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Reading Site Contamination and Site Remediation/Validation Reports

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Aims

- To look at ways of making Contamination Reports easier to Read
- To give an appreciation of the types of reports and how they fit into the stages of Contaminated Land Management (CLM)
- To suggest what to look for when reading reports on site contamination

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Report Structure

Good consulting reports follow a logical structure:

1. Background, Purpose & Project Objectives
2. Proposed Development
3. Site Setting & Conceptual Site Model (CSM)
4. Site History / Data Searches / Past Investigations
5. Assessment Plan, Methodology & Limitations
6. Data Quality Review & Results
7. Discussion of Results & Assessment of Risks
8. Conclusions & Recommendations
9. Figures & Appendices

20%

80%

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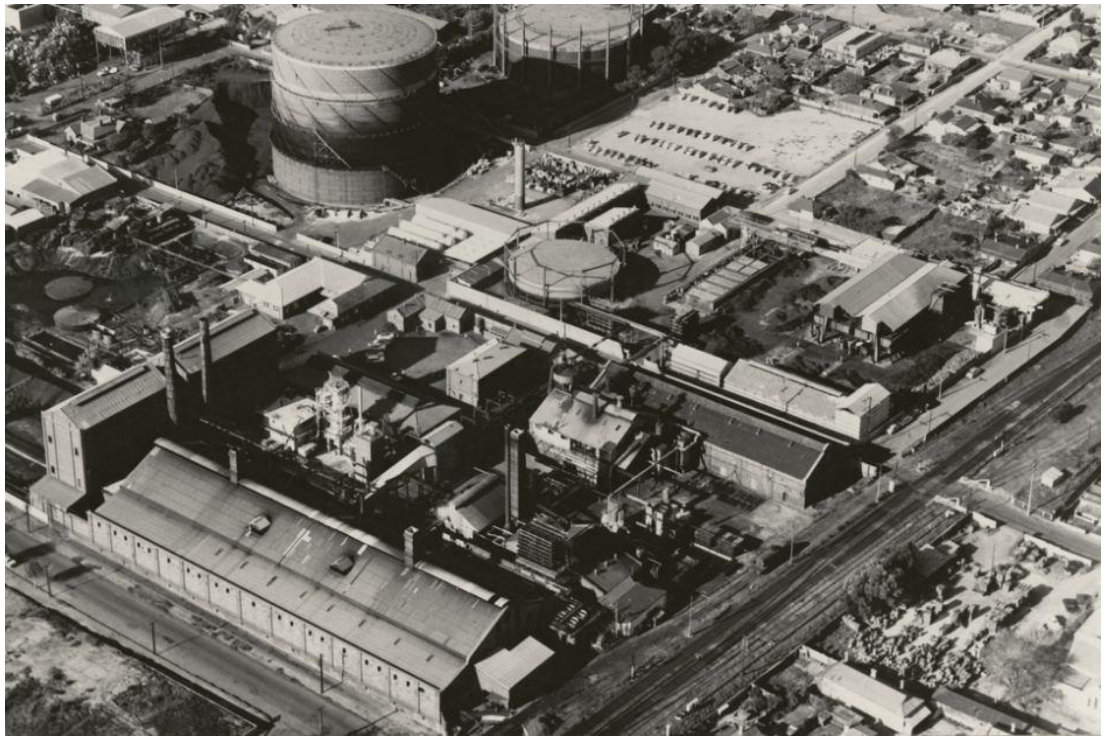
Report Types

Simple Reports - Greenfield or Single use sites

Complex Reports - Brownfield, multiple industrial use sites, with long and wide-ranging operational histories



Thorough assessment of risks is dependent on the consultant having a good understanding of the site

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Report Types

Stage 1 Preliminary Site Investigation → *PSI Report*

Is onsite contamination possible? What type? Where? HazMat?

Yes ↓

Stage 2 Detailed Site Investigation → *DSI Report*

Is contamination confirmed? Degree? Extent? Risk?

Yes ↓

Remedial Action Plan → *RAP Report*

Remedial Goals & Strategy, Data gaps, Unexpected Finds Protocol

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Report Types

Approvals obtained (Site Auditor, Consent Authority, Other) ↓

- HazMat Management
- Site Demolition
- Data Gap Closure Investigations
- RAP Revision
- Remediation
- Validation Assessment → *Validation Report*

If Residual Contamination is to Remain Onsite:

↓

Environmental Management Plan → *EMP Report*

Ongoing monitoring, Cap maintenance

Ref: NSW OEH (2011) Guidelines for Consultants Reporting on Contaminated Sites

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What to Read ?

Contamination reports generally comprise:

- **20%** TEXT
- **80%** Figures & Appendices

Hint: To simplify your read, FOCUS on the text

Understanding the Site

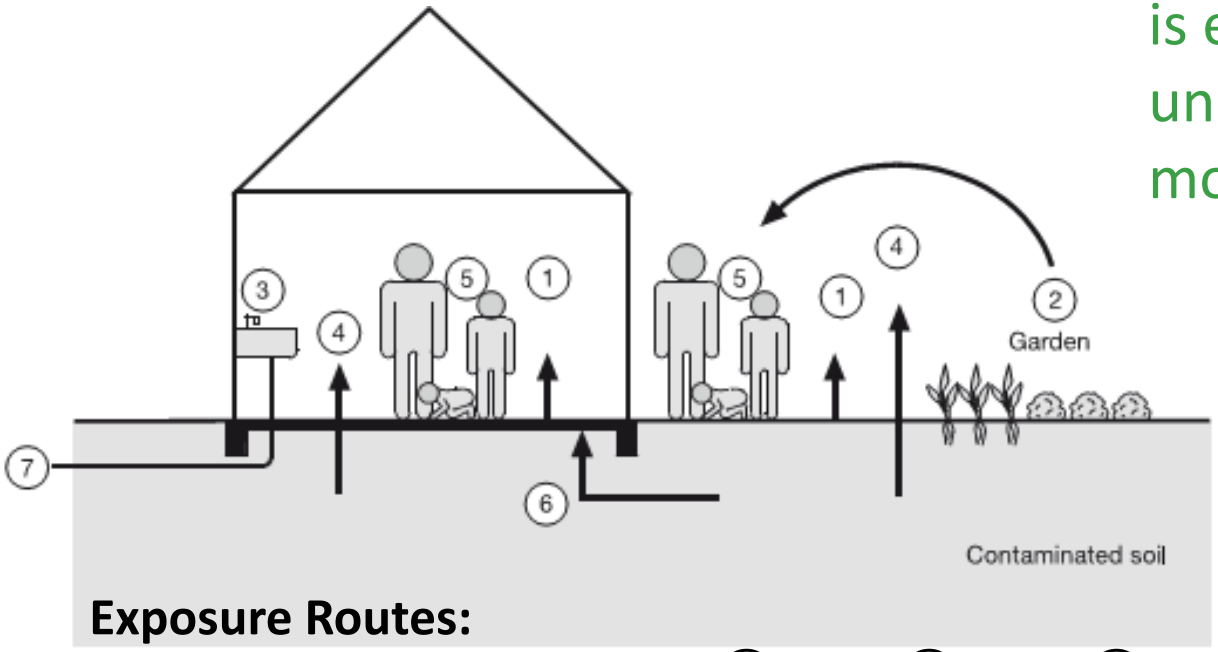
Source-Pathway-Receptor

Sources	Pathways	Receptors
Examples: • Contaminated soils • Contaminated water • Leaking drums • Industrial process releases • Hazardous materials • Waste	Examples: • Direct contact (dermal) • Ingestion • Inhalation	Examples: • People • Domestic and commercial property • Infrastructure • Ecosystems • Animals • Plants • Controlled waters

Good understanding of the site requires appreciation of the Conceptual Site Model (CSM)

Conceptual Site Model

Reading the report is easier if you understand the model



Exposure Routes:

- Ingestion of contaminants in ① dust, ② food, ③ water
- Inhalation of contaminants ④ in soil particles, dust, vapours
- Direct contact with contaminants ⑤ in soil, dust or water
- Contamination attack on building structures, ⑥ services and infrastructure ⑦

PSI/DSI assesses → RemVal breaks exposure pathways

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Prelim Site Investigation

- A PSI report should develop a Preliminary Conceptual Site Model (CSM)

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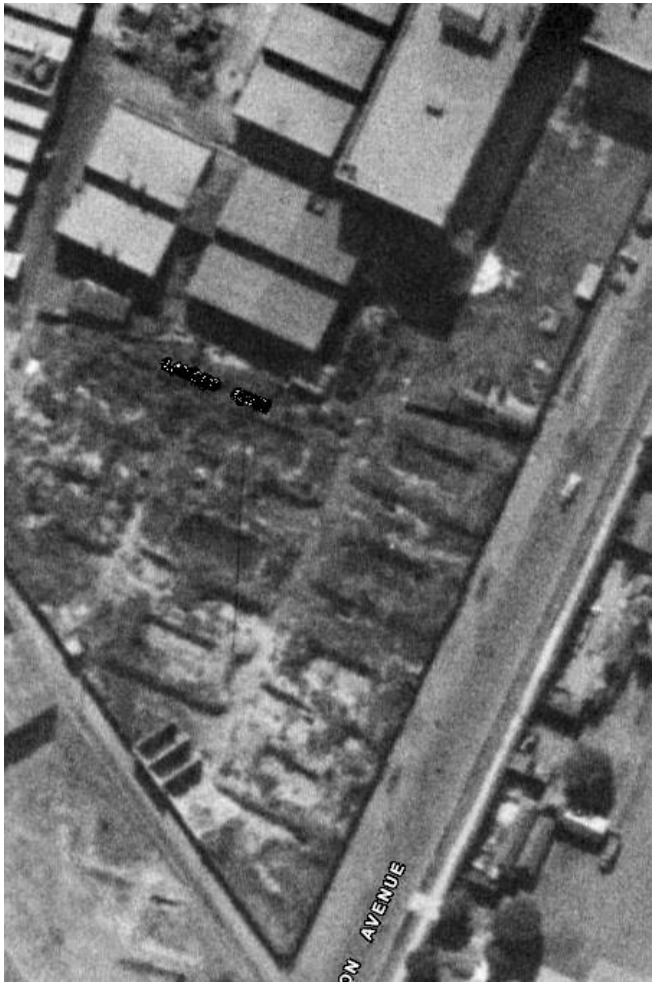
Prelim Site Investigation (PSI) - should:



- Define land use history
  - Historical land titles (may help understanding of contamination)
  - Historical aerial photos
  - Council records (past DAs, incidents, complaints, often fill the history gaps)
  - Interviews with former owners & longstanding employees (anecdotal, past practices, facility locations)

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PSI - should include:

- Detailed site inspection
  - Odours or visible evidence indicating contamination sources
  - Inventories of Hazchem, signs and labels on discarded containers

Any inaccessible areas (not inspected), must be highlighted as limitations

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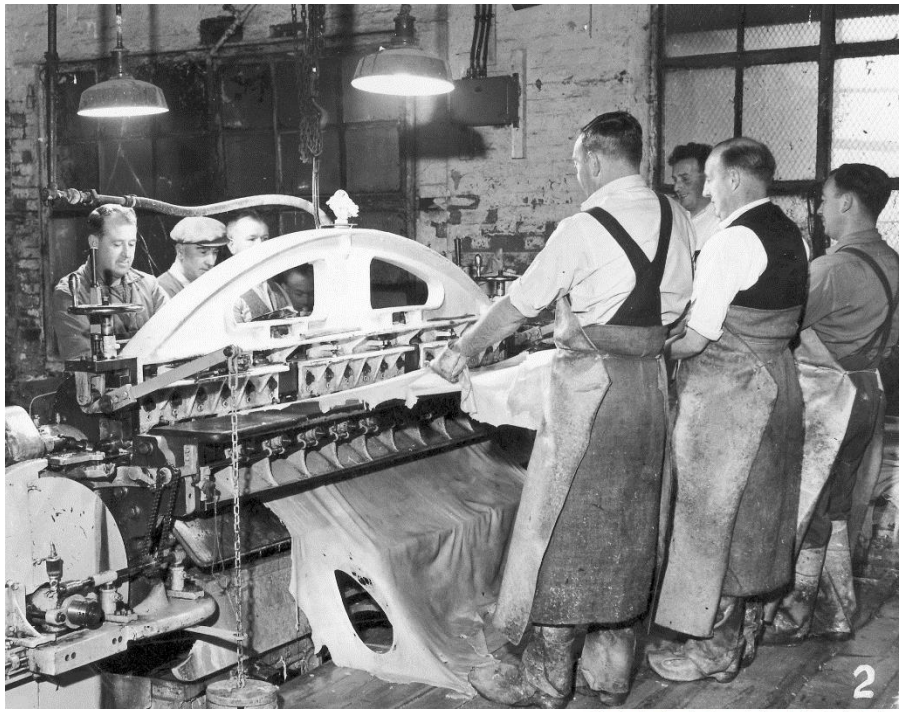
PSI - should include:

- Review of site setting (Geology, (hydrogeology, topography)
- Review of public data:
  - Section 149 Planning Certificate
  - Acid Sulphate Soil Risk Maps
  - WorkCover Stored Chemical Info
  - NSW EPA Contam Sites Register
  - Registered water bore records
- Archived info Historical Soc's (archived photos, etc.)
- Past surrounding land uses (potential for onsite migration)



PSI – should assess:

- **Early site use and Generic Risks** (imported fill, pesticide residues, structural ACM, roadworks)
- **Risks from historical use of toxic materials** (surfactants, HC lubricants, acids/alkalis, HC fuels, chlorinated solvents, pesticides, PCBs)
- **Risk of spillage / product release** (risk depends on toxicity, container size, handling procedures, age of tanks)

Useful Reference: SEPP 55 – Appendix A Industries & Chemicals Used

PSI - overall findings:

A. Site history is <u>complete</u> & demonstrates no previous contaminating activities or potential for onsite migration → No Further Action.

B. Site history is <u>incomplete</u> &/or contaminating activities (or onsite migration) are confirmed or suspected → Intrusive investigations are needed.

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What to look for in a DSI report

Look for evidence of Systematic Planning:

- Were Data Quality Objectives (DQOs) defined?
- Was Sampling, Analysis & Quality Plan (SAQP) developed?
- Did procedures exist for data that did not meet the DQOs?

Look at consultant's conclusions on Data Quality:

- What does the consultant think of the data obtained ?
- Were any data gaps identified? (significant? insignificant?)
- Was the data deemed valid for the assessment purpose?

DSI review:

- Were all areas of concern investigated?
- Was contaminant migration considered?
  - Leachability from soils?
  - Groundwater flow?
  - Air?
  - Dust?
  - Surface water drainage?

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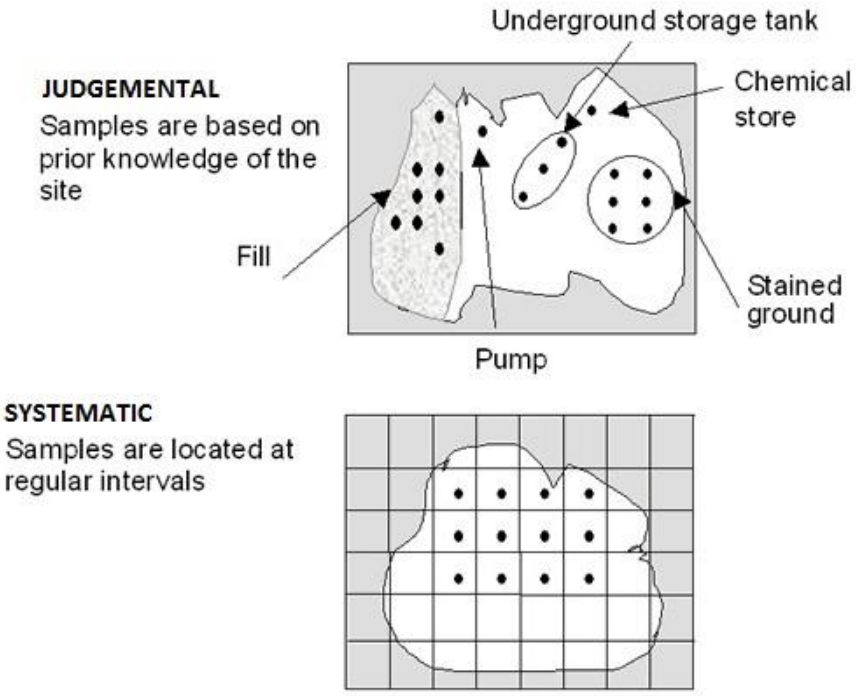
DSI - was sampling design appropriate?

- Use of **targeted** (judgemental) **sampling** close to <u>known</u> contamination sources?
- Use of **systematic** (grid-based) **sampling** in areas where operational history is <u>unknown or uncertain</u>?



DSI – did the investigator:

- Use sampling techniques to preserve sample integrity? (e.g. avoid cross-contamination, minimise VOC losses)
- Meet recommended minimum sampling densities (NSW EPA 1995/ NEPM 2013) achieved? (Note: Double density sampling frequency is required for Asbestos investigations)
- Select analytical parameters consistent with identified Chemicals of Concern? (Ref. PSI findings)

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DSI – detailed questions on data:

- Were analytical methods appropriate? (for the tested chemicals of concern)
- Was QC sampling adequate? (to assess reliability of field sampling procedures)
- Was the quality of analytical data assessed against Data Quality Indicators (DQI) and laboratory DQOs? (to confirm results validity)
- Was statistical analysis applied to define contaminant distribution? (as localised hotspot(s) or widespread contamination)

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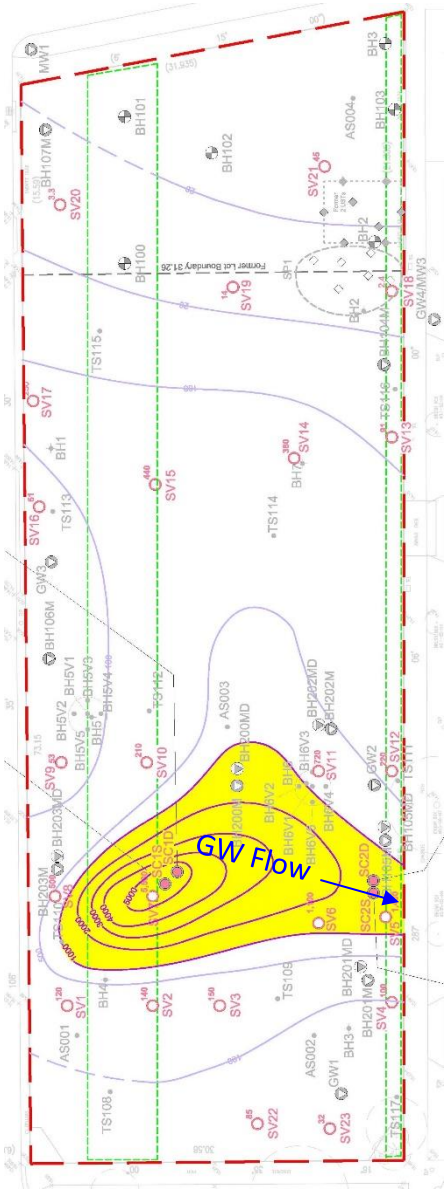
DSI – conclusions

- Were onsite contamination sources found?
- Is HazMat present?
- Do concentrations exceed relevant criteria?
- What is the vertical and lateral extent of impacts? Fill layer vertically delineated?
- If relevant, was potential for onsite & offsite migration discussed? (groundwater flow)
- Human health risks? (exposure pathways)
- Environmental risks? (offsite migration)
- Is the need for EPA notification triggered?
  (NSW EPA 2015 Guidelines on the Duty to Report Contamination)



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Detailed Site Investigation (Outcomes)

A. Site characterisation is complete & demonstrates no evidence of contamination (or low-level impacts below assessment criteria) → Site is deemed suitable for proposed uses, No Further Action

B. Site characterisation is incomplete &/or results confirm contaminant concentrations above assessment criteria (&/or unexpected finds, unresolved data gaps) → Further Investigations &/or Remediation required

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Remedial Action Plan (RAP)

- Have data gaps been addressed? (hotspot delineation, gap closure investigations)
- Are remediation goals & acceptance criteria relevant for intended uses?
- Have feasible remedial options been considered & is rationale for recommended approach provided?
- Are detailed remediation procedures provided?
- Is a validation plan provided? (to confirm effectiveness of remediation)
- Is a contingency plan provided to deal with failed validation results?

RAP

- Is an Unexpected Finds Protocol provided?

(e.g. underground tanks, buried asbestos, other?)

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RAP – what to look for:

- Are all contaminated areas addressed?
- Is site management planned for? (control of Stormwater, Soil-Noise-Dust-Odour, Groundwater, OHS&E, handling of complaints and Community relations during remediation provided)
- Are regulatory compliance requirements identified? (licenses, permits & approvals, responsible parties)

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Site Validation Report

- Has the site been cleaned up to the extent described in the RAP?
- Is the remediation process and methodology adequately documented? Did it follow the RAP?
- If deviations from the RAP occurred, are they adequately detailed with justification provided?

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Site Validation Report

- If contaminated soils were disposed offsite, is a waste reconciliation provided? (with disposal dockets attached)

Site Validation Report

- Where targets have not been achieved, are reasons given & additional works proposed for achieving the original RAP objectives?

Resources for Independent Review of Environmental Reports

- NSW EPA Site Auditors (able to perform statutory and non-statutory contaminated site audits);
- Independent Validation Assessment (by independent, qualified & experienced environmental consultant); and
- Contamination Central (funded by NSW Environment Trust)

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Take Home Messages

- Contamination reports always seem simpler to read when you focus on the text.
- Contamination Reports are easier to understand when the consultant understands the site.
- To understand the site, the investigator needs to access all areas.
- Permission to demolish buildings usually precedes complete site characterisation, remediation & site validation assessment.