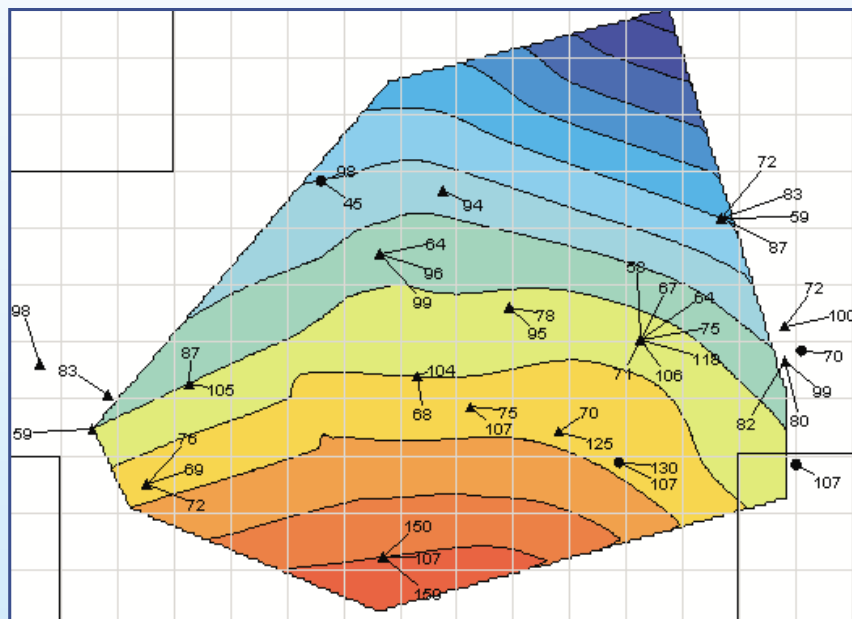


Stage 3 – Strategy Definition



URBAN GROUNDWATER PROFILE



Lessons learnt from Bishkek and Narayanganj

- Constructing the profiles was a worthwhile exercise because the cross-sectoral nature of the engineering, hydrogeological, economic and institutional components of the water infrastructure forced an awareness on the project teams of the interdependence of these factors.
- For instance, in Narayanganj, comparison of population, demographics and supply statistics soon showed the high *de facto* dependence of the city on the shallow aquifer for domestic supply, using private wells to supplement the capacity shortages of the public water utility, a fact barely acknowledged by local engineers and planning officials. Ignoring the role of the shallow aquifer in the steady expansion of the city out onto the periurban fringes of Dhaka would be a major water resource management oversight. Yet there is no information on the total volume abstracted from this resource, even though there seems little doubt that the upper aquifer is the primary source of potable supply for the rural and periurban populations of the project area.
- Similarly, in Bishkek, the perception was of an abstraction system engineered to be of low vulnerability because very deep boreholes (>200m deep) were said to only take from great depth, often under semi-confined conditions. That hydraulic inaccessibility would render the supply aquifers immune to contaminated urban recharge for many years is an important management supposition, and so the drafting of the profile prompted more detailed work by the project team on the stratigraphy and well design details in the city. These studies demonstrated the geometric complexity of the system, and to evident local surprise, showed that perhaps half of the wells currently in use have significant screen length open in the upper aquifer. (Figure 1) This is an important consideration for the city's water management because the Bishkek aquifer system comprises thick horizons with high vertical and horizontal permeabilities in which contaminated water would be mobile.
- Typically, the Urban Groundwater Profile will be completed in at least two stages. Only the most well-studied and documented cities will possess a prior groundwater degradation risk assessment so that the second half of the profile can be completed. A more typical scenario would be for the risk and impact assessments to be completed as an aquifer protection plan activity, and the whole profile would then become a brief to deploy in policy development, preferably with the active involvement of stakeholders.

Points added to Urban Groundwater Profile Tool from applying it to case-study cities

- The profile may need to be completed in stages as information becomes available

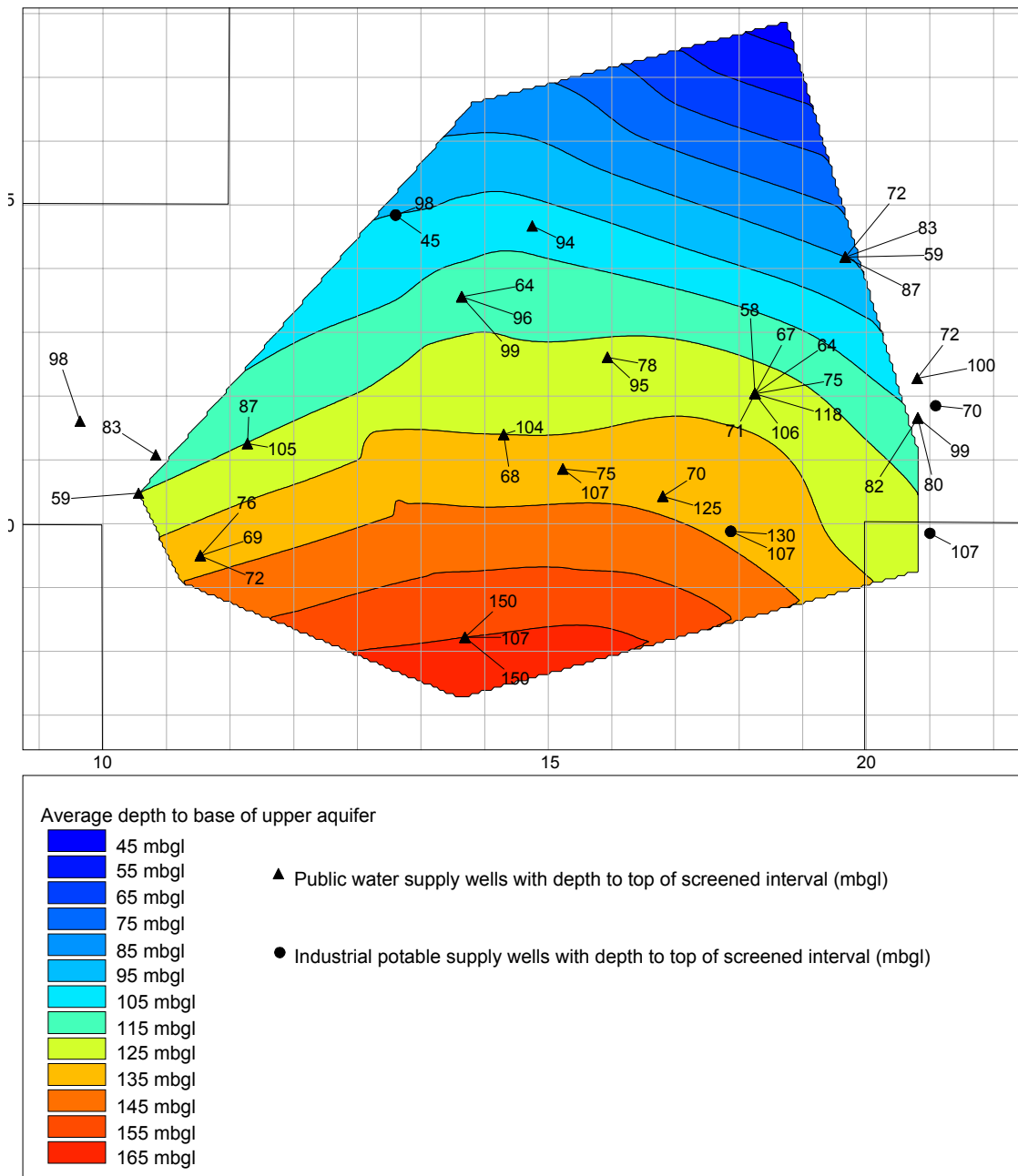


Figure 1. Public supply and potable-use industrial wells tapping the upper aquifer in Bishkek