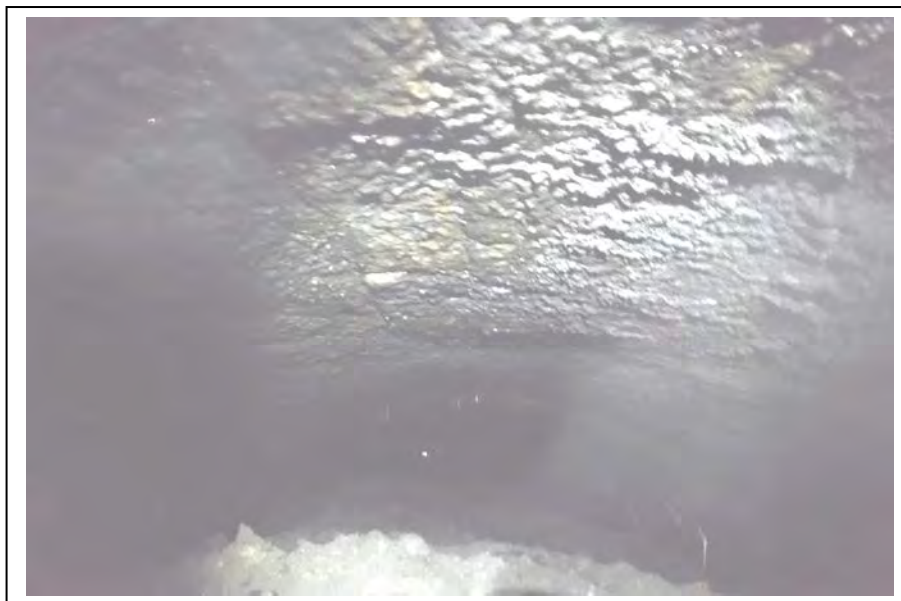
Photograph no 218: D/S haunch at 3122m
 Wet, otherwise good

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line				OS ref:	SS 915 986	
Name:	The Rhondda Tunnel				Type:	Tunnel	

Photographs of structure



Photograph no 219: D/S haunch at 3122m
Wet, otherwise good



Photograph no 220: Crown at 3122m
Good

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no 221: The whole area between diaphragm wall at 3044m and backfill is flooded to 450mm max



Photograph no 222: As photo 221

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no C1: Cwg ① at 1944m LE crown



Photograph no C2: Cwg ① LE crown

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no C3: Cwg ① LE US sidewall



Photograph no C4: Cwg ① LE DS sidewall

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no C5: Cwg ① CE DS sidewall



Photograph no C6: Cwg ① CE crown

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no C7: Cwg ① CE US sidewall



Photograph no C8: Cwg ② LE crown

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no C9: Cwg ② CE DS sidewall



Photograph no C10: Cwg ② LE US sidewall

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



Photograph no C11: Cwg ② CE crown



Photograph no C12: Cwg ② CE sidewall

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no C13: Cwg ② CE sidewall



Photograph no C14:Cwg ③ LE crown

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



Photograph no C15: Cwg ③ LE sidewall



Photograph no C16: Cwg ③ LE DS sidewall

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no C17: Cwg ③ CE crown



Photograph no C18: Cwg ③ CE DS sidewall

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no C19: Cwg ③ CE US sidewall



Photograph no C20: Barrel at LE of Cwg is firm

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no C21: Hinge to crown visible at LE



Photograph no C22: As photo 21

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no C23: Loss of section along hinge line at 1947m
 Approx 0.1m², appears 75 deep



Photograph no C24: Hinge at CE of Cwg1 at 1948m

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no C25: Fractured unit along hinge line at 1949m open 6mm



Photograph no C26: As photo 25

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



Photograph no C27: Crown at 1950m
Spalling along hinge line to 50 deep



Photograph no C28: DS haunch at 1950m
Hinge becomes more severe over Cwg 2

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no C29: As photo 28



Photograph no C30: No evidence of packing to haunches of Cwg gap is typical of all elements, similar to crown

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



Photograph no C31: Secondary hinge at DS haunch at 1951m



Photograph no C32: No evidence of packing to haunches of Cwg gap is typical of all elements, similar to crown

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no C33: No evidence of packing to haunches of Cwg gap is typical of all elements, similar to crown



Photograph no C34: Flattening of arch at 1951m is typical

ELR:	RSB	Structure No:		Mileage:	1m 48ch	Examination date:	26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref:	SS 915 986		
Name:	The Rhondda Tunnel			Type:	Tunnel		

Photographs of structure



Photograph no C35: As photo 34



Photograph no C36: Hinge at 1952m

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no C37: No evidence of packing to US haunch/ crown
1952m shown



Photograph no C38: Arch flattened over Cwg ②
Hinge pronounced in this area

ELR:	RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route:	Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name:	The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no C39: Arch flattened over Cwg No 2
Hinge pronounced in this area



Photograph no C40: Arch flattened over Cwg ②
Hinge pronounced in this area

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no C41: Arch flattened over Cwg ②
Hinge pronounced in this area



Photograph no C42: Arch flattened over Cwg ②
Hinge pronounced in this area

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no C43: Arch flattened over Cwg ②
Hinge pronounced in this area



Photograph no C44: Hinge remains pronounce above LE of Cwg ③

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no C45: Hinge remains pronounce above LE of Cwg ③



Photograph no C46: Form of barrel only slightly hinged at CE of Cwg ③

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line			OS ref: SS 915 986
Name: The Rhondda Tunnel			Type: Tunnel

Photographs of structure



Photograph no C47: Form of barrel only slightly hinged at CE of Cwg ③



Photograph no C48: Form of barrel only slightly hinged at CE of Cwg ③



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

Balfour Beatty
Rail

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
Blaencwm End						
0	↑				↑	0
20						20
40		<i>Masonry barrel and sidewalls</i>			<i>Examined 26.4.18</i>	40
60		<i>60m</i>	<i>Sheeting to crown and haunches</i>			60
80	<i>78m</i>					80
	↓	<i>Masonry barrel and sidewalls supported by 132no metal ribs @ 915mm (3') centres</i>			<i>Examined 30.4.18</i>	
		<i>See Page6e for typical section</i>				
	↓				↓	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

Balfour Beatty
Rail

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
100	↑				↑	100
120						120
	<i>Masonry barrel and sidewalls supported by 132no ribs @915mm (3') c/cs</i>					
140					<i>Examined 30.4.18</i>	140
160						160
180						180
	↓				↓	
	<i>Masonry barrel and sidewalls</i>				<i>26.4.18</i>	



The Rhondda Tunnel
 Detailed Tunnel Examination Report
 26th April – 18th May 2018

Balfour Beatty
 Rail

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
200	<i>Masonry barrel and sidewalls</i>					200
205m	<i>Masonry barrel and sidewalls supported by 3no ribs at 915mm 3' c/cs</i>					
207m						
220						220
240	<i>Masonry barrel And sidewall</i>					240
260						260
280						280

Examined 26.4.18



The Rhondda Tunnel
 Detailed Tunnel Examination Report
 26th April – 18th May 2018

Balfour Beatty
 Rail

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
300	↑				↑	300
320						320
	<i>Masonry barrel and sidewalls</i>					
340					Examined 26.4.18	340
360						360
380	*					380
	<i>Brick barrel with mass concrete sidewalls, relieving arches</i>					
	↓				↓	



The Rhondda Tunnel
 Detailed Tunnel Examination Report
 26th April – 18th May 2018

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
400	↑				↑	400
420						420
		<i>Brick barrel with mass concrete sidewalls with relieving arches</i>				
440						440
460					<i>Examined 26.4.18</i>	460
480						480
	↓				↓	



The Rhondda Tunnel
 Detailed Tunnel Examination Report
 26th April – 18th May 2018

Balfour Beatty
 Rail








ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
500	↑				↑	500
520						520
	<i>Brick barrel with mass concrete sidewalls and relieving arches</i>					
540					<i>Examined 26.4.18</i>	540
560						560
580						580
	↓				↓	



The Rhondda Tunnel
 Detailed Tunnel Examination Report
 26th April – 18th May 2018

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>		
600	 <i>Brick barrel with mass concrete sidewalls and relieving arches</i> 					600	
619m							
620							
							
640		<i>Masonry barrel and sidewalls</i>			<i>Examined 26.4.18</i>	640	
660							660
680						680	
							



The Rhondda Tunnel
 Detailed Tunnel Examination Report
 26th April – 18th May 2018

Balfour Beatty
 Rail

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
700	↑				↑	700
720						720
740	<i>Masonry barrel and sidewalls</i>				<i>Examined 26.4.18</i>	740
760						760
780						780
	↓				↓	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

Balfour Beatty
Rail

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
800		<i>Masonry barrel and sidewalls</i> <i>Masonry barrel and sidewalls supported by 7no metal ribs@ 915mm (3') c/cs</i>				800
807m						
813m		<div style="border: 1px solid black; padding: 5px; text-align: center;"> <i>See Page 6e for typical section</i> </div>				
818m						
820						820
840		<i>Masonry barrel and sidewalls supported by 123no metal ribs @900mm (approx) c/cs</i> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <i>See Page 6e for typical section</i> </div>				840
860						860
						Examined 30.4.18
880						880



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

Balfour Beatty
Rail

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
900	↑				↑	900
		<i>Masonry soffit and sidewall supported by 123no metal ribs @ 900mm (approx) c/cs</i> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;"> <i>See Page 6e for typical detail</i> </div>				
920 925m	✳					920
		<i>Masonry soffit and sidewalls</i>				
940 942m	✳				Examined 30.4.18	940
960						960
980		<i>Masonry soffit and sidewalls supported by 80no metal ribs @915mm (3') c/cs</i> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;"> <i>See Page 6e for typical detail</i> </div>				980
	↓				↓	



The Rhondda Tunnel
 Detailed Tunnel Examination Report
 26th April – 18th May 2018

Balfour Beatty
 Rail

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
1000	↑	<i>Masonry barrel and sidewalls supported by 80no ribs at 915mm (3')</i> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;"> <i>See Page 6e for typical section</i> </div>			Examined 30.4.18	1000
	↕				↕	
1020						1020
		<i>Masonry barrel and sidewalls</i>				
1040					Examined 1.5.18	1040
1060						1060
1080						1080
	↓				↓	



The Rhondda Tunnel
 Detailed Tunnel Examination Report
 26th April – 18th May 2018

Balfour Beatty
 Rail

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
1100	↑					1100
	<i>Masonry barrel and sidewalls</i>					
1120						1120
1140						1140
					<i>Examined 1.5.18</i>	
1160	↑ <i>1160m</i>					1160
	<i>Brick barrel Mass concrete sidewall and relieving arches</i>					
1180						1180
	↓					



The Rhondda Tunnel
 Detailed Tunnel Examination Report
 26th April – 18th May 2018

Balfour Beatty
 Rail

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
1200	↑					↑
	<i>Brick barrel with mass concrete sidewalls & relieving arches</i>					
1220						↑
	1238m ✱					
1240		<i>Masonry barrel & sidewalls</i>			Examined 1.5.18	↑
	1260m ✱					
1260						↑
	<i>Masonry soffit with masonry sidewall with brick relieving arches</i>					
1280						↑
	1291m ✱					
	↓	<i>Masonry soffit with mass concrete sidewalls</i>				↓



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

Balfour Beatty
Rail

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
1300						1300
	<i>Masonry soffit with mass concrete sidewall</i>					
	1310m					
1320						1320
		<i>Brick soffit with mass concrete sidewall</i>				
1340						1340
					<i>Examined 1.5.18</i>	
1360	1363m					1360
1380		<i>Brick soffit with brick sidewalls and 2.7m long relieving arches</i>				1380



The Rhondda Tunnel
 Detailed Tunnel Examination Report
 26th April – 18th May 2018

Balfour Beatty
 Rail

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
1400	↑				↑	1400
1420						1420
1440						1440
					<i>Examined 1.5.18</i>	
	<i>Brick soffit with brick sidewalls and relieving arches 2.7m wide</i>					
1460						1460
1480						1480
	↓				↓	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

Balfour Beatty
Rail

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
1500	↑				↑	1500
1520		<i>Brick soffit and sidewalls with relieving arches at 2.7m c/cs</i>				1520
1540					<i>Examined 1.5.18</i>	1540
1560	↓					1560
1580		<i>Barrel remains in brickwork but widens to a profile 6.81m wide, 5.26m high. Area is at the approximate mid-point of the tunnel and is known as The Church.</i>				1580
	↑	<i>Masonry barrel and sidewalls</i>			<i>Examined 27.4.18</i>	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

Balfour Beatty
Rail

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
1600	↑				↑	1600
	<i>Masonry barrel and sidewalls</i>					
1620						1620
	1629m ✱	<i>Masonry barrel and concrete sidewall</i>				
	1633m ✱					
1640						1640
	<i>Brick barrel and concrete sidewalls</i>				<i>Examined 27.4.18</i>	
	✱					
1660						1660
	<i>Brick barrel and sidewalls</i>					
1680	1681m ✱					1680
	<i>Masonry barrel, brick sidewalls and relieving arches 2.78m long</i>					
	↓				↓	



The Rhondda Tunnel
 Detailed Tunnel Examination Report
 26th April – 18th May 2018

Balfour Beatty
 Rail

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
1700	↑				↑	1700
1720						1720
		<i>Masonry soffit with brick sidewalls and relieving arches 2.78m long</i>				
1740					<i>Examined 27.4.18</i>	1740
1760						1760
1780						1780
	↓				↓	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

Balfour Beatty
Rail

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
1800	↑				↑	1800
1820						1820
	<i>Masonry barrel with brick sidewalls and relieving arches</i>					
1840					Examined 27.4.18	1840
1860						1860
1880	1880m ✕					1880
	<i>Masonry barrel with concrete sidewalls and relieving arches</i>					
	↓				↓	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

Balfour Beatty
Rail

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
1900	↑ 1906m ↓	<i>Masonry barrel with concrete sidewalls and relieving arches</i>				↑ 1900
					Examined 27.4.18	
1920		<i>Masonry barrel and sidewalls</i>				↑ 1920
		<i>Masonry barrel and sidewalls supported by timbers cwgs</i>				
1940	↑ 1944m ↓		(C1) (C2)		↓ (C4)	↑ 1940
5.123m		Cwg ①				
	(C10) ↓	(C7) ↑	(C6) ↑ (C8) ↓	(C9) ↓	(C5) ↑	
7.83m		Cwg ②				
1960	(C13) ↑	(C15) ↓	(C11) ↑ (C14) ↓	(C16) ↓	(C12) ↑	↑ 1960
5.12m		Cwg ③				
1968m			(C17) ↑		(C18) ↑	
	(C19) ↓					
1980		<i>Masonry barrel and sidewalls</i>				↑ 1980
					Examined 27.4.18	
	↓				↓	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

Balfour Beatty
Rail

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
2000	↑				↑	2000
2020	<i>Masonry barrel and sidewalls</i>					2020
2040					<i>Examined 27.4.18</i>	2040
2053m	↓					
2060	<i>Masonry barrel and concrete sidewalls</i>					2060
2080m	*					
2080	<i>Masonry barrel and sidewalls</i>					2080
	↓				↓	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

Balfour Beatty
Rail

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
2100	↑				↑	2100
2020						2120
	<i>Masonry barrel and sidewall</i>					
2140					<i>Examined 27.4.18</i>	2140
2160						2160
	2177m ✱					
2180		<i>Masonry barrel and sidewall with brick relieving arches</i>				2180
	2192m ✱	<i>Masonry barrel and concrete sidewalls</i>			↓	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

Balfour Beatty
Rail

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
2200	↑ 2207m	<i>Masonry barrel and concrete sidewalls</i>			↑	2200
2220		<i>Masonry barrel and masonry sidewalls with brick relieving arches</i>				2220
2240					Examined 27.4.18	2240
2257m	↓					
2260		<i>Masonry barrel and concrete sidewalls</i>				2260
2279m	↓					
2280		<i>Masonry barrel and sidewalls with brick relieving arches</i>				2280
	↓				↓	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
2300	↑ <i>Masonry barrel and sidewall with brick relieving arches</i> 2318m ✱				↑	2300
2320						
2340		<i>Masonry barrel and sidewalls</i>			<i>Examined 27.4.18</i>	2340
2360						
2380	2388m ✱ 2399m ✱	<i>Masonry barrel and concrete rendered sidewalls</i>			↓	2380
		<i>Masonry barrel and sidewalls</i>				



The Rhondda Tunnel
 Detailed Tunnel Examination Report
 26th April – 18th May 2018

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
2400	↑				↑	2400
2420						2420
2440		<i>Masonry barrel and sidewalls</i>			<i>Examined 27.4.18</i>	2440
2460						2460
2480						2480
	↓				↓	



The Rhondda Tunnel
 Detailed Tunnel Examination Report
 26th April – 18th May 2018

Balfour Beatty
 Rail

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
2500	↑					↑
2520						2520
2540					<i>Examined 27.4.18</i>	2540
		<i>Masonry barrel and sidewalls</i>				
2560						2560
2580						2580
	↓					↓



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

Balfour Beatty
Rail

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
2600	↑					2600
2620						2620
						R
2640		<i>Masonry barrel and sidewalls</i>			<i>Examined 27.4.18</i>	2640
2660						2660
2680						2680
	↓					



The Rhondda Tunnel
 Detailed Tunnel Examination Report
 26th April – 18th May 2018

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
2700	↑				↑	2700
2720						2720
2740		<i>Masonry barrel and sidewalls</i>			<i>Examined 27.4.18</i>	2740
2760						2760
2780						2780
	↓				↓	



The Rhondda Tunnel
 Detailed Tunnel Examination Report
 26th April – 18th May 2018

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
2800	↑				↑	2800
2820						2820
2840		<i>Masonry barrel and sidewalls</i>			<i>Examined 27.4.18</i>	2840
2860						2860
2880						2880
	↓				↓	



The Rhondda Tunnel
 Detailed Tunnel Examination Report
 26th April – 18th May 2018

Balfour Beatty
 Rail

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
2900	↑				↑	2900
2920						2920
2940	<i>Masonry barrel and sidewalls</i>				<i>Examined 27.4.18</i>	2940
2960						2960
2980						2980
	↓				↓	



The Rhondda Tunnel
Detailed Tunnel Examination Report
26th April – 18th May 2018

Balfour Beatty
Rail

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>		
3000	↑				↑	3000	
3020		<i>Masonry barrel and sidewalls</i>		<i>Brick ventilation shaft (slightly offset to Down side)</i>	<i>Examined 2.5.18</i>	3020	
			2.06m (int. ϕ)				
3040	↓	<i>Blockwork and mass concrete diaphragm wall with hole drilled in centre approx 900m ϕ and 900mm from ground level</i>				↓	3040 <i>Examined 2.5.18 and 18.5.18</i>
	↑				↑		
3060		<i>Masonry barrel and sidewalls</i>			<i>Examined 18.5.18</i>	3060	
3080						3080	
	↓				↓		



The Rhondda Tunnel
 Detailed Tunnel Examination Report
 26th April – 18th May 2018

Balfour Beatty
 Rail

ELR: RSB	Structure No:	Mileage: 1m 48ch	Examination date: 26.4.18-18.5.18
Route: Rhondda and Swansea Bay Line		OS ref: SS 915 986	
Name: The Rhondda Tunnel		Type: Tunnel	

	<i>Sidewall</i>	<i>Haunch</i>	<i>Crown</i>	<i>Haunch</i>	<i>Sidewall</i>	
3100						3100
	<i>Masonry barrel and sidewalls</i>				Examined 18.5.18	
3120						3120
	↓				↓	
Blaengwynfi Portal (Country end)						

THIS PAGE IS INTENTIONALLY LEFT BLANK