

## Penticton Reference Line

### Validating Instrument Performance

GAIA-FIELD reference line intercomparison over two days in Penticton, Canada

Reference line was created by MHW Geo-Surveys using multiple L&R Gravimeters over 5 years

L&R Gravimeters are routinely calibrated using Rocky Mountain Absolute Stations

The reference line provides a ~40 mGal variation over 6 stations

GAIA-FIELD intercomparison was undertaken over two days in July 2025



#### Method Summary

- | Station Time 30 s
- | Repeats 3-5 per station
- | Environmental Conditions;
  - Full sun, windy conditions
  - Urban area with moderate traffic

#### Key Results

- | Max Error **33**  $\mu\text{Gal}$
- | Mean Error **-8**  $\mu\text{Gal}$
- | Mean Abs Error **15**  $\mu\text{Gal}$
- | St Deviation of Errors **10**  $\mu\text{Gal}$
- | Residual Drift / Day **22**  $\mu\text{Gal}$

#### Analysis

- Uncertainty of the reference line values estimated at  $\pm 20 \mu\text{Gal}$
- Individual repeats  $\pm 16 \mu\text{Gal}$
- St Dev of individual readings 26...99  $\mu\text{Gal}$
- Urban environment (local vehicle and construction vibrations)
- Instrument drift calibrated in the UK two weeks before deployment

#### MHW Comments

SMG Gravity have proven themselves to be a company we are comfortable to work with.

After several trials we're now looking forward to testing our own GAIA-FIELD systems in commercial field surveys

Station	GAIA	Reference	Difference
10	0.000	0.000	0.000
30	-7.813	-7.829	-0.016
70	-17.891	-17.919	-0.028
90	-27.241	-27.254	-0.013
100	-31.879	-31.900	-0.021
120	-39.659	-39.672	-0.013
100	-31.867	-31.900	-0.033
90	-27.228	-27.254	-0.026
70	-17.904	-17.919	-0.015
30	-7.823	-7.829	-0.006
10	-0.003	0.000	0.003

^ Summary Station Data ( $\mu\text{Gal}$ )

Station	GAIA	StDev
120 (day 2)	9495.553	0.034
120 (day 2)	9495.546	0.034
120 (day 2)	9495.550	0.028
120 (day 2)	9495.551	0.033
120 (day 2)	9495.544	0.028

^ Example Trial Data ( $\mu\text{Gal}$ )