KeySolutions (2005) Ltd
Ph: 07 378 4415 • Mob: 027 494 0125 • info@keysolutions.co.nz • 66 Wharewaka Road • TAUPO

KeySolutions 121212

Proposed Accommodation
Moerangi Valley
Whirinaki Te Pua-a-Tane Conservation Park

PROPOSAL FOR THE PROVISION OF WATER SUPPLY AND WASTEWATER SERVICE

APPLICANT:
MANAAKI GROUP HOLDINGS LTD

14 May 2018

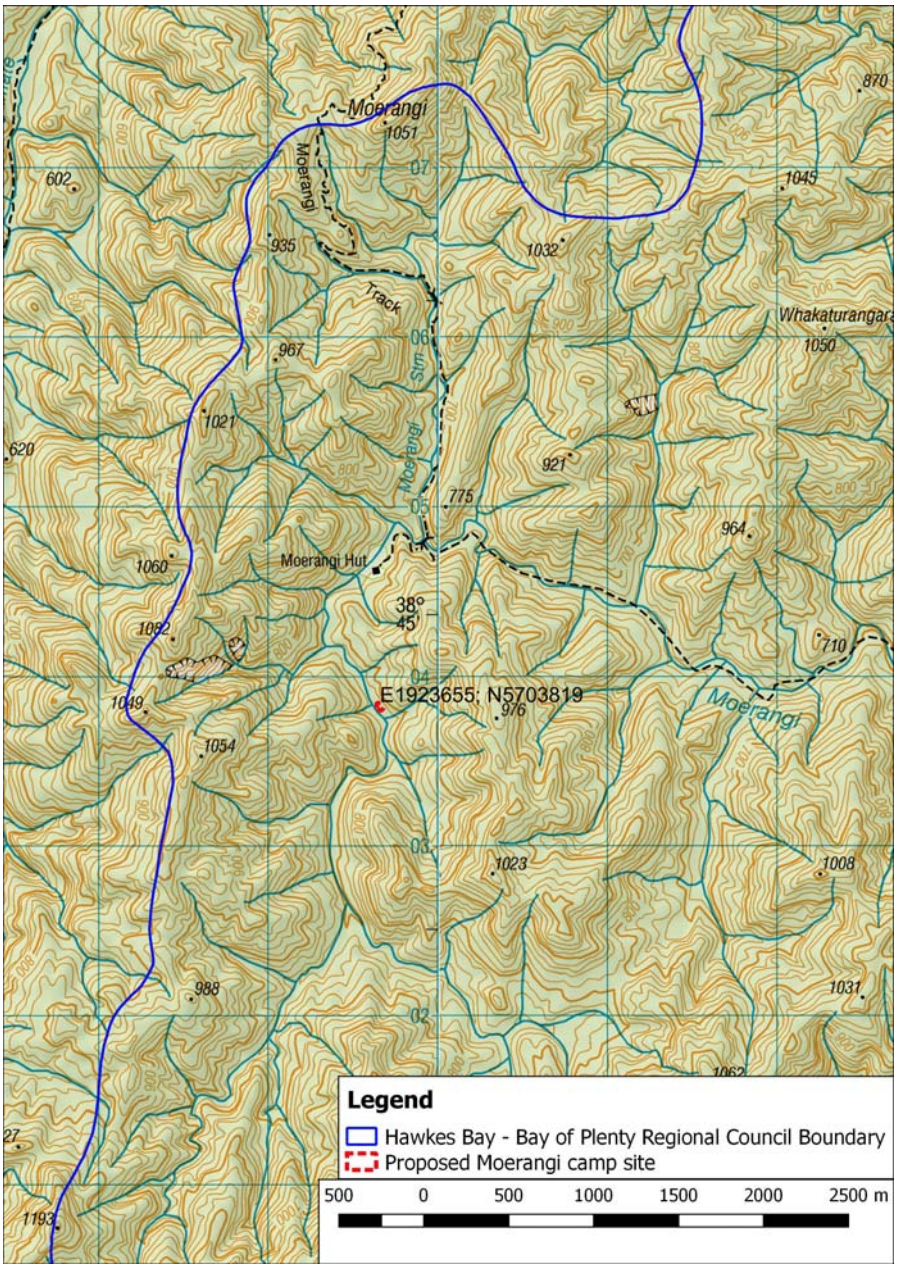
"unlocking the answers"

1 INTRODUCTION

KeySolutions is a small engineering consultancy operating out of Taupo, New Zealand. The Director is Mike Keys who has spent 40 years designing and approving infrastructural engineering in and around the Taupo District. From 1993 to 2006 Mike was the Chief Engineer at Taupo District Council. He is familiar with both small and large water supplies and wastewater systems, and innovative solutions for the tertiary treatment of wastewater.

2 OVERVIEW

The Principal of the Applicant Company has been operating single day and two day walks in the Whirinaki Conservation Park for 24 years and it has been a successful operation. The company wishes to expand the range of tours it operates to incorporate a 3 day, 2 night experience following the recent opening of a 35 kilometre dual purpose (walking and mountain biking) track in that locality by the Department of Conservation. This 3 day option will involve the construction of new overnight accommodation in the Moerangi Valley, which will be home for the second night of the 3 day walk. The location is shown at left.



The proposed accommodation will be on a plateau on the true right bank of the Moerangi Stream at NZTM co-ordinates E1923655 N5703819.

This report covers the provision of water and wastewater services for this development proposal.

The proposed lease provides for 10 Sleeping Huts/wharemoe each with its own ensuite, the number 10 being consistent with the consent/lease recently granted for the company's other site in the Okahu Valley. In addition there will be accommodation for 2 on-site staff, a total of 22 persons for a maximum of 8 months per annum. A Kitchen/dining hall/wharekai will also be built where 2 staff will live and guests will dine.

There will be no electricity supply at the facility so neither water supply or wastewater infrastructure will incorporate an ability to pump or aerate.

3 WATER SUPPLY

The potable water for the accommodation will be sourced from an adjacent stream and from the roof of the kitchen/dining hall.

The proposed extraction system will be located in a stream south east of the proposed accommodation which feeds into the Moerangi Stream. This side stream can be seen on the location map above. The intake would be a screened gravity inlet structure with a pipe approximately 20 or 25mm in diameter feeding storage tanks. The tanks will have enough capacity to cater for the daily peaks of usage and refill through the feed pipe in a "trickle feed" 24/7 type operation. This un-named side stream has widely varying flows, but even at low flow the "trickle" extraction will mean that less than 10% of the flow is consumed [this is a condition of the Hawkes Bay Regional Council (HBRC) and explained further later in this report]. It can be seen on the map above that it is fed by a sizeable catchment area, at least 500m x 500m, 25ha. The tanks will provide at least 2 days storage (5000 litres) and be kept full from the trickle feed. "Overflow" water will be fed back into the stream downstream of the tanks.

Water will be filtered at the outlet of the tank before being reticulated to the wharekai and the 10 wharemoe. It will be monitored for compliance with the drinking water standards and additional treatment added into the system in series if necessary. This proposed system and catchment is similar to the one in use at the companys existing site in the Okahu Valley and there have been no water quality or quantity problems at that site.

4 WASTEWATER SERVICE

i. Wastewater from the wharekai and the 10 wharemoe will be reticulated to a treatment and design system, the design of which is a work in progress.

ii. The preliminary design of the wastewater infrastructure incorporates 2 standard septic tanks in series but with the ability to add a third and fourth should it prove environmentally and economically sensible to do so. Given that desludging tanks will require the use of a helicopter, the operation would be monitored closely to reduce the cost of maintenance and make it as efficient as possible. Technology exists in the form of a portable electronic sensor to determine the depth of the solids mat on the surface of tanks and to determine the depth of sludge on the bottom. We intend to use a similar monitoring system at this facility as it is important that solids removal is done in a timely manner. Both tanks would be designed with 24 hours retention of effluent and accommodate the ability to monitor sludge depths and thickness and also adjust the height that the outlet of each tank draws from so that it is producing the best effluent possible. It is likely that the first tank in the series will trap much of the grease and fats, so the outlet would be set at around 70% of liquid depth, the second tank around 50%. As mentioned, these will be adjustable by the Operator to get the best performance out of the system.

iii. One option for the treated effluent disposal system is a surface irrigation (dripper/dribbler) system. There is an undulating plateau, approximately 20m above the Moerangi Stream, and to the north of, and lower than, the proposed accommodation. This could be used as a dispersal field. Surface mounted "dribbler" pipes would connect to a larger diameter falling main and, like the septic tanks, will be monitored to ensure that the dispersal of effluent is as uniform as possible and no problematic concentration of effluent (ponding etc) is occurring. Provision will be made for a "balancing tank" should this prove necessary. This would accommodate the highs and lows of the daily effluent cycle by having a 90mm diameter inlet and a 20mm (may vary with final design of effluent dispersal system) outlet so that the disposal field is operating uniformly 24 hours a day. The surface irrigation pipes would need to be stapled in place as required by HBRC and covered by the leaf fall/ mulch which exists in abundance on the site.

iv. As detailed in the following section, discussion is ongoing with the consenting authority and it is likely that the final design will vary from that described above.

5 HAWKES BAY REGIONAL COUNCIL (HBRC) RULES

i. The site is within the Hawkes Bay Region. We have had extensive discussions with the Council's Regulatory staff regarding the Regional Plan rules that need to be complied with (both for the water supply extraction and for the wastewater treatment and disposal) and the best way of achieving this compliance. Both consents staff and council's hydrologists have been involved in those discussions.

ii. The position we have got to at time of writing this report is summarised in an email from the Consents Planner dated 10th May 2018:-

"I have spoken with one of our senior planners and Council's hydrologists in relation to your proposal.
I have a question regarding alternative methods of water supply. Have you considered rain water tanks in addition to or in the place of the proposed surface water take? I would suggest looking into this if you hadn't already.
If you wish to proceed with the surface water take as you have proposed, the following permitted activity rule (Rule 54) still applies.

a. Except for takes occurring for a period of less than 4 weeks, the total volume taken shall not exceed 20 m^3/d[134] per property; (or per work site where the activity relates to the take and use of water for the maintenance of road reserves) nor shall the total volume exceed the reasonable needs of the user, whichever is the lesser.
b. For takes occurring for a period of less than 4 weeks within any 90 day period, the total volume taken by any person shall not exceed 200 m^3 per 7 day period.
c. The rate of take shall not exceed 10% of the instantaneous flow[135] at the point of take.
d. The intake velocity shall not exceed 0.3 m/s.
e. The activity shall not adversely affect any wetland.
f. The take shall not adversely affect any lawfully established efficient groundwater take, or any lawfully established surface water take, which existed prior to commencement of the take unless written approval is obtained from the affected person.

I must stress that in order for the surface water take to remain permitted you will need to ensure you meet all of these conditions, particularly condition (c): the rate of take shall not exceed 10% of the instantaneous flow at the point of take. Council's hydrologists have estimated that the Mean Annual Low Flow (MALF) of the stream from which you are proposing to take is approximately 1.2 L/s. You will need to consider what your options are for water supply during summer dry when your rate of take will likely exceed 10% of 1.2 L/s and you will have to cease abstracting water. Based on the information you have supplied, and provided the above points can be addresses, then this take will be permitted and consent will not be required.
It will be your responsibility to ensure that any water abstracted is of suitable quality for its intended use. Where water is to be used for human consumption, you should have the water tested prior to use and should discuss these requirements with a representative of the Ministry of Health and should consider the following Drinking Water Standards (see link below):
https://www.health.govt.nz/system/files/documents/publications/drinking-water-standards-2008-jun14.pdf
The proposal to discharge wastewater at the site is slightly more difficult. Given there is a kitchen facility and the accommodation facilities proposed each have an en-suite with a shower/toilet, it is more appropriate to design the system with a flow allowance for a fully serviced camping ground. Having also taken into account the potential insecurities of water supply in periods of summer dry, it is considered more appropriate to base the flow allowance on the recommended flow allowance for a fully serviced camp ground with on-site roof water supply (100 L/person/day). Based on your calculations of maximum occupancy = 22 people, this equates to a maximum daily discharge volume of 2.2 m^3. This exceeds the permitted activity rule 37 (b). You will need to look at what type of system has the required capacity and is appropriate for the site.
The other issue is that in order to install surface irrigation, wastewater must be secondary treated (see 6.2.2 of Figure 6 in the RRMP), or consent is required. If you were to use a trench or bed system then gravity drainage is not permitted, unless a specifically designed siphon system is used to provide dose loading and even distribution. So either way, you will need to apply for resource consent to discharge wastewater to land.
I recognise there are some limitations at the site and would recommend speaking to one of our accredited wastewater designers/installers about your proposal. I have attached the accreditation register with the names of designers and the types of systems they are accredited for. They are used to filling out our forms but I have attached these as well in case you wish to fill them out yourself.
As always, let me know if you have further questions. We give an hour of free advice and then charge for our time on an actual and reasonable basis, just to let you know.

Kind regards

Amberley Gibson
Consents Planner

6 OUR RESPONSE

i. With respect to water supply, the system proposed is to "trickle feed" storage tanks on a 24/7 basis through a small diameter screened intake. This methodology will prevent the peaks and lows of normal domestic demand impacting on the stream source.

ii. HBRC hydrologists have confirmed that the Mean Annual Low Flow of the stream at the extraction point is approximately 1.2 litres/second or 103680 litres/day. Noting that Rule 54c (see 5ii) requires that less than 10% of this flow is extracted, a maximum take of 10,000 litres/day is permitted. Our calculations suggest that the demand will be less than a quarter of this. HBRC's calculation for daily water demand (see 5ii) is 2.2m^3 or 2200 litres.

iii. As discussed in Section 4, the design of the wastewater infrastructure is ongoing. Certainly the requirements of HBRC will be met, and every effort will be made to exceed that benchmark. This tourist operation has a strong environmental message associated with all the activities involved and it is paramount that the Applicant "walks the talk". It would be appropriate to be able to say that environmental requirements are being met and bettered.

iv. With this in mind, we will continue to search for an appropriate "state of the art" treatment and disposal system for wastewater for this unique accommodation, and work closely with HBRC staff regarding the necessary consenting, implementation and monitoring processes required.

7 SUMMARY

The proposed accommodation in the Moerangi Valley for Manaaki Group Holdings Ltd will provide a serviced overnight facility for trampers on a 3 day trek in a very special part of New Zealand's wilderness.

Providing water supply and wastewater infrastructure to service this facility also needs to be done in a special way.

Water can be sourced from an adjacent stream, stored and treated to serve the wharekai and staff quarters and the ensuite bathrooms in the 10 wharemoe. No consent from HBRC is required for this operation and the water quality will meet drinking water standards.

All wastewater (black and grey) will be collected from the facility and treated and disposed of in a way which meets HBRC requirements. This will be done in a transparent way so as to showcase protection of the pristine environment

Mike Keys
KeySolutions (2005) Ltd
May 2018