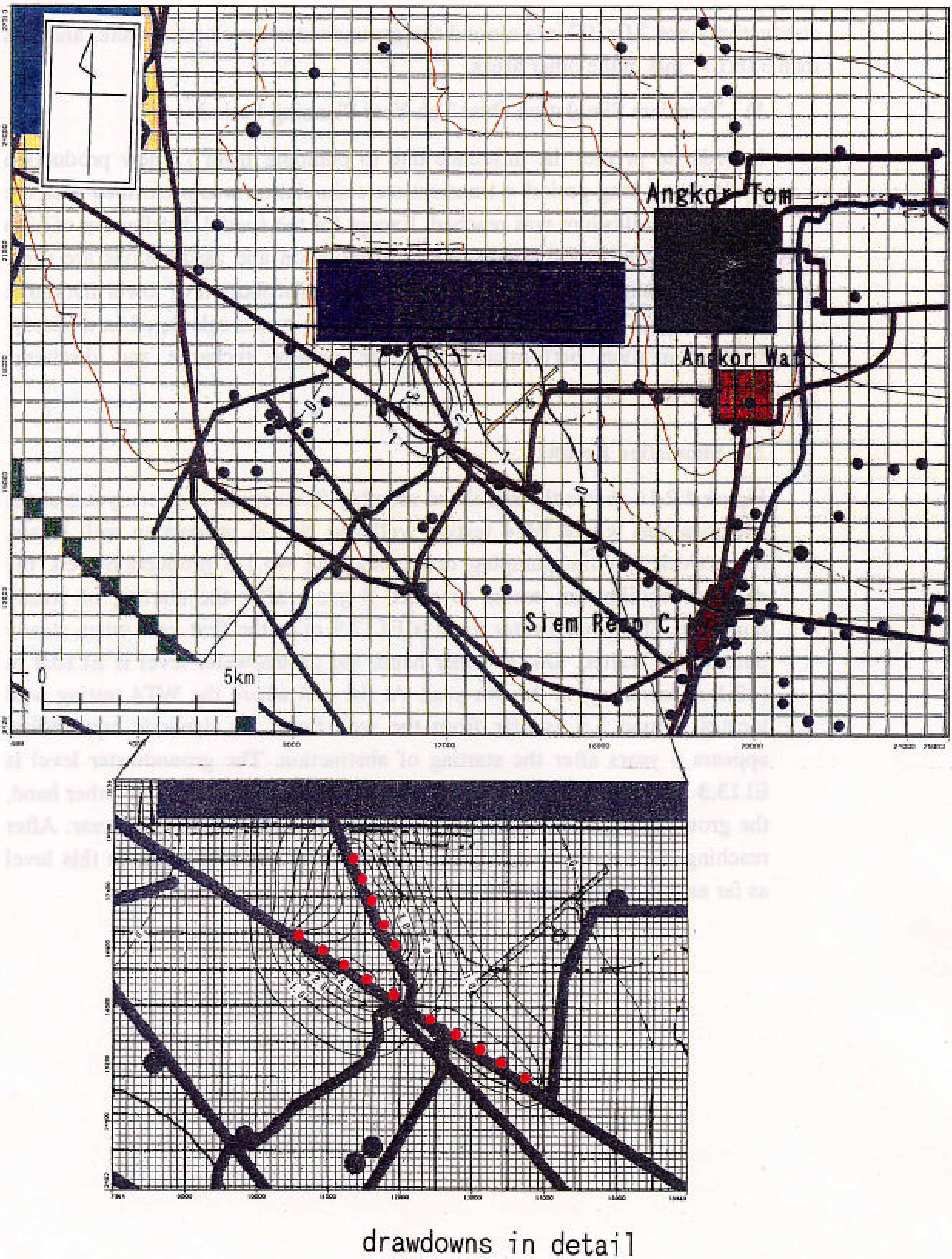


The Study on Water Supply System for Siem Reap Region in Cambodia	**Figure 4.2.15** **The Simulated Drawdown Contours in 5 Years**
Japan International Cooperation Agency	

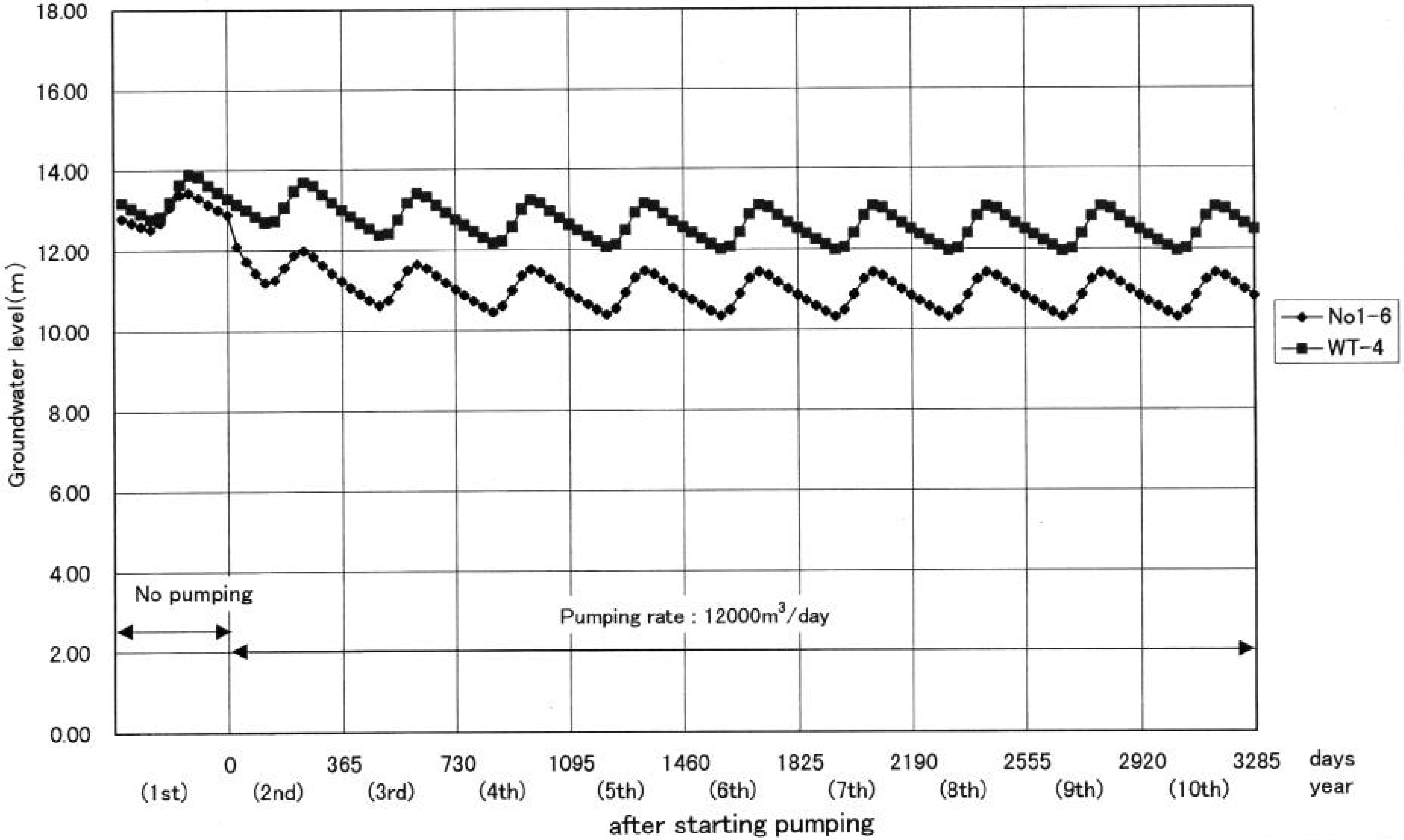
conductivity are $2.0x10^{-4}$ m/s around the groundwater development site, and less than $3.0x10^{-4}$ m/s in the other areas.

1) Transient Simulation Over Ten-Year Planning Period

In order to predict the influence due to pumping from 15 new production wells over a long period, a transient-state simulation was performed until the dynamic equilibrium was reached. Except for the spatial distribution of high hydraulic conductivity, other model formulation and assumptions are same as in the simulation model under the spatial distribution of lower hydraulic conductivity. The initial head values were the heads calculated in a steady-state simulation performed under the present recharge and discharge condition.

2) Simulation Results

Figure 4.2.16 shows the simulated monthly fluctuations over ten years at the two locations where WT4 testing well and No.1-6 production well locate, respectively. At the pumping cell containing No.1-6 production well, the dynamic equilibrium seems to reach 8 years after the starting of steady pumping. The groundwater level is El.12.9 m in the first year when steady pumping is started. On the other hand, the groundwater level is El.10.8 m (=2.1 m lowering) in the 9th year. At the cell where the WT4 testing well locates around 3.0 km far from the well field, the dynamic equilibrium appears 6 years after the starting of abstraction. The groundwater level is El.13.3 m in the first year when starting steady pumping. On the other hand, the groundwater level is El.12.5 m (=0.8 m lowering) in the 7th year. After reaching the dynamic equilibrium, the groundwater will maintain this level as far as this steady pumping continues.



The Study on Water Supply System for Siem Reap Region in Cambodia	Figure 4.2.16 The Simulated Monthly Groundwater Level Fluctuation under the Spatial Distribution of Higher Hydraulic Conductivity
Japan International Cooperation Agency	

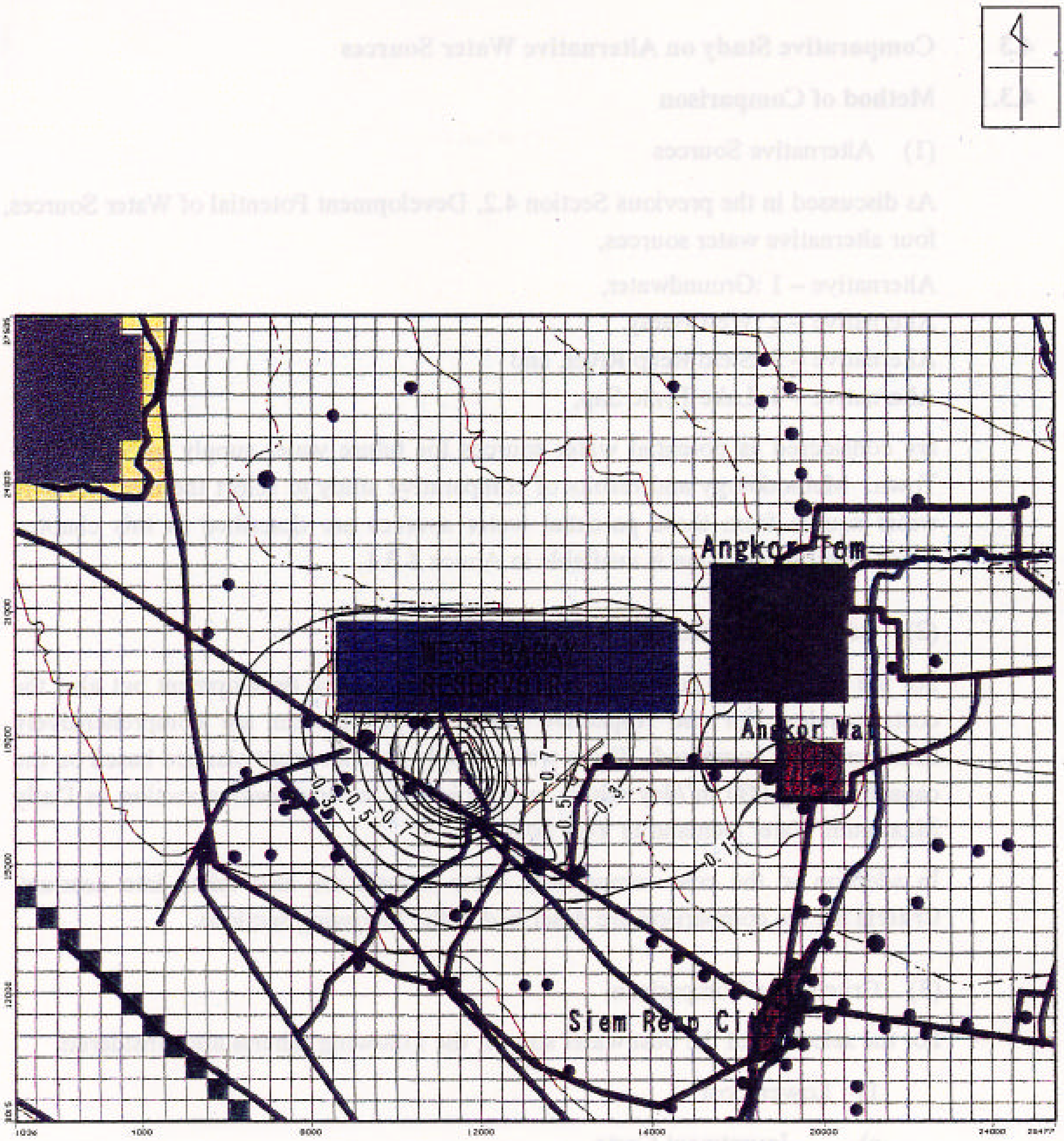
3) Influence of Pumping Plan

Figure 4.2.17 shows the simulated groundwater level contours in February 2015. In this case, the influence due to the steady pumping extends over the Angkor heritage. However, the land subsidence can be predicted as 0.1 mm since the drawdowns around the Angkor heritage are limited to only 0.10 m. On the other hand, the drawdown more than 2.0 m still does not extend over the area where many shallow wells locate.

Therefore, it is considered that this pumping plan will not cause the land subsidence problem around the Angkor heritage and stopping or less production of the shallow wells even under the spatial distribution of high hydraulic conductivity condition.

(6) Necessity of Monitoring Ground water Level

The present simulation model was formulated under the different spatial distributions of hydraulic conductivity around the well field. Both the first and the second simulation results show the pumping plan will not cause any adverse side effects on the surrounding area. However, the simulation model needs more hydrogeological information in order to achieve more reliable and precise prediction since the simulation models predict the different extents of the influence due to the same pumping plan. Therefore, the monitoring of groundwater level at the observation wells should be also continued so that the pumping plan can be modified to avoid the problems due to pumping which cannot be forecasted at present.



The Study on Water Supply System for Siem Reap Region in Cambodia	Figure 4.2.17 The Simulated Drawdown Contours in 10 Years under the Spatial Distribution of Higher Hydraulic Conductivity
Japan International Cooperation Agency	