

Figure 7.4 Correlation Map of Water Quality

same as the extent of water contamination identified by the analysis results of the drilling survey.

7.4 Groundwater Modeling of Wadi Suq and Simulation

As part of this study, modeling of the groundwater and contamination transport of Wadi Suq was undertaken to evaluate the long-term effects of potential countermeasures on the groundwater quality in Wadi Suq.

Groundwater and contamination transport modeling requires several important quantitative information and data. These include the geology, the topography, the initial groundwater levels, and initial contaminant concentrations in the groundwater. The modeling requires quantitative data for these items, which have been investigated during this and prior studies.

The groundwater modeling of Wadi Suq was performed using the computer software MODFLOW (McDonald, M.G., & A. W. Harbaugh, 1988, *A modular three-dimensional finite-difference ground-water flow model, Techniques of Water Resources Investigations 06-A1, United States Geological Survey*). Contamination transport prediction was performed using the computer software MT3DMS (Zheng, C., Wang, P., 1998, *“MT3DMS: A Modular Three-Dimensional Multispecies Transport Model for Simulation of Advection, Dispersion and Chemical Reactions of Contaminants in Groundwater Systems, University of Alabama*). Both of these programs are available in a commercial version of the United States Department of Defense Groundwater Modeling System GMS v3.0, which is a product of the Environmental Modeling Research Laboratory (EMRL) of Brigham Young University in Provo, Utah.

The model encompassed the entire Wadi Suq and its tributaries from the tailings dam to the Gulf of Oman, as shown on Figure 7.5. The groundwater level for the simulation was taken from the most recent groundwater level measurements in Wadi Suq (December 2000). The initial groundwater levels are shown on Figure 7.6.

7.4.1 Proposed Remedial Measures

The proposed remedial measures for the groundwater contamination in Wadi Suq were presented in other sections of this report. A summary of these measures is shown in Table 7.4.

7.4.2 Modeling Assumptions

(1) Modeling of Trenches -1 and -2

Trenches -1 and -2 were modeled as “drains” located at a certain elevation below the ground surface. For Trench - 1, we assumed that the drain is located at Elevation +224, which is 1.0 to 4.0 m below the

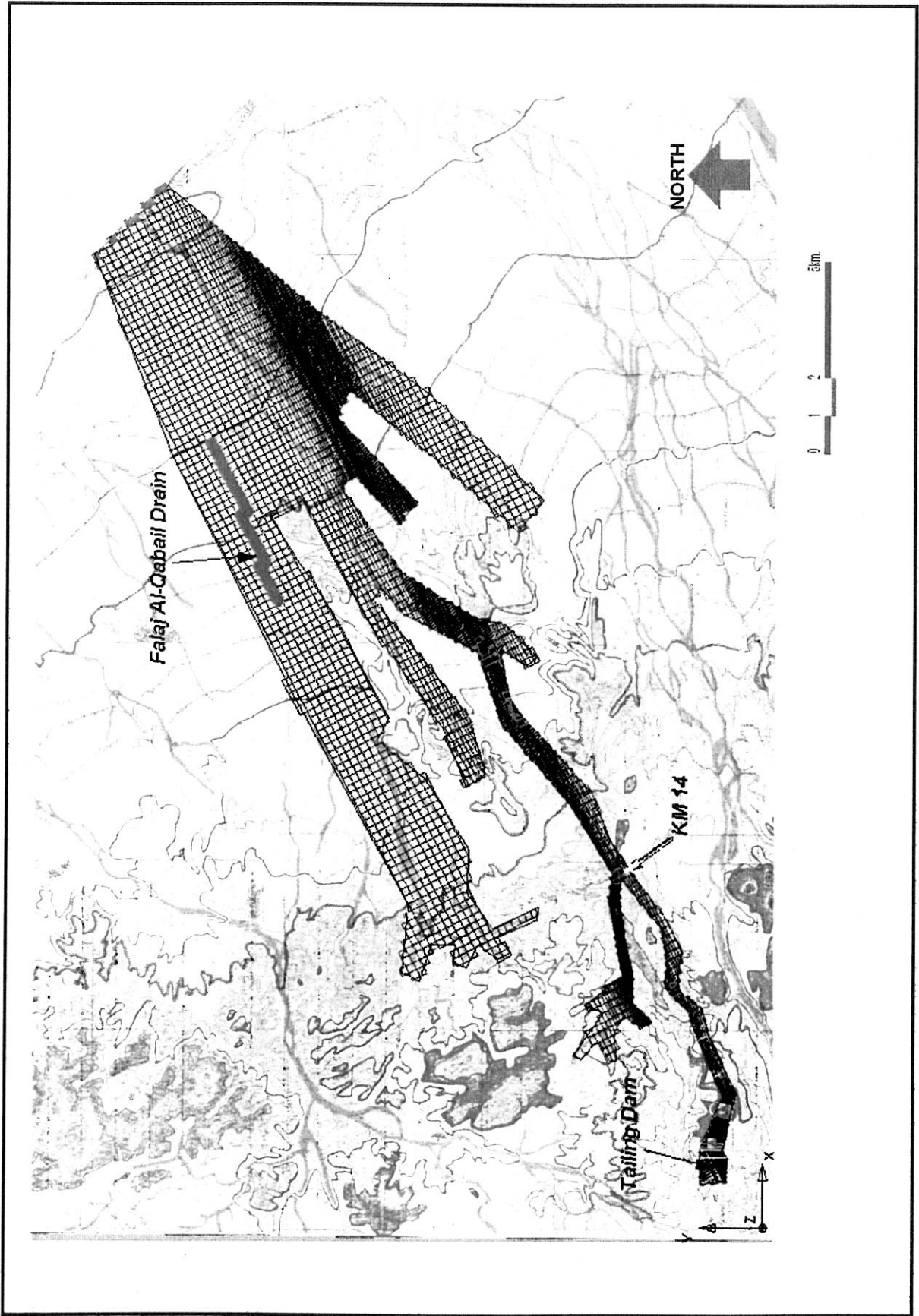


Figure 7.5 Plot Plan of Modeled Area