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## Discrete Water Quality – Surface Water Grab Sampling

### 1. Overview:

The Discrete Water Quality Program involves the sampling of surface waters via grab samples using various combinations of sample containers and test parameters. As such, the way we take a sample using several separate sample containers needs to be considered. This is complicated further by the use of sample container preservatives, the relationship of tests spread over several different containers and unique requirements required by certain tests.

Horizons strives to adhere to [National Environmental Monitoring Standards](#): Water Quality (documents 1-4) with its Discrete Water Quality Program. All Horizons staff are encouraged to become familiar with these documents.

Reference should be made to [Section 15.4 of the Hydrology Operations Manual](#) with regards to the sample bottles required for each profile Horizons Regional Council (HRC) samples for. Reference should also be made of the Standard Operating Procedure on the safe handling of sample preservatives: [Section 15.8 Appendix 2 of the Hydrology Operations Manual](#).

### 2. Good Sampling Practice:

On arrival at a sampling site take the time to plan your activities, always ensure your safety and assess the site for hazards prior to the commencement of sampling. The following rules need to be applied for all surface water sampling undertaken by HRC:

- Collect samples from flowing water, which is a representative (i.e. 'fully mixed') part of the water body being sampled, providing it is safe and practicable to do so.
- Always sample from a run if possible.
- Sample from just below the surface (i.e. the water should be approximately up to your elbow).
- Sample upstream of any activity that may be occurring at the sample site that can stir up sediment (i.e. stock in watercourse).
- Sample downstream of the handheld meters probe(s).
- Position your body downstream of the sample bottle(s).
- The sample across the entire sample set should be as homogeneous as possible (i.e. avoid scums and sediment clouds).
- Sample technique: unscrew the bottle(s) and hold inverted above the water body (i.e. the opened top facing the water body). Then immerse in the water body allowing the bottle(s) to fill facing upstream.

### 3. Aseptic Techniques:

Aseptic techniques are essential to avoid contaminating both the sample bottle(s) and sample(s).

#### ALWAYS:

- Collect Microbiological Samples before collecting other samples.
- Take a minimum of one Spare set of sample bottles on your run.
- Discard damaged, dirty or questionable sample bottles. If in doubt, throw away and replace with new (replace the sample bottle with new if you suspect that contamination has occurred during sampling).
- Wash your hands thoroughly before collecting samples (cleaning solutions, alcohol gel & wipes are available).

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- Avoid/Minimise putting the bottle lid on the ground whilst sampling

### NEVER:

- Touch in the inside rim or interior of the sample bottles

## 4. Use of Sample Poles:

From the initial site assessment, the need for using a sample pole to carry out the sampling should be identified. The option of a sample pole allows for the sampling to be undertaken without directly accessing the water body. Certain sites: such as those with unsafe access/egress; unsafe water depths; or those waterborne obstructions present (among other hazards) may always require the use of sample pole. High or flood flow conditions will result in the need to use sample poles.







The good sampling techniques and aseptic techniques should still be adhered to as much as practicable when using a sample pole. **Note on the comments form of the field sheet if a sample pole was used.**

## 5. Sampling Order:

The order in which the sample is completed and whether certain bottles are sampled via a subsample or directly, depend on the nature of the sample profile (i.e. the actual tests required by that particular sampling program). The main surface water programs are covered below, the State of Environment (SoE) and Point Discharge (PD) profile has been covered first and in most detail as it constitutes the bulk of Horizon's sampling sites. To avoid repetition the subsequent profiles are covered in less detail with reference to the detailed analysis provided for the SoE and PD profile required.

Site and climatic conditions will require the use of Sample poles in place of physically wading to the appropriate sample point within the desired water body.

### 5.1 State of Environment (SoE) and Point Discharge (PD) Grab Sampling:

					
1L Chemistry bottle	500ml Chemistry Bottle	50ml Cations Digi-tube	50ml Anions Digi-tube	100ml total nutrients Bottle	120ml Sterile (Micro) Bottle

The SoE and PD profiles each typically consist of six separate sample bottles, and both should be collected in the same manner. Aseptic sampling techniques should be applied to prevent contaminating the sample container and water sample.

### WADING:

In *Ideal conditions* where it is safe to wade to the sampling location or safely gain access to a discharge point the sample **must** be collected in the following order:

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1. The 120ml sterile bottle should be collected first– this bottle is used for Microbiological (i.e. E.coli testing). The sample bottle must **NOT** be rinsed or allowed to overflow and should be sampled direct from the source. Hold the bottle at the bottom taking when unscrewing and screwing - the shape of this bottle and lid does make the risk of contamination from the sampler more likely than the other bottles we currently use so take care.
  2. The Cations & Anions Digi-tubes and Total Nutrients bottles should be decanted from the same 'sample', in this case the sampler should fill the 1 litre chemistry bottle and decant this into the three smaller bottles (i.e. these three are sub-samples from the same common sample).
  3. The 1 litre bottle is then agitated/shaken and rinsed out in order to remove any sediment from the initial fill and then re-filled and tightly capped.
  4. The 500ml Chemistry Bottle is exclusively for SSC, therefore this bottle must be filled directly from the source (i.e. it is **NOT** a subsample from a larger bottle). The one litre bottle is tested for various turbidity and sediment parameters and is therefore closely linked to the 500ml Chemistry Sample Bottle (these values are compared against each other in the QC process) so these two bottles need collecting with minimum time between them.
- a) Additional metals bottles: These may or may not contain preservatives, for those that do ensure that they are not rinsed or allowed to overflow (refer to this [SOP](#)). These should be filled in step 2 above, being subsampled from the 1 litre Chemistry bottle. To reduce the risk of contamination (i.e. preservative getting into the other subsamples) **these bottles should be subsampled last.**
  - b) Additional Micro bottles: Occasionally a second micro bottle is required for a sample – this should also be collected in step 1 above.
  - c) Additional 1 litre bottle: For some PD sites an additional 1 litre bottle is required for ScBOD5 analysis – this should be collected after the first 1 litre bottle.








### SAMPLE POLE:

During Hi-flow conditions or for Sample Locations with unsafe access the sampler is limited to using a sample pole. Currently HRC sample staff have sample poles that can hold (and therefore sample with) the 120ml Micro Bottle, 1 litre Chemistry (with some persuasion) and 500ml chemistry bottles. The principles of aseptic techniques should be applied as much as is practicably possible. The same sampling order details above is to be adhered to. Additional bottles: the above comments (re: sampling in ideal conditions) also apply here.

### Other Surface Water Sampling

The same principles detailed above apply to HRC's other sampling programs, however changes in the sample composition need to be accounted for. These differences are highlighted below by sample program.

## 5.2 Coastal & Estuary Grab Sampling:

						
1L Chemistry bottle	1L Chemistry bottle	500ml Chemistry Bottle	50ml Cations Digi-tube	50ml Anions Digi-tube	100ml total nutrients Bottle	120ml Sterile (Micro) Bottle






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## Discrete Water Quality – Surface Water Grab Sampling

	(Chlorophyll A)					
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For hand and sample pole sampling the same procedures as detailed above for the SoE and PD sampling applies. **This sample set requires a second one litre general chemistry bottle for chlorophyll A analysis – this should be collected at the end of the sampling order.**

### 5.2 Cyanobacteria & Periphyton Grab Sampling:

				
<b>500ml Chemistry Bottle</b>	<b>50ml Cations Digi-tube</b>	<b>50ml Anions Digi-tube</b>	<b>100ml total nutrients Bottle</b>	<b>120ml Sterile (Micro) Bottle</b>

**Both of these sample suites require the Digi-tubes and total nutrients bottle to be to be subsampled from an extra 1 litre bottle.** The one litre sample bottle can be recycled when back at the office.

### 5.4 Turbidity Grab Samples:

	
<b>1L Chemistry bottle</b>	<b>500ml Chemistry Bottle</b>

The same sampling order is required regardless of sampling by hand or sample pole. Both sample containers need to be filled directly (and therefore independently) but are related. Fill the one litre sample bottle first followed by the 500ml bottle with as little time between each as possible. Pay particular attention to ensuring homogeneity for both bottles as the results between each bottle are closely related.

### 6. Re-Sampling:

It is anticipated that sample staff obtain all required grab samples to the prescribed frequency, provided it is safe to do so. Reasons for being unable to get a grab sample may include (but not be limited to): unsafe flow conditions, unsafe access, no access, and no sample source (i.e. a nonoperational pump or discharge site or a dry sample reach).

If samples could not be collected, other than that of either (i) a discharge site no discharging upon time of arrival or (ii) a sample location being dry, then a repeat sample attempt should be attempted. The resample is required within the same month as the original planned date and ideally within +-1 hr of the normal sample time for the sample location. It is the shared responsibility of the sample staff member and Discrete WQ portfolio holder to confirm any missed samples as soon as possible. Any resampling is to be organised by the Discrete WQ portfolio holder.