GSQ Borehole Profile

Guidance document

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This document is a part of the declaration of the Geological Survey of Queensland's [1] *borehole* profile. It is a *guidance* document which means it is one of many parts of the profile and it intended to assist users of the profile with using it.

When and how should I use this profile?

You should use this profile when you want to represent information about a *borehole* (see discussion about what a *borehole* is below) such as its location, depth, etc. and also when you want to relate a borehole to other things, such as samples from it, the feature that the borehole is used to take samples from (typically an aquifer, the earth's crust etc.). It can also be used, with extension, to represent non-biophysical information about boreholes, such as ownership, access, other legal information and status (e.g. in use/ceased).

What is a borehole?

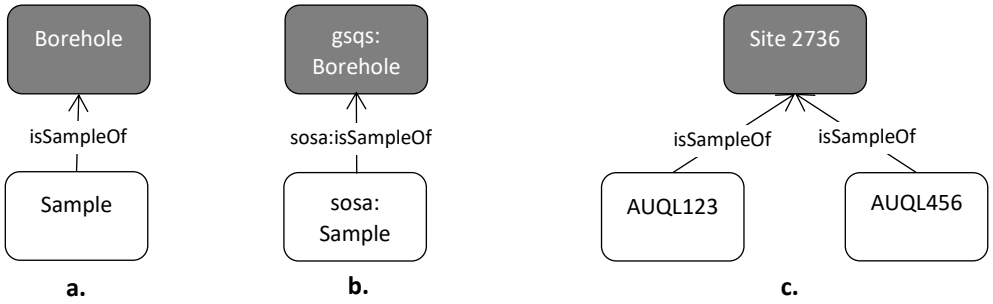
As per GeoSciML [1], a borehole is:

> *"the generalized term for any narrow shaft drilled in the ground, either vertically, horizontally, or inclined"*

GSQ uses the term *borehole* to cover boreholes with a range of purposes, such as groundwater monitoring bores, petroleum prospecting bores, rock sampling bores and so on. Where required, specialised subclasses of the generic `Borehole` class in GSQ Borehole Profile are made. A requirement would be the need to record specialised metadata in addition to generic borehole metadata or perhaps to create a specialised schema for a data storing system with specialised validation rules.

How does a borehole relate to other information objects?

GSQ implements a range of component information models within an overarching information model for the whole agency and this GSQ Borehole Profile is one of the components. The overarching model describes how the component models relate to one another, for example, the Borehole and Samples component models are related by the `Sample` class being related to the `Borehole` class by the `isSampleOf` relationship, as per Figure 1 below.



gsqs: http://linked.data.qld.gov.au/def/gsqs/
sosa: http://www.w3.org/ns/sosa/

Figure 1a: The general relationship between Samples and Boreholes.
1b: the same relationship as 1a with formal class names with namespace prefixes shown.
1c: An example of two specific samples coming from a single borehole.

How do Boreholes relate to Sites?

In GSQ, the word *site* is often taken to include a borehole. The way this profile models this is to say that the Borehole class is a specialised version of a Site class. So, a borehole can be a site but not all sites need be boreholes. Additionally, since sites may be related to one another, a single non-borehole site might contain, or be related to, multiple boreholes.

Note here that the purpose of a borehole is assumed to be one of sampling: a borehole is something you use to get/observe samples of something else (a so-called *Feature of Interest*), such as the earth's crust, an underground aquifer or some sort of petroleum sands. Figure 2 shows borehole/site relations.

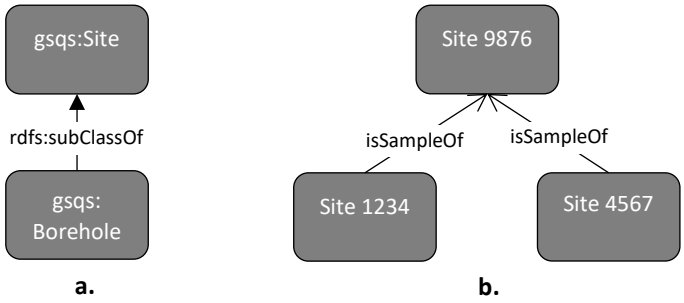


Figure 2a: `Boreholes` are a specialised type of `Site` (`subClassOf` the `Site` class).
2b: Any particular `Borehole` may relate to a particular `Site` be being a sample of it (`isSampleOf`).

References

[1] Open Geospatial Consortium (OGC) *OGC Geoscience Markup Language 4.1 (GeoSciML).* OGC Standard, 2017-01-31. http://www.opengis.net/doc/geosciml/4.1

[2]