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	<b>Hydrology Operations Manual</b>	

## Site Inspections: General

### Overview:

The purpose of any site inspection is to verify the function and accuracy of the recording instruments against an appropriate reference. Sites should be inspected on a routine basis relative to the sensor requirements and environmental conditions to ensure the site is meeting its performance objectives.

### Work Planning:

A record of inspection history should be maintained for each site to ensure that inspections are undertaken in a timely manner, and so that calibration and servicing requirements are met. These records can be maintained electronically and can be accessed via your team's tab in the [Hydro Hub](#). Daily checks on telemetered data streams are required to detect discrepancies in the record or site function that may require additional investigation. Major faults with voltage and communications may be automatically detected, and notified via email reports that come through at around 8am each morning, but these will not detect some sensor and data faults.

### Inspection Frequency:

As a minimum, sites should be inspected at the following intervals:

Rainfall*	2 Monthly (Nov – Mar), 3 Monthly (Apr – Oct)
River Level (Flood Warning Only)	2 Monthly
River Level (Flow Sites)	1 Monthly
Water Quality	1 Monthly
Ground Water	3 Monthly
Air Quality	3 Monthly
Flow Meters	Annual



*\*The frequency of Rainfall inspections are increased over the summer months to account for an increased risk of grass/seeds potentially blocking gauges being undetected*

### General Inspection Requirements

At the time of any site inspection, an electronic field sheet (EFS) must be completed. The type of inspection and the tasks undertaken will determine the necessary fields to be filled out in the EFS.

### Hazard Review

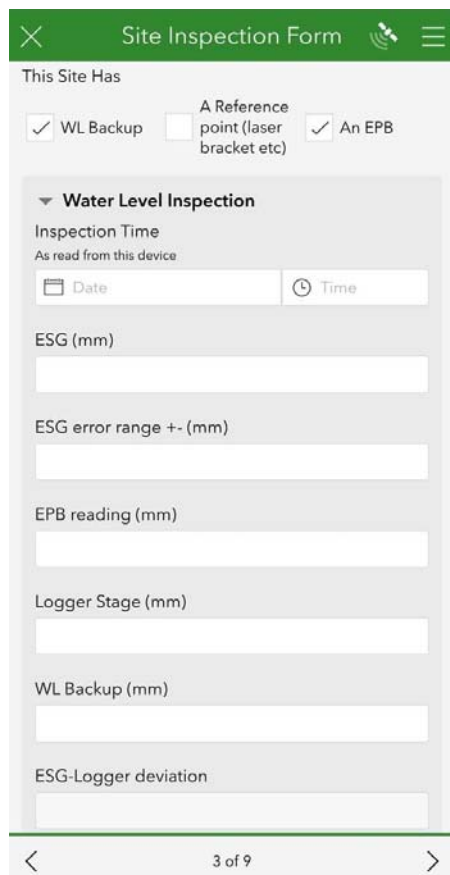
Prior to your first visit to **any** site, you must read and have a good understanding of all hazards identified at the site on previous inspections. This **does not** negate the need to be mindful of, and note, and new hazards or changes to existing hazards via the EFS.

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### Instrument checks

Each measurement at a site should be checked against a suitable reference at a known time/date. These measurements must be recorded in the appropriate tab and section of the EFS. Tabs in the EFS have been arranged to combine multiple measurements of similar categories (Rainfall, Water Quality, Water Level etc.), with a section for the time and date of check in each section.



This is an example of the screen in Survey 123 where you record a water level inspection. The technician enters all check values in the appropriate space, the app will automatically calculate deviations based on these values.



Time can be automatically populated with the current time by tapping on the greyed out date/time boxes, or manually edited to reflect the actual time the reading was taken (if different).

***\*\*Note: Reference checks should be carried out prior to logger checks to minimise any bias of the check values***

Once all fields are entered, the technician can move through the tabs to different aspects of the inspection (water quality for example) and enter these. At the last tab, you can enter a departure time, and submit the form to be sent back to the office.

These forms are automatically sent through to the database (with check values) each evening at 6pm, so if any adjustments need to be made, they can be edited on your device prior to this time without affecting any stored data.

The technician only needs to fill out the information relevant to the site, for example, at a “rainfall only” site; you do not need to enter any information on the “water level” page of the EFS.

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### Obtaining logger values

Logger values can be obtained by connecting to the data logger and recording the stored values at a given time. There are multiple methods available to connect to a data logger – via VPN, 1000KD device, or laptop (using Device Configuration Utility); each method has limitations and not each one will be possible at all sites.

For specific instructions on connecting to a data logger with these methods, see: cd\_om\_4.1 Appendix 4\_Connecting to a data logger

Logger values are recorded in the EFS; the values should be taken at the time of stored values for the measurement. Water level values are typically stored at 5-minute intervals, for water quality this is usually 15 minute intervals.

***\*Note:** For Water level, the “Stage Avg” values should be used in the EFS, rather than the point sample, as this is also the recorded telemetry value in our time-series management software.*

### Site faults and failures

Occasionally, when inspecting a site, instrument faults or failures are detected. These faults and failures *can* be flagged by the EFS when check values fall outside a maximum error range. These ranges differ by measurement and instrument but are automatically detected in the EFS reference checks. A table containing the acceptable deviation of measurements from their reference can be found at [\\tqm.horizons.govt.nz\hydrology\SOPs\cd\\_om\\_4.1\\_Appendix\\_3\\_Recorder\\_inspection\\_guide.pdf](\\tqm.horizons.govt.nz\hydrology\SOPs\cd_om_4.1_Appendix_3_Recorder_inspection_guide.pdf)

When a fault is discovered at a site, a non-conformance report should be generated; these can be started within the EFS at the site and completed later in the office once the fault is fixed. Non-conformance reports are a useful tool for tracking where time and money is lost through repairs, maintenance, or replacement. These reports can also be used to help direct us to purchase equipment that is more reliable or change our deployment practices to minimise these costs in the future.

### Finishing the inspection

When the inspection is finished and the EFS has been completed *including departure time*, check that all communications are plugged in and functioning, all instrument wiring is connected, and instruments are in their correct locations. Ensure the recorder box is closed and locked before leaving the site. If any gates were used in accessing the site, these should all be left as found (if open, leave open, if shut, leave them shut).