

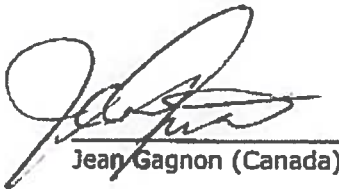
**Alberta - British Columbia Boundary Commission**

**Resolution 2018-02**

The purpose of this Resolution is to confirm that the Alberta - British Columbia Boundary Commission accepts the Tent Mountain Pass Boundary Survey Phase 1 report (Rev. 2.0) prepared for the Alberta - British Columbia Boundary Commission by Luke Dixon, ALS of Global Raymac Surveys Inc, Calgary, Alberta. The Alberta, British Columbia and Canada Boundary Commissioners have one original signed copy each in their records.

**Therefore Be It Resolved:**

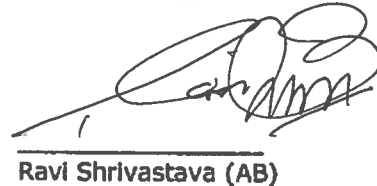
The Alberta-British Columbia Boundary Commission accepts the above noted inspection survey.



Jean Gagnon (Canada)

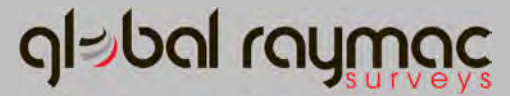


Mike Thomson (BC)



Ravi Shrivastava (AB)

**NOTE: Original signatures on file at Surveyor General Branch**



# Tent Mountain Pass

## Boundary Survey Phase 1

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**Prepared for:**

The Alberta – British Columbia Boundary Commission  
under contract to Alberta Environment and Parks

**Submitted by:**

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**Contract:** 19OPP801  
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**Revision:** 2.0

October 31<sup>st</sup>, 2018

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## INTRODUCTION

Global Raymac Surveys Inc. was contracted to inspect 13 monuments on the Alberta – British Columbia border south of Highway 3 in the Crowsnest Past at an area known as Tent Mountain Pass. The purpose of the inspection was to assess the condition of monuments, area accessibility and prepare for Phase II restoration in 2019. The area has been used extensively for industrial and recreational purposes. The former through coal mining and logging and the latter for hiking and hunting.

The field inspection was carried out September 19<sup>th</sup> and 20<sup>th</sup>. The conditions were excellent for both travel and inspection with no snow on the ground and dry roads.

## ACCESS DETAILS

All inspection activities were accessed from the BC side of the boundary. Vehicle access was south from HWY 3 for 14.8km via the Corbin Rd. This is a paved road with a significant amount of industrial and recreational use. At 14.8km on the Corbin Creek Rd there is an unmarked turn-off with access to the Tent Valley Road. The Tent Valley Road is gated. At the time of our inspection the gate was unlocked and wide open. All subsequent roads travelled were well graded from recent logging activity assumed to have been completed in 2017. The south fork of the Tent Valley Road follows the old road as seen on Google Maps with a parking area approximately 300m west of monument 75F. The north fork of Tent Valley road again follows the trail as seen on Google Maps. It passes through a second open gate 0.7km from the first gate and continues for another 1.6km before terminating. There is a new road installed circa 2017 that initially follows the north fork of Tent Valley Road, but makes a right hand turn at km 1.3 and continues to Tent Valley Pass. Through conversation with a local mine environmental inspector we believe that gates are rarely locked and road access should be open, but this could change and should be re-confirmed at time of Phase II.

Significant road maintenance, new road construction and logging has occurred on the BC side of the tent valley. At the pass logging was complete to within a few meters of the monuments. This has resulted in excellent vehicle access and reasonable hiking access through both old cut block, recent cut block and untouched forest. Burn piles have not yet been burned and road culverts have not been removed for reclamation.

Monument 73F through 81F were accessed by parking at the end of the south fork of the Tent Valley Road. Monuments 55F through 69F were accessed by parking at the north end of Tent Valley Road. The ridge was gained approximately halfway between 57F and 59F. After completing 57F and 55F the ridge was re-traced and followed south until the inspection of 69F after which the logging roads were followed to return to the vehicle. 71F was accessed by parking near Tent Mountain Pass.

## WILDLIFE

No sizable wildlife was seen during the inspection. However, both droppings and footprints from bear, elk and moose were frequent. On September 19<sup>th</sup> one hunter was encountered right at the pass. The hunter had approached the pass from the Alberta side of the border. Bear spray was carried at all times during the inspection.

## MONUMENT COORDINATES

Coordinates on all monuments were observed during the inspection. Two base positions were established using NRCAN PPP with and RTK GPS check completed between the two base points. Differential observations were obtained for all monuments exception of 73F. 73F was directly in large trees at the bottom of the pass. The absolute accuracy of the 12 monuments is expected to be approximately 20cm. This includes error sources from NRCAN PPP, typical RTK GPS errors, centering errors from using a pogo and bipod on top of the monuments and the effects of poor GPS sky view for many of the locations. The position for 73F was obtained from an autonomous position and is estimated to be +/-5m. Coordinates below are NAD83 CSRS 2002.

Monument	Latitude (N)	Longitude (W)	Ellipsoidal Height (m)*
55F	49° 35' 47.1479"	114° 44' 15.0360"	1873.06
57F	49° 35' 40.1279"	114° 44' 11.6520"	1875.69
59F	49° 35' 20.0039"	114° 44' 8.2680"	1823.59
61F	49° 35' 5.1360"	114° 44' 6.0000"	1769.05
63F	49° 34' 49.1879"	114° 44' 5.7840"	1691.22
65F	49° 34' 35.5440"	114° 43' 58.0080"	1634.95
67F	49° 34' 37.1999"	114° 43' 46.3800"	1576.09
69F	49° 34' 32.6999"	114° 43' 25.5359"	1488.05
71F	49° 34' 24.0599"	114° 43' 29.4600"	1498.42
73F	49° 34' 17.7240"	114° 43' 31.8720"	1490
75F	49° 34' 13.2599"	114° 43' 21.1799"	1566.12
77F	49° 34' 4.3320"	114° 43' 12.5040"	1618.44
79F	49° 33' 57.2399"	114° 42' 52.4879"	1822.47

\*Ellipsoidal Heights referenced to CGVD28 Vertical Datum

Monument	Northing	Easting	Orthometric Elevation (m)**
55F	5496219.68	663492.91	1886.65
57F	5496005.46	663567.09	1889.28
59F	5495386.20	663653.38	1837.18
61F	5494927.90	663712.94	1782.64
63F	5494436.46	663731.86	1704.81
65F	5494019.43	663901.13	1648.54
67F	5494077.64	664132.56	1589.68
69F	5493951.84	664555.29	1501.63
71F	5493681.70	664484.94	1512.00
73F	5493484.81	664439.28	1504
75F	5493353.29	664661.33	1579.70
77F	5493082.79	664843.70	1632.02
79F	5492876.20	665252.46	1836.04

\*\*Orthometric Elevation derived through HTv2.0 GEOID & CGVD28 Vertical Datum

This report is certified correct and completed by Luke Dixon, ALS. October 31, 2018

## MONUMENT DESCRIPTIONS

### Monument 55F

- Access Comments:** The monument was the first accessed on September 20<sup>th</sup>. The Ridge was gained approximately 200m south of the monument and then traversed north to the monument. There were some very tight forested areas on the ridge to hike through in order to access 55F.
- Position Comments:** The boundary position can be determined through the bolt in to the top of monument.
- Base Condition:** Likely the best base of all 13 monuments.
- Pillar Condition** Metal is peeling back.
- Plate Condition:** Both plates are attached to the monument.
- GPS Suitability:** Good sky view and suitable for GPS survey.

## Monument 57F

- Access Comments:** This monument was accessed by walking the ridge between 55F and 57F. The ridge is reasonably open between these two monuments and has some spectacular views.
- Position Comments:** The boundary position can be determined through the bolt on the top of monument.
- Base Condition:** The base of the monument is severely cracked.
- Pillar Condition:** Metal is peeling back.
- Plate Condition:** Both plates are attached to the monument.
- GPS Suitability:** Excellent sky view and suitable for GPS survey.

## Monument 59F

- Access Comments:** This monument was accessed by retracing steps from 55F past 57F and continuing to southward along the ridge. There are some tight trees between 57F and 59F; which opens up while hiking the final slope towards 59F. Some clearing of juniper bushes was required to ascertain the condition of the base.
- Position Comments:** The boundary position can be determined through the bolt on the top of monument.
- Base Comments:** The base of the monument is moderately cracked.
- Pillar Condition:** Metal is peeling back, and the concrete is crumbling.
- Plate Condition:** The British Columbia plate is missing from the monument.
- GPS Suitability:** Excellent sky view and suitable for GPS survey.

## Monument 61F

- Access Comments:** This monument was accessed by walking the ridge south from 59F. The ridge is reasonably open between these two monuments and has great views.
- Position Comments:** The boundary position can be determined through the bolt on the top of monument.
- Base Condition:** The base of the monument is moderately cracked.
- Pillar Condition:** Metal is peeling back.
- Plate Condition:** Both plates are attached to the monument.
- GPS Suitability:** Good sky view and suitable for GPS survey.

## Monument 63F

- Access Comments:** This monument was accessed by walking south from 61F. There the ridge drops in elevation noticeably between these two monuments.
- Position Comments:** The boundary position can be determined through the bolt on the top of monument.
- Base Condition:** The base of the monument is in quite good condition
- Pillar Condition:** Metal is peeling back.
- Plate Condition:** Alberta side plate is missing from the monument.
- GPS Suitability:** Reasonable sky view and suitable for GPS survey.

## Monument 65F

- Access Comments:** This monument was accessed by walking south from 63F. Between the two monuments, the logging from the AB and BC side both reach almost all the way up to the top of the ridge. Significant elevation is lost descending from 63F to 65F with a slight uphill in the last 100m.
- Position Comments:** The boundary position can be determined through the bolt on the top of monument.
- Base Condition:** The base of the monument is cracked.
- Pillar Condition:** This monument had the most intact metal cladding with only a couple pieces of the top missing. This gives some indication of the decomposition process. One would expect with the top pieces now missing that water combined with freeze thaw will continue to deteriorate the pillar
- Plate Condition:** Both plates are attached to the monument.
- GPS Suitability:** Mediocre sky view. We had difficulty obtaining a GPS fix and resulting positional quality is mediocre. The removal of a handful of trees to 20cm would result in excellent ability sky view for GPS survey.



## Monument 67F

- Access Comments:** This monument was accessed by walking downhill due east from 65F. Partway towards 67F it became evident that the intention of 2017 logging was to log up to the AB-BC boundary between 65F and 71F.
- Position Comments:** The boundary position can be determined through the bolt on the top of monument.
- Base Condition:** The base of the monument is severely decayed.
- Pillar Condition:** Metal is severely peeling back.
- Plate Condition:** Both plates are attached to the pillar.
- GPS Suitability:** The logging activities have created clear views to south and west. However, the remaining trees create mediocre GPS conditions. The removal of 4 large 30-40cm diameter trees would allow for a GPS survey of 67F. Conversely, temporary points can be established in the cut-block and 67F surveyed from those points.

## Monument 69F

- Access Comments:** This monument was accessed by walking downhill through the cut block from 67F. The old Tent Mountain Pass trail was crossed between these two monuments. No clear evidence of the cross-border pipeline could be seen either in the cut block or at the treeline limits.
- Position Comments:** The boundary position can be determined through the bolt in to the top of monument.
- Base Comments:** The base of the monument is severely cracked.
- Pillar Condition:** Metal is peeling back. The monument has been painted red in the distant pass.
- Plate Condition:** Both plates are attached to the monument.
- GPS Suitability:** The logging activities have created partial sky view to north and west. The monument is set several meters into the forest. This point could not be GPS surveyed without many trees being cut. Temporary points can be established in the cut-block and 69F surveyed from those points.

## Monument 71F

- Access Comments:** This monument was accessed by walking approximately 200m through the cut block from the parked truck on September 19<sup>th</sup>. The vehicle was parked at the end of the brand new 2017 logging road described earlier in the general access comments.
- Position Comments:** The boundary position can be determined by using two intact corners of the base.
- Base Condition:** The base of the monument is severely deteriorated with two corners missing. Two corners can be determined.
- Pillar Condition:** The pillar was entirely missing.
- Plate Condition:** Both plates were missing.
- GPS Suitability:** This monument has open sky views on three sites and is suitable for GPS observations.

## Monument 73F

- Access Comments:** This monument was accessed by walking down a steep hill from 75F and through the forest. There is a small creek approximately 1m wide 5m west of the monument.
- Position Comments:** The boundary position can be determined through the bolt on the top of monument.
- Base Condition:** The base of the monument is reasonable condition. Soil and vegetation had encroached around the edges requiring some excavation to properly observe the base.
- Pillar Condition:** The pillar was in good condition with some peeling of the metal.
- Plate Condition:** Both plates were attached to the pillar.
- GPS Suitability:** This monument is in thick tall forest and is not suitable for GPS observations. Survey of this position would require either a large GPS window or conventional traversing from the low areas to the north, or from 75F to the south.

## Monument 75F

- Access Comments:** This monument was accessed by walking from the 2017 parking area on the south fork of the logging road, along the original logging road for approximately 100m and then through trails in the reseeded cut block.
- Position Comments:** The boundary position can be determined through the corners of the base.
- Base Condition:** The base of the monument is mostly destroyed condition. Soil and vegetation had encroached around the edges requiring some excavation to properly observe the corners.
- Pillar Condition:** The pillar was entirely destroyed.
- Plate Condition:** Both plates were missing.
- GPS Suitability:** This monument is in re planted cut block. GPS views are excellent, and this location is suitable for GPS survey.

## Monument 77F

- Access Comments:** This monument was accessed by walking from 75F. It is possible to cover the distance entirely in old cut block; which travels well on the AB side of the boundary. The monument is tucked in the south west corner of the cut block.
- Position Comments:** The boundary position can be determined through the bolt on the monument.
- Base Condition:** The base of the monument is reasonable condition. It has some cracks and a couple of the tops of the corners are knocked off.
- Pillar Condition:** The metal cladding on the pillar is peeling back.
- Plate Condition:** Both plates are attached to the pillar.
- GPS Suitability:** This monument is in the corner of a cut block with 50cm diameter trees nearby. GPS views are marginal, and this monument would be better surveyed by establishing temporary points in the cut block and conventionally surveying to the monument.

## Monument 79F

- Access Comments:** This monument was accessed by hiking uphill from 77F. Most of the hiking is through large forest with little undergrowth. One open area with rocks was hiked through.
- Position Comments:** The boundary position can be determined through the bolt on the monument.
- Base Condition:** The base of the monument is reasonable condition. It has some cracks and underside the north side has been eroded under the base.
- Pillar Condition:** The metal cladding on the pillar is peeling back.
- Plate Condition:** Both plates are attached to the pillar.
- GPS Suitability:** This monument is in on the edge of ridge that defines the AB-BC boundary. There are some sky views to the east. About a dozen trees with 10cm diameter would need to be cut to obtain enough GPS window to survey this location. Opportunities for conventional survey and traverse are limited.

## Monument 81F

After completing 79F we proceeded steeply uphill to 81F. 81F is not part of the scope of work required for this contract. However, 81F is an A.O Wheeler original monument. Conrad Kain participated with A.O Wheeler on his 1914 trip to the Crowsnest Pass and it is possible he was involved with the original survey. Much to our disappointment no trace of 81F was found on the ridge.

## CONCLUSION

None of the 13 monuments were truly lost. All inspected monuments have some damage, but most have original bolt intact. Logistics, access routes and elevation gain should be closely examined by any surveyor returning to the area intent on reconstructing the monuments. There is a large variation in effort required to access the various monuments.

Monument 55F – Alberta Side of Monument



Tent Mountain Pass  
Boundary Survey Phase 1

Monument 55F – Top View



Monument 57F – Side View



Monument 57F – Top View



Monument 59F – Side View





Monument 59F – Top View



Monument 61F – Side View



Monument 61F – Top View



Monument 63F – Side View



Monument 63F – Top View



Tent Mountain Pass  
Boundary Survey Phase 1

Monument 65F – Side View



Tent Mountain Pass  
Boundary Survey Phase 1

Monument 65F – Top View



Tent Mountain Pass  
Boundary Survey Phase 1

Monument 67F – Side View





Monument 67F – Side View #2



Monument 69F – Side View



Monument 69F – Top View



Monument 71F – Corner View



Monument 71F – Top View



Tent Mountain Pass  
Boundary Survey Phase 1

Monument 73F – Side View



Tent Mountain Pass  
Boundary Survey Phase 1

Monument 73F – Top View



Tent Mountain Pass  
Boundary Survey Phase 1

Monument 75F – Side View





Monument 75F – Top View



Monument 77F – Side View



Tent Mountain Pass  
Boundary Survey Phase 1

Monument 77F – Top View



Tent Mountain Pass  
Boundary Survey Phase 1

Monument 79F – Side View



Monument 79F – Top View



Monument 81F – Approximate Location



Tent Mountain Pass  
Boundary Survey Phase 1

Monument 81F – Approximate Location

