

Hydrological Impacts of Sudair Industrial City on Soil and Groundwater

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Abstract

This research considers the likely impact of contamination of soil, and water of the Sudair Industrial City development. This research provides information about potential and known sources of contamination within and around the site, associated potential impacts, mitigation measures and residual impacts following mitigation and aspects of the development that could affect, or be affected by soil and water contamination.

The environmental setting of the site, with regard to ground conditions and contaminated land issues, has been determined from available information prepared as part of the Environmental Baseline and mentoring reports. Using this information, potential risks to receptors from identified possible sources of contamination via a number of pathway linkages have been identified.

Objective

The main objectives of this research are:

- Identify the potential and known sources of contamination within and around Sudair Industrial City;
- Classify the aspects of the development that could affect, or be affected by soil and water contamination or the physical ground conditions;
- Localize the associated potential impacts, mitigation measures and residual impacts.
- Recognize the available information and potential risks to receptors from identified possible sources of contamination.

Methodology

The significance of the hazards posed by potential sources of contamination both on and off site has been assessed following the review of the Environmental Monitoring Report.

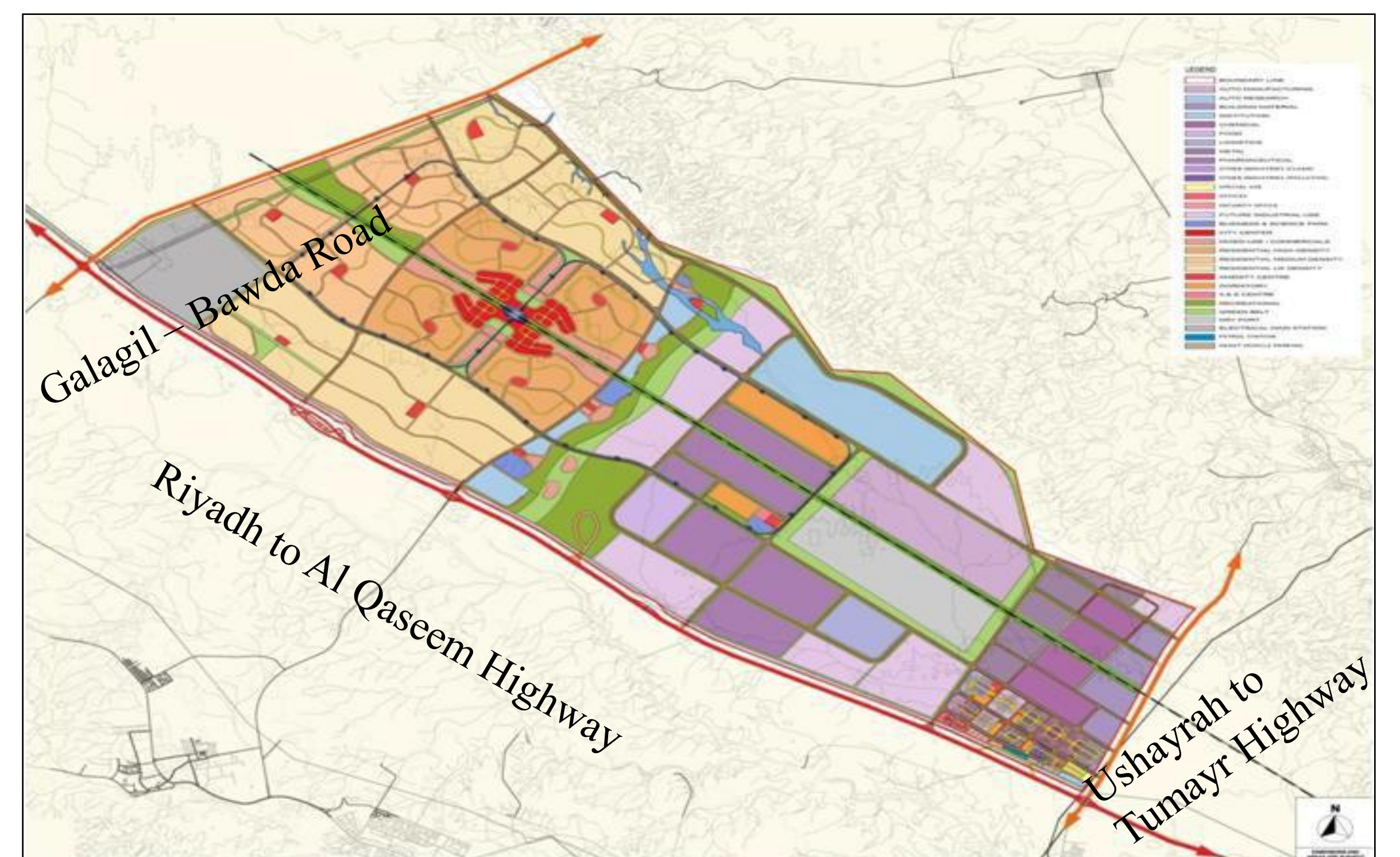
The methodology for impact prediction is based on:

- Assessing both the magnitude of the changes expected and the sensitivity of the receptors.
- Criteria for assessing the significance of potential human and environmental impacts have been based on a qualitative assessment of the magnitude of the impact, or how far the impact deviates from the baseline condition, and the receptor sensitivity.

Significance to the Kingdom

This study aims to save soil and groundwater resources from pollution sources at Sudair Industrial City and the surrounding cities. Sources of pollution will be identified and mitigation measurements also should be applied. It is anticipated that more than 655,000 cubic meter of Treated Sewage Effluent per day would be deposited from the Sewage Treatment Plan between 2020- 2025. This large amount needed to be treated well and then discharge to the groundwater wells or to be used in irrigation if possible.

Site Description



Main Results

A ground investigation was carried out in the start up area for geotechnical purposes. Boreholes were drilled down to a maximum 15m depth. **The findings were:**

- The geology encountered typically comprised clayey sands, gravel and fractured limestone.
- No Made Ground was recorded and no groundwater was encountered during the drilling operations.
- No chemical testing of the soil for potential contaminants was carried out.
- Visual evidence of limited/ localized contamination was observed in the area where construction is currently being carried out on site
- Large amounts of dust related to continuous hauling and excavating of soil and frequent heavy vehicle.

Potential source	Location	Potential Contaminants
Made Ground construction waste, spoil from various Excavations.	Potential across parts of the site where works taking place.	Heavy metals, inorganics, asbestos, petroleum hydrocarbons, polycyclic aromatic hydrocarbons.
Leakage of fuels/oils from tanks, vehicles	Vehicle workshop area	Petroleum hydrocarbons, PAHs, PCBs
Disposal of Treated Sewage Effluent to the underlying aquifer.	Adjacent to Sewage Treatment Plant (STP) on site	Heavy metals, inorganics, BOD, polychlorinated suspended solids, coliforms, etc.

Conclusions

In summary, a number of potential sources have been identified, all of which present potential impacts from the construction and operational phases of the development. However these will require review following:

- the completion of the site investigation; Key construction impact mitigation measures include the adoption of safe working practices;
- stockpile management procedures, dust suppression and temporary drainage measures;
- Potential operational impact mitigation measures comprise source removal and / or remediation and implementation of clean service trench techniques.