

## MEMORANDUM

COMPANY:	SKM Pty Ltd				
ATTENTION:	██████████				
CC:	██████████, Office of the Coordinator-General; ██████████, Office of the Coordinator-General; ██████████, SunWater; ██████████, SunWater; ██████████, SKM; ██████████, SKM				
FROM:	██████████				
DATE:	13 November 2012	JOB NO:	B78B	DOC NO:	013a
SUBJECT:	Nathan Dam Springs Drilling Program Observations and Comments				

Dear ██████████

I have reviewed the 8 November 2012 Outcomes of field investigations (29 Oct -0 1 Nov 2012) file note. I focused my review on assessing the appropriateness of the proposed drilling locations and drill depths.

The bores are located within the four spring groups targeted for sampling. The drill locations chosen do strike a balance between being located proximal to active springs but not so close as to potentially interfere with spring function. However, the proposed drill sites are generally located near active or ephemeral water courses. The location of the proposed drill site is driven by the location of the springs, which generally occur near water courses. My only concern is that the proposed bores may be subject to inundation during extreme weather events. I would recommend that you ask the hydrologists associated with the Nathan Dam project to review the exact locations proposed to confirm that the proposed drill sites are not at risk of flooding.

I have also reviewed the proposed drilling depths relative stratigraphic and lithological data from the nearest bores taken from the DEHP Groundwater Database (GWDB). This review suggests that the proposed shallow bores may have final completion depths between 10 and 40 m. The review also suggests that the deeper bores targeting the Precipice Sandstone may exceed 70 m to reach the desired aquifer. The review details are presented below.

A driller with a Queensland Class 3 driller's licence will be required given the likelihood of encountering significant artesian pressures at the proposed drill sites, and the drilling method and equipment should provide for cement grouting of the annulus.

### **Boggomoss North springs**

Seven registered water bores were identified in the general vicinity of the proposed Boggomoss North springs drill sites. The table below contains details extracted from the Stratigraphy, Strata Logs, Aquifer and Casings tables in the DEHP GWDB.

Boggomoss North springs					
RN	Total depth (m b GL)	Aquifer	Opening type	Opening top depth (m b GL)	Depth to contact with Precipice Sandstone (m b GL)
12719	87	Evergreen and Precipice	Open hole	71.9	84
13438	91	Boxvale and Precipice	Open hole	39.6	44
13585	41.5	Precipice	Open hole	17.6	30
14597	181	Precipice	Open hole	21.3	
14750	86	Precipice	Open hole	38.1	
14998	122	Precipice	Open hole	28.4	
15535	61	Evergreen and Precipice	Perforated	55.7 to 56.4	40.5

Depending on the location of the drill sites, the Precipice Sandstone will likely be encountered at depths between 30 and 84 m below Ground Level (bGL), consistent with the SKM note.

### Boggomoss South springs

Three registered water bores were identified in the general vicinity of the proposed Boggomoss South springs drill sites. Two of those bores are also located near the Boggomoss North springs. The table below contains details extracted from the Stratigraphy, Strata Logs, Aquifer and Casings tables from the DEHP GWDB.

Boggomoss South springs					
RN	Total depth (m b GL)	Aquifer	Opening type	Opening top depth (m b GL)	Depth to contact with Precipice Sandstone (m b GL)
13585	41.5	Precipice	Open hole	17.6	30
14597	181	Precipice	Open hole	21.3	
35256	140	Precipice	Perforated	82 to 139	

Depending on the location of the drills sites, the Precipice Sandstone will likely be encountered at a depth below 30 m bGL; therefore, it is likely that proposed shallow bore will have a depth less than the 60 m indicated by SKM.

### Cockatoo Creek

Seven registered water bores were identified in the general vicinity of the proposed Cockatoo Creek drill sites. The table below contains details extracted from the Stratigraphy, Strata Logs, Aquifer and Casings tables from the DEHP GWDB.

Cockatoo Creek					
RN	Total depth (m b GL)	Aquifer	Opening type	Opening top depth (m b GL)	Depth to contact with Precipice Sandstone (m b GL)
18279	72	Precipice	Open hole	12	Not listed
26081	11		Not listed	--	Not listed
47330	15	Cockatoo Creek Alluvium	Screen	14.8 to 15.5	Not listed
57700	91		Not listed	--	Not listed
89599	277	Precipice	Not listed	--	Not listed

The Precipice Sandstone outcrops in the area of the proposed drill site; however, the available data suggests that a monitoring bore will need to be drilled to at least 30 to 40 m to reach artesian conditions within the Precipice Sandstone (perhaps as much as the 60 m as indicated by SKM).

### Dawson 8

Four registered water bores were identified in the general vicinity of the proposed Dawson 8 drill sites. The table below contains details extracted from the Stratigraphy, Strata Logs, Aquifer and Casings tables from the DEHP GWDB.

Dawson 8					
RN	Total depth (m b GL)	Aquifer	Opening type	Opening top depth (m b GL)	Depth to contact with Precipice Sandstone (m b GL)
88465	22	Hutton	Perforated	17 to 35	11
89602	42	Birkhead	Perforated	27 to 42	Not recorded
14182	73	Hutton	Not recorded		Not recorded
14183	98	Birkhead	Not recorded		Not recorded

The depth to the contact between the Hutton Sandstone and the Birkhead Formation is not recorded in the DEHP GWDB; however, the lithological data suggest that the contact may be as shallow as 10 m bGL in some places. It is suggested that the deeper hole be drilled first to identify the depth to the contact at the proposed drill site.

### Nathan Gorge

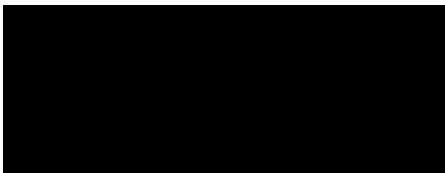
Seven registered water bores were identified in the general vicinity of the proposed Nathan Gorge drill sites. The table below contains details extracted from the Stratigraphy, Strata Logs, Aquifer and Casings tables from the DEHP GWDB.

Nathan Gorge					
RN	Total depth (m b GL)	Aquifer	Opening type	Opening top depth (m b GL)	Depth to contact with Precipice Sandstone (m b GL)
30507	71	Precipice	Open hole	51 to 71	61
57615	72	Precipice	Not recorded		39
67281	80	Precipice	Open hole	19 to 80	69
13030796	86	Precipice	Perforated	71 to 83.5	70
13030797	109	Precipice	Perforated	97 to 109	80
13030798	107	Precipice	Perforated	89 to 107	86
13030799	91	Precipice	Perforated	53 to 90	41

The depth to the contact between the Precipice Sandstone and the Evergreen Formation varies from 39 to 86 m bGL near the proposed Nathan Gorge drill sites. Nominally it is recommended to plan for the deeper bore to be completed at a depth of at least 70 m bGL (deeper than the 60 m recommended by SKM). The actual completion depth will depend on the depth at which the Precipice Sandstone is encountered.

Please call me at [REDACTED] or email me at [REDACTED] if you have any questions.

Yours sincerely,  
**RPS Aquaterra**



Senior Hydrogeologist