

|                                                                                                                       |                                    |                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------|------------------------------------|-------------------------------------------------------------------------------------|
| Version No: 01<br>Issue Date: 24/06/2021<br>Portfolio: Survey                                                         | <b>Horizons Regional Council</b>   | Section No: 3.1<br>Appendix No:<br>Page: 1 of 2                                     |
| <b>horizons</b><br>regional council  | <b>Hydrology Operations Manual</b> |  |

## Site Surveys – Overview

---

### Overview

Surveys allow us to set up and maintain our sites to a known and consistent level or *datum*. This gives us the ability to come back to a water level site at any point in time and check that our reference points, like a staff gauge or EPB, have not moved and are still able to be used to accurately determine the water level.

Surveys can also be used to measure the height that a river reached in a flood when that exceeds any of our usual references, and can even be used to determine cross-sectional area for flow calculations.

Therefore, it is important that we consistently set up our sites and routinely perform surveys to ensure the data they provide is representative of what is really happening.

### Survey Level Types

For site levelling, the three main methods used are the dumpy level, laser level, and the Total Station. The Dumpy level and laser level are more widely used for benchmark, water level, and instrument level checks, while the Total Station is more commonly used for cross-sectional and reach surveys

### Other Level types

It can be useful to bring in a level to a known common datum e.g. Moturiki or NZVD etc. In these cases, the Horizons Regional Council Survey team can use a GPS level to tie a site's most stable benchmark to the desired datum. This allows all surveys on site to be adjusted to this common datum.

### Choosing the correct equipment

Depending on the purpose of the survey, and the information outputs required, different equipment is more suitable for the job. You should choose the correct equipment for outputting the required level of accuracy of your survey.

### Dumpy and Laser levels

The Dumpy and laser level are ideal for benchmark surveys (including staff gauges and local references). These levels can give a high degree of accuracy in a local site survey, and the outputs are suitable for instrument checks and establishment of new sites to a local or adopted datum.

These levels can also be used to tie in a temporary reference (such as a peg from a flood peak debris line) to a local benchmark for use in hydrological analyses.

|                                                                                                                                      |                                        |                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------|
| Version No: 01<br>Issue Date: 24/06/2021<br>Portfolio: Survey                                                                        | <b>Horizons Regional<br/>Council</b>   | Section No: 3.1<br>Appendix No:<br>Page: 2 of 2                                     |
| <b>horizons</b><br><small>regional council</small>  | <b>Hydrology Operations<br/>Manual</b> |  |

## Site Surveys – Overview

---

### Total Station

The total station is best suited for cross-sectional surveys and complex sections where you want to include heights and positions including distance from your reference point.

For more information on levelling with the total station, see the operations manual:

[http://tqm.horizons.govt.nz/hydrology/SOPs/cd\\_om\\_3.3\\_Total%20Station.pdf](http://tqm.horizons.govt.nz/hydrology/SOPs/cd_om_3.3_Total%20Station.pdf)

### GPS levelling

GPS levelling has the lowest accuracy in terms of a local survey, around +/-50mm, but is useful for bringing a stable, known, local reference point into a common datum such as NZVD. This is can be used to analyze water level one site with regard to another site on the same datum.

The Horizons Regional Council survey team own and operate a GPS survey level, and can be contracted to tie a local reference to the desired datum.