Experience comes to life when it is powered by expertise

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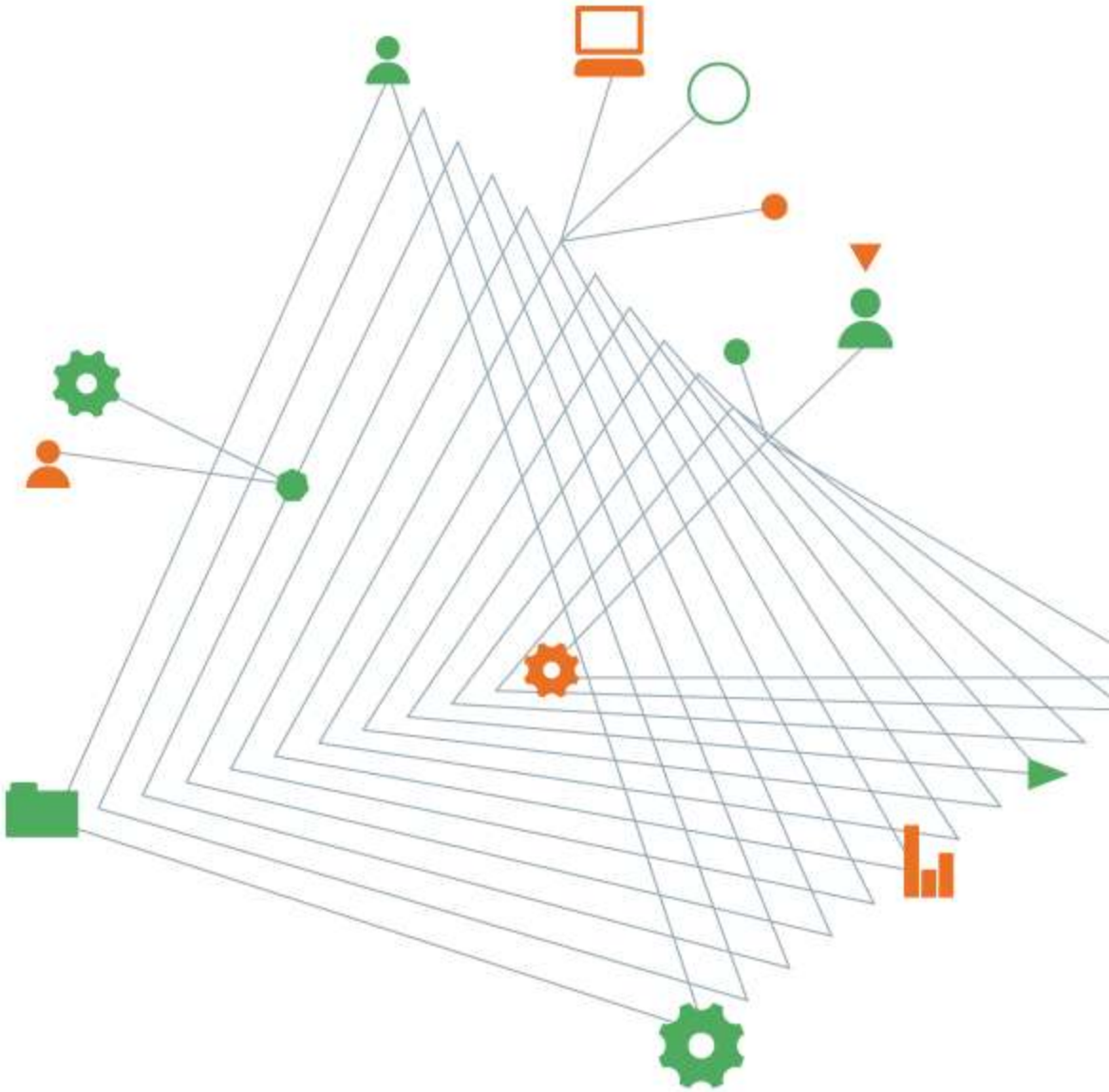
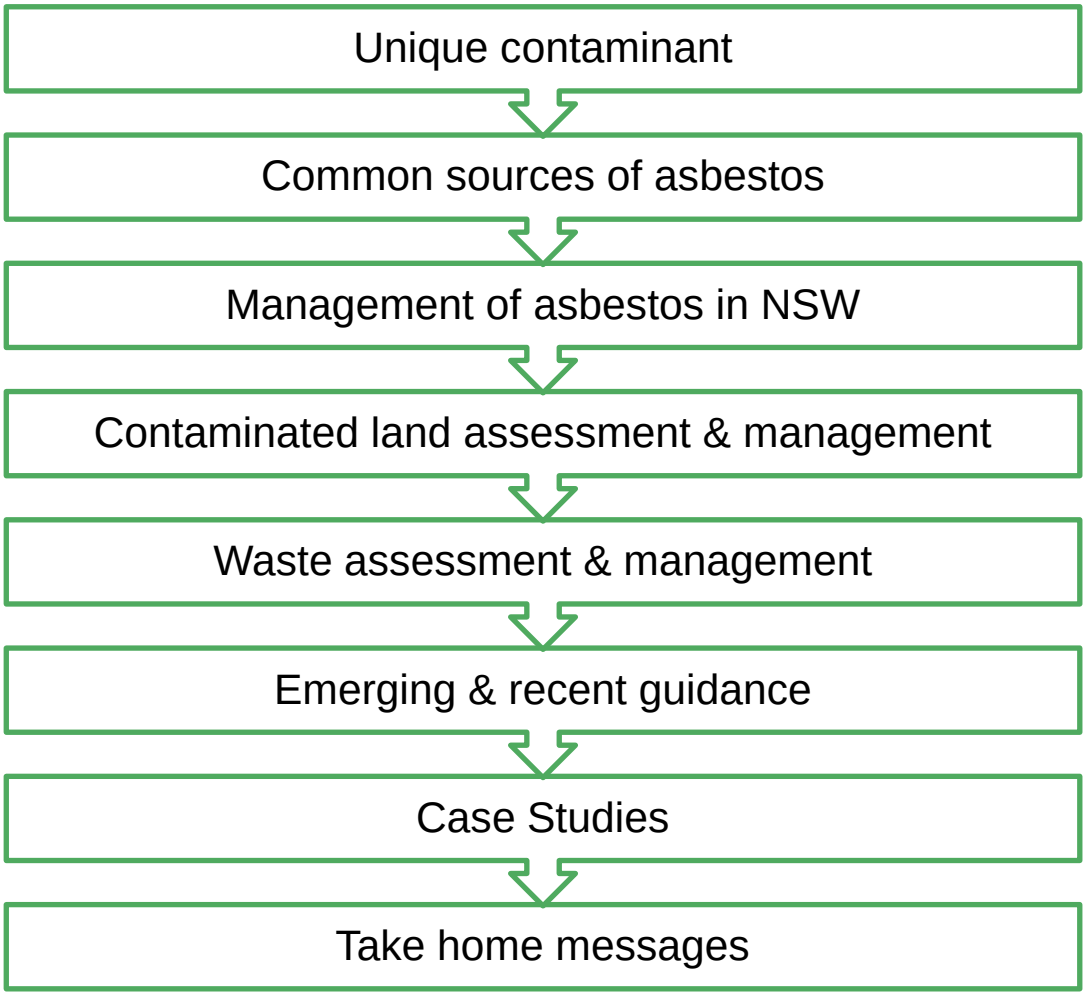


Navigating a pathway in dealing with asbestos impacted sites

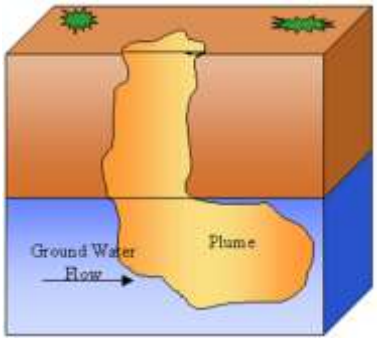
Tony Scott

A presentation to ASBG 23 June 2017

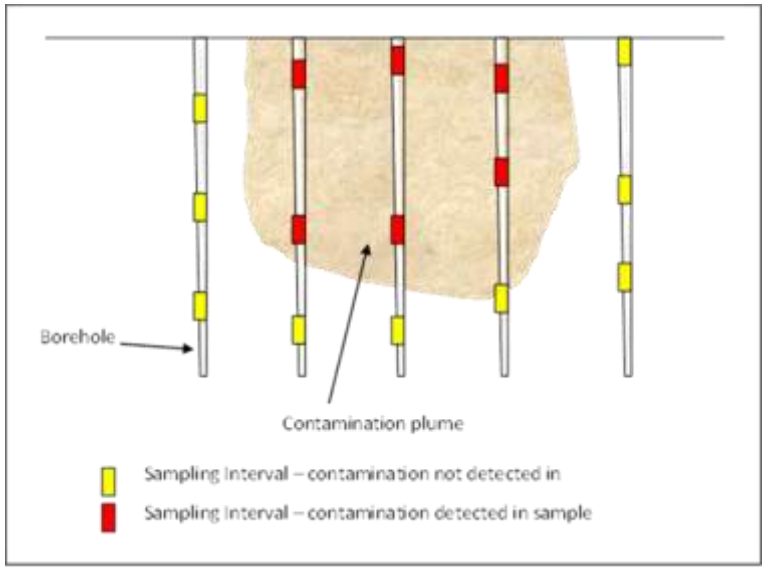
Topics


Unique contaminant
Common sources of asbestos
Management of asbestos in NSW
Contaminated land assessment & management
Waste assessment & management
Emerging & recent guidance
Case Studies
Take home messages

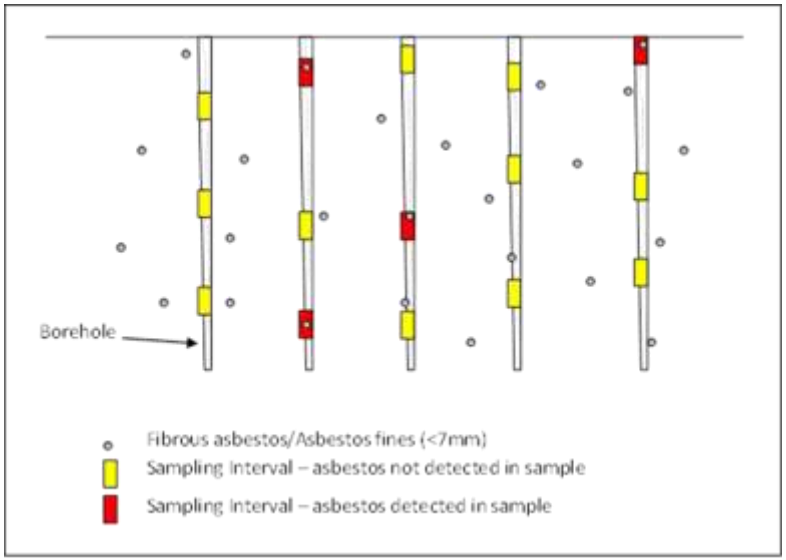
Asbestos in soil - not the normal distribution model?



Geometric distribution of liquid release



Random distribution of asbestos in soil contamination



Common sources of asbestos in soil - contamination and waste

Surface debris

following demolition or degradation of buildings

Onsite dumping or burial of debris/waste

Imported fill

(and possibly recycled concrete)

Pits & buried underground asbestos services

Natural exposed outcrops

Unusual uses – formwork, piling

Management of asbestos in NSW

Worksites – WorkCover NSW	Contaminated Land – EPA & Councils	Waste – EPA
• Work Health and Safety Act & Regulation • How to Manage and Control Asbestos in the Workplace Code of Practice (Safe Work Australia) • How to Safely Removal Asbestos Code of Practice (Safe Work Australia)	• Contaminated Land Management Act • NEPM Assessment of Site Contamination (2013) • WA DoH Asbestos Guidelines (2009) • NSW Govt. – Managing asbestos in or on soil (2014)	• POEO Act • Managing asbestos waste under POEO (Scheduled Activities and Waste) Regulation 2008 • The storage, disposal and transport of asbestos waste under POEO (Waste) Regulation 2005 • Various other regulations.

Contaminated land

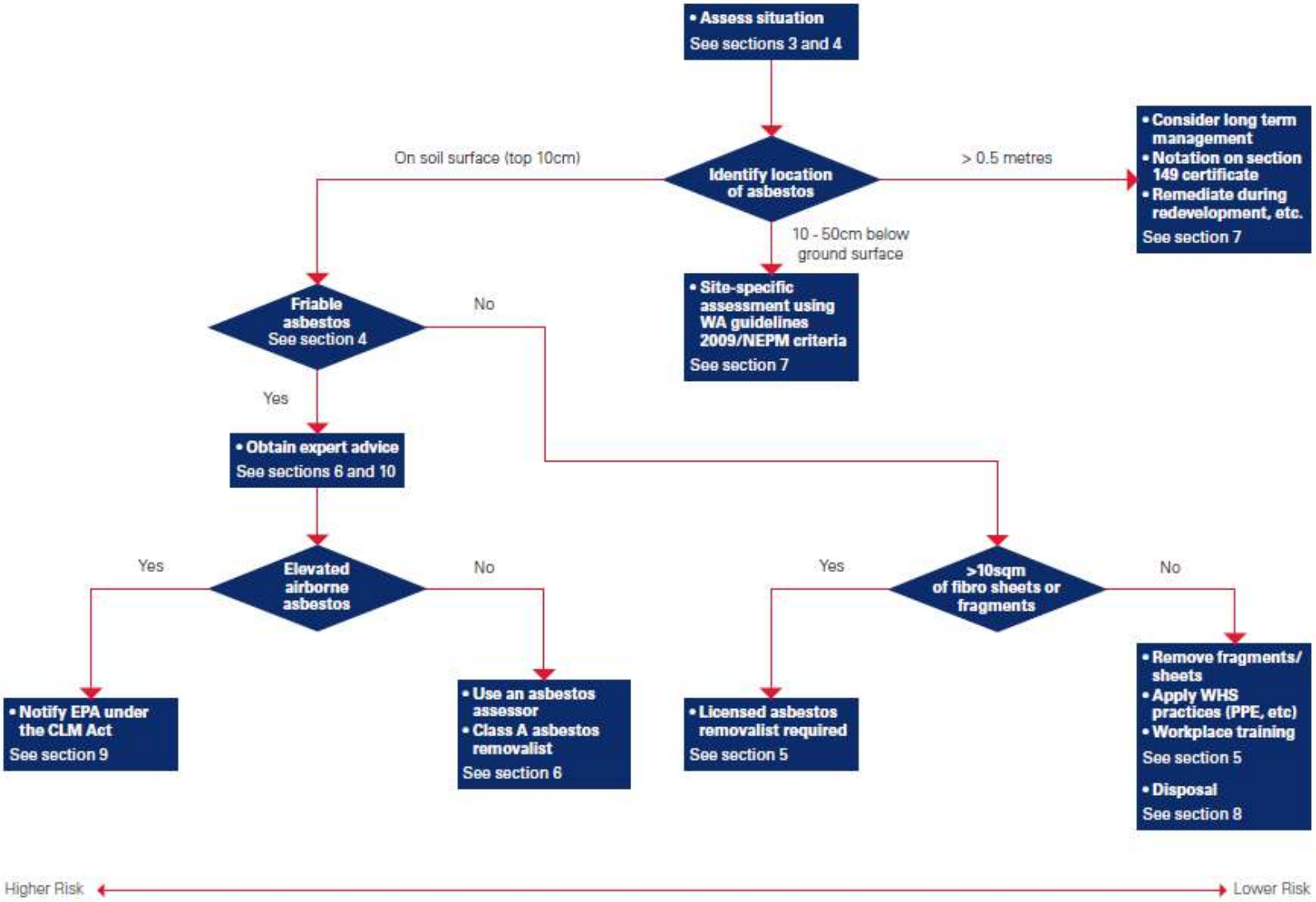
Contaminated Land - assessment & management of asbestos in soil contamination

	Guidelines	Key Points
Assessment	NEPM (as amended 2013)	• Based on the WA DoH • Assessment of bonded ACM where no Fibrous Asbestos (FA) and Asbestos Fines (AF) • Co-located asbestos – >10% AF, FA laboratory analysis necessary • Sites contaminated by ACM only assessment for fibres only warranted > 10% AF, FA

Assessment & Remediation / Management	WA DoH Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (May 2009)	• Assessment as described in NEPM but more detail and information
		• Risk Assessment
		• Remediation and Management
		  ○ Consideration of other contaminants may affect approach
		  ○ Management insitu often preferable - via clean cover (WA MoT)
		  ○ Treatment onsite (hand picking, tilling, screening, excavation and onsite burial)
		  ○ Offsite disposal
		  ○ Ongoing management, if required

- **Asbestos containing material (ACM) -** In sound condition, bound in matrix and > 7mm x 7mm
- **Fibrous asbestos (FA)** - Friable asbestos material, weathered ACM and loose fibrous material
- **Asbestos fines (AF)** - Free fibres of asbestos, small fibre bundles and ACM < 7mm x 7mm

NSW Government Managing asbestos in or on soil (March 2014)



NEPM Schedule B1 Guideline on Investigation Levels – Determining Asbestos In Soils Concentrations

- Bonded ACM is the most common and quantifiable form of asbestos in soil
- Bonded ACM in sound condition can be used as the primary means of estimating contamination by on-site sieving and gravimetric procedures
- **Assessment of bonded ACM is the recommended measure** for total asbestos contamination where FA and AF (derived from bonded ACM) are not likely to be significant as established by the PSI
- As a guide this may be taken where FA and AF are likely to make up less than 10% of the total amount of asbestos*

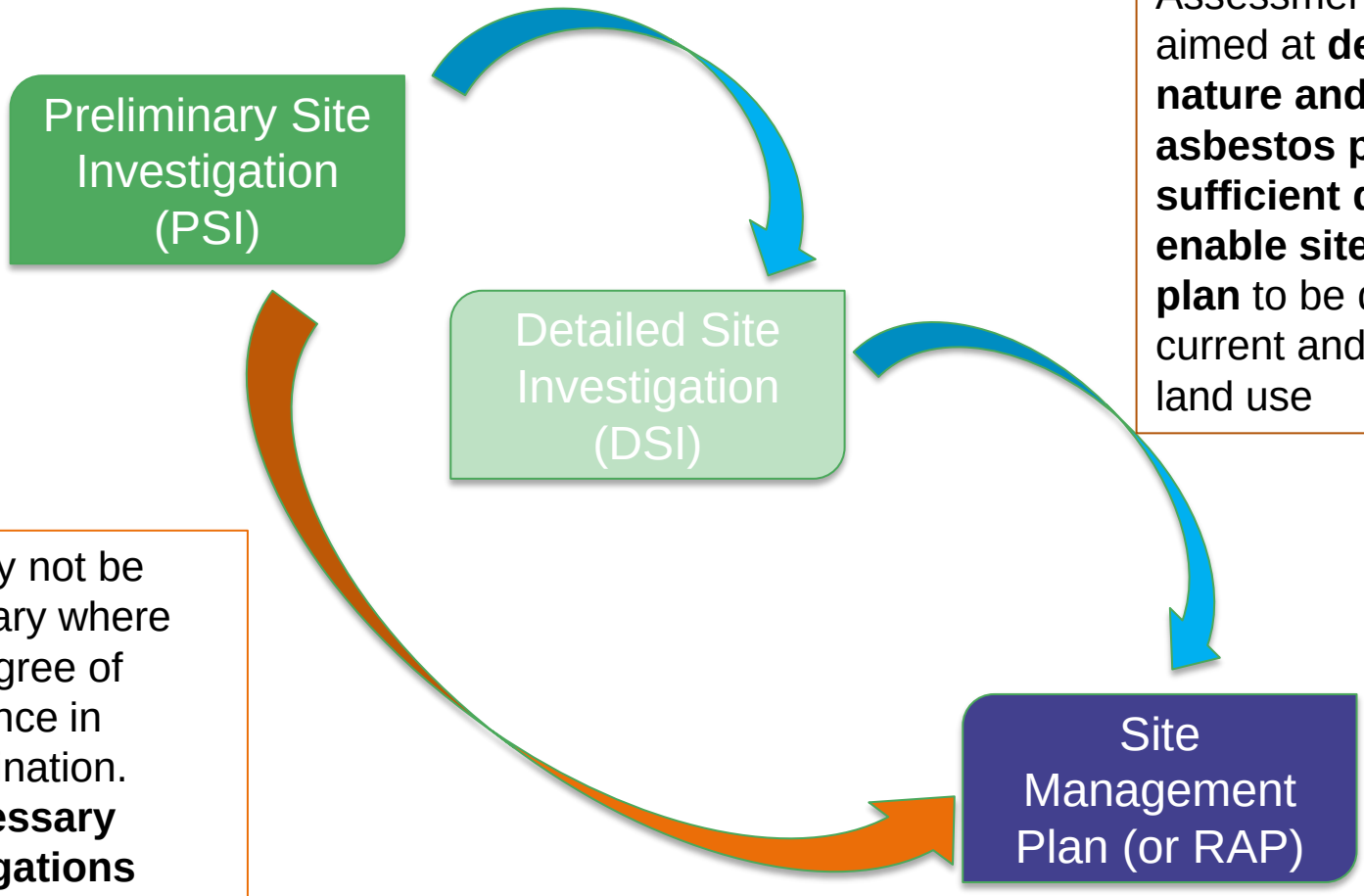
WA DoH

- "if AF arises from co-located ACM, DoH considers **this will not exceed 10% of the ACM even if the ACM is primarily very small pieces arising from severe mechanical action**. An exception would be ACM damaged resulting from power shaping tools."
- "If necessary or in doubt, sampling for ACM, FA and/or AF should occur and findings compared against the relevant investigation criteria."

NSW

- Soil sampling for the detection of asbestos fibres released from fragments of non-friable asbestos such as **fibro is not required where non-friable product is in good condition**

NEPM Schedule B2 Site Characterisation



Assessment should be aimed at **describing nature and quantity of asbestos present in sufficient detail to enable site management plan** to be developed for current and/or proposed land use

DSI may not be necessary where high degree of confidence in contamination. **Unnecessary investigations should be avoided**

Process generally consistent with WA DoH

NEPM Schedule B2 Site Characterisation – Preliminary Site Assessment

Site history investigation (as per Section 3 of NEPM Schedule B2)

- Likely presence of asbestos associated with
  - Remaining or demolished buildings
  - Possible disposal, burial or dumping
- Fill materials present and if incorporate demolition waste

Site inspection

- Grid based walk over visual indications – **comment on presence or absence**
- Identified areas surveyed in more detail noting
  - i) condition
  - ii) distribution

Sampling (not normal but may be undertaken particularly if going straight to Site Management Plan)

- Condition of asbestos materials – easily crushed by hand
  - Bonded
  - Friable
- Condition of soil and future uses
  - Soil pH
  - Soil moisture content

Conceptual Site Model

NEPM Schedule B2 Site Characterisation – Detailed Site Investigation

Sampling & Analysis

+

Assessing Concentration and Distribution

→

Characterisation

- Nature and condition of bonded ACM fragments and whether associated with potential free fibres
- Range and average size of fragments in each affected unit
- Description of affected fill/soil units
- Location and depth of samples taken for analysis
- Location / direction of photographs / videos
- Relevant equipment / machinery used e.g. sieve size etc.

NEPM Schedule B2 Site Characterisation – Detailed Site Investigation – Sampling and Analysis

Sampling & Analysis

- **Conceptual Site Model**
- SAQP including DQOs
- Site management for protection
- Greater reliance on judgemental sampling
- Grid sampling when contamination widespread
- **Sampling density and field procedures sufficient to characterise nature and extent of contamination to enable appropriate management to be developed**

Sampling Methods

- Hand picking (emu-bob) / raking
- Tilling (mechanical turning of soil) with manual collection
- Mechanical screening
- Test pits and trenches
- Borehole – least preferred ACM recovery generally poor

Other sampling methods in WA DoH include: Stockpile

NEPM Schedule B1 Guideline on Investigation Levels – Determining Asbestos In Soils Concentrations

Important considerations in determining asbestos concentrations in soils include

- Observations and calculations of surface asbestos recorded on a grid system
- Separate asbestos determinations if more than one distinct fill unit or stratum
- Inappropriate to average asbestos concentrations across all soils
- Subsurface sample calculations should be per sample (not averaged over a grid)
- Statistical procedures are not appropriate for asbestos

A weight of evidence approach

taking into account field observations, methodology and relevant site history is recommended for determining whether individual or adjacent samples exceeding screening levels are of concern

Assessment of asbestos contamination

Form	Health Screening Level (w/w)			
	Residential A	Residential B	Recreational	Commercial / Industrial
Bonded ACM	0.01%	0.04%	0.02%	0.05%
FA and AF (friable)	0.001%			
All Forms	No visible asbestos for surface soil (the top 10cm)			

- Close to criteria - beware of limbo dancing
- Remember its about assessing risks and management
- Weight of evidence

Health risks are from airborne fibres

Options

Management in-situ

- Involves isolation of the affected area using barriers or covers such that the contamination cannot be readily disturbed so that the likelihood of release of airborne fibres is minimised.

Treatment on-site

- Treatment may involve ACM hand-picking (or “emu-bob”), tilling, screening or excavation of the impacted soil and burial on-site (all asbestos).
- An important outcome of the remediation is that the top 10cm of soil should be free of all visible asbestos.

Removal of contaminated soil from the site

- Involves the excavation and offsite disposal to a waste facility licensed to receive asbestos

Contaminated Land - remediation and management

Remediation / management considerations

- Remediation options which minimise soil disturbance and public risk are preferred
- Management of asbestos in situ is encouraged which may include covering contamination with uncontaminated fill or other protective or warning layers
- Alternative to complete removal of asbestos often involves extensive and costly investigation and validation and may not be effective or necessary for protection of human health
- Regulatory authorities may consider statutory controls to land with substantial asbestos contamination to ensure appropriate management conditions, including land use limitations
- May include notation on title, approved management and listing on public site contamination registers

WA have a very good and easy system for recording notations on title – this is not the case in most other states including NSW

Assessment of asbestos contamination – emerging trends

- US EPA activity based sampling (Julie Wroble)
- Activities undertaken under dry conditions has an elevated risk
- Activities undertaken under wet, humid conditions reduces airborne concentrations and risk
- Applying measures to reduce the exposure is effective

Waste

Waste:

- Surplus to a site
- Becomes a waste when leaves the site

Assessment of asbestos in wastes
Waste Classification Guidelines (2008; revised 2014)

- Asbestos present in waste, classified as ‘Special Waste’
  - **Asbestos waste** means any waste that contains asbestos.
  - If asbestos is mixed with other waste, must also be assessed for other contaminants to classify.
  - Asbestos waste must then be managed to meet the management and disposal requirements of both asbestos and the other class of waste with which it is mixed
- Part 7 of the POEO Waste Regulation deals with transportation and disposal of asbestos
  - Reuse and recycling of asbestos waste is prohibited
  - A person disposing of asbestos waste off the site at which it is generated must do so at a landfill site that can lawfully receive the waste.
- If waste contains asbestos - can not use contaminated land techniques to change classification Recent EPA advice provides some clarity
- There is no quantification of amount of asbestos – presence of 1 fibre? Recent EPA advice provides some clarity

Protection of the Environment Operations Act Amendments Asbestos related

- (Waste) Regulation 2014 - Prescribed waste for land pollution offence (commenced 1 November 2014)
  - > 10 tonnes of asbestos waste included as one prescribed waste that automatically constitute land pollution under the section 142A of the POEO Act
  - Significant penalties can be up to $1,000,000 for corporations and $250,000 for individuals
- (Waste) Regulation 2014 - Asbestos waste monitoring commenced July 2015 – Waste Locate
  - Transporters to record movement of > 100kg asbestos waste or >10 m2 if asbestos sheeting
  - **WasteLocate** assigns a unique QR2id consignment code to allow EPA to monitor movement from site of generation to disposal
  - Transporters must create unique QR2id code for each load and at receiving facility use smartphone or tablet to scan a fixed QE2id at gate/weighbridge
  - Exemption to 30 September 2017 granted for asbestos contaminated soil – consists predominantly of soil contaminated with asbestos.
- EPA have been taking a very strong regulatory approach to asbestos waste
  - Prosecutions for illegal dumping and false and misleading information in waste classifications
  - Penalty notices

New Guidance from EPA (to site auditors May 2015)

- Asbestos in waste – disposal option
  - EPA has no objections to developing and implementing an asbestos segregation program
  - Program should aim to segregate and remove asbestos impacted materials under a rigorous sampling, testing, and inspection regime
  - Segregated non-asbestos material can be disposed to a facility that can lawfully receive the waste
  - Exercise professional judgement and follow relevant guidelines, standards, and best practices in developing such a program
  - Programme should be scientifically sound, defensible and protective of human health and the environment
  - Should not apply to material containing friable asbestos. Friable asbestos should immediately be disposed to a lawful facility with minimal handling

- Excavated Natural Materials (ENM)
  - ENM must not contain asbestos

New Guidance from EPA (to site auditors May 2015)

- AS 4964 Method for qualitative identification of asbestos in bulk samples
  - Where a laboratory has followed AS 4964, and the laboratory has not found asbestos in accordance with AS 4964, it allows for samples to be reported as 'no asbestos found at the reporting limit of 0.1g/kg'
  - Where samples can be reported as 'no asbestos found at the reporting limit of 0.1g/kg the relevant amount of waste that is statistically represented by the samples does not need to be reported as Special Waste (asbestos waste)
  - Still need to be classified in accordance with the *Waste Classification Guidelines, Part 1: classifying waste, EPA 2014*, or demonstrated for compliance against any relevant resource recovery order or resource recovery exemption
  - The EPA notes that where there is any visible asbestos, including visible friable asbestos, or bonded asbestos, that waste is not free of asbestos

If slides contain < 5 asbestos fibres → "No asbestos detected"

New Guidance for EPA waste updates – Laboratory reporting of asbestos (Site Auditor Meeting May 2016)

- Context
  - Laboratory receiving samples containing asbestos, but clients have not requested asbestos testing
  - Laboratory notifies clients of asbestos, but told by clients not to report asbestos
  - Laboratory undertakes testing for asbestos even when not requested by client:
    - To protect their workers, especially if fibres are found, and when undertaking foreign materials testing, which requires drying and sieving; and
    - To comply with s144AA – providing information about waste that is not false and misleading

- EPA requires laboratories to report where asbestos is identified in samples even if analysis for asbestos not requested

Emerging Guidance: Draft Auditor Guidelines – Waste Section Will apply to all waste removed from audited sites

- Auditors must have regard to provisions of the framework for managing wastes
- Waste classifications - auditors must check and review:
  - Sampling density
  - Sampling pattern and methodology
  - Selection of contaminants for analysis
  - If not satisfied require additional work or if waste has been removed notify client and EPA
- Waste disposal – auditor must check:
  - Waste disposed to facility licensed to receive the wastes
  - Estimated volume disposed
  - Disposal receipts verifying disposal
  - Reconciliation of waste disposed is consistent with waste generated
- EPA notification policy for waste – auditors must notify EPA immediately after becoming aware of: false or misleading information in classification; disposal to unlawful facility, disposed to a facility that cannot receive the waste; use that does not meet conditions of an Order or Exemption

Take home message - different approaches for contamination and waste

What are you dealing with?

Contamination

- Sample and assess contamination forms and levels compare to NEPM
- Assess remediation / management requirements
- Remediate / manage to retain onsite
- Continue to use site

AS 4964

0.01%

WA DoH

0.001%

Waste (surplus to site)

- Sample and classify as per Waste Classification Guidelines giving consideration to other contaminants
- Asbestos present can segregate but not remediate to change classification
- Transport and dispose of in accordance with the regulations
- WasteLocate

Which process is best?
The one that fits the situation may need to switch between each BUT
MANAGING ONSITE AND AVOIDING WASTE – GREATEST OPPORTUNITIES

Case Study 1
Redevelopment of Mental Health Facilities, South Australia

Context

- Redevelopment of Mental health facility operating since 1866
- Remediation and audit done in parallel with the development
- Ongoing operation and control by government
- Reuse of waste during the remediation works
- Ongoing site management plan

Asbestos Management

- Removal of asbestos conduits to extent practicable – recording details of conduits remaining
- Offsite disposal of fill and surface soils containing asbestos
- Cutting off of piles and onsite retention, surveying location and level of top of piles
- Ongoing site management plan including asbestos management

Case Study 2
Redevelopment Site, ACT

Context

- Early identification of potential asbestos water pipeline
- Confirmation of location and condition of pipe through careful intrusive investigations

Asbestos Remediation Strategy

- Development of remediation strategy to minimise breakage of pipe and asbestos waste
- Surgical excavation and pipe removal
- Segregation of clean and potentially asbestos impacted wastes
- Visual validation by Asbestos Assessor
- Over-excavation in areas of breakage
- Validated excavated soils re-used onsite

Case Study 3
Redevelopment Site, ACT

Context

- Demolition of asbestos structure
- Multiple asbestos clearances certificates
- Subsequent identification of asbestos fragments during contamination assessment

Asbestos Remediation Strategy

- Excavation and offsite disposal of disturbed area with asbestos impact
- Emu Pick around perimeter of excavation – multiple occasions
- Visual validation by Asbestos Assessor
- Multiple events required

Case Study 4
Redevelopment of Former Industrial Site, ACT

Context

- Recycling facility acceptance of waste disposal
- Waste included large quantities of asbestos
- Large scale offsite disposal to landfill

Asbestos Management Strategy

- 7000m^3 of soil potentially containing asbestos contained beneath portion of road
- Capping layer of geofabric and 1m clean cover
- Road to be handed back to Roads ACT
- Environment Management Plan to be implemented by Roads ACT
- Dial Before You Dig

Case Study 5
Management of Asbestos Dumping in Regional Area NSW

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Context

- Apparent dumping of asbestos waste & migration of asbestos downhill of source
- Emu picking events but more reappearing
- Multiple users
  - Local Council
  - Bike track
  - Land owner

Asbestos Management Strategy (under consideration)

- Multiple strategies based on risk and site use in Asbestos Management Plan
  - Fencing to control access with bollards for bike access
  - Paving access road & realignment of bike track
  - Covering source area with geofabric & 100mm mulch cover & silt fencing
  - Emu picking to continue regularly and plan to scale back overtime

Other Case Studies

Case Study 7

Case Study 8

Case Study 9

Case Study 10

Take home messages - contamination

- Different contamination mechanism to most contaminants
- Site history, methodical site inspection and a robust CMS are critical
  - Good documentation records - including "no asbestos observed"
  - Do you really need to sample and test for AF/FA?
  - Understanding the form, distribution and condition of asbestos is critical to assessing risks – known knowns
  - Assess the need for additional investigation OR going directly to remediation / management
- Understand uncertainty – known unknowns and what may be the unknown unknowns
- Health risks are from airborne fibres (can't inhale an ACM fragment)
- Beware of limbo dancing - Weight of evidence approach
- Don't forget asbestos is emotional issue - Perception is reality

Take home messages - waste

- Understand the differences between managing asbestos as a contaminant and asbestos as a waste
- Understand the waste regulations
- Removal of ACM from impacted soils doesn't change classification but can use segregation
- Managing onsite as opposed as a waste offers more opportunities for ways of dealing with asbestos
- Asbestos is emotional issue - Perception is reality

Thank you

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