



# **GROUNDWATER QUALITY ANALYSIS REPORT**

## ***Kampong Chnang - Kampong Leaeng - Trangel (33F)***



Trangel is located in the district of Kampong Leaeng. The population of this commune is approximately 4922 (2004). Groundwater sample collection occurred in May 2010 and consisted of the sampling of 18 tube wells throughout the commune. The attached figure presents the location of Trangel within Kampong Chnang as well as groundwater sample locations and exceedances of health-impacting contaminants (when applicable).

### **Groundwater Quality Rating**

The groundwater quality rating for Trangel is 33F. Therefore, the general safety of deep aquifer groundwater is extremely poor and the aesthetic quality of the water is poor, according to the contaminants measured and samples collected. The following two sections describe all major health and aesthetic contaminants that exceeded drinking water standards in at least one sample within the commune.

### **Contaminants of Potential Concern – Health**

**Manganese** - Elevated concentrations of Manganese were observed within the commune. The estimated probability of encountering unacceptable concentrations of Manganese ( $>0.4$  mg/L) in tube wells is 56%, based on the observed data. Exposure to elevated concentrations of Manganese can cause neurological disorders. Aeration allows oxygen to enter the water and react with Manganese to form a compound which is insoluble in water. The newly formed solids will slowly settle to the bottom or can be removed more rapidly by filtration. Performing these procedures may reduce the concentration of Manganese in water but follow-up testing is recommended to ensure water quality standards are met.

**Nitrate** - Elevated concentrations of Nitrate were observed within the commune. The estimated probability of encountering unacceptable concentrations of Nitrate ( $>50$  mg/L) in tube wells is 49%, based on the observed data. Short-term exposure to elevated concentrations can cause blue-baby syndrome in infants.

**Fluoride** - Elevated concentrations of Fluoride were observed within the commune. The estimated probability of encountering unacceptable concentrations of Fluoride ( $>1.5$  mg/L) in tube wells is 5%, based on the observed data. At concentrations greater than 1.5 mg/L, Fluoride can cause dental fluorosis and at concentrations greater than 4 mg/L, skeletal fluorosis can occur.

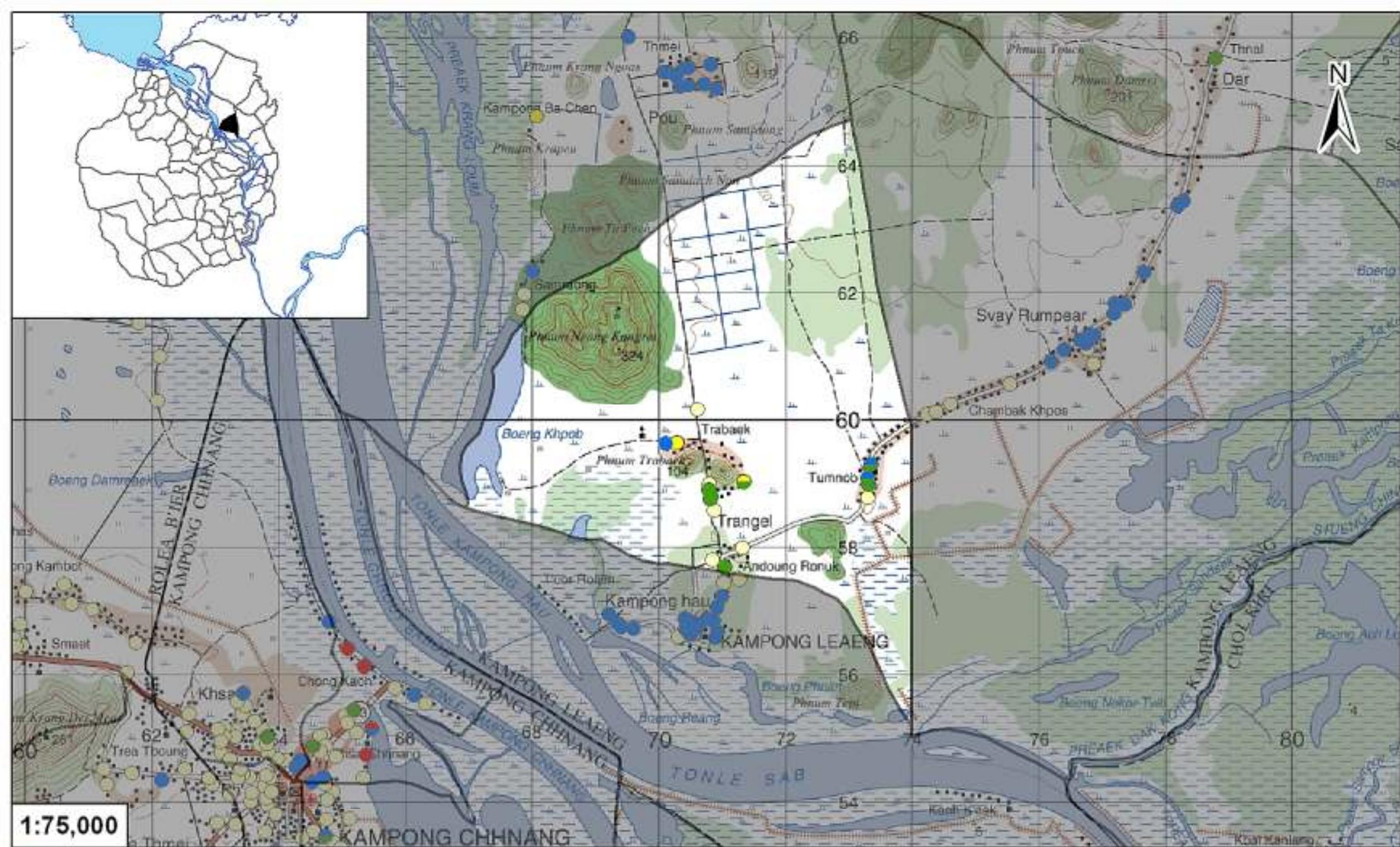
## **Contaminants of Potential Concern – Aesthetic**

Iron - Elevated concentrations of Iron were observed within the commune. The estimated probability of encountering potentially unacceptable concentrations of Iron (>1 mg/L) in tube wells is 17%, based on the observed data. At elevated concentrations, Iron causes water to be cloudy and unpleasant to drink. An odor may also be encountered at high concentrations. Iron can also stain laundry, food (can cause discoloration of cooked rice), and leave deposits. Aeration allows oxygen to enter the water and react with Iron to form a compound which is insoluble in water. The newly formed solids will slowly settle to the bottom or can be removed more rapidly by filtration. Performing these procedures may reduce the concentration of Iron in water but follow-up testing is recommended to ensure water quality standards are met.

Manganese - Elevated concentrations of Manganese were observed within the commune. The estimated probability of encountering unacceptable concentrations of Manganese (>0.4 mg/L) in tube wells is approximately 56%, based on the observed data. At elevated concentrations, Manganese causes water to be cloudy and unpleasant to drink. Manganese can also stain laundry, food (can cause discoloration of cooked rice), and leave deposits. Aeration allows oxygen to enter the water and react with Manganese to form a compound which is insoluble in water. The newly formed solids will slowly settle to the bottom or can be removed more rapidly by filtration. Performing these procedures may reduce the concentration of Manganese in water but follow-up testing is recommended to ensure water quality standards are met.

Turbidity - Elevated levels of Turbidity were observed within the commune. The estimated probability of encountering potentially unacceptable levels of Turbidity (>20 ntu) in tube wells is 8%, based on the observed data. Turbid or cloudy water appears unpleasant to the eye and is more likely have an unpleasant taste or odor. Turbidity can be reduced by filtration.

Hardness - Elevated levels of Hardness were observed within the commune. The estimated probability of encountering potentially unacceptable levels of Hardness (>500 mg/L) in tube wells is 51%, based on the observed data. Elevated hardness levels impact the effectiveness of soaps and detergents and can cause scaling on pipes and pans. Contrary to common belief, there is no relationship between consumption of hard water and urinary tract problems and kidney stones.



### Tube Well Sample Locations and Health-Based Exceedances

Trangel - Kampong Leaeng - Kampong Chhnang - Cambodia

Resource Development International - Cambodia

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- Arsenic
  - Manganese
  - Fluoride
  - Nitrate
  - No Exceedance
  - Commune Boundary
  - Provincial Boundary
- Locations exceeding the Cambodian water quality standards for major health impacting contaminants have been color-coded and arranged such that they do not overlap