Queensland Government

Department of Resources

Certificate of Verification of a Reference Standard of Measurement in Accordance with Regulation 13 of the National Measurement Regulations 1999 (Cth) in Accordance with the National Measurement Act 1960 (Cth)

Description of standard of measurement:

Baseline Name: LEYBURN **Calibration Identification:** QLD.LEYB1.210826

Electronic Distance Measurement Baseline consisting of 7 concrete pillars. Baseline is located within Scientific Reserve 1/SP220298 off Rosenthall Boundary Rd, 10km NE of the Leyburn township.

Permanent Distinguishing Marks: Numerals 1 to 7 marked on concrete pillars. See also Mark ID as stated in the table below.

Client: Queensland Department of Resources
Client Address: Refer to signatory contact details below **Postal Address:**
Contact Name: **Contact Number:**

Date of Verification: 26th August 2021

Period of Verification: **2 years** (on the condition that baseline monuments remain undisturbed)

Date of Expiry of Certificate: 26th August 2023

Values of Standard of Measurement:
The base linear distances herein are from Station 7 and have been established by point to point measurement, corrected for slope, offset and datum plane. The base alignment is from Station 7 to Station 2. Negative offsets are to the left of the line viewed from Station 7. Datum Plane is based on Reduced Level (RL): 415 metres.

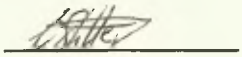
Station	Mark ID	Reduced Level (m)	Offset (m)	Distance (m)	Uncertainty (m)*
1	199101	414.275	0.091	N/A	N/A
2	199102	413.848	0.000	29.957	0.0006
3	199103	413.536	0.009	180.411	0.0008
4	199104	415.341	0.510	451.159	0.0011
5	199105	417.198	-0.004	782.077	0.0016
6	199106	418.776	-0.495	992.661	0.0018
7	199107	419.471	0.000	1082.913	0.0020

*** The stated uncertainty applies only to the distances in the table above. Distances are from Station 1.**

Test Method: CBD/041230.LTOLE_Baseline_Calibration_Procedure
Testing performed as per stated procedures. Distances measured using a Leica TS60 total station and atmospheric conditions measured using three Delta OHM HD31 Multifunction Loggers. All equipment is calibrated by NATA accredited laboratories.

Test Conditions: Measurements performed on the date of verification between 7 am and 2 pm under mostly fine conditions. Average ambient atmospheric conditions during the measurements are as follows:
Temperature 10.5 °C **Pressure 969.5 hPa** **Relative humidity 52.9 %**

Uncertainty of the Value(s): **$\pm (0.5 + 1.3 \times 10^{-3} \times L)$ mm (Where L is length in m)**
This uncertainty has been calculated in accordance with the principles in JCGM 100: 2008 *Evaluation of Measurement Data — Guide to the Expression of Uncertainty in Measurement*, and give intervals estimated to have a confidence level of 95% at the time of verification. Unless otherwise stated, a coverage factor (k) of 2.0 has been used. The uncertainties apply at the time of measurement only and take no account of any movement or other effects that may apply afterwards. When estimating the uncertainty at any later time, other relevant information should also be considered, including, where possible, the history of the stability of the baseline.

Verifying Authority: Queensland Department of Resources
Signatory: Isaac Aaron Stiller
Position: QLD State EDM Calibration Officer
Signature:  **Date of Issue:** 27 August 2021

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Being a person with powers delegated by the Director General of the Queensland Department of Resources, appointed as a verifying authority under Regulations 71 and 73 of the *National Measurement Regulations 1999* (Cth) in accordance with the *National Measurement Act 1960* (Cth), I hereby certify that the above standard is verified as a reference standard of measurement in accordance with the Regulations by the above named authority. Accredited for compliance with AS ISO/IEC 17025:2018. The measurements used to produce this report are from equipment calibrated by the National Measurement Institute and other NATA accredited facilities. The results of the tests and/or calibrations included in this document are consequently traceable to SI units through Australian/National standards.

NATA

NATA Accreditation No. 15032