W20

Orange to Broken Hill

Document Status

Version #	Date Reviewed	Prepared by	Reviewed by	Endorsed	Approved
3.0	10 Nov 23	Operations Standards	Stakeholders	Operations Standards Manager	Head of Operations Standards 18/12/2023

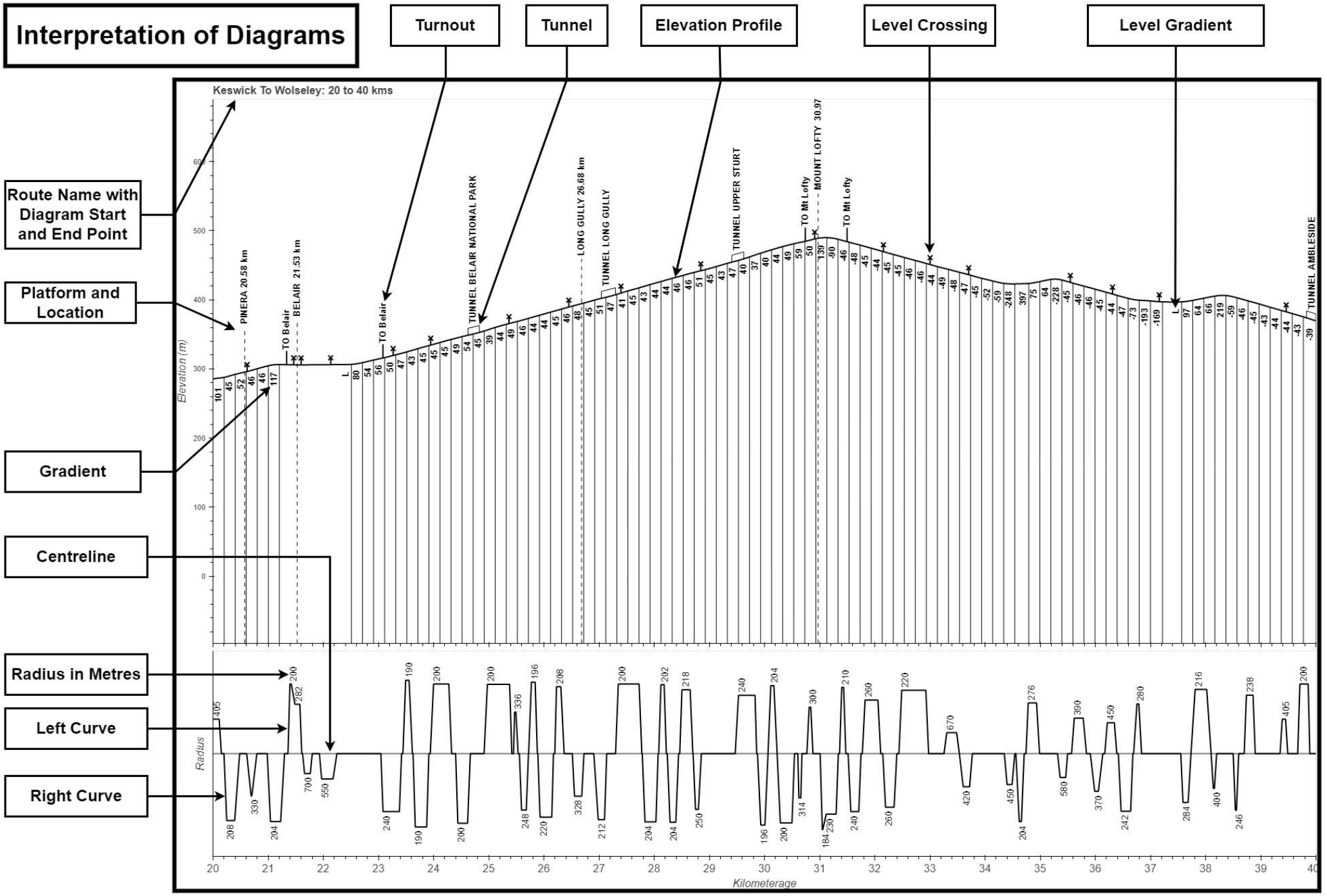
Curve and Gradient Diagrams – Data Sources and Descriptions

Data Type	Data Source	Data Description
Grade	ARTC Asset Register	Horizontal and vertical geometry obtained using Reigl LiDAR, GPS, IMU and Gyroscope fitted to ARTC Hi-Rail vehicle.
Curvature	ARTC Asset Register	Curvature data measured using AK car and verified against track design specifications.
Platforms	ARTC Asset Register	Asset locations obtained through TrackData.
Tunnels		
Turnouts		
Level Crossings		

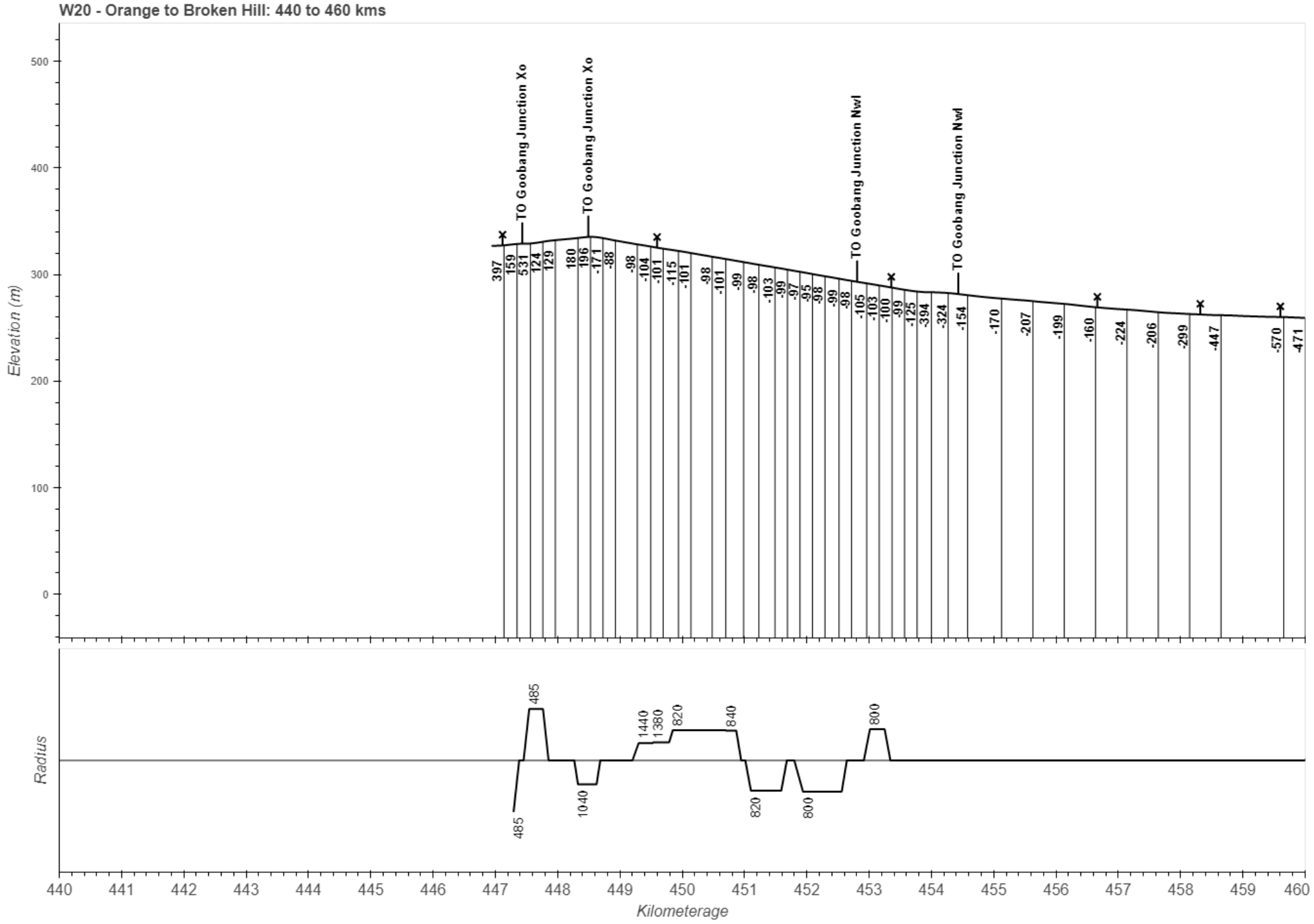
DISCLAIMER:

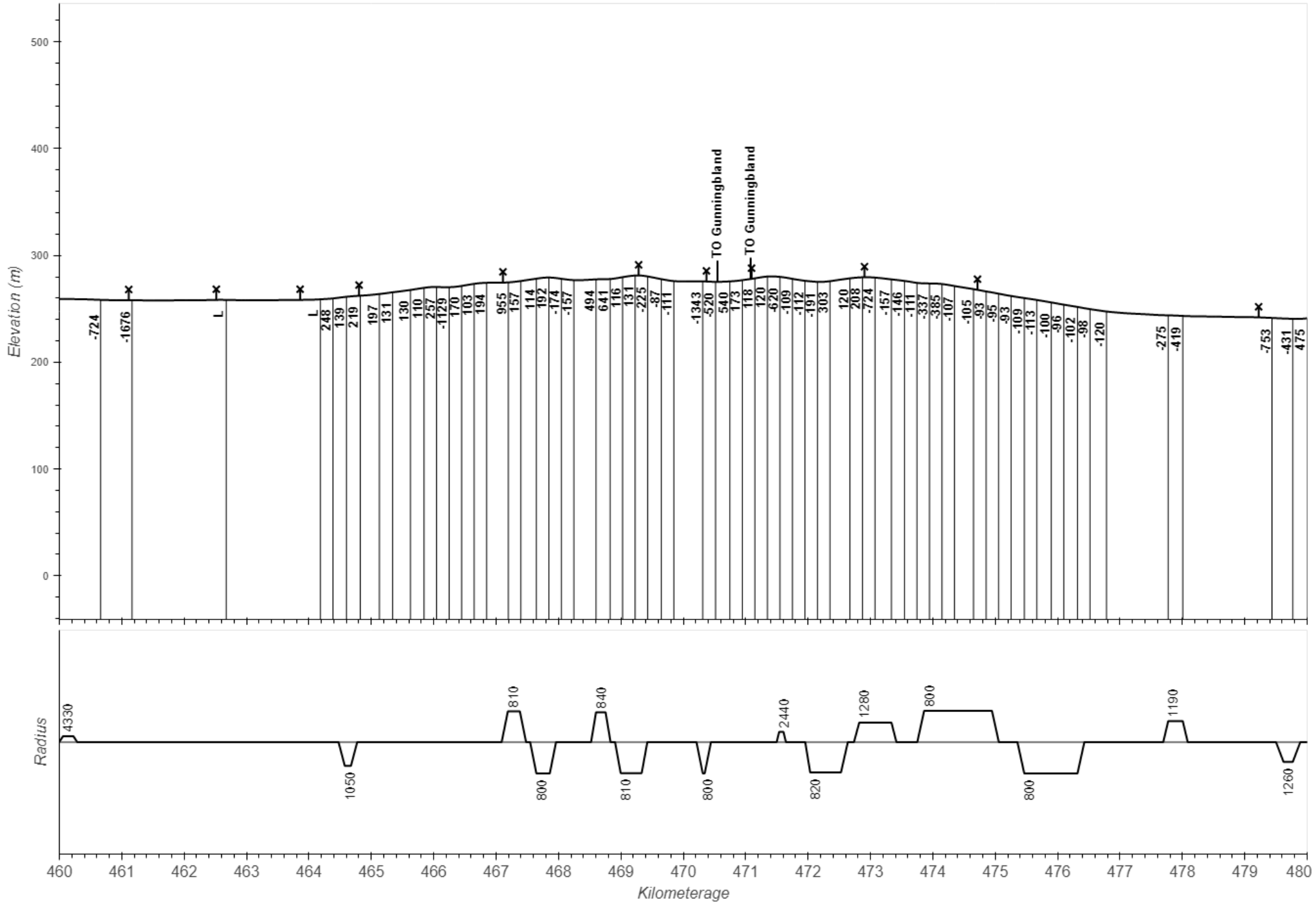
1. The following diagrams are a representation only.
2. Refer to the Curvature Master for controlled curvature data.
3. Refer to ARTC Network Information Books diagrams for detailed information.
4. This document is uncontrolled when printed.

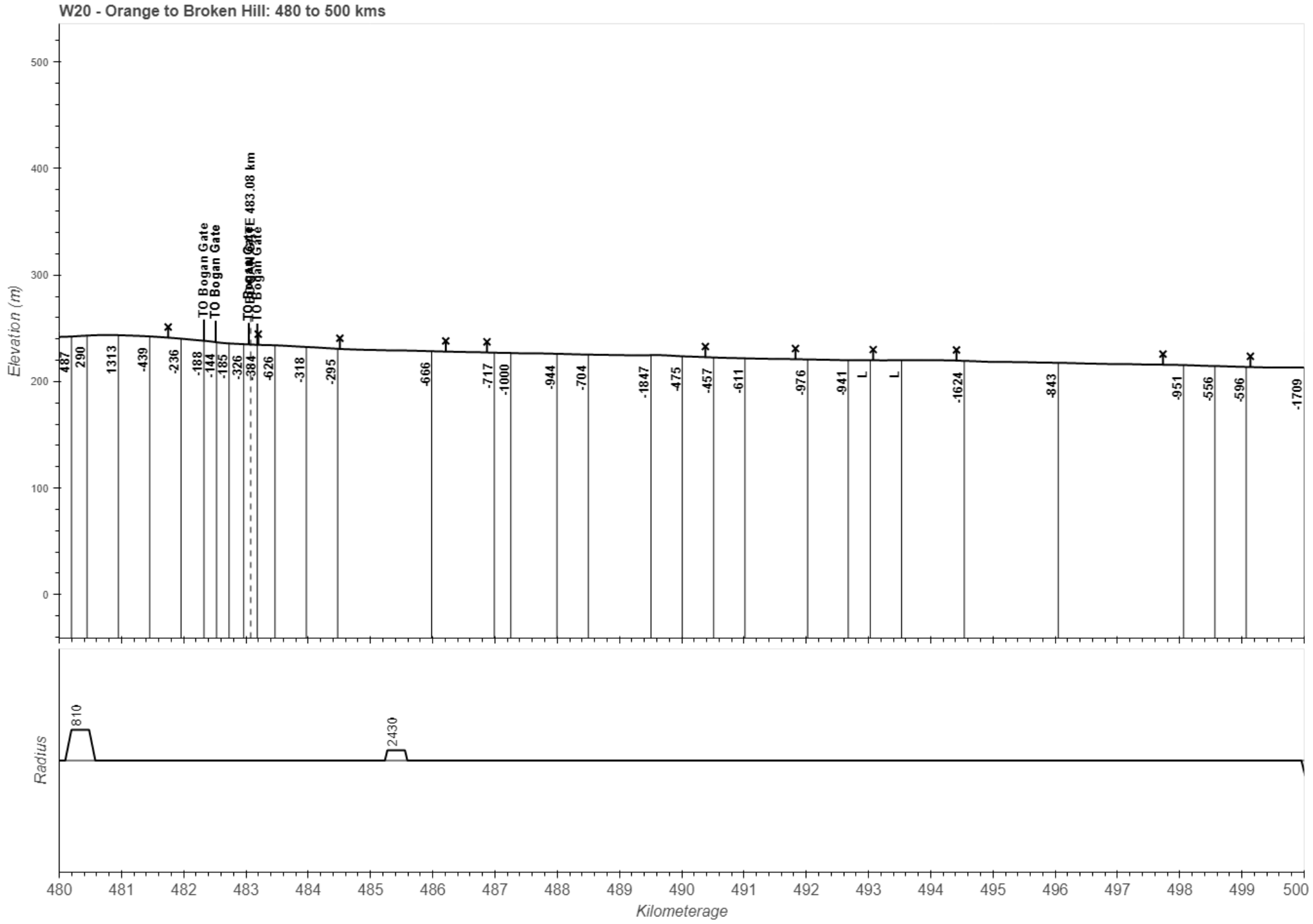
Interpretation of Diagrams

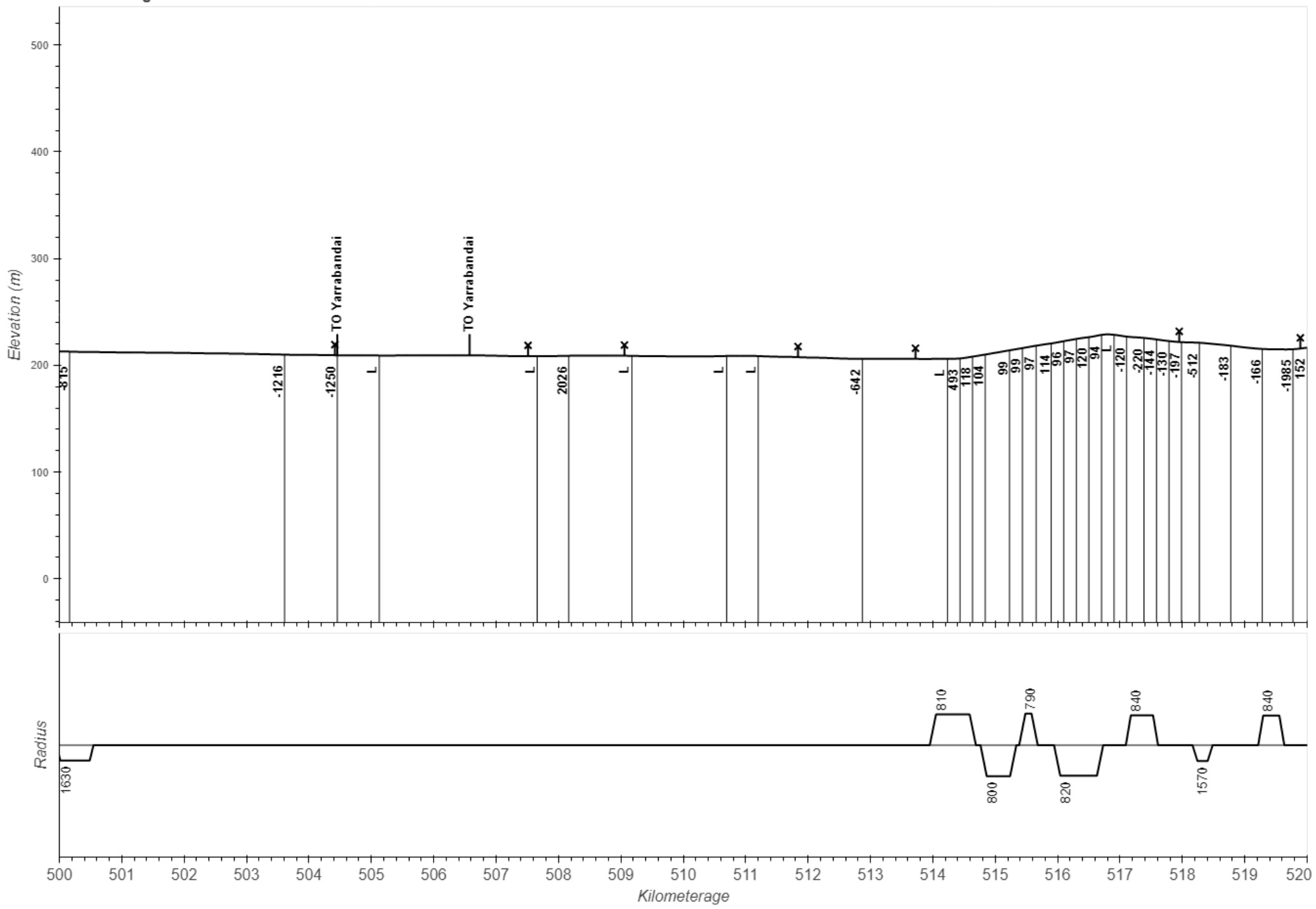


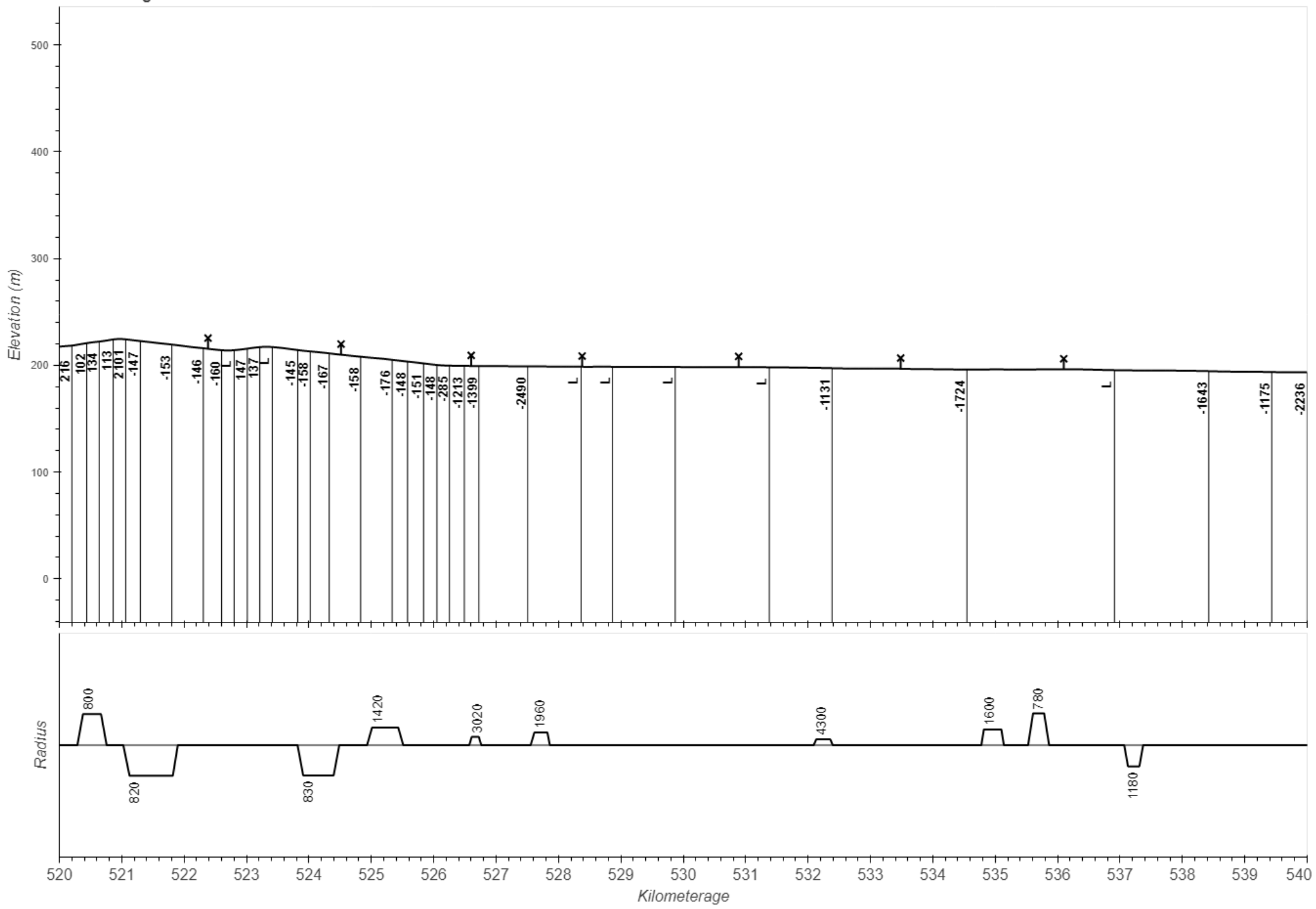
Turnout	Turnouts are denoted by a small vertical lines along the elevation profile, with a TO (turnout) prefix. A suffix of XO means that there is a crossover. These turnouts are toe of blades locations, and therefore should not be used to estimate standing length.
Tunnel	Tunnels are denoted by a step above the elevation profile. The length of the step is the length of the tunnel. The above label is the name of the tunnel.
Elevation Profile	The elevation line shows the elevation against distance. This elevation is relative to sea level, and the vertical range across an entire basecode is fixed and will not change from diagram to diagram.
Level Crossing	Level crossings are denoted by a cross on top of a vertical line above the elevation profile. This marker indicates the centre of the level crossing. Level crossings can be subject to change, so these are provided as a guide only.
Level Gradient	A level gradient is a gradient with an absolute value greater or equal to 1:2500. Level gradients are denoted by an “L”.
Route Name with Start and End Point	This is the title of the diagram. The route name is the start and finish point of the basecode. The stand and end points represent the distance covered by the diagram below.
Platform and Location	Platforms are denoted by a dashed vertical line leading up to a vertical label. Within the label, the platform name is indicated, followed by the kilometerage at platform centre. Both active and inactive platforms are included.
Gradient	The gradient is shown as a “1 in” number. A positive gradient indicates an increase in elevation and a negative gradient gradient indicates a decrease in direction. The gradients are calculated between the solid vertical lines which are approximate vertical intersection points.
Radius in Metres	The curvature is represented by the radius, in metres. The curvature line is represented as the “inverse radius”. This means that tighter curves have more deviation from the centreline. The radius labels are not inverted however, and show the radius in metres. Compound curves are stepped. The radius values are rounded depending on magnitude. < 250 is rounded to the nearest 2m, < 350 to the nearest 5m and >500 to the nearest 10m.
Centreline	The gray line on the radius plot incidicates a radius of 0. This line is included to increase the readability of curvature values.
Left Curve	Curves above the centreline indicate a left hand direction.
Right Curve	Curves below the centreline indicate a right hand direction.

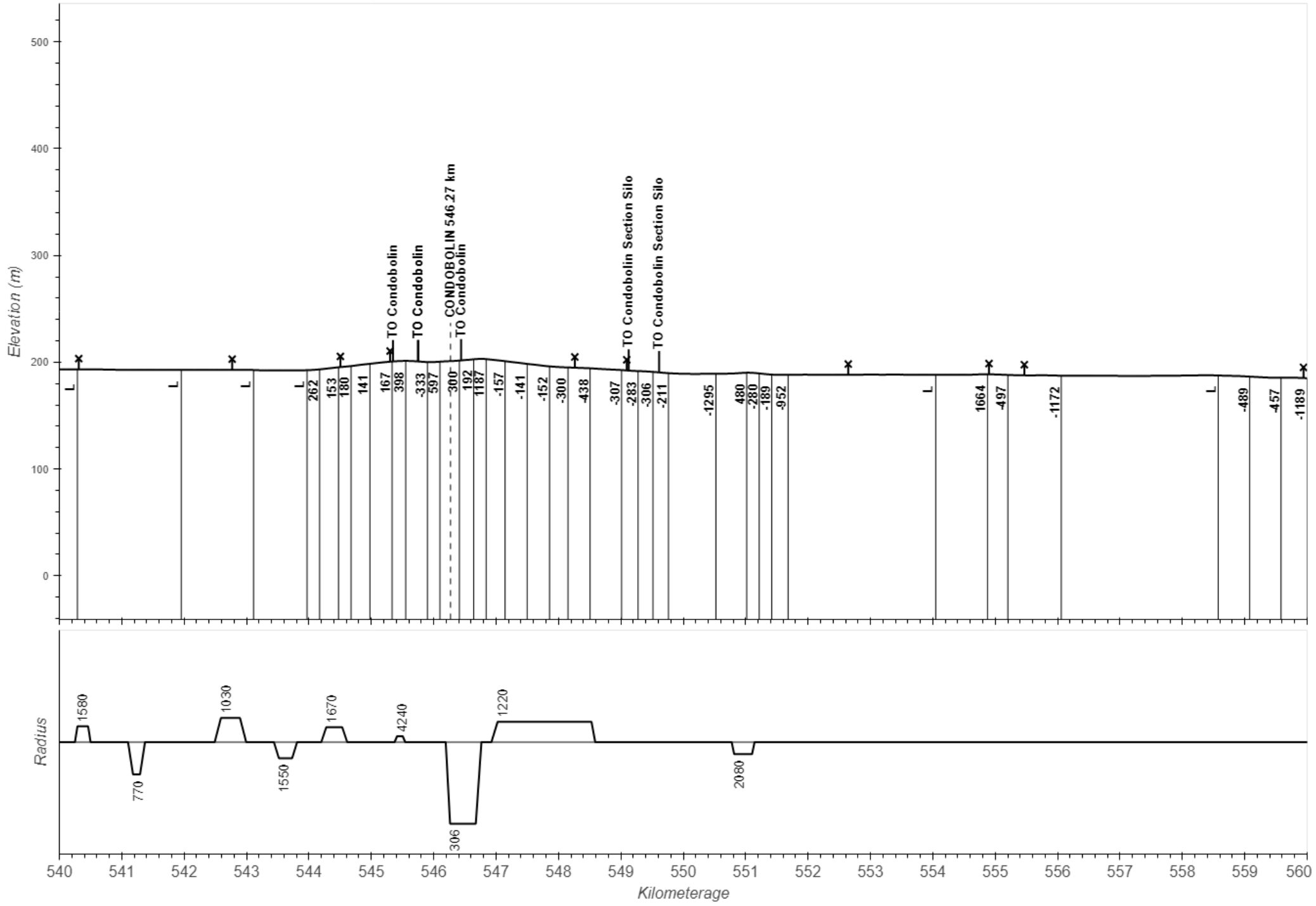

W20 - Orange to Broken Hill: 440 to 460 kms
Elevation (m)
500
400
300
200
100
0
TO Goobang Junction Xo
TO Goobang Junction Xo
TO Goobang Junction Nwl
TO Goobang Junction Nwl
397
159
531
124
129
180
196
-171
-88
-98
-104
-101
-115
-101
-98
-101
-99
-98
-103
-99
-97
-95
-98
-99
-98
-105
-103
-100
-99
-125
-394
-324
-154
-170
-207
-199
-160
-224
-206
-299
-447
-570
-471
Radius
485
485
1040
1440
1380
820
840
820
800
800
440
441
442
443
444
445
446
447
448
449
450
451
452
453
454
455
456
457
458
459
460
Kilometerage

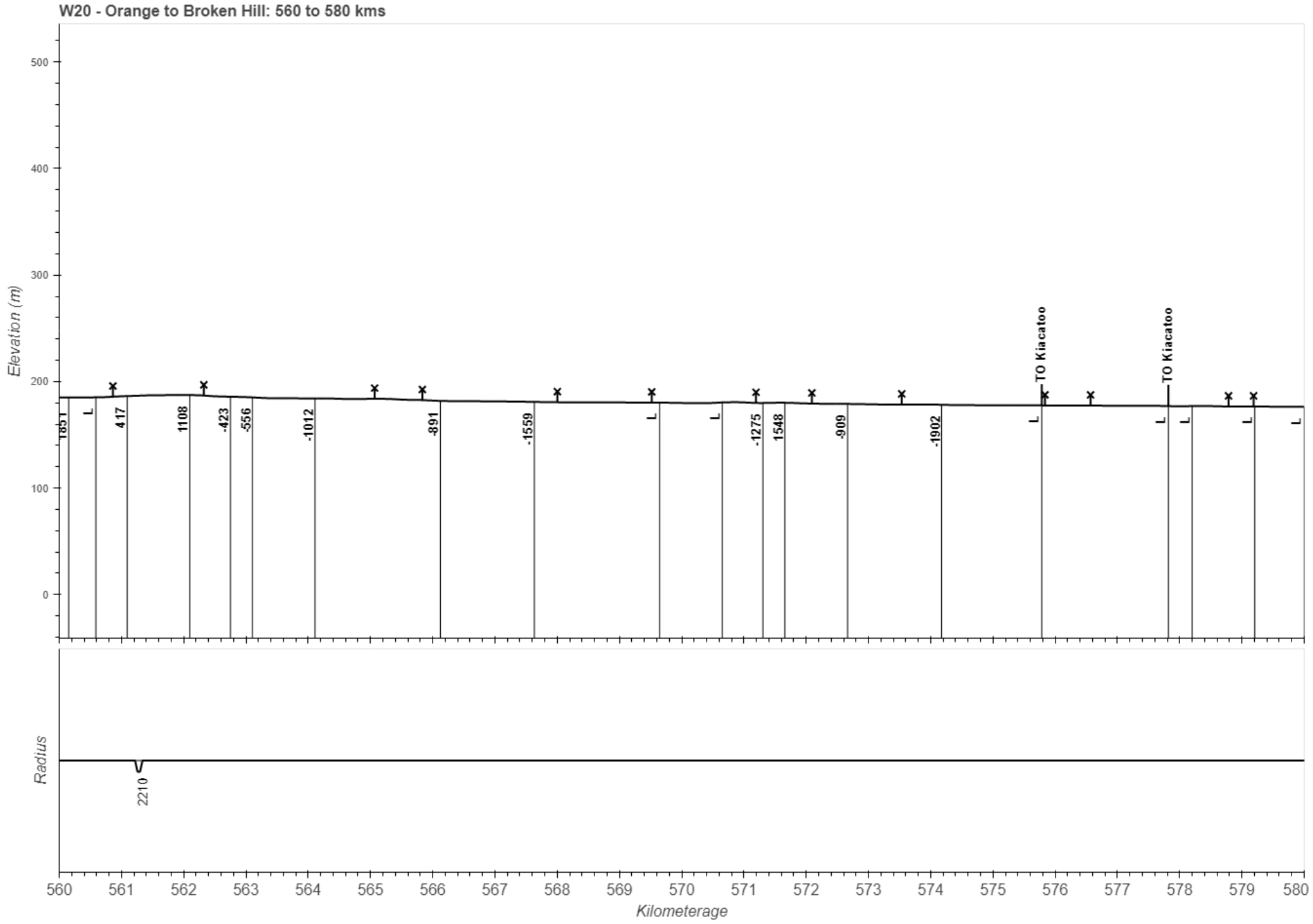

W20 - Orange to Broken Hill: 460 to 480 kms
Elevation (m)
500
400
300
200
100
0
-724
-1676
L
L
248
139
219
197
131
130
110
257
-1129
170
103
194
955
157
114
192
-174
-157
494
641
116
131
-225
-87
-111
-1343
-520
TO Gunningbland
540
TO Gunningbland
173
118
120
-620
-109
-112
-191
303
120
208
-724
-157
-146
-111
-337
-385
-107
-105
-93
-95
-93
-109
-113
-100
-96
-102
-98
-120
-275
-419
-753
-431
475
Radius
4330
1050
810
800
840
810
800
2440
820
1280
800
800
1190
1260
460
461
462
463
464
465
466
467
468
469
470
471
472
473
474
475
476
477
478
479
480
Kilometerage

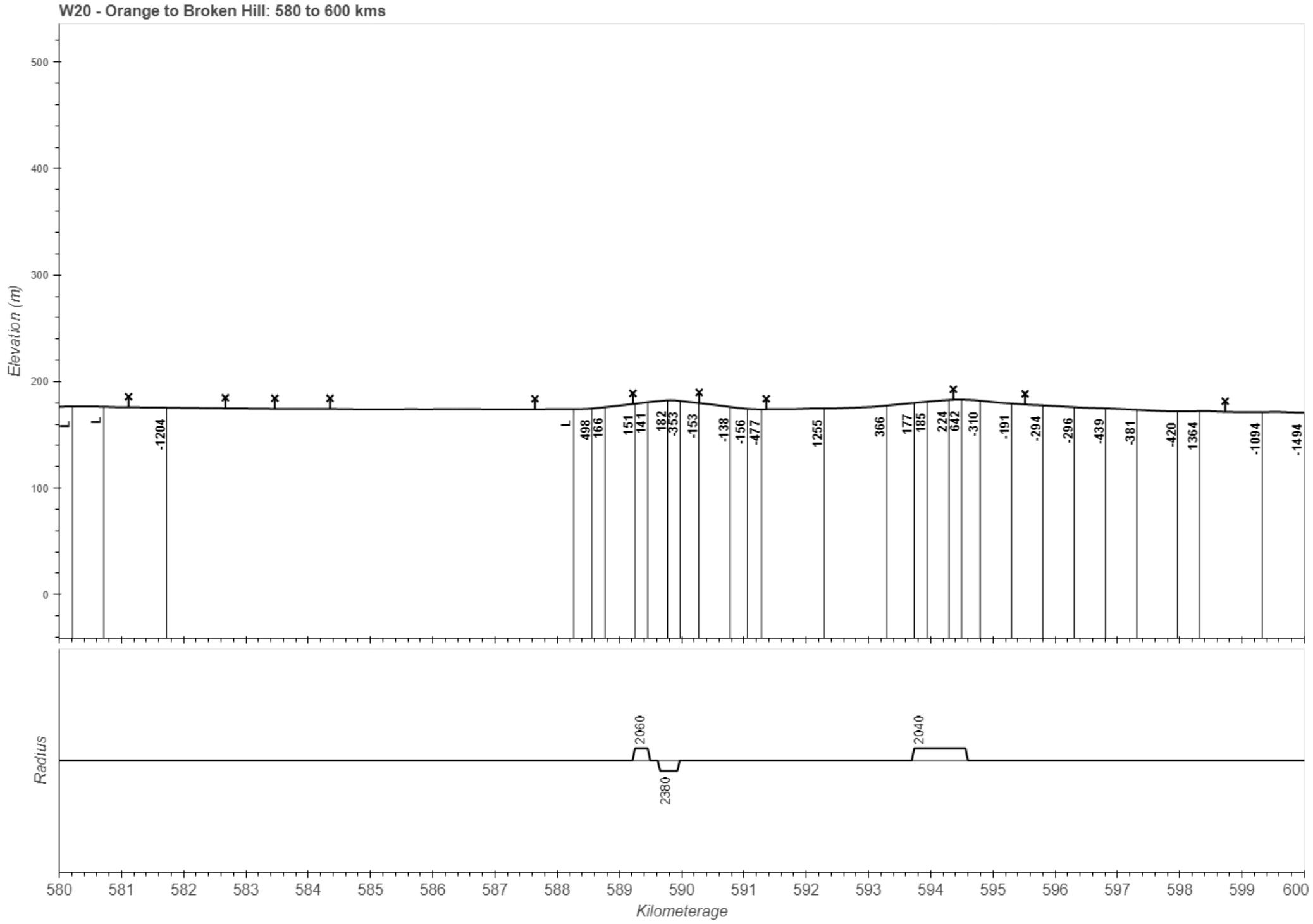

W20 - Orange to Broken Hill: 480 to 500 kms
Elevation (m)
500
400
300
200
100
0
TO Bogan Gate
TO Bogan Gate
TO Bogan Gate
TO Bogan Gate
TO Bogan Gate 483.08 km
487
290
1313
-439
-236
-188
-144
-185
-326
-384
-626
-318
-295
-666
-717
-1000
-944
-704
-1847
-475
-457
-611
-976
-941
L
L
-1624
-843
-951
-556
-596
-1709
Radius
810
2430
480
481
482
483
484
485
486
487
488
489
490
491
492
493
494
495
496
497
498
499
500
Kilometerage

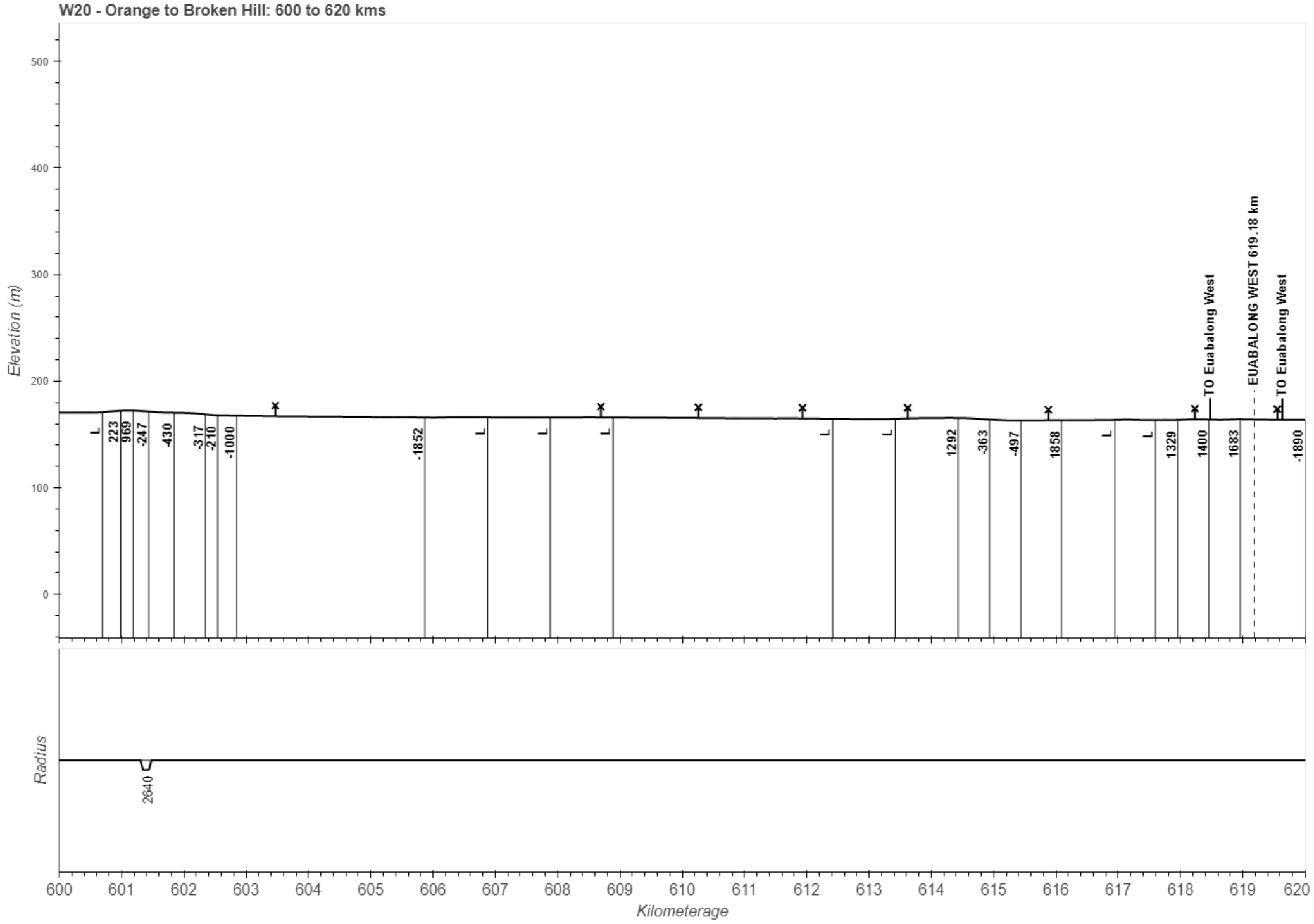

W20 - Orange to Broken Hill: 500 to 520 kms
Elevation (m)
500
400
300
200
100
0
TO Yarrabandai
TO Yarrabandai
-315
-1216
-1250
L
L
2026
L
L
L
-642
L
493
118
104
99
99
97
114
96
97
120
94
L
-120
-220
-144
-130
-197
-512
-183
-166
-1985
152
Radius
1630
810
800
790
820
840
1570
840
500
501
502
503
504
505
506
507
508
509
510
511
512
513
514
515
516
517
518
519
520
Kilometerage

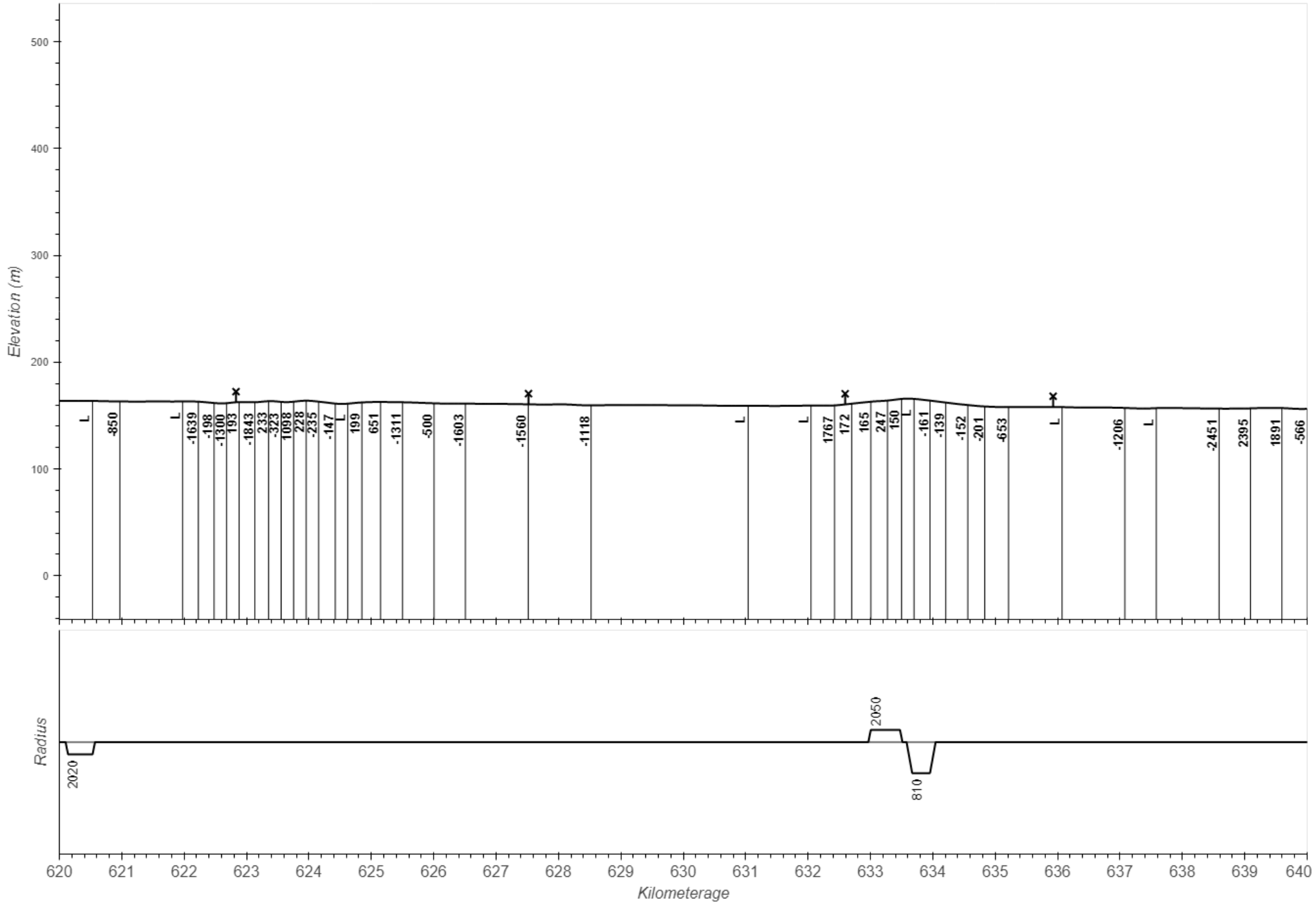

W20 - Orange to Broken Hill: 520 to 540 kms
Elevation (m)
500
400
300
200
100
0
216
102
134
113
2101
-147
-153
-146
-160
L
147
137
L
-145
-158
-167
-158
-176
-148
-151
-148
-285
-1213
-1399
-2490
L
L
L
L
-1131
-1724
L
-1643
-1175
-2236
Radius
800
820
830
1420
3020
1960
4300
1600
780
1180
520
521
522
523
524
525
526
527
528
529
530
531
532
533
534
535
536
537
538
539
540
Kilometerage

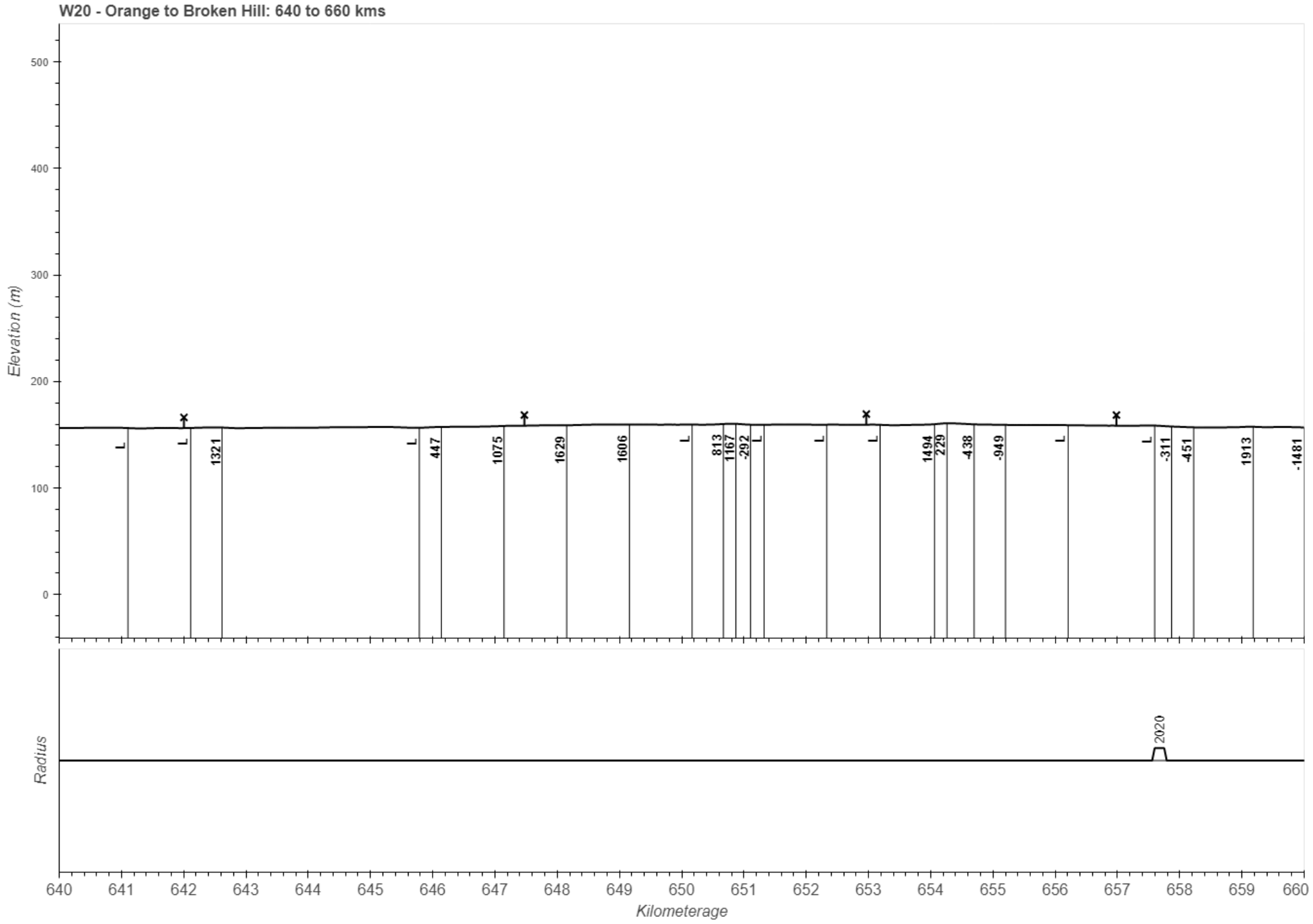

W20 - Orange to Broken Hill: 540 to 560 kms
Elevation (m)
500
400
300
200
100
0
TO Condobolin
TO Condobolin
CONDOBOLIN 546.27 km
TO Condobolin
TO Condobolin Section Silo
TO Condobolin Section Silo
L
L
L
L
262
153
180
141
167
398
-333
597
300
192
1187
-157
-141
-152
-300
-438
-307
-283
-306
-211
-1295
480
-280
-189
-952
L
1664
-497
-1172
L
-489
-457
-1189
Radius
1580
770
1030
1550
1670
4240
306
1220
2080
540
541
542
543
544
545
546
547
548
549
550
551
552
553
554
555
556
557
558
559
560
Kilometerage

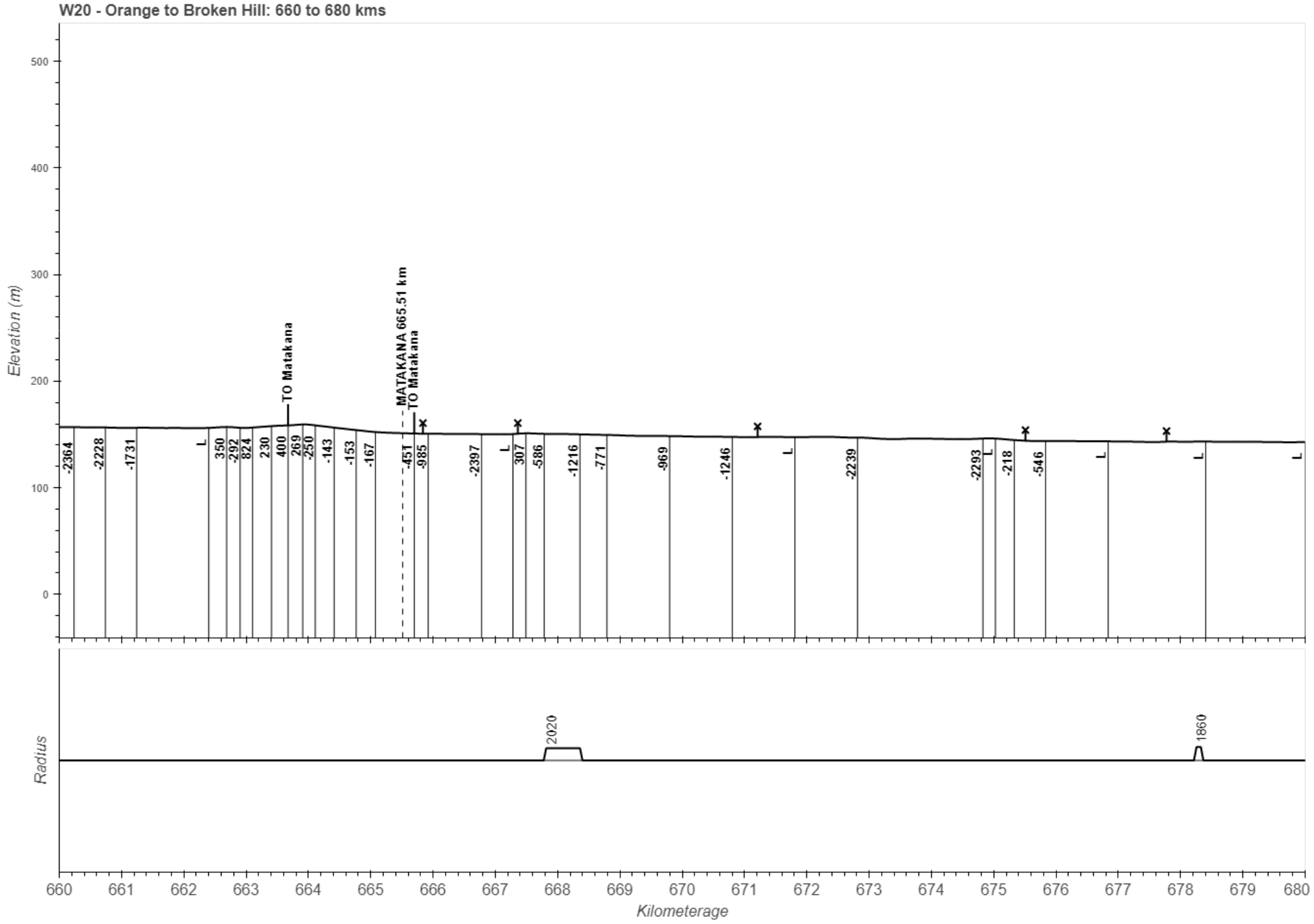

W20 - Orange to Broken Hill: 560 to 580 kms
Elevation (m)
500
400
300
200
100
0
185 L
417
1108
-423
-556
-1012
-891
-1559
L
L
-1275
1548
-909
-1902
L
TO Kiacatoo
L
TO Kiacatoo
L
L
L
Radius
2210
560
561
562
563
564
565
566
567
568
569
570
571
572
573
574
575
576
577
578
579
580
Kilometerage

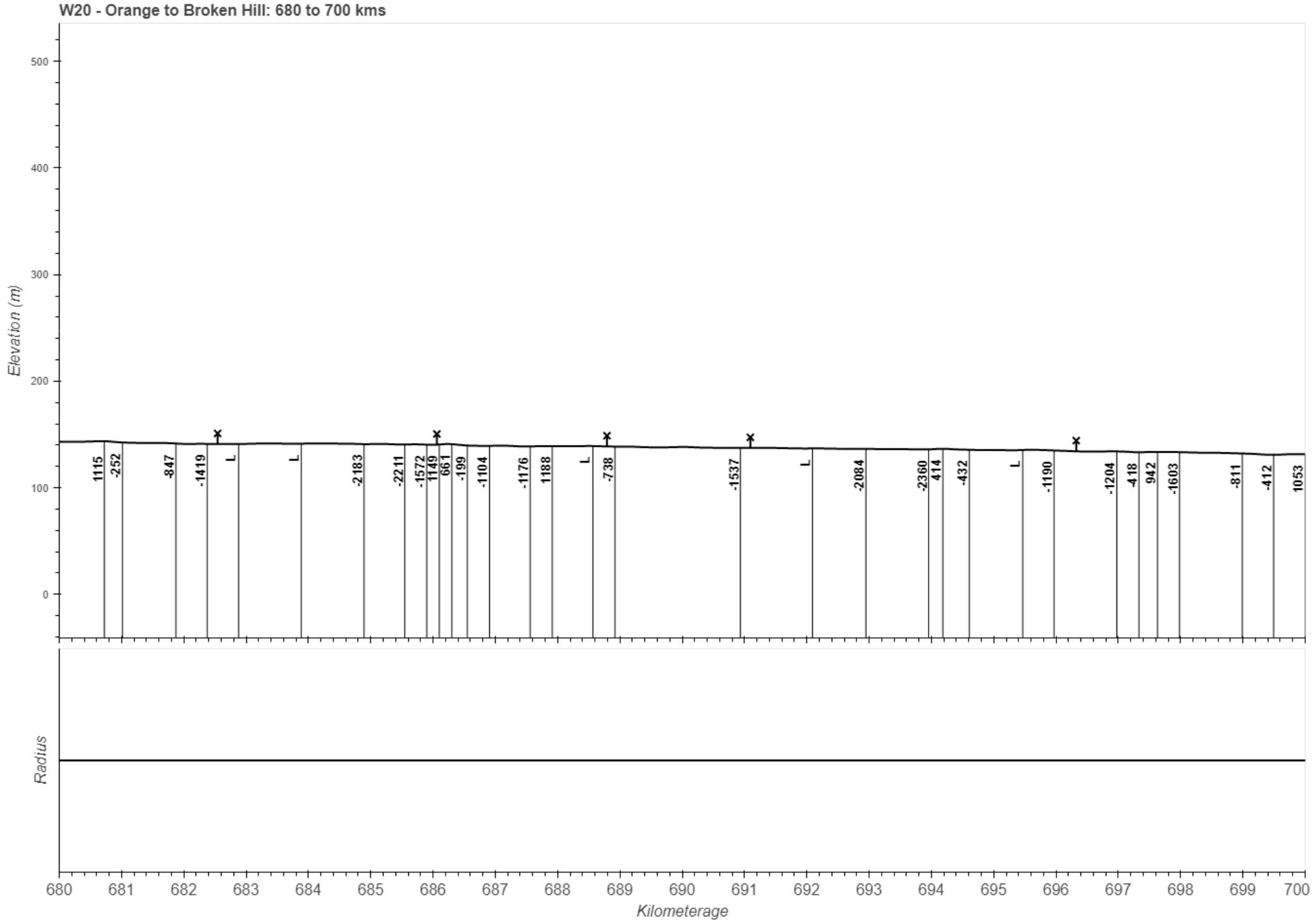

W20 - Orange to Broken Hill: 580 to 600 kms
Elevation (m)
500
400
300
200
100
0
L
L
-1204
L
498
166
151
141
182
-353
-153
-138
-156
-477
1255
366
177
185
224
642
-310
-191
-294
-296
-439
-381
-420
1364
-1094
-1494
Radius
2060
2380
2040
580
581
582
583
584
585
586
587
588
589
590
591
592
593
594
595
596
597
598
599
600
Kilometerage

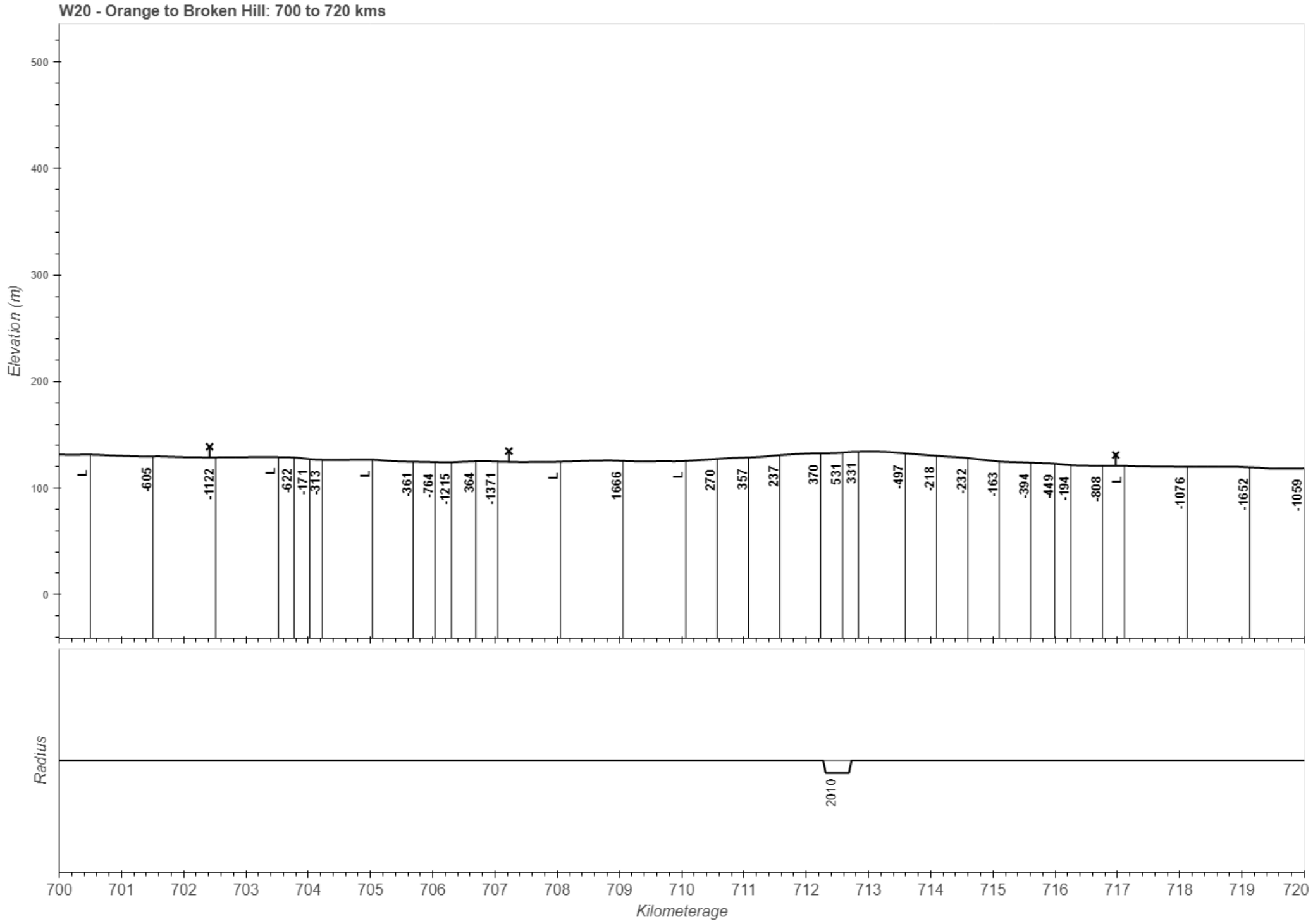

W20 - Orange to Broken Hill: 600 to 620 kms
Elevation (m)
500
400
300
200
100
0
L
223
969
-247
-430
-317
-210
-1000
-1852
L
L
L
L
L
1292
-363
-497
1858
L
L
1329
1400
1683
-1890
TO Euabalong West
EUABALONG WEST 619.18 km
TO Euabalong West
Radius
2640
600
601
602
603
604
605
606
607
608
609
610
611
612
613
614
615
616
617
618
619
620
Kilometerage

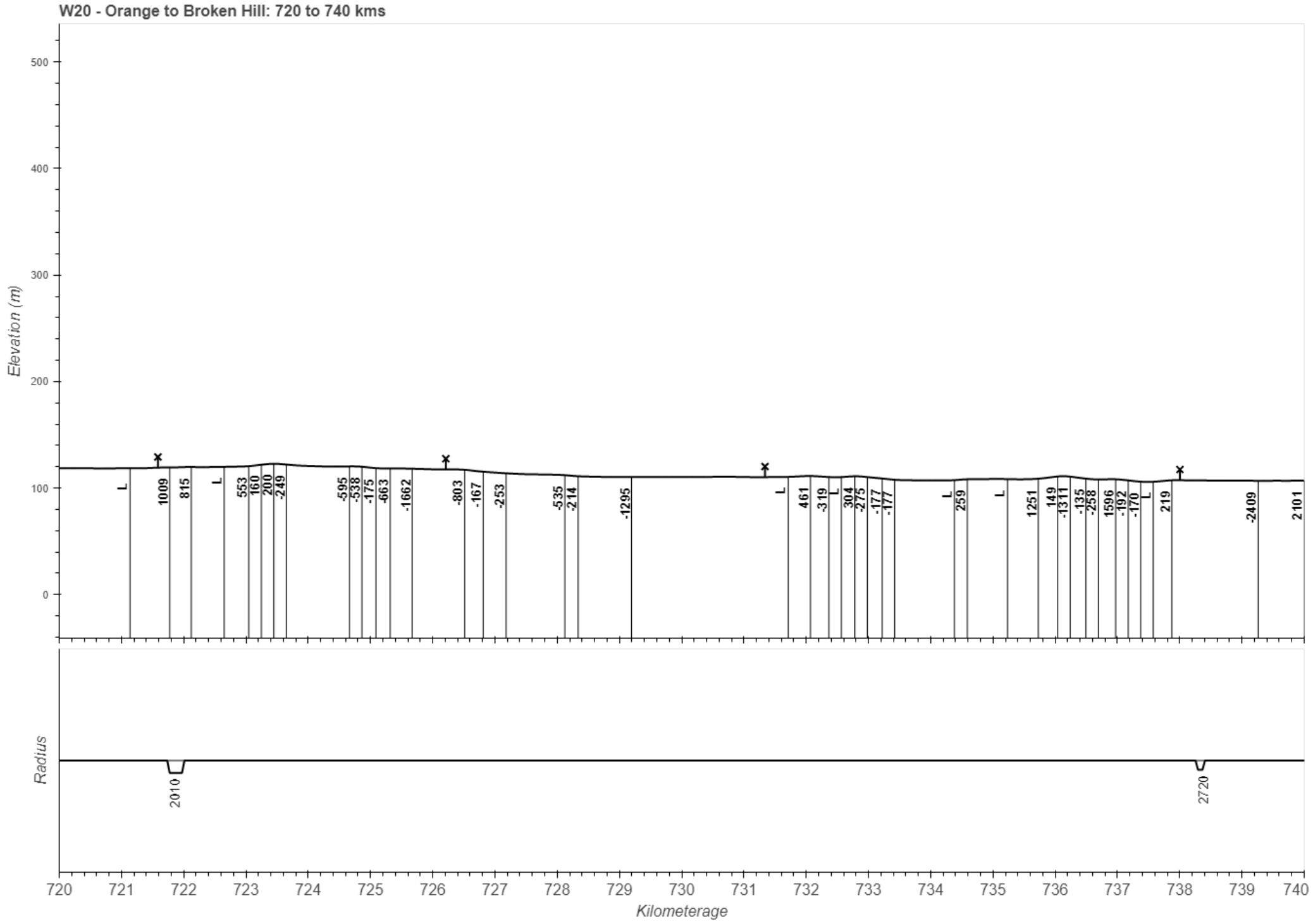

W20 - Orange to Broken Hill: 620 to 640 kms
Elevation (m)
500
400
300
200
100
0
L
-850
L
-1639
-198
-1300
193
-1843
233
-323
1098
228
-235
-147
L
199
651
-1311
-500
-1603
-1560
-1118
L
L
1767
172
165
247
150
L
-161
-139
-152
-201
-653
L
-1206
L
-2451
2395
1891
-566
Radius
2020
2050
810
620
621
622
623
624
625
626
627
628
629
630
631
632
633
634
635
636
637
638
639
640
Kilometerage

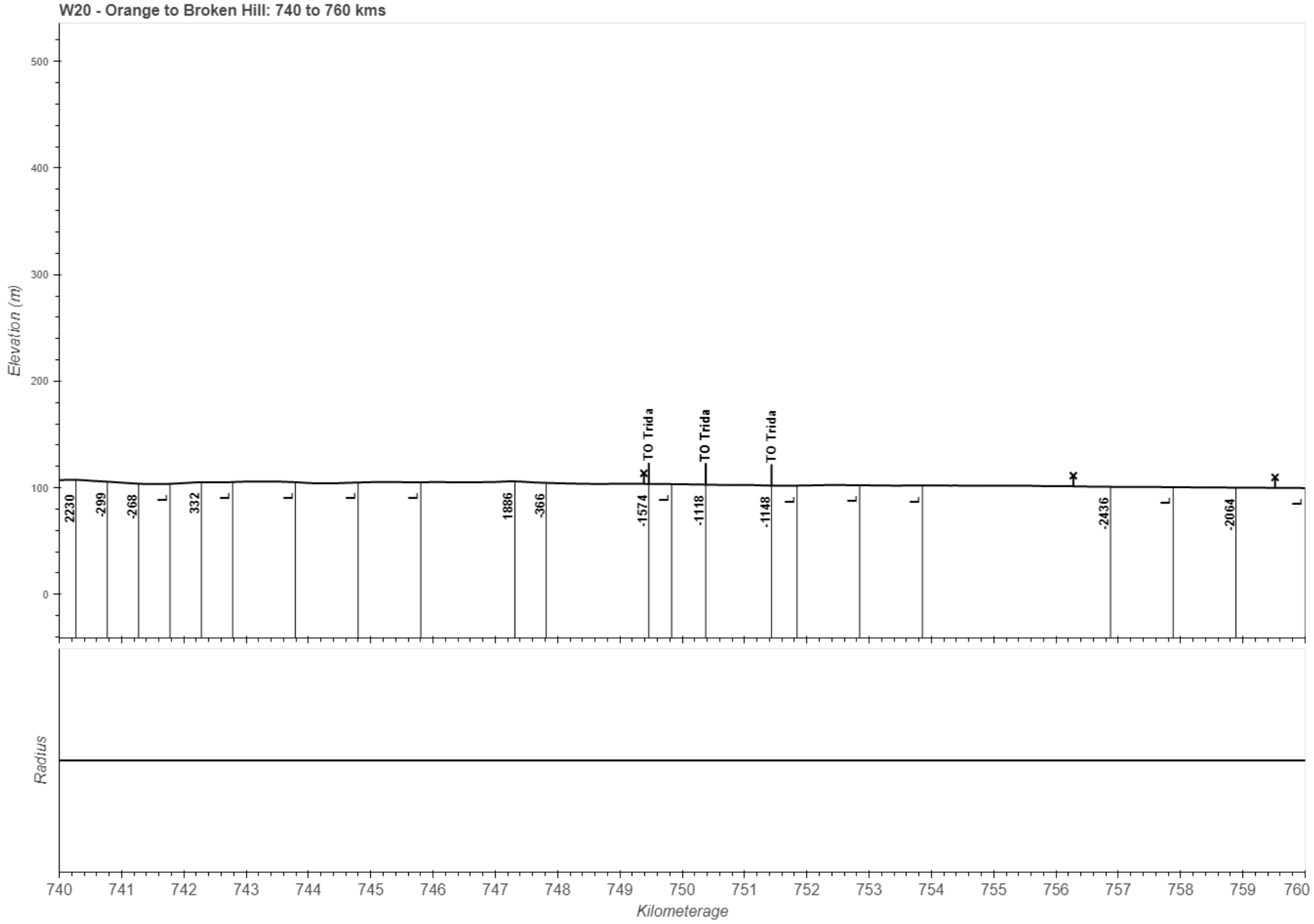

W20 - Orange to Broken Hill: 640 to 660 kms
Elevation (m)
500
400
300
200
100
0
L
L
1321
L
447
1075
1629
1606
L
813
1167
-292
L
L
L
1494
229
-438
-949
L
L
-311
-451
1913
-1481
Radius
2020
640
641
642
643
644
645
646
647
648
649
650
651
652
653
654
655
656
657
658
659
660
Kilometerage

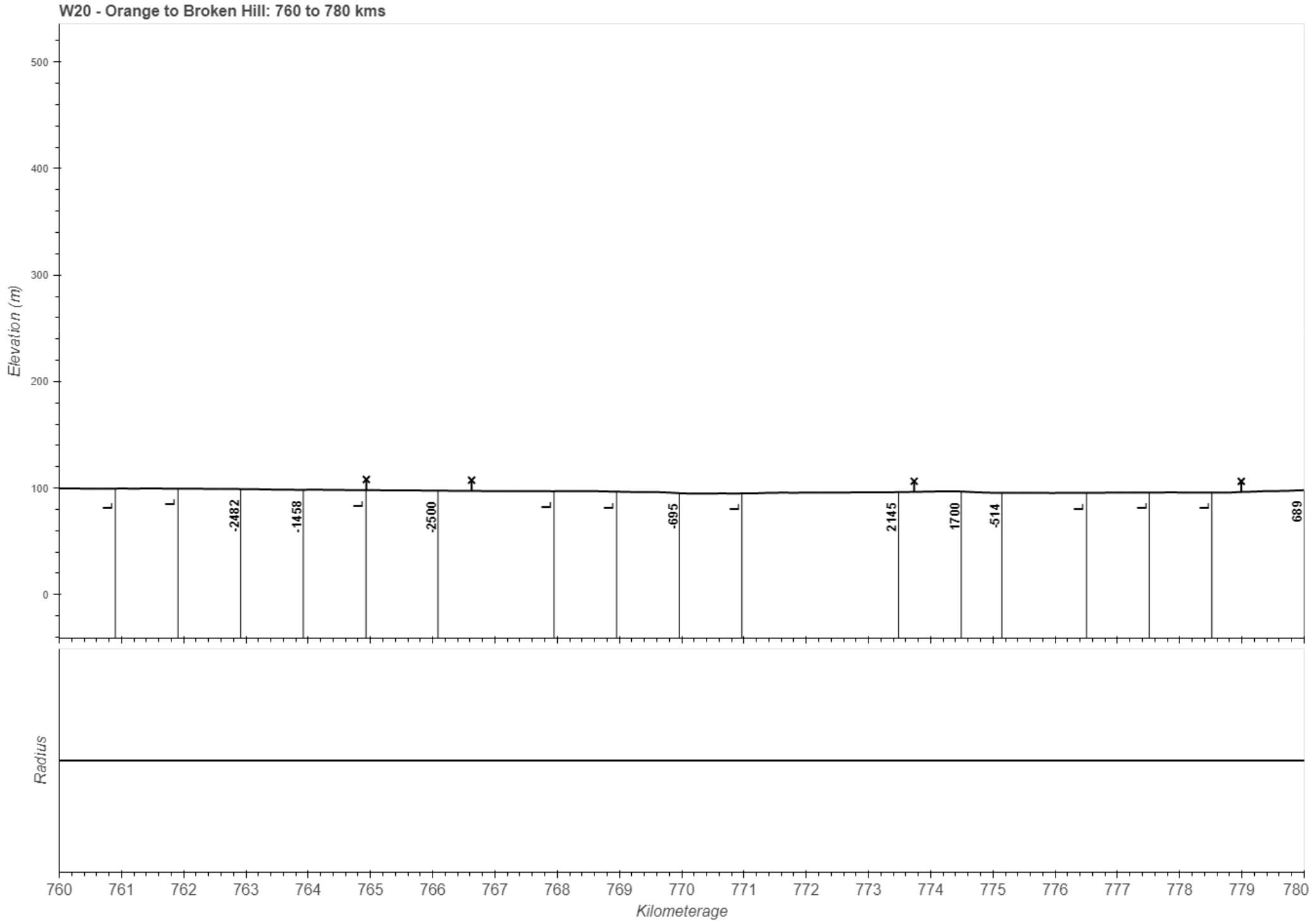

W20 - Orange to Broken Hill: 660 to 680 kms
Elevation (m)
500
400
300
200
100
0
TO Matakana
MATAKANA 665.51 km
TO Matakana
-2364
-2228
-1731
L
350
-292
824
230
400
269
250
-143
-153
-167
-451
-985
-2397
L
307
-586
-1216
-771
-969
-1246
L
-2239
-2293
L
-218
-546
L
L
L
Radius
2020
1860
660
661
662
663
664
665
666
667
668
669
670
671
672
673
674
675
676
677
678
679
680
Kilometerage

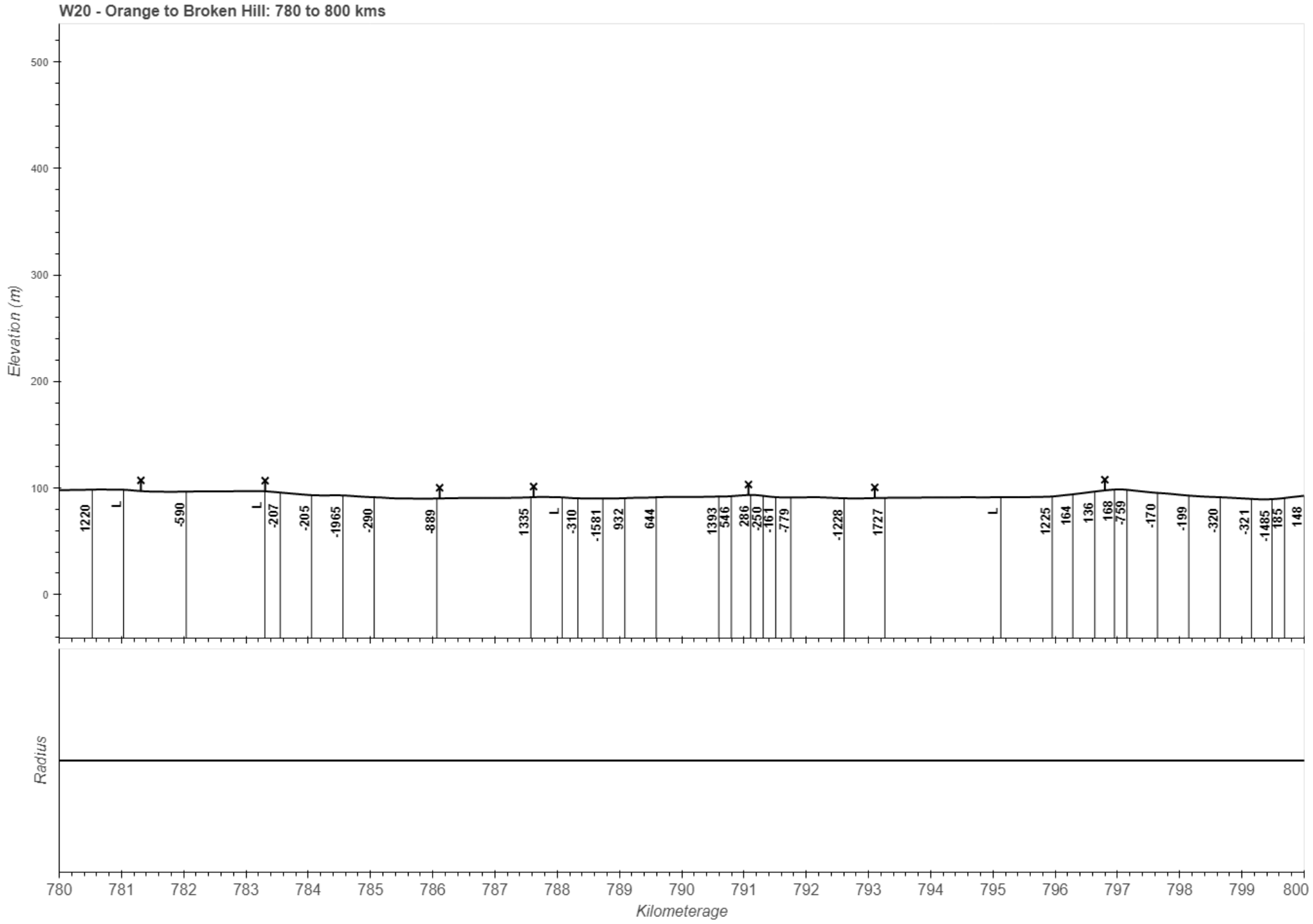

W20 - Orange to Broken Hill: 680 to 700 kms
Elevation (m)
500
400
300
200
100
0
1115
-252
-847
-1419
L
L
-2183
-2211
-1572
1149
661
-199
-1104
-1176
1188
L
-738
-1537
L
-2084
-2360
414
-432
L
-1190
-1204
418
942
-1603
-811
-412
1053
Radius
680
681
682
683
684
685
686
687
688
689
690
691
692
693
694
695
696
697
698
699
700
Kilometerage

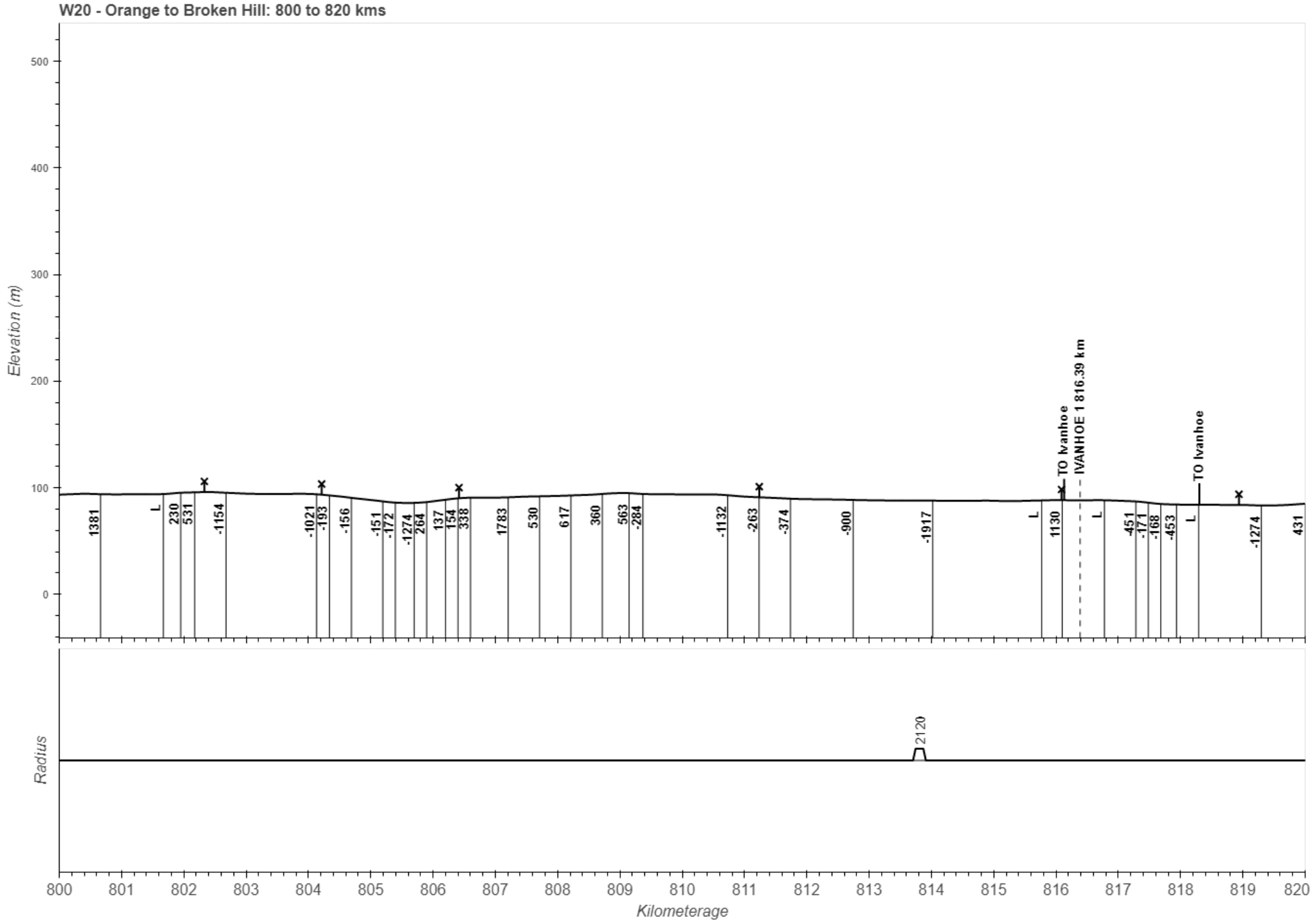

W20 - Orange to Broken Hill: 700 to 720 kms
Elevation (m)
500
400
300
200
100
0
L
-605
-1122
L
-622
-171
-313
L
-361
-764
-1215
364
-1371
L
1666
L
270
357
237
370
531
331
-497
-218
-232
-163
-394
-449
-194
-808
L
-1076
-1652
-1059
Radius
2010
700
701
702
703
704
705
706
707
708
709
710
711
712
713
714
715
716
717
718
719
720
Kilometerage

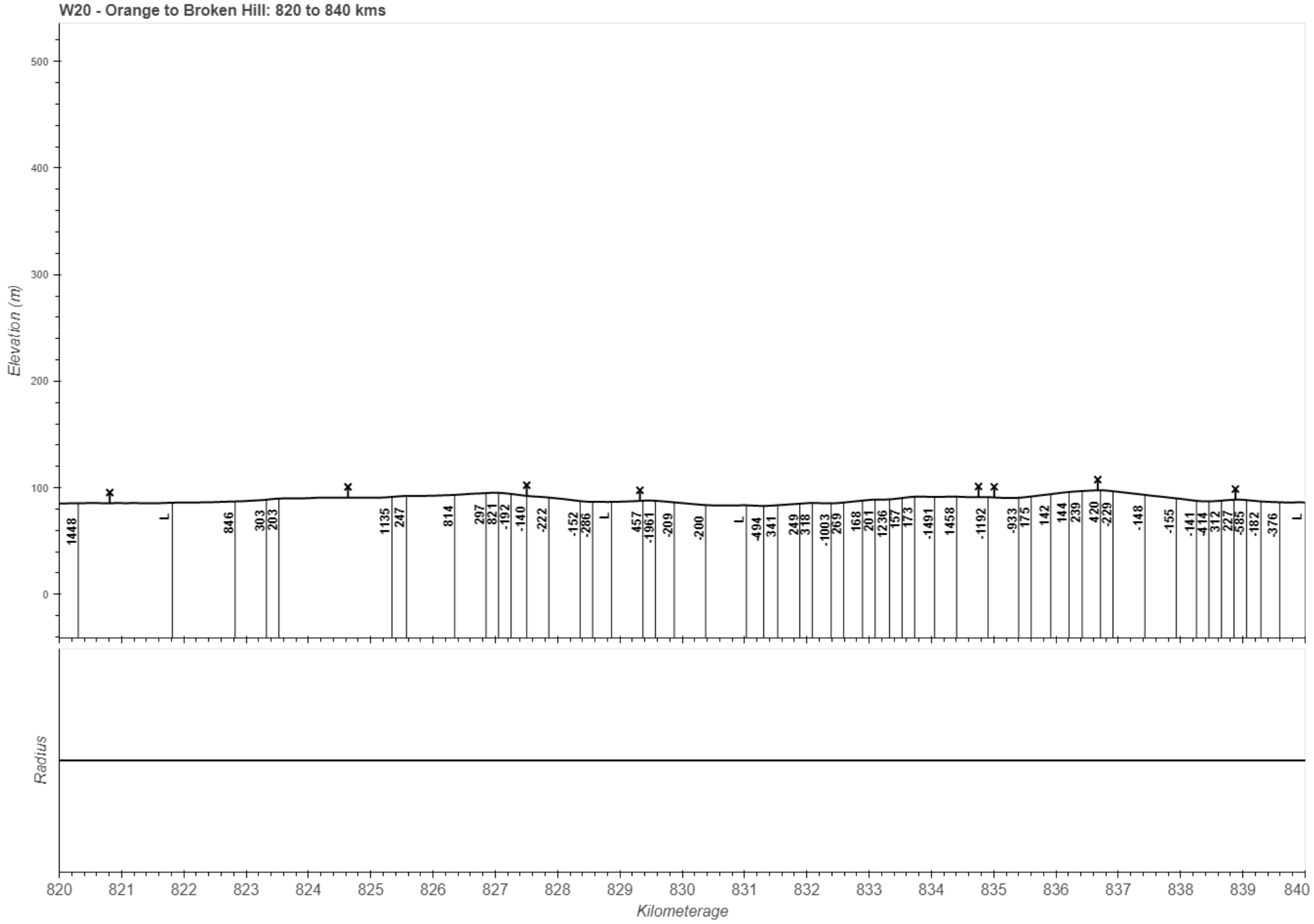

W20 - Orange to Broken Hill: 720 to 740 kms
Elevation (m)
500
400
300
200
100
0
L
1009
815
L
553
160
200
-249
-595
-538
-175
-663
-1662
-803
-167
-253
-535
-214
-1295
L
461
-319
L
304
-275
-177
-177
L
259
L
1251
149
-1311
-135
-258
1596
-192
-170
L
219
-2409
2101
Radius
2010
2720
720
721
722
723
724
725
726
727
728
729
730
731
732
733
734
735
736
737
738
739
740
Kilometerage

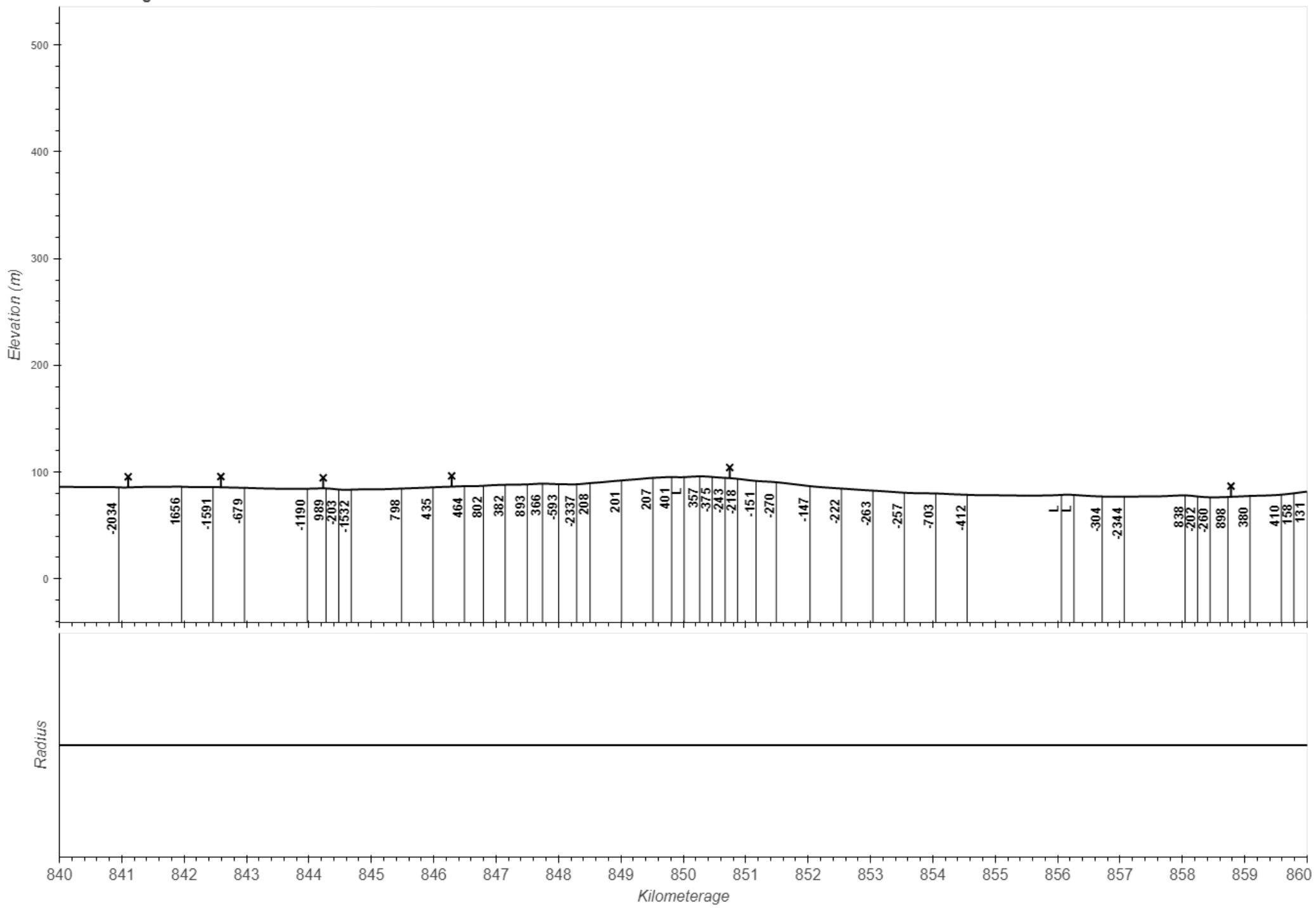

W20 - Orange to Broken Hill: 740 to 760 kms
Elevation (m)
500
400
300
200
100
0
2230
-299
-268
L
332
L
L
L
L
1886
-366
TO Trida
-1574
L
TO Trida
-1118
TO Trida
-1148
L
L
L
-2436
L
-2064
L
Radius
740
741
742
743
744
745
746
747
748
749
750
751
752
753
754
755
756
757
758
759
760
Kilometerage

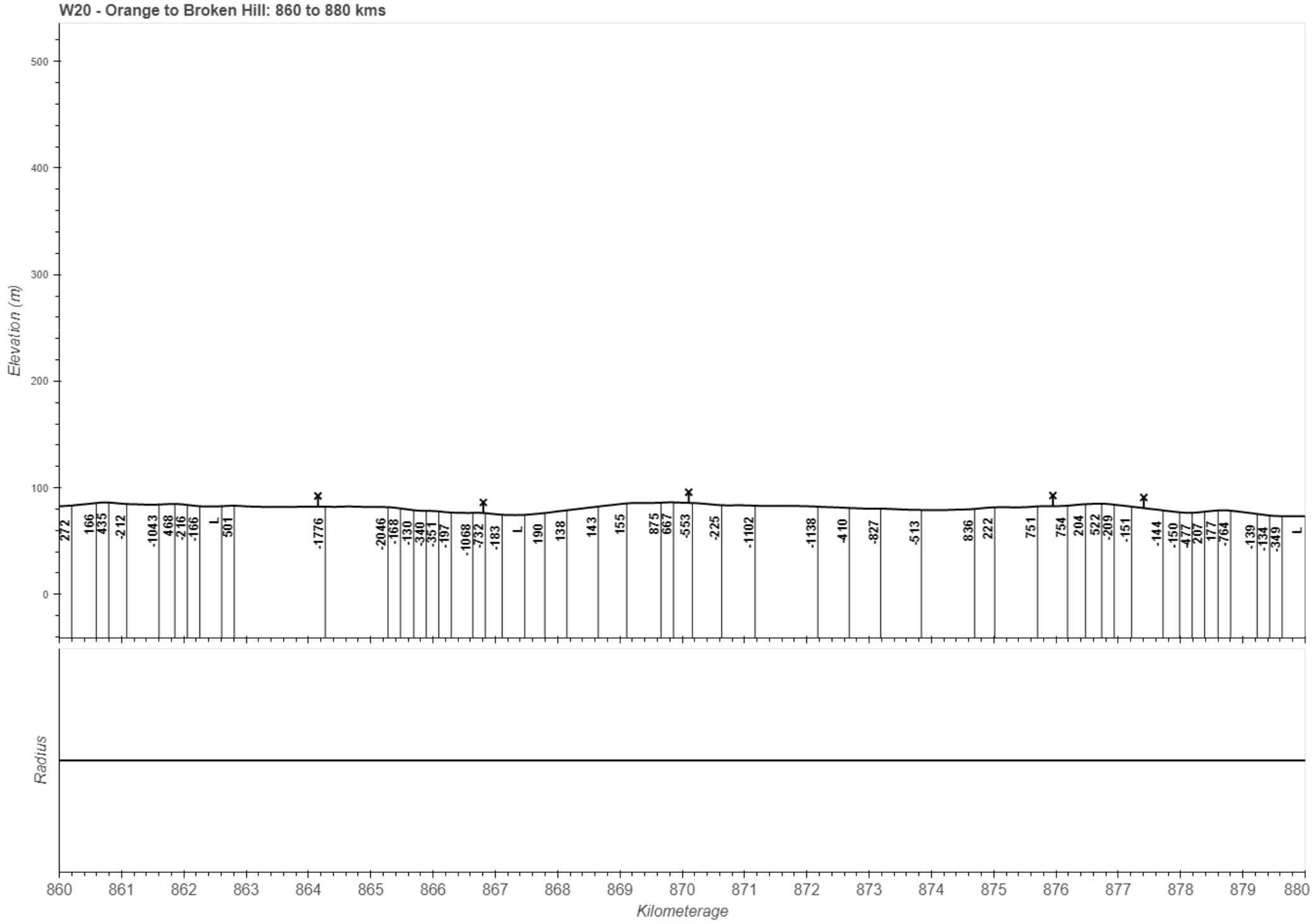

W20 - Orange to Broken Hill: 760 to 780 kms
Elevation (m)
500
400
300
200
100
0
L
L
-2482
-1458
L
-2500
L
L
-695
L
2145
1700
-514
L
L
L
689
Radius
760
761
762
763
764
765
766
767
768
769
770
771
772
773
774
775
776
777
778
779
780
Kilometerage

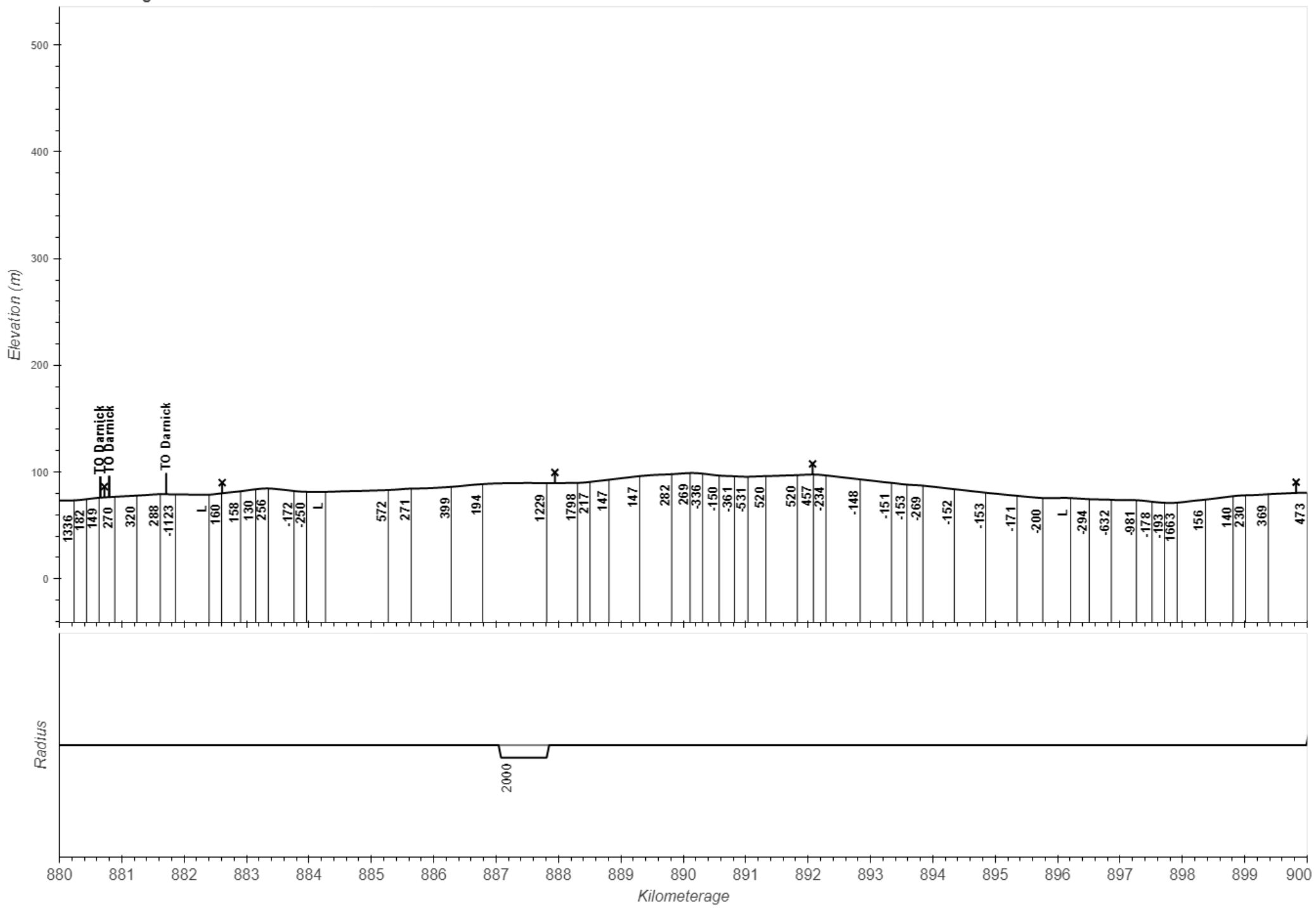

W20 - Orange to Broken Hill: 780 to 800 kms
Elevation (m)
500
400
300
200
100
0
1220
L
-590
L
-207
-205
-1965
-290
-889
1335
L
-310
-1581
932
644
1393
546
286
-250
-161
-779
-1228
1727
L
1225
164
136
168
-759
-170
-199
-320
-321
-1485
185
148
Radius
780
781
782
783
784
785
786
787
788
789
790
791
792
793
794
795
796
797
798
799
800
Kilometerage

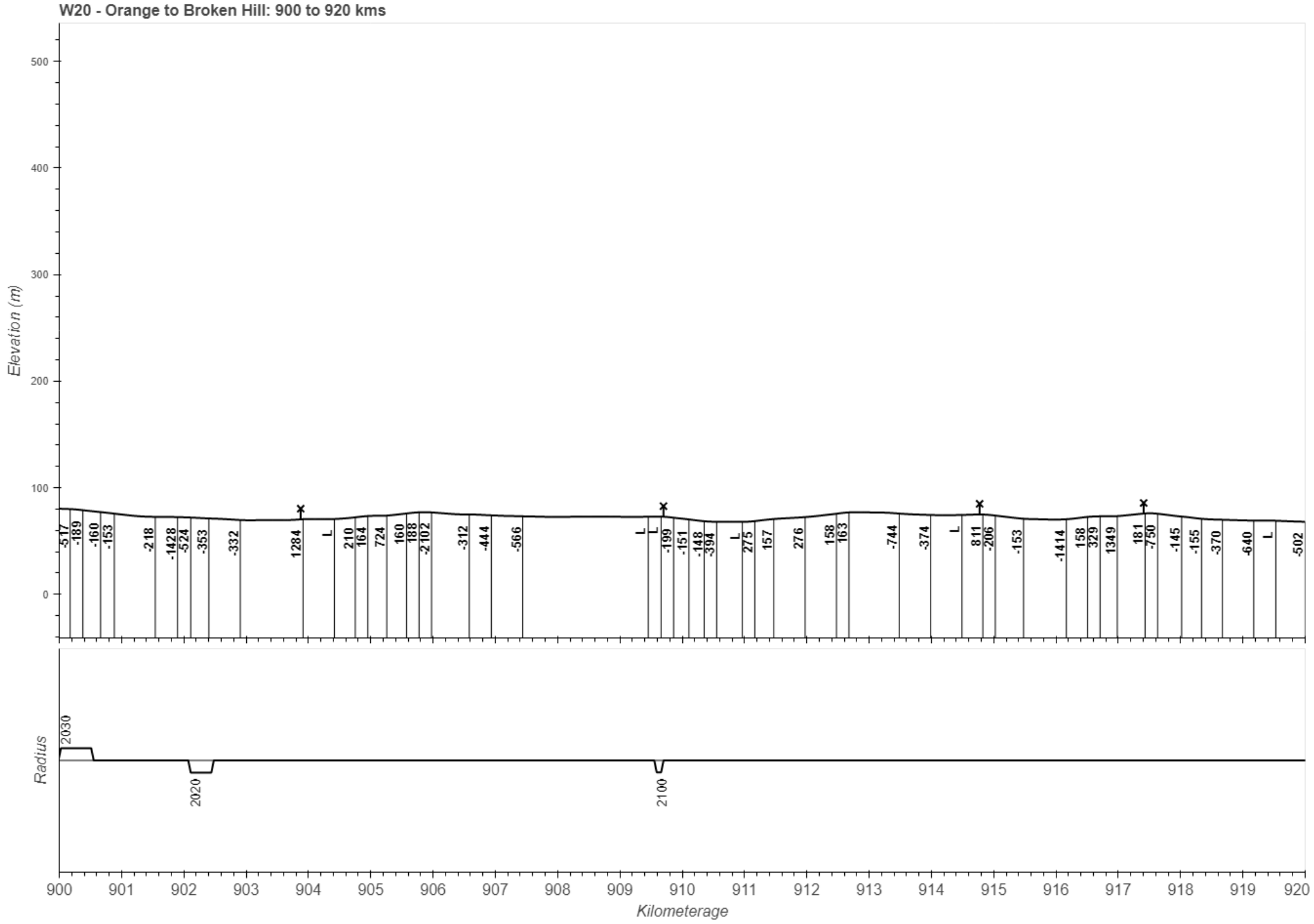

W20 - Orange to Broken Hill: 800 to 820 kms
Elevation (m)
500
400
300
200
100
0
1381
L
230
531
-1154
-1021
-193
-156
-151
-172
-1274
264
137
154
338
1783
530
617
360
563
-284
-1132
-263
-374
-900
-1917
L
1130
TO Ivanhoe
IVANHOE 1 816.39 km
L
451
-171
-168
-453
L
TO Ivanhoe
-1274
431
Radius
2120
800
801
802
803
804
805
806
807
808
809
810
811
812
813
814
815
816
817
818
819
820
Kilometerage

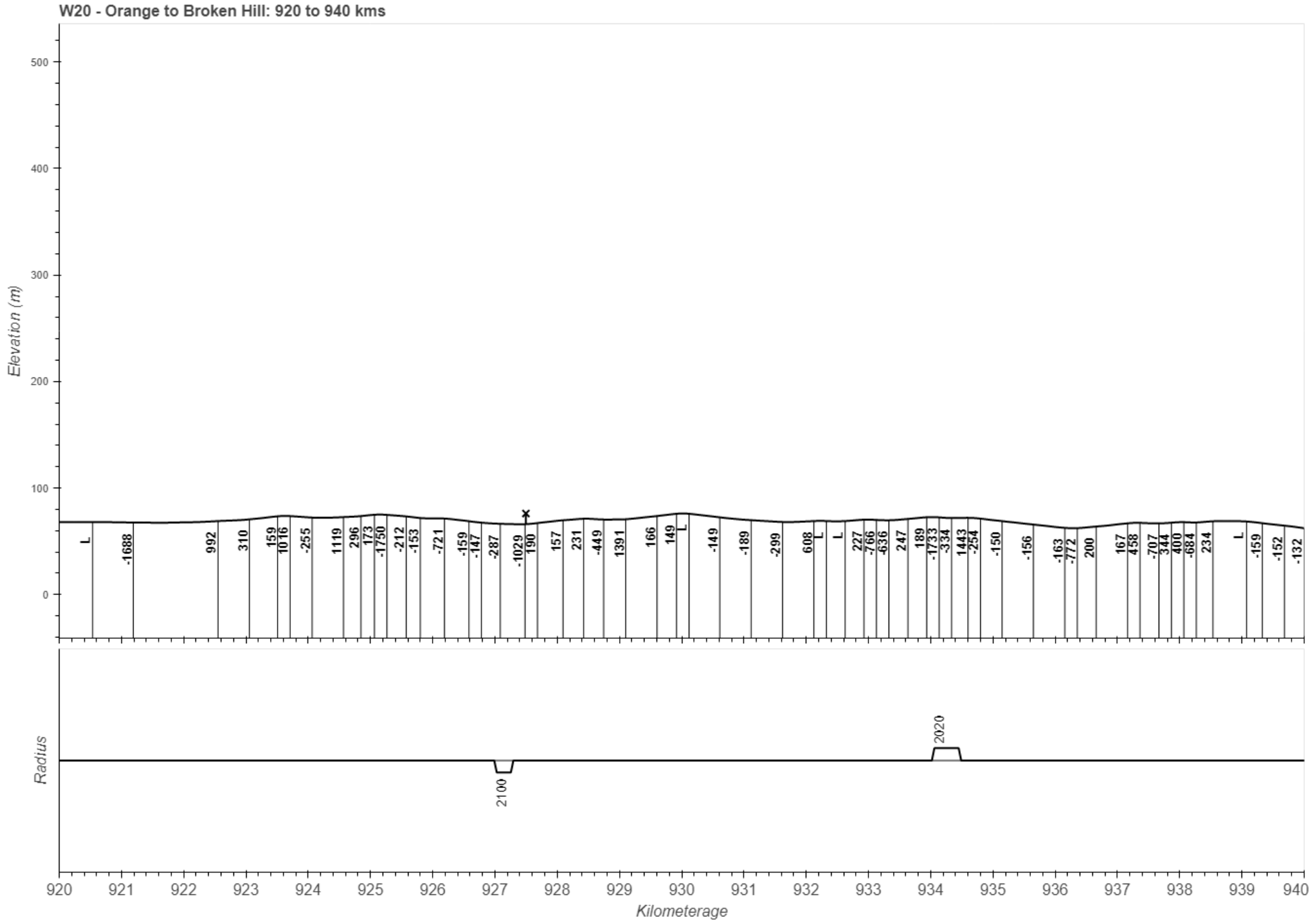

W20 - Orange to Broken Hill: 820 to 840 kms
Elevation (m)
500
400
300
200
100
0
1448
L
846
303
203
1135
247
814
297
821
-192
-140
-222
-152
-286
L
457
-1961
-209
-200
L
-494
341
249
318
-1003
269
168
201
1236
157
173
-1491
1458
-1192
-933
175
142
144
239
420
-229
-148
-155
-141
-414
312
227
-585
-182
-376
L
Radius
820
821
822
823
824
825
826
827
828
829
830
831
832
833
834
835
836
837
838
839
840
Kilometerage

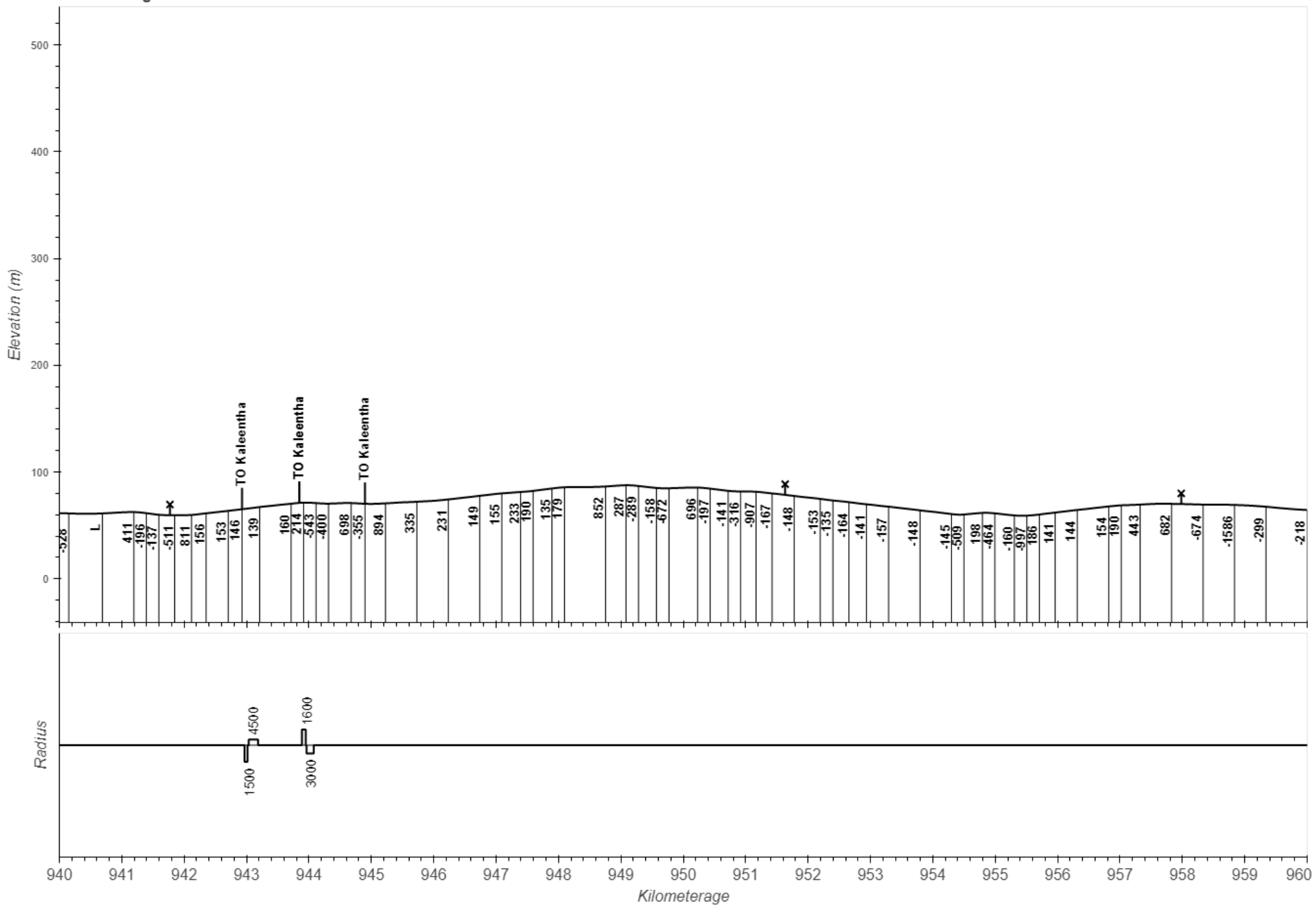

W20 - Orange to Broken Hill: 840 to 860 kms
Elevation (m)
500
400
300
200
100
0
-2034
1656
-1591
-679
-1190
989
-203
-1532
798
435
464
802
382
893
366
-593
-2337
208
201
207
401
L
357
-375
-243
-218
-151
-270
-147
-222
-263
-257
-703
-412
L
L
-304
-2344
838
-202
-260
898
380
410
158
131
Radius
840
841
842
843
844
845
846
847
848
849
850
851
852
853
854
855
856
857
858
859
860
Kilometerage

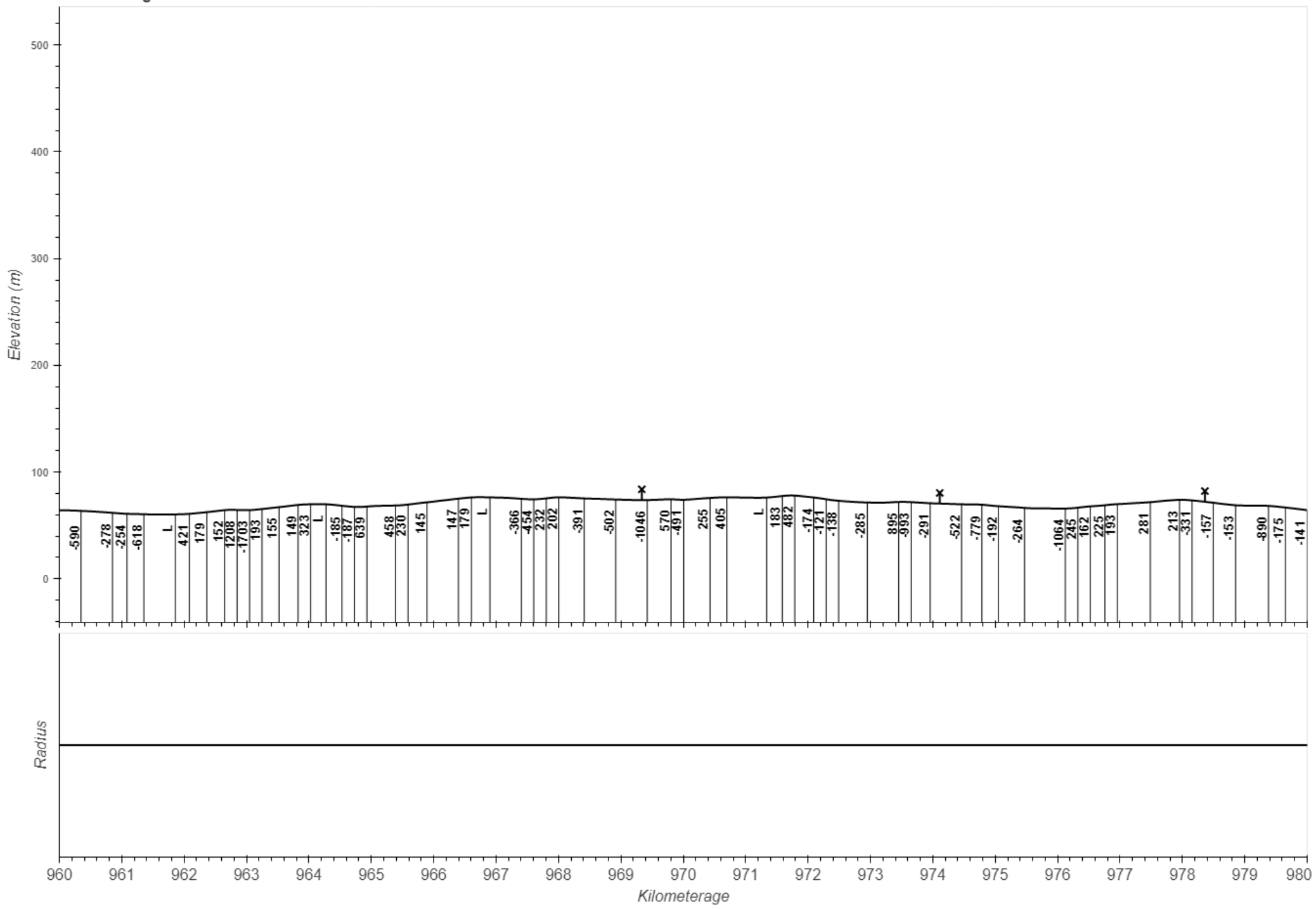

W20 - Orange to Broken Hill: 860 to 880 kms
Elevation (m)
500
400
300
200
100
0
272
166
435
-212
-1043
468
-216
-166
L
501
-1776
-2046
-168
-130
-340
-351
-197
-1068
-732
-183
L
190
138
143
155
875
667
-553
-225
-1102
-1138
-410
-827
-513
836
222
751
754
204
522
-209
-151
-144
-150
-477
207
177
-764
-139
-134
-349
L
Radius
860
861
862
863
864
865
866
867
868
869
870
871
872
873
874
875
876
877
878
879
880
Kilometerage

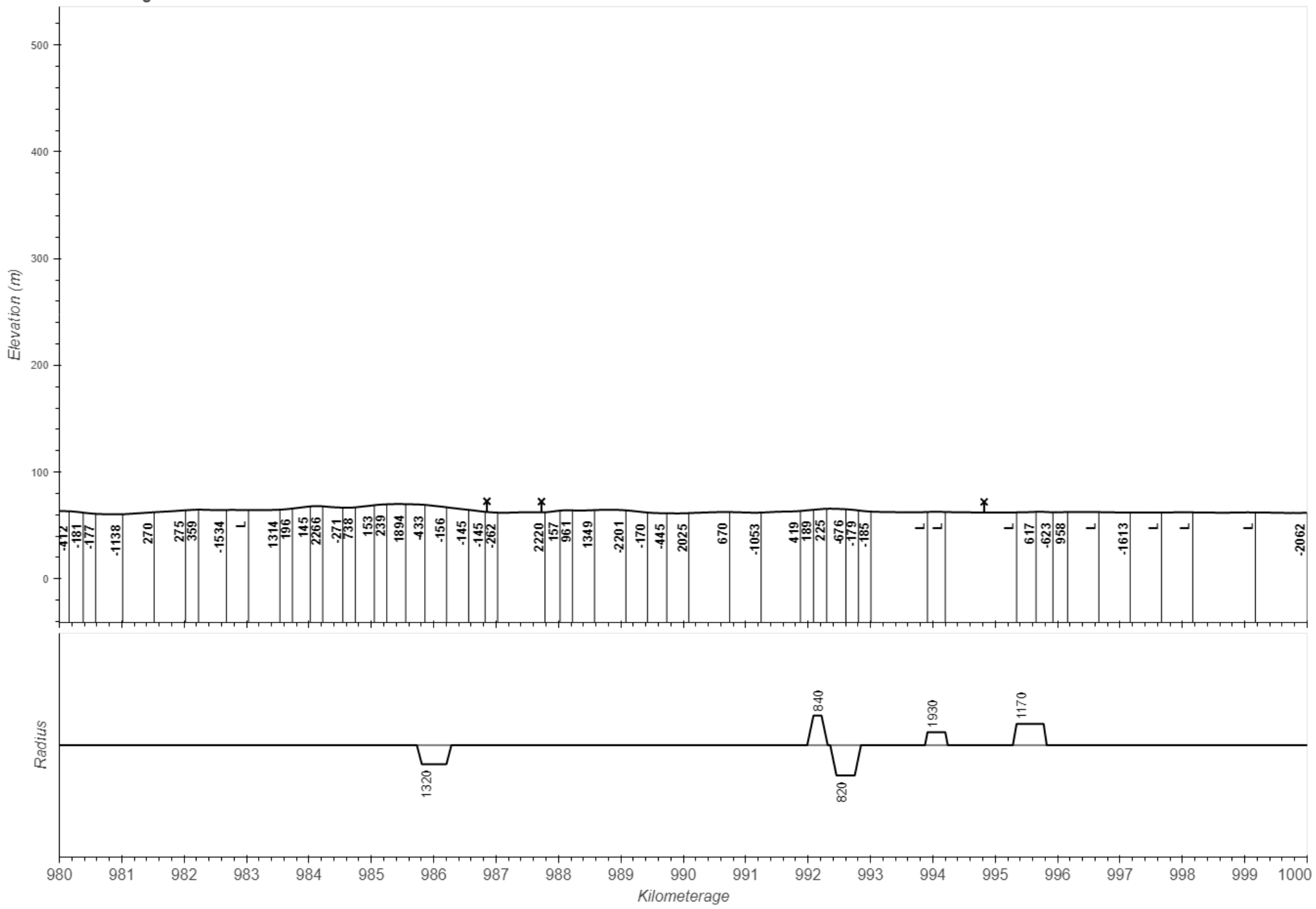

W20 - Orange to Broken Hill: 880 to 900 kms
Elevation (m)
500
400
300
200
100
0
TO Darnick
TO Darnick
TO Darnick
1336
182
149
270
320
288
-1123
L
160
158
130
256
-172
-250
L
572
271
399
194
1229
1798
217
147
147
282
269
-336
-150
-361
-531
520
520
457
-234
-148
-151
-153
-269
-152
-153
-171
-200
L
-294
-632
-981
-178
-193
1663
156
140
230
369
473
Radius
2000
880
881
882
883
884
885
886
887
888
889
890
891
892
893
894
895
896
897
898
899
900
Kilometerage

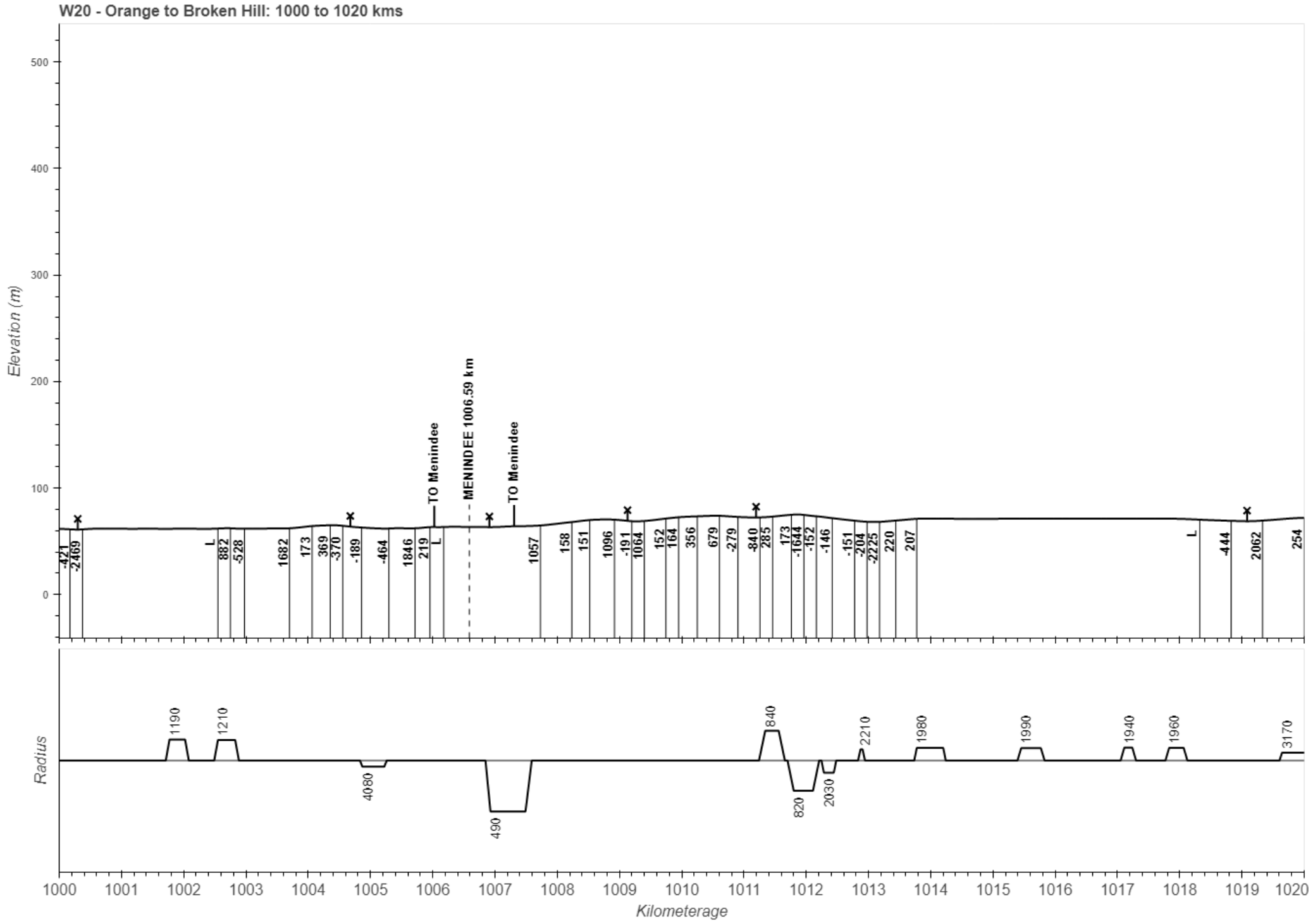

W20 - Orange to Broken Hill: 900 to 920 kms
Elevation (m)
500
400
300
200
100
0
-517
-189
-160
-153
-218
-1428
-524
-353
-332
1284
L
210
164
724
160
188
2102
-312
-444
-566
L
L
-199
-151
-148
-394
L
275
157
276
158
163
-744
-374
L
811
-206
-153
-1414
158
329
1349
181
-750
-145
-155
-370
-640
L
-502
Radius
2030
2020
2100
900
901
902
903
904
905
906
907
908
909
910
911
912
913
914
915
916
917
918
919
920
Kilometerage

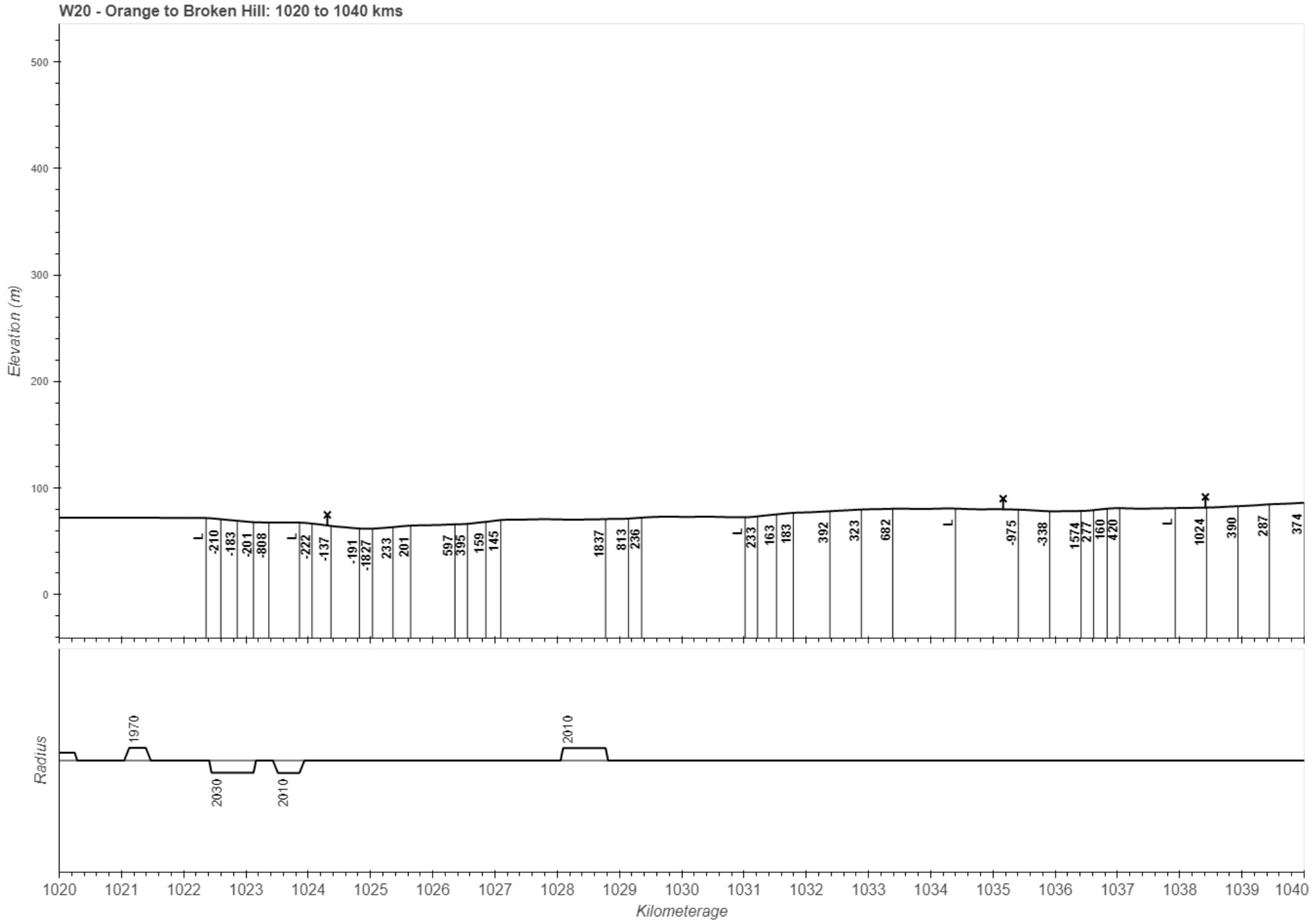

W20 - Orange to Broken Hill: 920 to 940 kms
Elevation (m)
500
400
300
200
100
0
L
-1688
992
310
159
1016
-255
1119
296
173
-1750
-212
-153
-721
-159
-147
-287
-1029
190
157
231
-449
1391
166
149
L
-149
-189
-299
608
L
L
227
-766
-636
247
189
-1733
-334
1443
-254
-150
-156
-163
-772
200
167
458
-707
344
400
-684
234
L
-159
-152
-132
Radius
2020
2100
920
921
922
923
924
925
926
927
928
929
930
931
932
933
934
935
936
937
938
939
940
Kilometerage

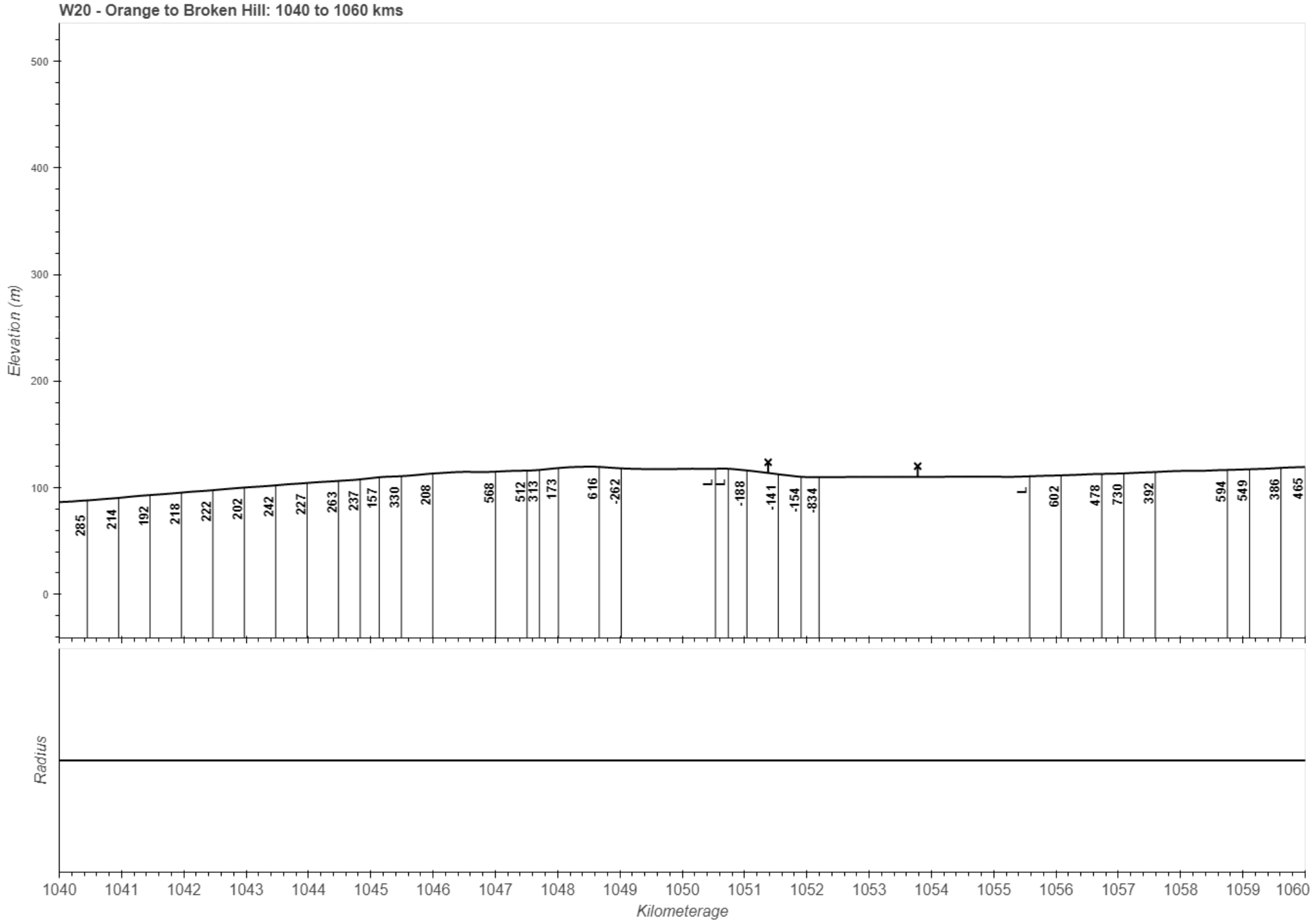

W20 - Orange to Broken Hill: 940 to 960 kms
Elevation (m)
500
400
300
200
100
0
-528
L
411
-196
-137
-511
811
156
153
146
139
TO Kaleentha
160
214
-543
-400
TO Kaleentha
698
-355
894
TO Kaleentha
335
231
149
155
233
190
135
179
852
287
-289
-158
-672
696
-197
-141
-316
-907
-167
-148
-153
-135
-164
-141
-157
-148
-145
-509
198
-464
-160
-997
186
141
144
154
190
443
682
-674
-1586
-299
-218
Radius
4500
1600
1500
3000
940
941
942
943
944
945
946
947
948
949
950
951
952
953
954
955
956
957
958
959
960
Kilometerage

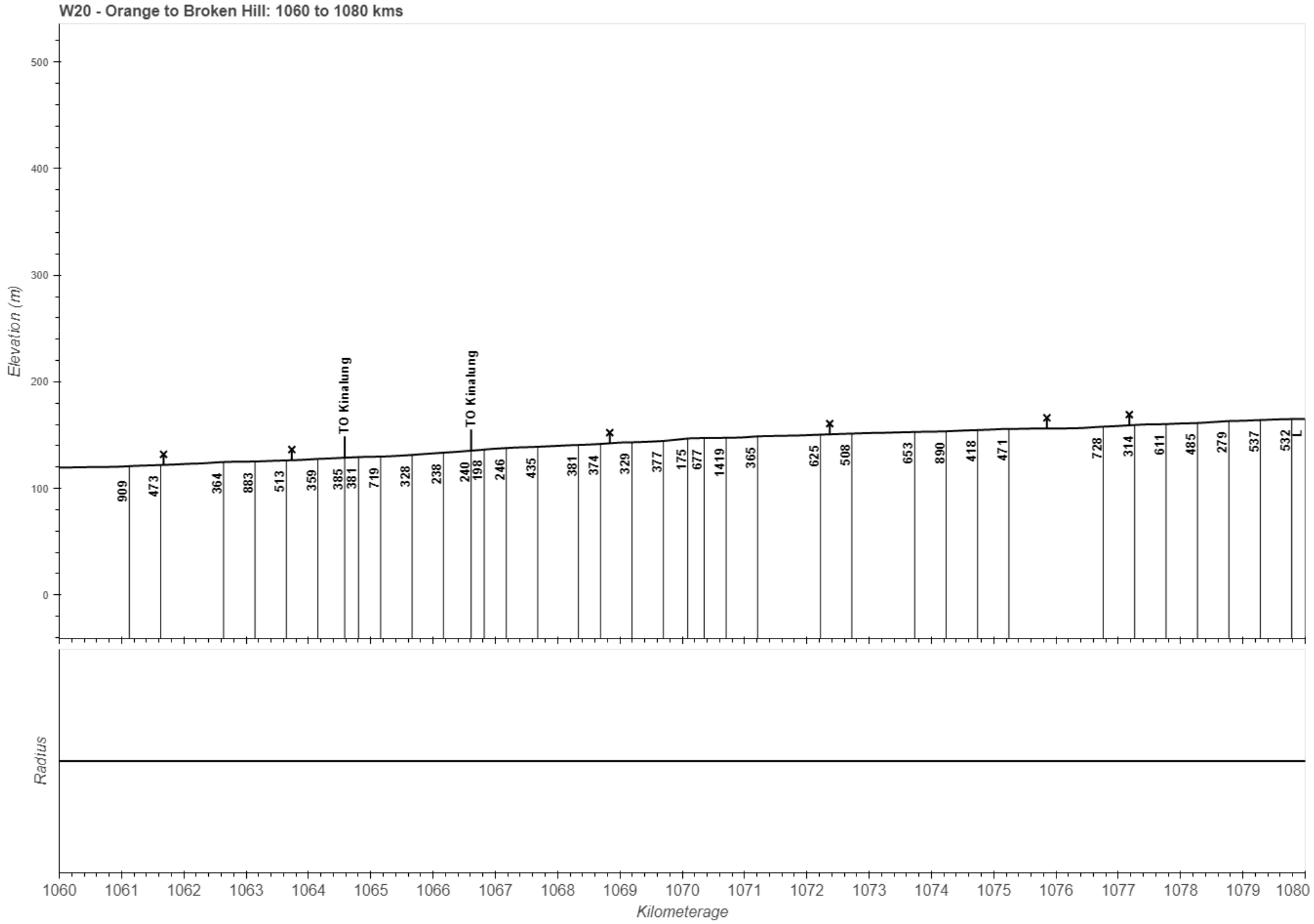

W20 - Orange to Broken Hill: 960 to 980 kms
Elevation (m)
500
400
300
200
100
0
-590
-278
-254
-618
L
421
179
152
1208
-1703
193
155
149
323
L
-185
-187
639
458
230
145
147
179
L
-366
-454
232
202
-391
-502
-1046
570
-491
255
405
L
183
482
-174
-121
-138
-285
895
-993
-291
-522
-779
-192
-264
-1064
245
162
225
193
281
213
-331
-157
-153
-890
-175
-141
Radius
960
961
962
963
964
965
966
967
968
969
970
971
972
973
974
975
976
977
978
979
980
Kilometerage

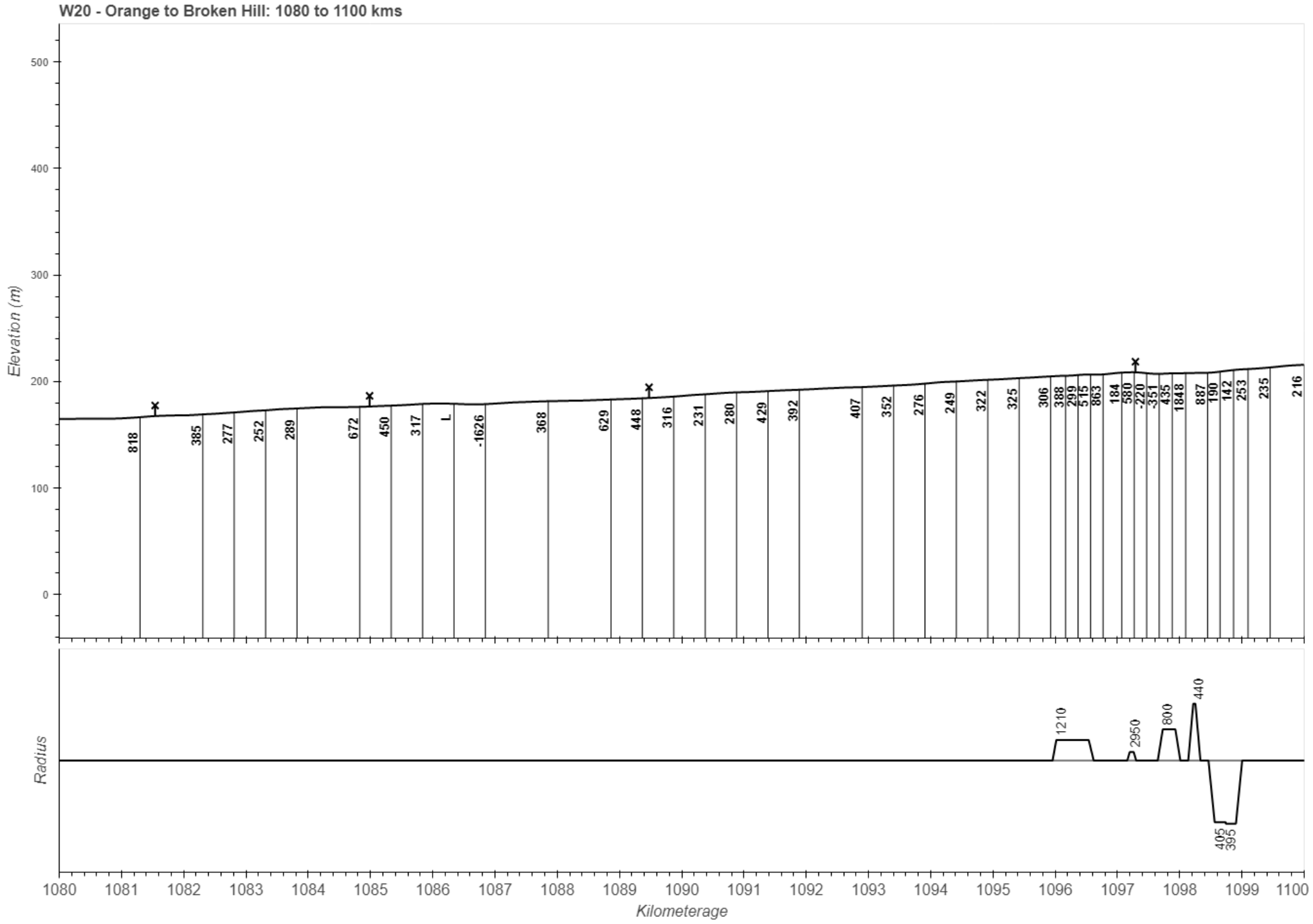

W20 - Orange to Broken Hill: 980 to 1000 kms
Elevation (m)
500
400
300
200
100
0
-412
-181
-177
-1138
270
275
359
-1534
L
1314
196
145
2266
-271
738
153
239
1894
-433
-156
-145
-145
-262
2220
157
961
1349
-2201
-170
-445
2025
670
-1053
419
189
225
-676
-179
-185
L
L
L
617
-623
958
L
-1613
L
L
L
-2062
Radius
1320
840
820
1930
1170
980
981
982
983
984
985
986
987
988
989
990
991
992
993
994
995
996
997
998
999
1000
Kilometerage

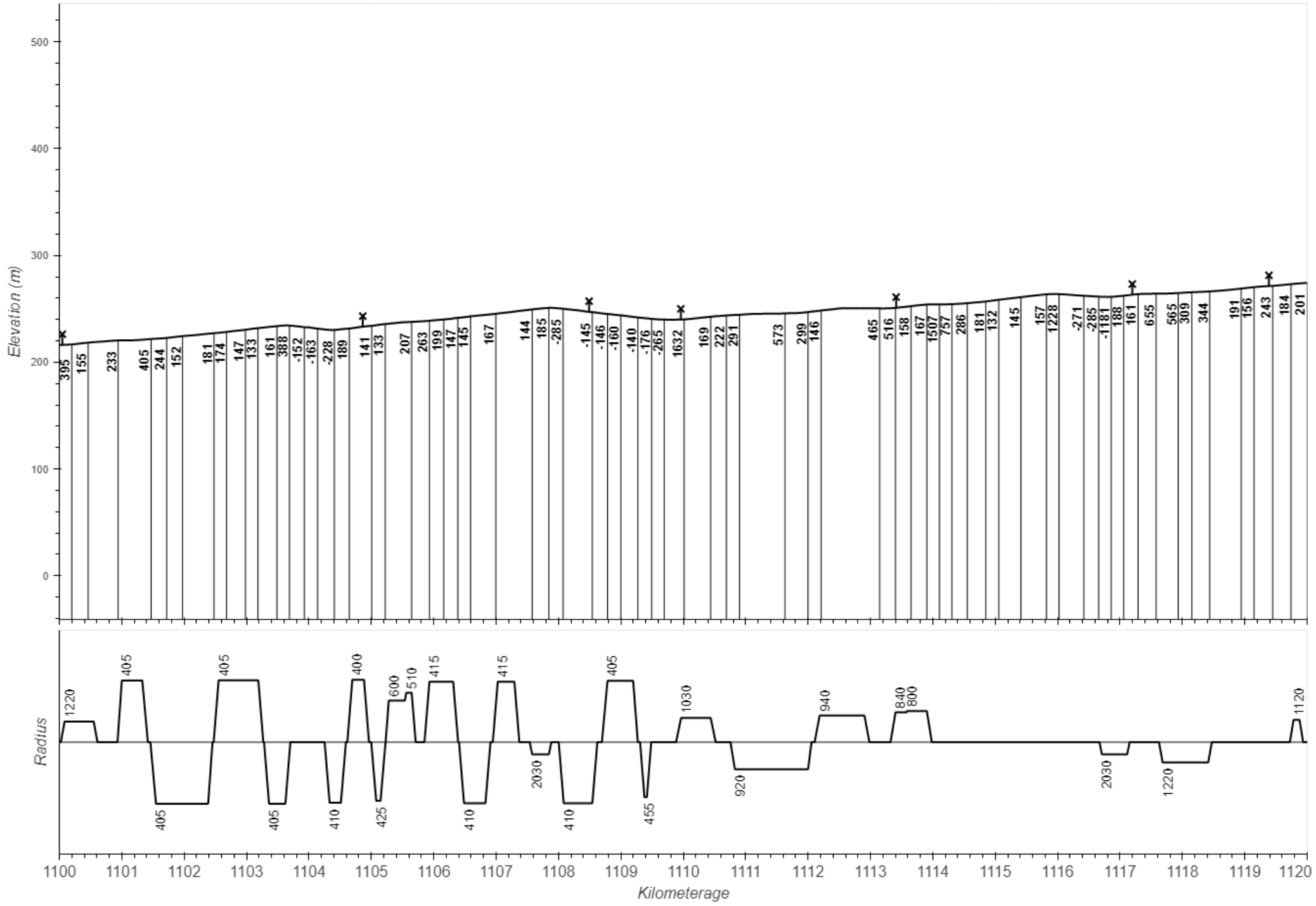

W20 - Orange to Broken Hill: 1000 to 1020 kms
Elevation (m)
500
400
300
200
100
0
TO Menindee
MENINDEE 1006.59 km
TO Menindee
-421
-2469
L
882
-528
1682
173
369
-370
-189
-464
1846
219
L
1057
158
151
1096
-191
1064
152
164
356
679
-279
-840
285
173
-1644
-152
-146
-151
-204
-2225
220
207
L
-444
2062
254
Radius
1190
1210
4080
490
840
820
2030
2210
1980
1990
1940
1960
3170
1000
1001
1002
1003
1004
1005
1006
1007
1008
1009
1010
1011
1012
1013
1014
1015
1016
1017
1018
1019
1020
Kilometerage

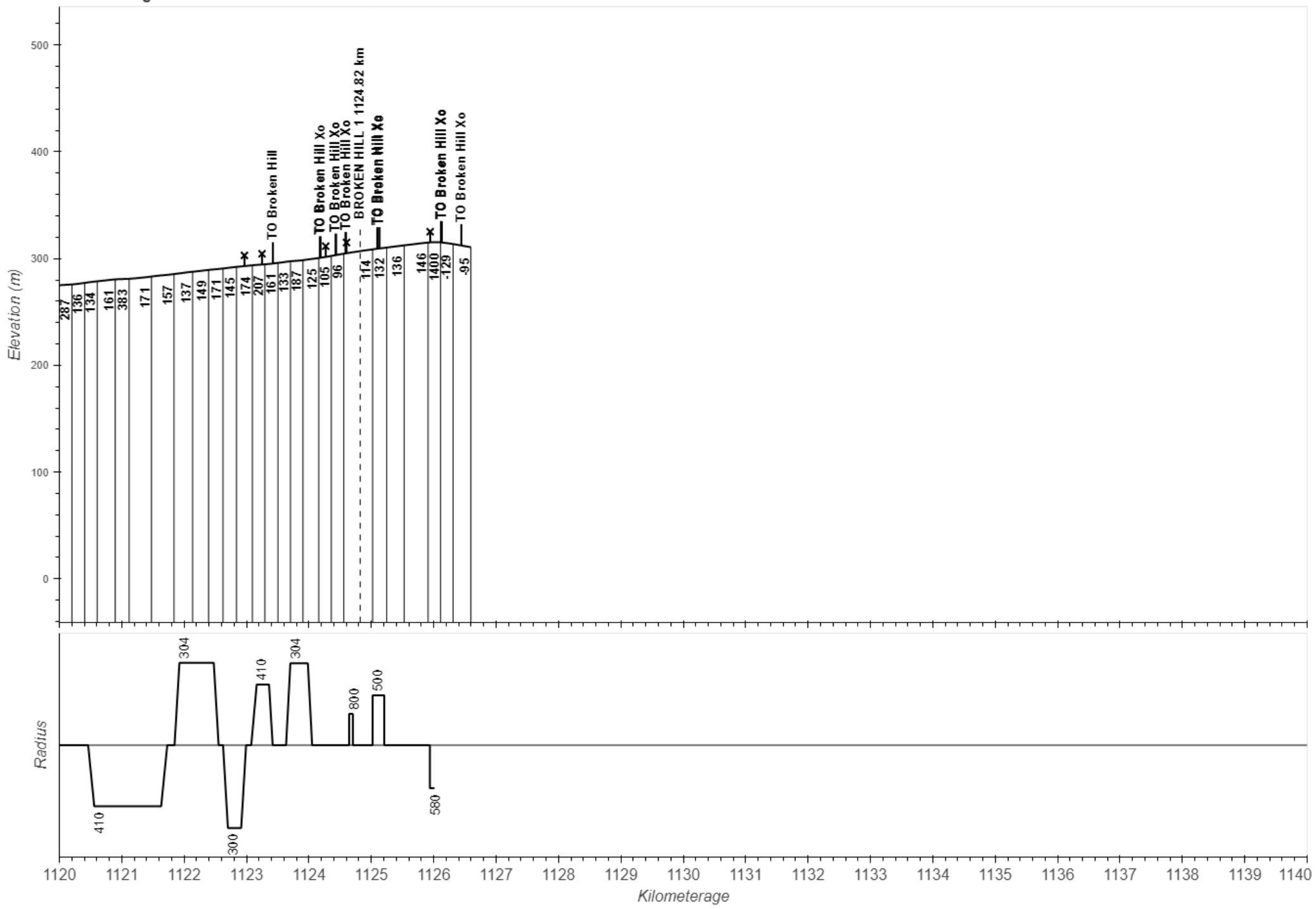

W20 - Orange to Broken Hill: 1020 to 1040 kms
Elevation (m)
500
400
300
200
100
0
L
-210
-183
-201
-808
L
-222
-137
-191
-1827
233
201
597
395
159
145
1837
813
236
L
233
163
183
392
323
682
L
-975
-338
1574
277
160
420
L
1024
390
287
374
Radius
1970
2030
2010
2010
1020
1021
1022
1023
1024
1025
1026
1027
1028
1029
1030
1031
1032
1033
1034
1035
1036
1037
1038
1039
1040
Kilometerage


W20 - Orange to Broken Hill: 1040 to 1060 kms
Elevation (m)
500
400
300
200
100
0
285
214
192
218
222
202
242
227
263
237
157
330
208
568
512
313
173
616
-262
L
L
-188
-141
-154
-834
L
602
478
730
392
594
549
386
465
Radius
1040
1041
1042
1043
1044
1045
1046
1047
1048
1049
1050
1051
1052
1053
1054
1055
1056
1057
1058
1059
1060
Kilometerage


W20 - Orange to Broken Hill: 1060 to 1080 kms
Elevation (m)
500
400
300
200
100
0
TO Kinalung
TO Kinalung
909
473
364
883
513
359
385
381
719
328
238
240
198
246
435
381
374
329
377
175
677
1419
365
625
508
653
890
418
471
728
314
611
485
279
537
532
Radius
1060
1061
1062
1063
1064
1065
1066
1067
1068
1069
1070
1071
1072
1073
1074
1075
1076
1077
1078
1079
1080
Kilometerage


W20 - Orange to Broken Hill: 1080 to 1100 kms
Elevation (m)
500
400
300
200
100
0
818
385
277
252
289
672
450
317
L
-1626
368
629
448
316
231
280
429
392
407
352
276
249
322
325
306
388
299
515
863
184
580
-220
-351
435
1848
887
190
142
253
235
216
Radius
1210
2950
800
440
405
395
1080
1081
1082
1083
1084
1085
1086
1087
1088
1089
1090
1091
1092
1093
1094
1095
1096
1097
1098
1099
1100
Kilometerage


W20 - Orange to Broken Hill: 1100 to 1120 kms
Elevation (m)
500
400
300
200
100
0
395 155 233 405 244 152 181 174 147 133 161 388 -152 -163 -228 189 141 133 207 263 199 147 145 167 144 185 -285 -145 -146 -160 -140 -176 -265 1632 169 222 291 573 299 146 465 516 158 167 1507 757 286 181 132 145 157 1228 -271 -285 -1181 188 161 655 565 309 344 191 156 243 184 201
Radius
1220 405 405 405 405 400 600 510 415 415 405 1030 940 840 800 1120
405 405 410 425 410 2030 410 455 920 2030 1220
1100 1101 1102 1103 1104 1105 1106 1107 1108 1109 1110 1111 1112 1113 1114 1115 1116 1117 1118 1119 1120
Kilometerage


W20 - Orange to Broken Hill: 1120 to 1140 kms
Elevation (m)
500
400
300
200
100
0
TO Broken Hill
TO Broken Hill Xo
TO Broken Hill Xo
TO Broken Hill Xo
BROKEN HILL 1 1124.82 km
TO Broken Hill Xo
TO Broken Hill Xo
TO Broken Hill Xo
287
136
134
161
383
171
157
137
149
171
145
174
207
161
133
187
125
105
96
114
132
136
146
1400
-129
-95
Radius
304
410
304
800
500
410
300
580
1120
1121
1122
1123
1124
1125
1126
1127
1128
1129
1130
1131
1132
1133
1134
1135
1136
1137
1138
1139
1140
Kilometerage