

Student 1-Low Excellence

The problem: To find the best possible site for a new cell phone tower to service the Queenstown area.

The solution to this problem needs to address 4 criteria. Possible sites need to be

1. On land that is at least 1500 metres in elevation.
2. On land with as low a slope as possible.
3. Within 4 km of a major road.
4. Within 12 km from the major town of the area.

Summary of findings for each of the 6 locations:

| Site # | Name | Position | Elevation (m) | Slope | Nearest road (km) | Distance to Q. (km) |
|--------|-----------------------|----------------------------|---------------|-------|-------------------|---------------------|
| 1 | Remarkables Range (1) | 45°02'23"S, 168°47'50"E | 1560 | 11% | 3.5 | 10.7 |
| 2 | Remarkables Range (2) | 45°04'32"S, 168°48'00"E | 1800 | 6% | 3.1 | 11.7 |
| 3 | Peninsular Hill | 45°02'25"S, 168°43'28"E | 834 | 5% | 1.3 | 5 |

To find a site that meet these requirements in the Queenstown area is difficult because of its mountainous relief. This area has steep sided glacial valleys... While the 1500m high location would offer good reception for the mobile phone users, it is also important to note that line of sight from where the majority of cell phone use is, would be very important to guarantee reception and effective placement of a tower (2).

Of the 6 sites considered, site 1 (Remarkables Range – North) adheres to the criteria and could possibly give better coverage for more of Queenstown's mobile phone users than the other sites.

The first criteria is the elevation, which is needed to ensure the best reception. The site needs to be at least 1500masl, and have direct line of sight with Queenstown. Site 1 meets this criteria as it is at 1560masl and the Google Earth image shows clear line of sight. Other sites which are higher, like Site 2 in the southern Remarkables at 1800masl, would not be able to solve black spots along SH6 to the south from Frankton caused by the terrain...Bowen Point and Ben Lomond have similar issues for ... despite acceptable elevations of...(3)

While elevation is important, the site needs be accessible. Existing roading would be favourable and slope also needs to be considered in situations if roads need to be constructed. Site 1 again meets these requirements as access can be gained from SH6 then up the Remarkables ski road, which although being unsealed is graded and easily accessible by 4x4. Site 4-Skippers Saddle immediately appears the best site when focusing on this criteria as it is close to the Skippers Road and has easy access, however it does not afford good coverage of Frankton, Queenstown CBD and areas to the west along the lake side such as Fernhill...(4)

Slope for each site has been considered and shown on the graph... while this can be overcome it would increase costs...

Of the 6 potential sites, Site 1 would need to be considered as the best site for a new cell phone tower (5). However, in reality, because of issues of line of sight ...for places like the CBD it might be better for a number of cell phone towers to be built in the area. This is indicated by maps such as that of the Vodafone 3G ...satellite imagery which show where the coverage is good and where it is not. Site 4 would provide a suitable location for a second cell phone tower as it would enable Arrowtown to be covered and the area of Arthur's Point, where there are new subdivisions being developed...(6)

I would also recommend that if the company wants to extend their coverage in an area then new sites must be considered that compliment and extend the existing network (7).