

TECHNICAL MEMORANDUM

DATE 26 June 2024

Reference No. 20435097-004-M-Rev0

TO Callum Hart
Hesperia

CC

FROM David Barrett

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OCTOBER 2022 GROUNDWATER LEVEL MONITORING EVENT SMITHS BEACH DEVELOPMENT

1.0 INTRODUCTION

Hesperia engaged WSP Pty Ltd (WSP) to undertake a round of groundwater levels measurements and download transducers deployed at the proposed development at Smiths Beach, Yallingup (the site). The proposed development includes a hotel, campground and village residences and there is a need for management of sewage wastes. Two potential options have been considered, the installation of septic systems at each village residence or collection of the waste to a central location for a larger septic system. As part of this work, it is necessary to better understand the groundwater levels at the site.

It is expected that water infiltrating into the ground following rainfall events will perch on top of the bedrock and flow with the slope of the bedrock before discharging to the surficial aquifer adjacent to the beach. Golder previously installed 10 groundwater monitoring wells at the site (three by drilling methods and seven by hand auger) and completed groundwater level measurements and collected a limited data set using transducers (Golder, 2021). Due to the time of year the investigation was undertaken, there was limited groundwater encountered across the site with only groundwater encountered in the northern portion of the site, in proximity to the spring.

This technical memorandum presents the results from a groundwater level monitoring event completed on 21 October 2022. The work has been undertaken for Hesperia in accordance with proposal 20435097-003-R-RevA dated December 2021. The report has been updated based on comments provided by JBS&G dated 24 May 2024.

Groundwater levels were last measured on 27 October 2021. Figure 1 shows the monitoring network consisting of 10 monitoring wells drilled in 2021.

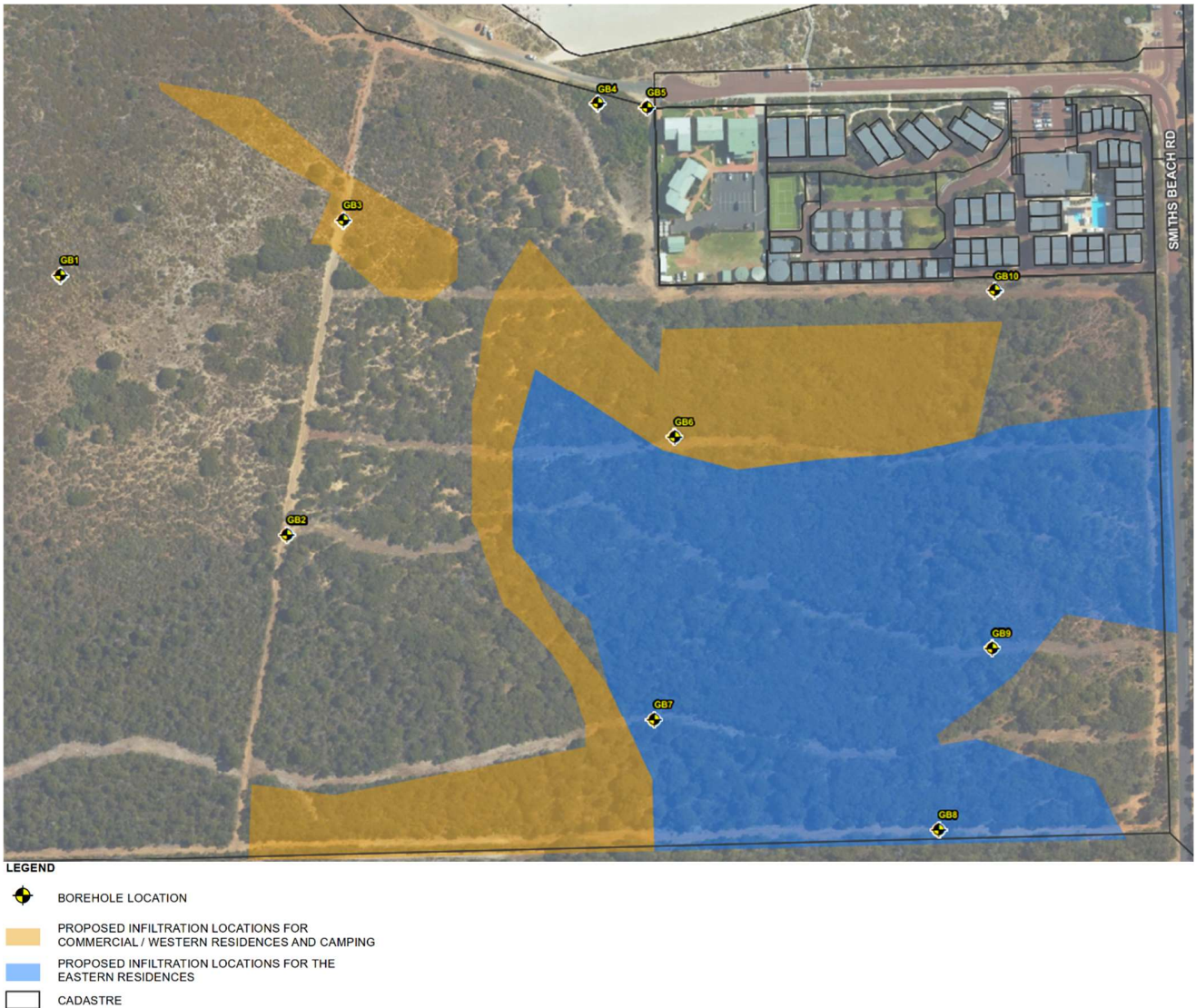


Figure 1: Groundwater Monitoring Well Locations

2.0 SCOPE OF WORK FOR OCTOBER 2022 EVENT

The following scope of work was completed for the October 2022 monitoring event.

- Manual measurement of groundwater levels in 10 groundwater monitoring wells.
- Download of 5 transducers.

Manual groundwater measurements and transducer download could not be completed for GB04 monitoring well due to overgrown vegetation which limited access (Figure 2). In reviewing the data, it is noted that the four transducers at GB03, GB05, GB06 and GB09 ceased logging in September 2022 and are currently not collecting additional measurements.

3.0 RESULTS

The results of the manual groundwater measurements and transducer data are presented in the following section.

3.1 Manual Groundwater Level Measurements



Figure 2: GB04 location on 21/10/2022

A summary of the manual groundwater level measurements is provided in Table 1. At the time of the site visit all of the monitoring wells were dry.

Table 1: Summary of Manual Water Level Measurements

| Location ID | Ground Surface Elevation (m AHD) | Time | Water Level (m bgl) | Water Level (m AHD) |
|-------------|--|-------|---------------------|---------------------|
| GB01 | 31.70 | 13:37 | DRY | DRY |
| GB02 | 40.11 | 13:54 | DRY | DRY |
| GB03 | 21.77 | 13:16 | DRY | DRY |
| GB04 | Groundwater measurements not completed due to access constraints | | | |
| GB05 | 6.91 | 15:45 | DRY | DRY |
| GB06 | 18.35 | 14:56 | DRY | DRY |
| GB07 | 38.62 | 14:10 | DRY | DRY |
| GB08 | 43.36 | 14:18 | DRY | DRY |
| GB09 | 38.75 | 14:35 | DRY | DRY |
| GB10 | 13.22 | 15:15 | DRY | DRY |

3.2 Transducers

The barometric troll was located at GB04 and was therefore not accessible. Instead, the data was processed using barometric pressure sourced from the Bureau of Meteorology (BOM) Bunbury Station. The hydrographs for the groundwater levels and showing rainfall over the similar period is presented in Figure 3. The hydrographs have been presented as water level above base of well, which is deemed to be comparable to water level above base of surficial sediments.

Rainfall data has been taken from Cape Naturaliste station (0095119).

The hydrographs indicate that GB06 and GB03 are predominantly dry and only occasionally have detectable groundwater. In comparison, GB05 and GB09 frequently detect groundwater in the monitoring well. GB05, which is located in proximity to the spring contained groundwater during the last sampling event in October 2021. The groundwater levels at GB05 appear to be only partially influenced by rainfall, with increases in groundwater levels noted at other times.

The results indicate that perched groundwater is present above the bedrock following rainfall events.

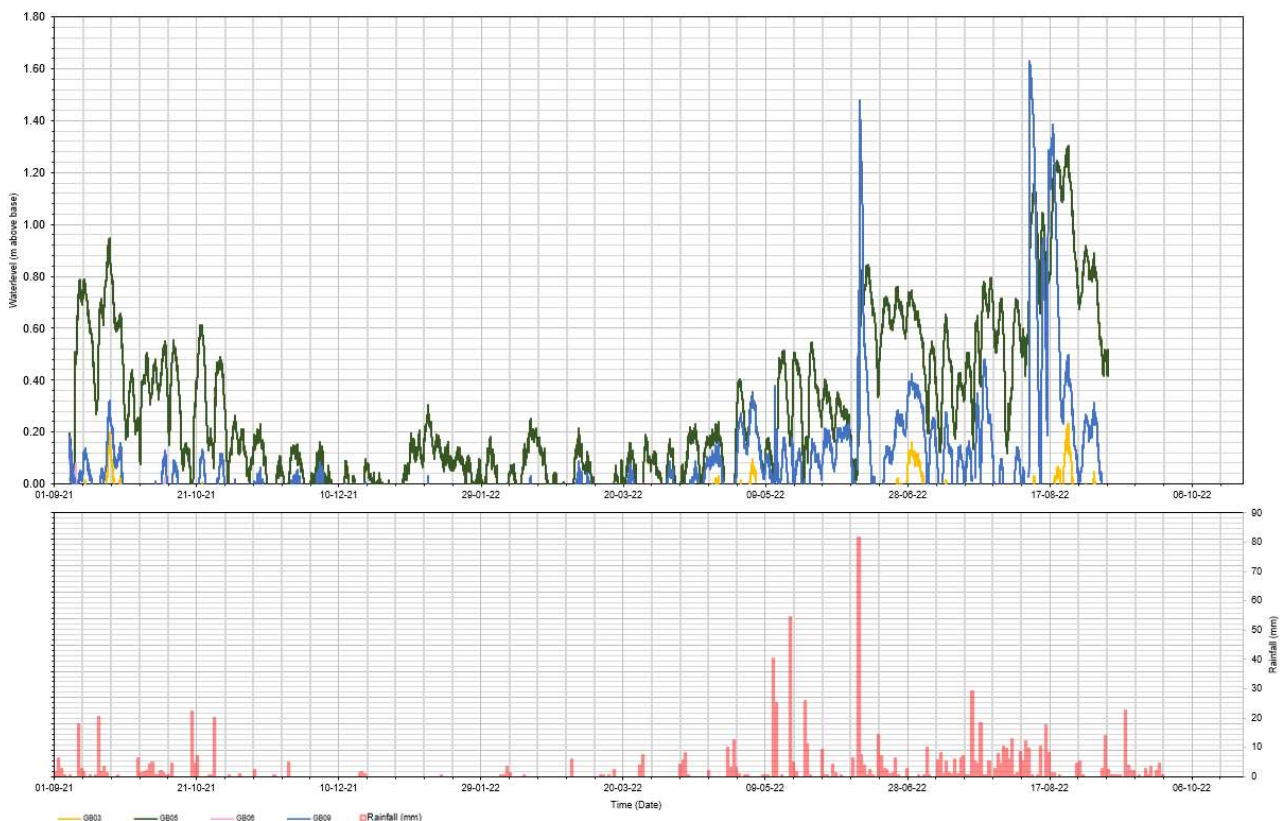


Figure 3: Rainfall and groundwater levels (m above base of well) – 6 September 2021 to 6 September 2022

4.0 SUMMARY

Hesperia engaged WSP to undertake a round of groundwater levels measurements and download transducers deployed at the proposed development at the site. A site visit was completed on 21 October 2022 where manual groundwater levels were collected, and transducers were downloaded. At the time of the site visit GB04 was inaccessible due to overgrown vegetation and therefore no additional groundwater information was collected from this location. The transducers are currently not logging groundwater pressure.

The manual groundwater levels did not identify groundwater present in the nine monitoring wells which were accessed. Transducer data collected from four locations, GB03, GB05, GB06 and GB09 did indicate that groundwater was present in the wells over the year (September 2021-September 2022). Both GB03 and GB06 had limited groundwater, with it only occasionally being measured following rainfall events for a limited period.

GB05 and GB09 noted groundwater more frequently. GB05 is in proximity to the man-made spring and groundwater occurrence may be influenced by this feature. GB09 is located further upgradient and the transducer indicates that following rain events up to 1.5 m of groundwater may be present within the groundwater well. The transducers results therefore suggest that there are periods where groundwater appears to perch on top of the bedrock at different magnitudes and frequency.

5.0 IMPORTANT INFORMATION

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Golder Associates Pty Ltd



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Principal Geotechnical Engineer

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Attachments: A – Important Information

<https://wsonline.sharepoint.com/sites/gld-137165/project files/6 deliverables/20435097-004-m-reva-draft - copy.docx>

ATTACHMENT A

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