



# **Groundwater Remediation at Harwell**

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# Harwell: Background

## ■ Harwell:

- Until 1930s: Farms and Racehorse stables
- 1935 to 1946: RAF airfield
- Nuclear research site for over 40 years
- Since mid-1990s, focus on decommissioning and clean up for redevelopment (“Harwell Science and Innovation Campus”)



# Harwell Science and Innovation Campus

The Diamond Light Source - Synchrotron



# The Groundwater Contamination

- Chalk groundwater contamination identified in late 1980s
- Associated with waste disposal operations at 2 sites:
  - The Southern Storage Area (SSA)
    - disposals up to 1970
  - The Western Storage Area (WSA)
    - 1970 to early 1990s (solvent disposals ceased in 1977)



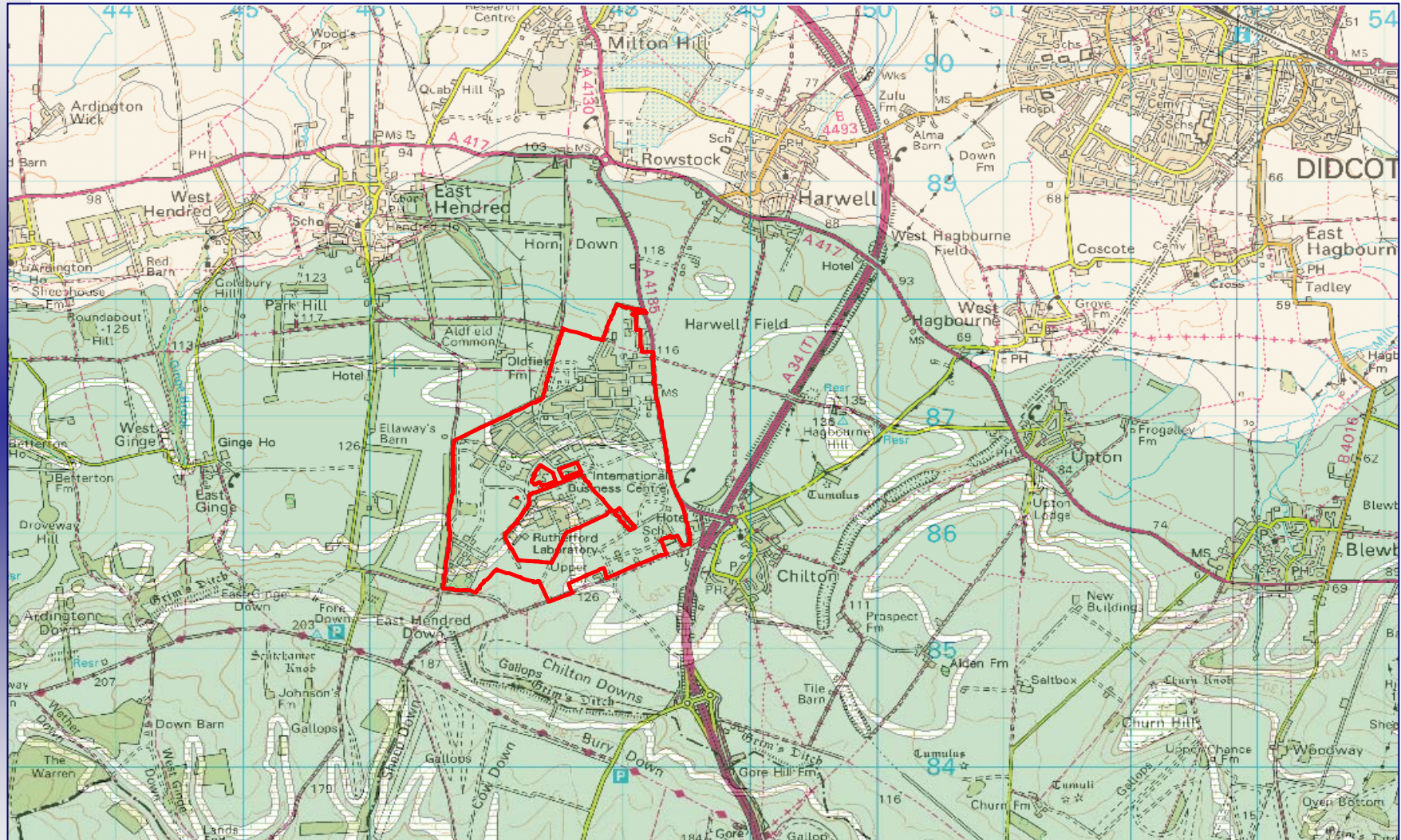
# The Western Storage Area (WSA)


- Mixed hazardous chemical wastes
- Significant quantities (20 tonnes?) of chlorinated solvents
- 25 unlined chalk pits
- No liner in pits



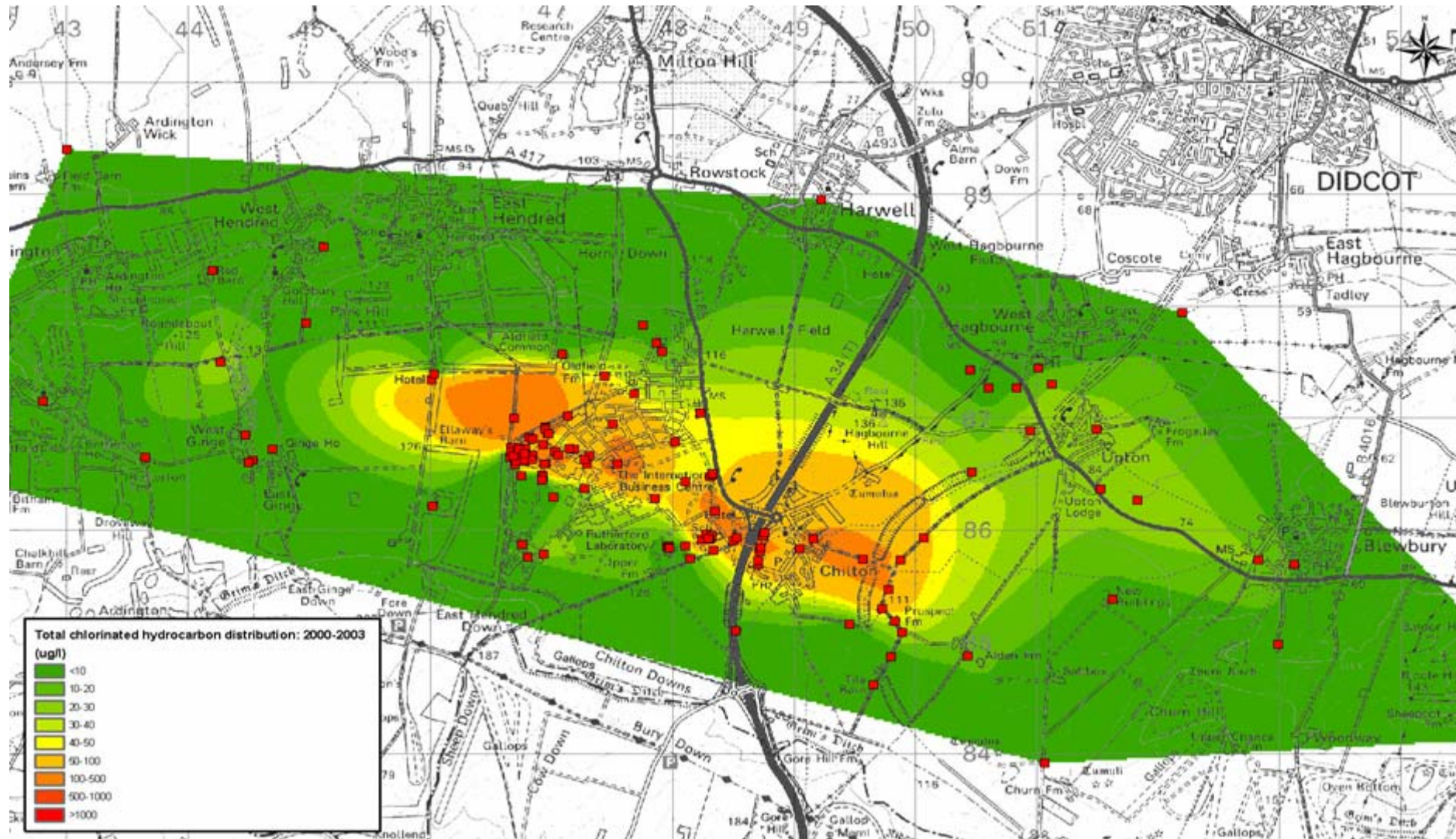
Waste disposal at the WSA

# Geology



 = Chalk

# Groundwater Plume (2000-2003)



# Remediation Strategy

- Remediation strategy (source-pathway-receptor)
  - Receptors: ensure contaminated water not consumed
  - Pathway: monitor water quality jointly with EA
  - Source (i): SSA
    - Groundwater containment (completed 2002)
    - Pit removal (completed 2002)
    - Site to form part of large housing development
  - Source (ii): WSA
    - Groundwater containment: to 2025?
    - Pit removal (completed 2005)
    - Unsaturated zone remediation (2005-?)
  - Stakeholder communications
  - Objective:
    - no more active remediation after 2025



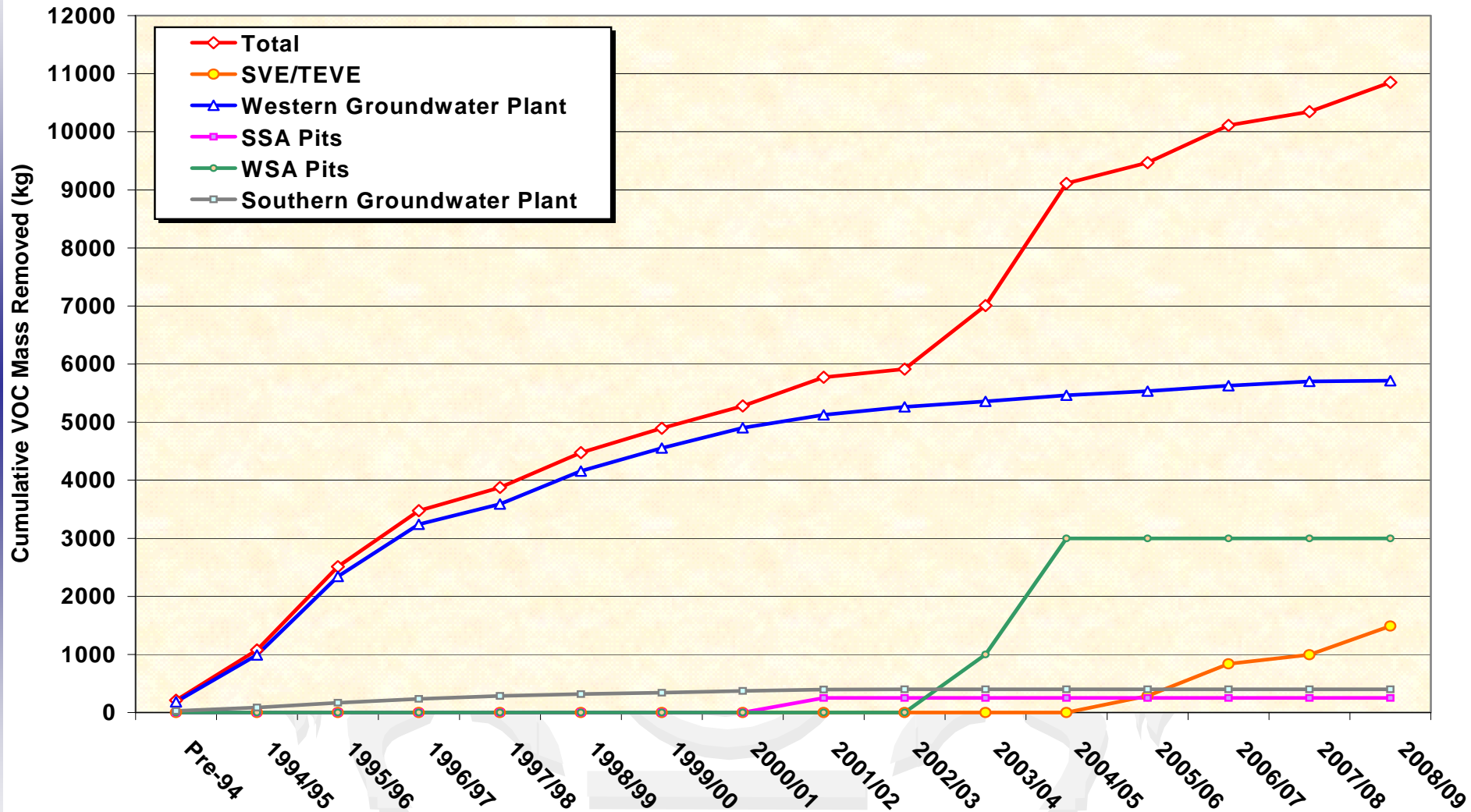
Buried munitions

Groundwater Treatment





# Estimated Contaminant Mass Removed



# WSA: Unsaturated Zone Remediation

- Significant unsaturated zone (USZ) source:
  - Groundwater contamination increases by an order of magnitude as groundwater levels rise in autumn/winter
- 1996 strategy (AEA Technology) suggested further investigation of unsaturated zone remediation for WSA
- Options study (Babtie, 2001) suggested trial of SVE, TESVE and/or air sparging for USZ/zone of water table fluctuation (ZWTF) at the WSA
- Removal of pit contents a pre-requisite for USZ/ZWTF remediation



# WSA USZ Remediation Contract

- Contract for pit waste removal completed in early 2005
- Competitive tender process for USZ remediation started in late 2004
- Phased approach to contract:
  - Allowed pilot phase to evaluate multiple techniques
  - Better suited to UKAEA's annualised funding arrangements
- Contract awarded to AIGE in July 2005