



---

## **Report on well site selection and construction for National Agriculture Education Collage**

By:  
M. Hassan Saffi,  
Senior Hydrogeologist

October 08, 2015

Paikob-e-Naswar, Wazirabad, PO Box 208, Kabul, Afghanistan  
Phone: (+93)(020) 220 17 50 Mobile (+93)(0)70 28 82 32  
E-mail: [dacaar@dacaar.org](mailto:dacaar@dacaar.org) Website: [www.dacaar.org](http://www.dacaar.org)

## Table of Contents

1. Location.....	3
2. Surface Geology of Area .....	3
3. Availability of groundwater.....	3
4. Suggestion for well drilling site selection .....	4
4.1. Short time solution .....	4
4.2 Proposed technical condition of drilling well.....	5
5. Suggestion for well drilling site selection .....	5
5.1 Long time solution .....	5
5.2 Proposed technical condition of drilling well.....	6

## Table of Figure

Figure 1. Surface geology of the area .....	3
Figure 2. New well drilling site.....	4
Figure 3. Location of well drilling site .....	6

## 1. Location

National Agriculture Education Collage (NAEC) is located in the south of Kabul City and the east part of Kabul Takhnikum. It is located in the skirt of mountain.

## 2. Surface Geology of Area

The upper part of area consist of host mountain eroded dry sedimentary deposits and the lower part of sedimentary deposits lays Early Proterozoic Age fundamental Rocks which is consist of gneiss, biotitic-amphibolites, marble, quartzite and amphibolites. The surface Geology of the area is shown in the Figure1.

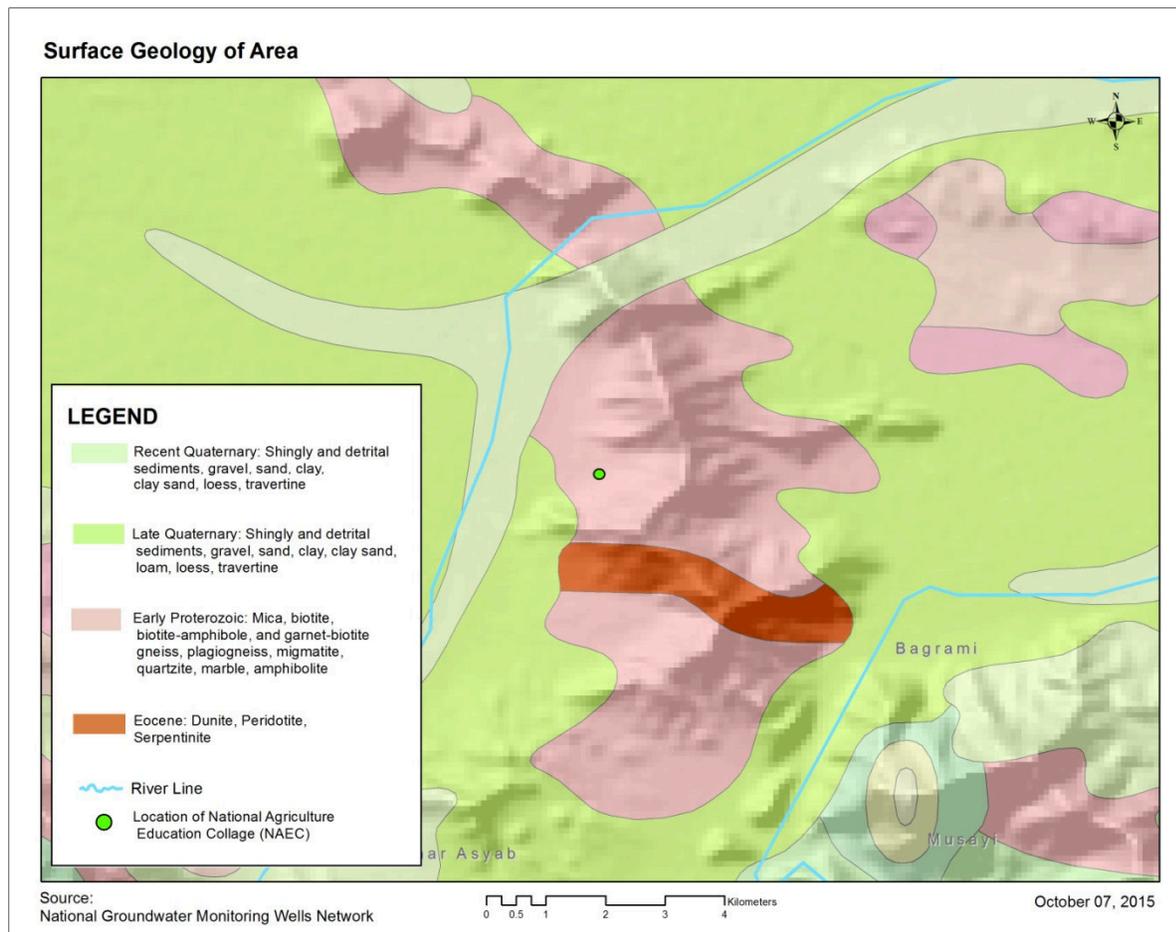


Figure 1. Surface geology of the area

## 3. Availability of groundwater

There is not available potential aquifer but there is possible to find the secondary fracture water within the Early Proterozoic Age fundamental Rocks, but the discharge of water is very low around (1-1.5 L/s) (liter per second).

There was drilled and constructed a well and it was equipped with electrical submersible water pump. We tried to find the document of well regarding well construction, litho logy and well hydraulic parameters (well, discharge, water level, drawdown.....), but we couldn't find needy information to visualize exact hydrogeological condition of the area. There we also cannot perform geophysical investigation due to limit area for investigation.

On October 6, 2015, we reviewed the existing well discharge into the reservoir, it produces about 1.25 L/s or 4 cubic meters per hours. It is not fulfilling requirement of NAEC.

## 4. Suggestion for well drilling site selection

### 4.1. Short time solution

It is suggested to drill the well 200m away in south part of existing well. It will produce 1-1.5 L/s, but it is not sustainable for the long time due low recharge and availability of fracture water. The new drilling well site is shown in the Figure 2.

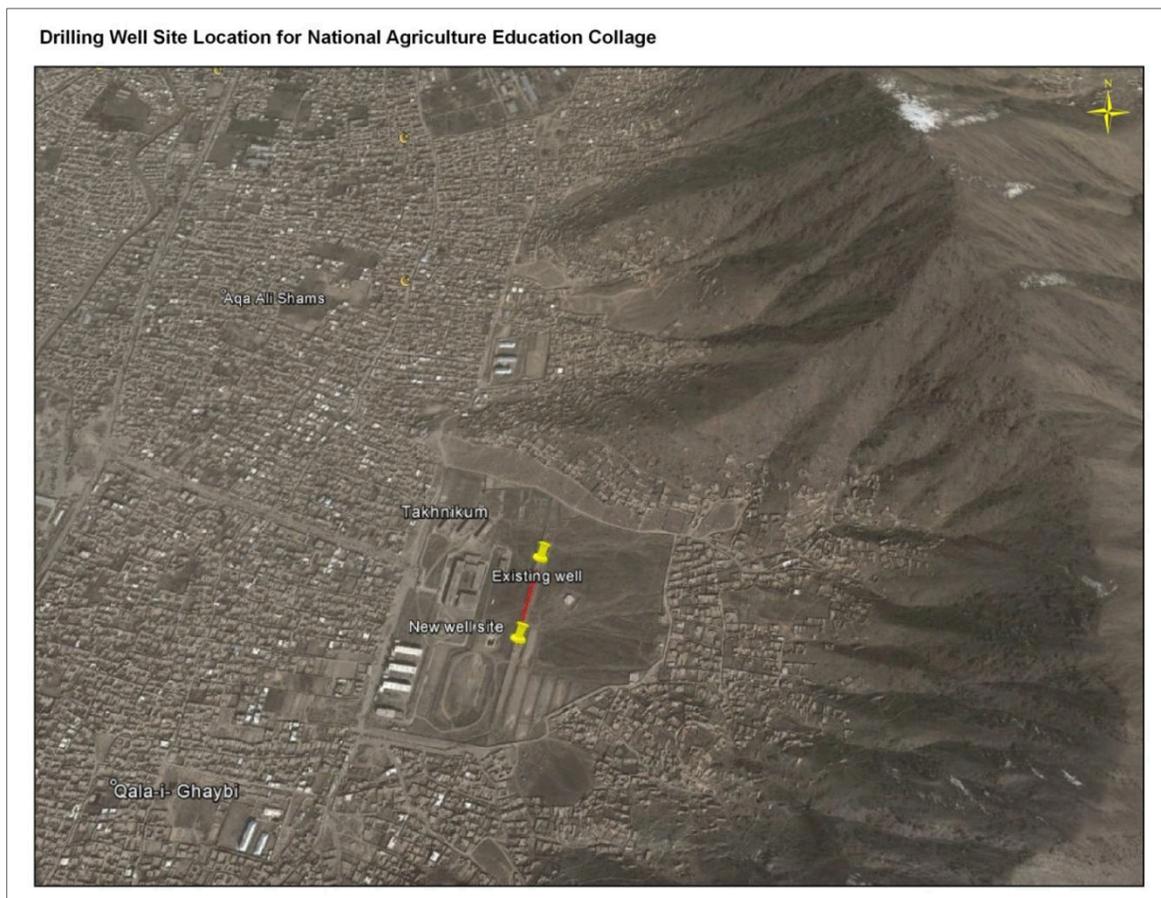


Figure 2 .New well drilling site

## 4.2 Proposed of technical condition of drilling well

- The wells should be drilled by heavy rotary rig with 16 inch diameter drilling bit to the depth of 130 m.
- The drilling diameter of wells from the starting to the ending of drilling should not be less than 14 inches (from the ground surface to the depth of 80 m should be drilled by the 16 inches diameter Bit and from the depth of 80m to the depth of 130 m should be drilled by the 14 inches diameter Bit)
- The well should be drilled by heavy rod and it should be used between drilling rod and drilling bit for straight-line drilling of well
- Drilling Rod diameter should be 89 -100mm
- The drilling bit should be according to the well litho logical layers.
- During drilling should take the sample from each meter and put in to the sample box.
- 8 inches PVC E class casing and screen should be lowered according to the wells design.
- The lowering and installation of screen and pipe should be in a straight line into the well.
- Around the pipe and screen should be filled by 2-6 mm rounded, sorted and washed river gravel according to the wells design
- Around the pipe, above the water level should be filled with impervious clay according to the well design
- The well should be cleaned and developed by air compressor and use GI pipe (Flange) (one job) until the water of well completely cleaned from mud, silt and dust. The capacity of compressor should be 12 atmospheres and it ablest to clean and develop the well to the depth of 130 m. The development of wells mines to close and open the gate valve of water pipe outlet during compressor operation for better cleaning and sorting of gravel and sand around the pipe and screen.
- Pumping Test should be performed by electric submersible pump for 7 hours for finding well hydraulic parameters such as static water table, discharge, dynamic water table, and time drawdown and time recovery. The minimum and maximum discharge of pump should be between 5- 7 L/s (letter per second) and the pump head should not be less than 80 m. The power of generator should be according to the power of water pump

## 5. Suggestion for well drilling site selection

### 5.1 Long time solution

It is suggested to drill the well along the Road of Kabul Takhnikum. It will produce about 8 - 10 L/s, it is sustainable and long time solution due high availability of aquifer water. The well drilling site is shown in the Figure 3.

Location of drilling well (Second Option) for National Agriculture Education Collage (NAEC)



Figure 3. Location of well drilling site

## 5.2 Proposed technical condition of drilling well

- The wells should be drilled by heavy percussion rig to the depth of 80 m with 14"-16" inch diameter of bucket.
- The diameter of wells from the starting to the ending of drilling should not be less than 14 inches drilling of bucket.
- During drilling should take the sample from each meter and put in to the sample box.
- 8 inches PVC (E class) casing and screen should be lowered according to the wells design.
- Around the pipe and screen should be filled by 2-6 mm rounded, sorted and washed river gravel according to the wells design.
- Around the pipe, above the water level should be filled with impervious clay according to the well design
- The well should be cleaned and developed by air compressor until the water of wells completely cleaned from mud, silt and dust. The capacity of compressor should be 12 atmospheres and should have the capability to clean and develop the well to the depth 80m. by using of GI pipe (Flange) The development of well mains

to close and open the gate valve of water pipe outlet during compressor operation for better cleaning and sorting *of* gravel and sand around the pipe and screen.

- Pumping Test should be performed by electric submersible pump for 7 hours for finding well hydraulic parameters such as static water table, discharge, dynamic water table, and time drawdown and time recovery. The minimum and maximum discharge of pump should be between 5- 7 L/s (liter per second) and the pump head should not be less than 80 m. The power of generator should be according to the power of water pump.
- The contractor should take the sample from each meter and put in to the sample box.