



CASE STUDY

DRAINAGE SYSTEMS: DEVELOPMENT OF AN ASSET MANAGEMENT STRATEGY

CLIENT:
TOP TIER COMAH
INSTALLATION

ASSET COMPLIANCE

Arthian's engineering team has assisted our client with the development of a comprehensive asset management programme that would focus on below-ground drainage sumps and chambers on their Northwest assets.

As a leading operator of chemical storage and distribution facilities, demonstrating compliance with HSE guidance for secondary containment and the prevention of groundwater pollution from solvents were top priority for our client. Our team proposed a phased management and delivery strategy to demonstrate that below-ground drainage assets were compliant. Our inspections highlighted where remedial works would be required, and recommendations for repairs, refurbishment or replacement options.



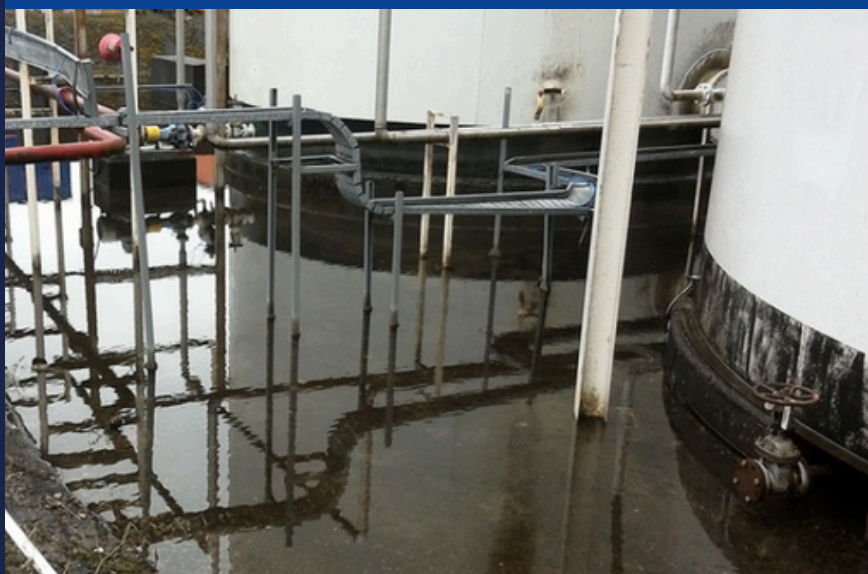
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CRITICAL ELEMENTS

Elements within the drainage systems were identified as critical to the efficiency and compliance of the overall system including:

- Pumping Chamber Pits
- Attenuation Tanks



DESK STUDY

Undertaken to understand the drainage system to be inspected, including a review of the archive drawings and previous inspection reports.



SITE WALKOVER

Undertaken to verify the information from the desk study and highlight visible changes since the previous inspection. Potential enabling requirements are highlighted for inspection works to be completed.



INSPECTION ENABLING WORKS

- Emptying of manholes & attenuation tanks
- Jet cleaning & removal of debris within chambers & pipes
- Enabling works to facilitate entry into chambers.



INSPECTION WORKS

- Visual Inspection from grade
- Review of CCTV survey of drainage lines & chambers
- Man Entry to allow for close visual inspection of chamber conditions
- Identified differences in existing site drainage layouts



REPORTING

- Upon completion of inspection works an inspection report including the manhole schedule and defects identified
- Update to site drainage plans to reflect on site findings



RECOMMENDATION

- Priority repairs are determined based on site operation consequences & environmental risks

INSPECTION & ASSESSMENT

In addition to the chamber pits and attenuation tanks, Arthian looked to identify the risk, likelihood and consequence of the failure of the ancillary equipment including:



PUMPS

LIKLIHOOD OF FAILURE: HIGH

Consequence: pump failure would restrict the ability to move effluent from storage tanks discharge, reducing capacity within site attenuation.



VALVES

LIKLIHOOD OF FAILURE: LOW

Consequence: valve failure would result in the inability to shut off sections of system reduce contamination build-up system.

REPORTING & RECOMMENDATION

1

VALVE REPLACEMENT

CHAMBER PIT 1

The engineering team recommended the replacement of a defective valve in chamber pit 1 to enable the system to be closed in case of a product spill within the concrete hardstanding area. This would prevent contaminants from entering the downstream storage tank, containing the product in a smaller area, resulting in less spread and easier remediation.

2

PVC PUMPING CHAMBER LEAK

CHAMBER PIT 1

Upon drainage, groundwater was entering through defective concrete in the cover slab. Should the chamber be full of effluent, this would be released to groundwater resulting in potential environmental damage. Further investigation is required to understand the extent of the damage with appropriate remedial work carried out based on the findings.

3

CONCRETE SPALLING

PIT 4 MIXING CHAMBER

Arthian recommended that defective concrete within the mixing chamber was repaired to ensure the integrity of the chamber was maintained. Arthian provided repair specifications to achieve this.

4

CONCRETE SPALLING

CHAMBER PIT 4

The outfall pipe to the pump house has collapsed resulting in having to discharge to an adjacent chamber pit. Arthian recommended further investigation be carried out via CCTV to understand the extent of the pipe's collapse. This will allow for remediation or for a long-term solution to allow direct connection to the pump house.