

Full order	Anchor Number	Anchor type	Anchor width (mm)	Anchor depth (mm)	Bond type	Batch number	Anchor location	Placement date	Placement Score	Placement notes	Test date	Exercised	Dry	Approx load first deformation (kN)	Peak Load	Failure mechanism	Failure narrative
Owmorthin Site A (Back Vein) Pillar																	
1	BP5	Bolt Product 8mm twist	16	96	KMR resin	226	Owmorthin, Back Vein	10/12/14	2	Pillar, not enough resin used	06/01/15	Yes	No	7	26	Resin/rock	Resin extracted as a plug, with the upper section looking dirty
2	BP6	Bolt Product 8mm twist	16	96	KMR resin	225	Owmorthin, Back Vein	10/12/14	2	Pillar, not enough resin used	06/01/15	No	No	3	28.99	Resin/rock	Resin extracting as a plug
3	IC27	IC	12	82	KMR resin	TJY	Owmorthin, Back Vein	24/12/14	3	Pillar	06/01/15	Yes	No	5	28.66	Resin/rock	Slight spalling. Maintained high load throughout extraction. Resin extracted with the anchor appeared to be acting as a wedge as the lower section of the anchor became visible
4	IC30	IC	12	82	KMR resin	TJV	Owmorthin, Back Vein	24/12/14	3	Pillar	06/01/15	No	No	-	29.37	Resin/rock	Slight spalling. Maintained high load throughout extraction, with resin extracted with the anchor
5	G4	Goujon anchor, Coeur hanger	12	60	Expansion	-	Owmorthin, Back Vein	09/12/14	3	Pillar	06/01/15	No	No	5	37.48	Hanger snapped	Some indication of rock damage
6	G3	Collinox	10	70	SPIT Ampule	-	Owmorthin, Back Vein	09/12/14	3	Pillar	06/01/15	No	No	9	31.13	Resin/rock	Resin cracked around peak load, then extracted relatively steadily
7	C1	Collinox	10	70	SPIT Ampule	-	Owmorthin, Back Vein	09/12/14	3	Pillar	06/01/15	Yes	No	9	30.58	Resin/rock	Resin cracked around peak load, then extracted relatively steadily
8	G2	Goujon anchor, Coeur hanger	12	60	Expansion	-	Owmorthin, Back Vein	09/12/14	3	Pillar	06/01/15	Yes	No	5	35.6	Rock cone failure	Spalling along the cleavage plane
9	IC31	IC	12	82	KMR resin	TJO	Owmorthin, Back Vein	24/12/14	3	Pillar	06/01/15	No	Yes	6	31.8	Resin/rock	Slight spalling. Maintained high load throughout extraction
Owmorthin Site A (Back Vein) Working Face																	
10	BP11	Bolt Product 8mm twist	16	96	KMR resin	227	Owmorthin, Back Vein	10/12/14	3	Cleavage (working face)	06/01/15	Yes	No	6	34.5	Resin/anchor	Spalling 10-15cm around head. Twisted out leaving resin
11	G8	Goujon anchor, Coeur hanger	12	60	Expansion	-	Owmorthin, Back Vein	09/12/14	3	Cleavage (working face)	06/01/15	Yes	No	5	18	Rock cone failure	Significant rock failure (approx. 30cm around anchor). Anchor was placed a little over 20cm away from a clear crack
12	G7	Goujon anchor, Coeur hanger	12	60	Expansion	-	Owmorthin, Back Vein	09/12/14	3	Cleavage (working face)	06/01/15	No	No	5	22	Rock cone failure	Significant rock failure 30-40cm long
13	G9	Collinox	10	70	SPIT Ampule	-	Owmorthin, Back Vein	09/12/14	3	Cleavage (working face)	06/01/15	Yes	No	6	30.5	Resin/rock	Small amount of surface spalling, pulled out relatively steadily with resin around the anchor between the broad threads
14	C10	Collinox	10	70	SPIT Ampule	-	Owmorthin, Back Vein	09/12/14	3	Cleavage (working face)	06/01/15	No	No	6	32.61	Resin/rock	Small amount of surface spalling, pulled out relatively steadily with resin between the broad threads of the anchor. Anchor slightly bent
15	IC29	IC	12	82	KMR resin	TJX	Owmorthin, Back Vein	24/12/14	3	Cleavage (working face)	06/01/15	Yes	No	3	35.19	Resin/rock	Very clean hole. Maintained high load throughout extraction
16	BP14	Bolt Product 8mm twist	16	96	KMR resin	228	Owmorthin, Back Vein	10/12/14	3	Cleavage (working face)	06/01/15	Yes	No	4	37.02	Anchor/resin	Unscrewed leaving resin plug (cork screw)
17	C12	Collinox	10	70	SPIT Ampule	-	Owmorthin, Back Vein	09/12/14	3	Cleavage (working face)	06/01/15	No	Yes	6	28.23	Resin/rock	Slight surface spalling, steady extraction
18	G13	Goujon anchor, Coeur hanger	12	60	Expansion	-	Owmorthin, Back Vein	09/12/14	3	Cleavage (working face)	06/01/15	No	Yes	4	32.15	Rock cone failure	Large rock failure at peak load, at least 50cm long, approx. 2-3cm deep
19	IC28	IC	12	82	KMR resin	TUY	Owmorthin, Back Vein	24/01/14	3	Cleavage (working face)	06/01/15	No	Yes	3	35.92	Resin/rock	Very small amount of spalling, maintained high load throughout extraction
20	BP15	Bolt Product 8mm twist	16	96	KMR resin	230	Owmorthin, Back Vein	10/12/14	1	Cleavage (working face), possibly compromised by previous anchor	06/01/15	No	Yes	3	31.58	Rock cone failure	Large spalling, likely relating to the crack generated by G13
21	IC26	IC	12	82	KMR resin	TJU	Owmorthin, Back Vein	24/12/14	1	Cleavage (working face), possibly compromised by previous anchor	06/01/15	No	No	3	33.06	Rock cone failure	Large spalling, likely relating to the crack generated by G13
Owmorthin Site B (Stripy Vein) Pillar																	
22	BP6	Bolt Product 8mm twist	16	96	KMR resin	221	Owmorthin, Stripy Vein	10/12/14	3	Pillar	06/01/15	Yes	No	6	36.64	Anchor/resin	Slight spalling, twisted out leaving resin. Maintained high load on extraction
23	G5	Goujon anchor, Coeur hanger	12	60	Expansion	-	Owmorthin, Stripy Vein	09/12/14	3	Pillar	06/01/15	Yes	No	4	38.03	Hanger snapped	Clean break of the hanger with some deformation of anchor
24	C1	Collinox	10	70	SPIT Ampule	-	Owmorthin, Stripy Vein	09/12/14	3	Pillar	06/01/15	No	No	10	32.16	Resin/rock	Clean extraction with resin still attached
25	IC21	IC	12	82	KMR resin	TJL	Owmorthin, Stripy Vein	24/12/14	3	Pillar	06/01/15	No	No	6	24	Resin/rock	Suspect error with reset of gauge. Probably more like 24kN peak load
26	C4	Collinox	10	70	SPIT Ampule	-	Owmorthin, Stripy Vein	09/12/14	3	Pillar	06/01/15	Yes	No	7	34.21	Resin/rock	Clean extraction with resin still attached
27	IC22	IC	12	82	KMR resin	TJV	Owmorthin, Stripy Vein	24/12/14	3	Pillar	06/01/15	Yes	No	9	35.89	Resin/rock	Clean extraction maintaining high loads throughout
28	G2	Goujon anchor, Coeur hanger	12	60	Expansion	-	Owmorthin, Stripy Vein	09/12/14	3	Pillar	06/01/15	No	No	5	37.27	Hanger snapped	Hanger snapped, anchor slightly bent
29	BP3	Bolt Product 8mm twist	16	96	KMR resin	223	Owmorthin, Stripy Vein	10/12/14	3	Pillar	06/01/15	No	No	3	41.87	Anchor/resin	Twisted out leaving some resin in place. Fast extraction, quicker pumping!
Owmorthin Site B (Stripy Vein) Working Face/Cleavage																	
30	IC24	IC	12	82	KMR resin	TJT	Owmorthin, Stripy Vein	24/12/14	3	Cleavage (working face)	06/01/15	No	No	3	37.1	Resin/rock	Very clean extraction maintaining high loads throughout
31	IC25	IC	12	82	KMR resin	TJR	Owmorthin, Stripy Vein	24/12/14	3	Cleavage (working face)	06/01/15	No	No	10	33.94	Resin/rock	Very clean extraction maintaining high loads throughout
32	BP15	Bolt Product 8mm twist	16	96	KMR resin	222	Owmorthin, Stripy Vein	10/12/14	3	Cleavage (working face)	06/01/15	No	No	3	31.98	Complex	Initial anchor/resin failure but significant spalling at the end of the extraction (20cm)
33	C7	Collinox	10	70	SPIT Ampule	-	Owmorthin, Stripy Vein	09/12/14	3	Cleavage (working face)	06/01/15	No	Yes	7	34.12	Resin/rock	Very slight spalling, extraction with resin plug
34	BP11	Bolt Product 8mm twist	16	96	KMR resin	227	Owmorthin, Stripy Vein	10/12/14	3	Cleavage (working face)	06/01/15	No	No	3	46.1	Anchor/resin	Twisted out with slight spalling. Maintained high load
35	BP12	Bolt Product 8mm twist	16	96	KMR resin	224	Owmorthin, Stripy Vein	10/12/14	3	Cleavage (working face)	06/01/15	No	Yes	3	42.44	Anchor/resin	Rig jammed during extraction. Spalling as anchor twisted out (approx. 10cm)
36	IC23	IC	12	82	KMR resin	TJS	Owmorthin, Stripy Vein	24/12/14	3	Cleavage (working face)	06/01/15	No	Yes	6	35.55	Resin/rock	Very clean extraction maintaining high loads throughout
37	G10	Goujon anchor, Coeur hanger	12	60	Expansion	-	Owmorthin, Stripy Vein	09/12/14	3	Cleavage (working face)	06/01/15	No	Yes	4	38.12	Hanger snapped	Hanger snapped, anchor slightly bent
38	G8	Goujon anchor, Coeur hanger	12	60	Expansion	-	Owmorthin, Stripy Vein	09/12/14	3	Cleavage (working face)	06/01/15	No	No	3	36.5	Rock cone failure	Significant "dinner plate" failure approx. 2-3cm deep and 30cm long
39	C9	Collinox	10	70	SPIT Ampule	-	Owmorthin, Stripy Vein	09/12/14	3	Cleavage (working face)	06/01/15	No	No	10	31.86	Resin/rock	Slight surface spalling, clean extraction with some resin attached
40	C14	Collinox	10	70	SPIT Ampule	-	Owmorthin, Stripy Vein	09/12/14	3	Cleavage (working face)	06/01/15	No	No	12	32.4	Resin/rock	Very slight surface spalling, clean extraction with resin attached
41	G13	Goujon anchor, Coeur hanger	12	60	Expansion	-	Owmorthin, Stripy Vein	09/12/14	3	Cleavage (working face)	06/01/15	No	No	5	37.56	Hanger snapped	Hanger snapped, anchor slightly bent
Cambrian Pillar																	
42	IC16	IC	12	82	KMR resin	TJK	Cambrian	23/12/14	2	Pillar, soft rock	07/01/15	No	No	6	34.83	Resin/rock	Clean extraction
43	C2	Collinox	10	70	SPIT Ampule	-	Cambrian	23/12/14	1	Pillar, soft rock. Install error, hole drilled to deep (90mm not 70mm)	07/01/15	No	No	9	18.53	Resin/rock	Clean extraction with resin clearly attached
44	G7	Goujon anchor, Coeur hanger	12	60	Expansion	-	Cambrian	23/12/14	2	Pillar, soft rock	07/01/15	Yes	No	4	20.23	Resin/rock	Relatively clean extraction
45	BP12	Bolt Product 8mm twist	16	96	KMR resin	283	Cambrian	23/12/14	2	Pillar, soft rock	07/01/15	Yes	No	3	41.44	Complex	Twisting out initially (resin/anchor bond failure), followed by rock failure along the cleavage plane
46	BP11	Bolt Product 8mm twist	16	96	KMR resin	263	Cambrian	23/12/14	2	Pillar, soft rock	07/01/15	No	No	4	33.13	Rock cone failure	Slight twisting at early stages followed by significant (40cm) rock failure along cleavage plane
47	G6	Goujon anchor, Coeur hanger	12	60	Expansion	-	Cambrian	23/12/14	2	Pillar, very soft rock	07/01/15	Yes	No	3	11.46	Rock cone failure	Some spalling, then relatively clean extraction
48	C1	Collinox	10	70	SPIT Ampule	-	Cambrian	23/12/14	1	Pillar, very soft rock. Possibly compromised by G6	07/01/15	Yes	No	6	22.91	Rock cone failure	Rock failure along the cleavage plane
49	IC17	IC	12	82	KMR resin	TJH	Cambrian	23/12/14	1	Pillar, very soft rock. Possibly compromised by G6	07/01/15	Yes	No	7	25.39	Complex	Small amount of rock spalled, and cracking followed by usual clean resin/rock failure and extraction
50	BP13	Bolt Product 8mm twist	16	96	KMR resin	282	Cambrian	23/12/14	3	Cleavage Plane (top of fallen block)	07/01/15	No	No	2	41.72	Complex	Spalling around mid way through extraction, with cone failure. Mixed resin/anchor bond failure
51	BP14	Bolt Product 8mm twist	16	96	KMR resin	287	Cambrian	23/12/14	3	Cleavage Plane (top of fallen block)	07/01/15	Yes	No	3	37.95	Anchor/resin	Small amount of surface spalling
52	IC18	IC	12	82	KMR resin	TJG	Cambrian	23/12/14	3	Cleavage Plane (top of fallen block)	07/01/15	No	No	8	37.4	Resin/rock	Very clean extraction maintaining high load throughout
53	G9	Goujon anchor, Coeur hanger	12	60	Expansion	-	Cambrian	23/12/14	3	Cleavage Plane (top of fallen block)	07/01/15	Yes	No	3	35.25	Rock cone failure	Cone failure approx 15cm, as well as a larger (approx 30cm long) surface flake
54	C21	Collinox	10	70	SPIT Ampule	-	Cambrian	23/12/14	3	Cleavage Plane (top of fallen block)	07/01/15	No	No	13	31.72	Resin/rock	Clean extraction with resin plug evident
55	G8	Goujon anchor, Coeur hanger	12	60	Expansion	-	Cambrian	23/12/14	3	Cleavage Plane (top of fallen block)	07/01/15	No	No	4	36.15	Hanger snapped	Anchor bent and hanger snapped in one place
56	IC19	IC	12	82	KMR resin	TJC	Cambrian	23/12/14	3	Cleavage Plane (top of fallen block)	07/01/15	Yes	No	6	37.12	Anchor/resin	Very clean extraction maintaining high load throughout
57	C3	Collinox	10	70	SPIT Ampule	-	Cambrian	23/12/14	3	Cleavage Plane (top of fallen block)	07/01/15	Yes	No	12	30.04	Resin/rock	Clean extraction with resin plug evident
58	IC20	IC	12	82	KMR resin	TJJ	Cambrian	23/12/14	3	Cleavage Plane (top of fallen block)	07/01/15	No	Yes	3	34.34	Anchor/resin	Very clean extraction maintaining high load throughout, again!
59	BP20	Bolt Product 8mm twist	16	96	KMR resin	290	Cambrian	23/12/14	3	Cleavage Plane (top of fallen block)	07/01/15	No	Yes	3	39.8	Resin/rock	Clean extraction with resin plug evident
60	G10	Goujon anchor, Coeur hanger	12	60	Expansion	-	Cambrian	23/12/14	3	Cleavage Plane (top of fallen block)	07/01/15	No	Yes	3	27	Rock cone failure	Significant spalling approx 40cm
61	C5	Collinox	10	70	SPIT Ampule	-	Cambrian	23/12/14	2	Cleavage Plane (top of fallen block), possibly compromised by G10	07/01/15	No	Yes	6	30.68	Rock cone failure	Significant spalling, piece approx 2cm deep and 30cm long. Possibly related to the previous anchor G10
Braich Goch/Corris Pillar																	
62	BP12	Bolt Product 8mm twist	16	96	KMR resin	242	Braich Goch, Corris	18/12/14	3	Pillar, front plane.	13/01/15	Yes	No	5	29.59	Anchor/resin	Some surface spalling, anchor "unscrewed" leaving the resin in place
63	C2	Collinox	10	70	SPIT Ampule	-	Braich Goch, Corris	18/12/14	3	Pillar, front plane.	13/01/15	Yes	No	8	32.02	Resin/rock	Clean extraction with resin visible between the broad threads of the anchor
64	G7	Goujon anchor, Coeur hanger	12	60	Expansion	-	Braich Goch, Corris	18/12/14	3	Pillar, front plane.	13/01/15	Yes	No	6	35.23	Rock cone failure	Catastrophic spalling around 50cm long, 20cm wide and 30cm deep
65	BP11	Bolt Product 8mm twist	16	96	KMR resin	288	Braich Goch, Corris	18/12/14	2	Pillar, front plane, possibly compromised by rock failure of G7	13/01/15	No	No	1	31.91	Anchor/resin	Slight surface spalling, with anchor twisting out leaving the resin in place
66	C1	Collinox	10	70	SPIT Ampule	-	Braich Goch, Corris	18/12/14	3	Pillar, front plane.	13/01/15	No	No	8	21.89	Resin/rock	Small amount of surface spalling, anchor extracted clean with resin visible between the broad threads
67	G6																