

SAMPLE REPORT

MSI DATA REPORT: CONTAMINATED LAND ASSESSMENT AND REMEDIATION: UK

A report researched and published by:

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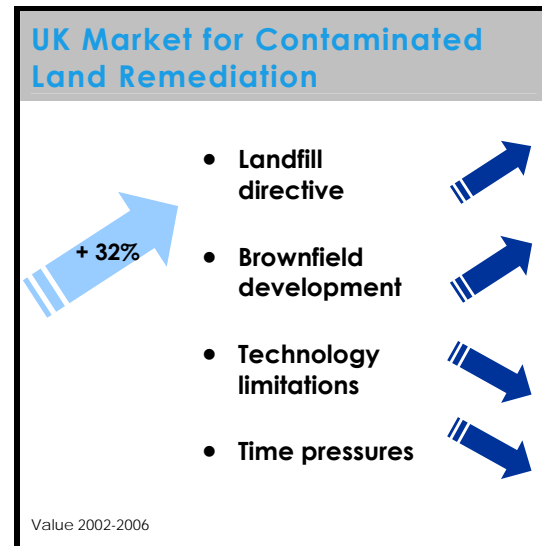
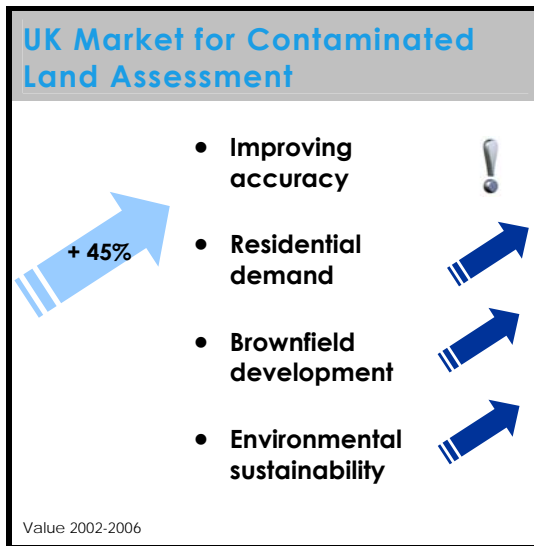
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1. Key Findings



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2. Introduction

2.1 About MSI

MSI Marketing Research for Industry is an **independent market research company** established in 1980.

- Our **core business** is to produce market research reports on Business-to-Business Markets.
- Our **mission** is to provide managers with an accurate view of the market to be used as an analytical and decision-making tool. Our research reports aim to identify market drivers and key issues for strategic and commercial planning.
- Our **research** covers numerous key business-to-business markets, including:
 - Construction & Building Products
 - Building Services
 - Healthcare
 - Security & Surveillance
 - Environment & Energy
 - Transportation & Infrastructure
 - Packaging & Paper
 - Metal & Metalworking
 - Business Services
- Our research reports aim to quantify market size and trends, accompanied and explained with qualitative information. Market segmentations are carefully analysed through a two-stage process:
 - An observation stage analysing the current situation and previous years
 - Considering likely future scenarios and developing forecasts for the future

Cultural diversity has always been at the heart of our values and this is illustrated through the different nationalities which make up our research teams. MSI is therefore capable of carrying out market research on the UK, French, German and Spanish markets as well as Pan-European market research. MSI publishes in excess of 80 reports every year.

2.2 Methodology

The research methodology employed by MSI has been subject to numerous procedures to guarantee the quality and the reliability of the information contained within the reports. In-house consultants are employed full-time and receive a six-months training period to acquire and implement MSI's research methodology.

MSI's methodology can be divided into five principal stages:

- **Stage 1: secondary research**

The consultancy teams work closely with trade associations, magazines, and government bodies operating in the researched field. Further research is also carried out from information available internally from our in-house documentation service and externally from the Internet. The latter is carried out by our teams which have the experience and the know-how to efficiently and productively extract information from existing sources.

- **Stage 2: primary research: interviews with trade sources**

The consultancy team proceeds to undertake a series of telephone or face-to-face interviews, with a representative selection of companies operating in the chosen industry. Every attempt is made to talk to leading players in the sector as well as smaller companies. Interviews

are therefore carried out with manufacturers, distributors, importers, suppliers, installers and end-users. Indeed, some of our studies involve more than a hundred interviews. The data gathered from interviews is systematically checked and compared with the secondary research.

- **Stage 3: analysis of the gathered data**

The information gathered during the two previous stages is then analysed and synthesized. A second series of interviews can be done if necessary to check and validate the data during this decisive stage.

- **Stage 4: quantitative data**

MSI reports provide quantitative data, such as market estimates and forecasts, to measure the researched market. This data is based on the estimates obtained during stage 3.

The quantitative data contained in the reports is based upon the consultancy teams' appreciation and analysis of the market and is consequently unique to MSI.

- **Stage 5: quality control**

Each report is the subject of a rigorous checking and editing process by an experienced management team, to ensure the accuracy and consistency of the

published data. Each consultant involved in the research process receives substantial on-going training and support, as part of MSI's stringent internal quality procedures.

2.3 Definitions

1) Glossary: Scope of the report

| | |
|-----------------------------|--|
| Coverage | <p>This market analyses the UK market for contaminated land assessment and remediation. The report includes all types of contamination including contamination to ground water, radioactive contamination and contamination of military sites are included.</p> <p>The report also includes remediation undertaken by companies other than environmental contractors. The report does not include the value of any form of insurance claims. The market size represents the value of the contracts awarded to assessment and remediation companies. This will be the final cost of the treatment rather than the initial estimation. As some contracts have different sharing strategies for risk.</p> |
| Review period | <p>2002 to 2006. Research has been carried out during September 2006. Data for 2006 are estimates based on knowledge of the first six-month 2006 period. 2006 is therefore shown as a full year in tables and graphs.</p> |
| Forecast period | <p>2007-2011.</p> |
| Market size | <p>Quantifies sales made by manufacturers in the UK, including imports. Export sales are specifically excluded (unless otherwise specified).</p> <p>It should be noted that the market size data has not been obtained by simply adding the turnover of the various companies produce only one type of product or service.</p> |
| Revisions/Amendments | <p>The data presented in this report has a modified segmentation compared to MSI's report on this subject, published in September 2004. Solidification is now included as a chemical treatment and excavation and disposal is included as a physical treatment. As a result, direct comparisons between these two reports may not be possible.</p> |

2) Glossary: Units

Exchange Rates

The following exchanges rates are used in this report.

| | | | |
|-------|----|---|-------|
| 2000: | £1 | = | €1.64 |
| 2001: | £1 | = | €1.61 |
| 2002: | £1 | = | €1.59 |
| 2003: | £1 | = | €1.45 |
| 2004: | £1 | = | €1.47 |
| 2005: | £1 | = | €1.46 |
| 2006: | £1 | = | €1.46 |

Value

All values are quoted at current prices unless otherwise specified. Values exclude VAT unless otherwise stated but are inclusive of landfill tax where appropriate.

3) Glossary: Definitions of the Products and Markets

Assessment market

Includes the costs of the desktop and walkover study by the consultancy, the cost of sampling by a drilling contractor if required, the cost of laboratory analysis by a specialist laboratory, the cost of reporting the analysis of the result of sampling and testing by the consultancy, the post remediation testing and long term monitoring if appropriate.

For the purpose of this report the assessment market is split into five phases for the assessment of the land and determination as to whether remediation work is required.

Contaminated land

The contaminated land regime, as set out in Part IIA of the Environmental Protection Act 1990 was introduced in England in April 2000, July 2001 in Wales; a similar regime was introduced in Scotland in July 2000.

Part IIA provides a statutory definition of contaminated land:

“any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances, on, or under the land that

- significant harm is being caused or there is significant possibility of such harm being caused;

or

- pollution of controlled waters is being, or is likely to be caused.”

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3) Glossary (cont): Definitions of the Products and Markets

| | |
|------------------------------------|---|
| Desktop and walkover study | This covers the costs of the consultancy firm's time to research the previous land use during the desktop study and the time taken to walk over the site to determine the possible potential contaminants and how to go forward in the assessment of the site. |
| Laboratory testing | Includes the cost of transporting the soil samples to the specialist laboratory, and the main cost of the laboratory testing of the soils. Where remediation work takes place the cost of testing the soils once the work has taken place is also included. No laboratory analysis is included in the market value, as the norm is for laboratories to simply provide factual information: the analysis is normally undertaken by the consultancy and is part of the reporting stage. |
| Physical site investigation | The costs of obtaining the sample soils to be sent for analysis. This will include the costs of drilling rigs for the purpose of creating boreholes to obtain the samples where appropriate. |
| Remediation market | Covers all the costs involved with treating the contaminant. This includes the costs of the selected technique, the equipment and transport costs if soils need moving to landfill or off site treatment centres. The remediation market includes the treatment of radioactive waste, but excludes the clean up of nuclear sites. |
| The reporting stage | Is the compilation of all the information gathered by the consultancy firm including the desktop study, site walkover and laboratory results. The consultancy firm is then able to determine if treatment is needed and what treatment should be applied. |

4) Glossary: Definitions of Regions of England as used in Market Analysis, by Region of England

| | |
|---------------------------------|--|
| Midlands | Includes the counties Shropshire, Herefordshire, Gloucestershire, Staffordshire, Worcestershire, Warwickshire, Derbyshire, Nottinghamshire, Leicestershire, Northamptonshire and Lincolnshire. |
| North East | Includes the counties of Northumberland and Durham. |
| North West | Includes the counties of Cheshire, Merseyside, Greater Manchester, Lancashire and Cumbria. |
| South East | Includes the counties Norfolk, Suffolk, Cambridgeshire, Bedfordshire, Buckinghamshire, Hertfordshire, Essex, Buckinghamshire, Oxfordshire, Berkshire, Wiltshire, Hampshire, Surrey, Sussex, Kent and London. |
| South West | Includes Somerset, Dorset, Devon and Cornwall. |
| Yorkshire and Humberside | Includes the counties North Yorkshire, West Yorkshire, East Riding of Yorkshire, South Yorkshire, including the city Kingston Upon Hull, and the immediate area around the river Humber. |

5) Glossary: Definitions of Regions of England by Government Office Region, as used in Previously Developed Land Analysis

| | |
|-----------------------------|--|
| North East | Includes the counties of Northumberland and Durham. |
| North West | Includes the counties of Cheshire, Merseyside, Greater Manchester, Lancashire and Cumbria. |
| Yorkshire and Humber | Includes the counties North Yorkshire, West Yorkshire, East Riding of Yorkshire, South Yorkshire, including the city Kingston Upon Hull, and the immediate area around the river Humber. |
| South West | Somerset, Dorset, Devon and Cornwall. |
| West Midlands | Including the counties of Shropshire, Staffordshire, Herefordshire, Worcestershire, Birmingham, Warwickshire and Gloucestershire. |
| East Midlands | Including Derbyshire, Nottinghamshire, Lincolnshire, Leicestershire and Northamptonshire. |
| East of England | Including the counties of Norfolk, Cambridgeshire, Suffolk, Bedfordshire, Hertfordshire and Essex. |
| South East | Including Oxfordshire, Buckinghamshire, Wiltshire, Berkshire, Hampshire, Surrey, West and East Sussex and Kent. This does not include London. |
| London | Includes the City of London and all London boroughs. |

6) Glossary: Definitions of the Terms and Materials

| | |
|--|--|
| Air sparging | The process of injecting air directly into groundwater. Air sparging remediates groundwater by volatilising contaminants and enhancing biodegradation. As the contaminants migrate in the ground, a soil vapour extraction system is usually used to remove vapours. |
| Biological processes | The natural physiological process of micro-organisms such as bacteria and fungi to transform, destroy, fix, or mobilise contaminants. |
| Bioslurping, bioventing | The simultaneous application of vacuum enhanced extraction/recovery, and vapour extraction. This combines with bioventing to address Light Non Aqueous Phase Liquid (LNAPL) contamination. |
| Brownfield sites | Sites that have been previously developed on, but no longer have a use in their current form. Therefore they require redevelopment to return them back into useful sites. |
| Chemical Oxidation | Involves the degradation of contaminants by injecting a strong oxidant in an aqueous solution. It is most effective in high permeability aquifers. It is an aggressive treatment that is particularly effective with targeting concentrated zones of high contamination. |
| Chemical processes in soil treatments systems | Used to destroy, fix or neutralise hazardous compounds into a safe or more environmentally friendly form. |
| Chemical Reduction | Decreases the chemical valence of contaminants using reduction agents by changing them into less toxic compounds that are more stable and less mobile. |

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6) Glossary (cont): Definitions of the Terms and Materials

| | |
|---|---|
| Containment treatments | Defined as processes designed to prevent or limit the migration of contaminants. The contaminant may be left in place, confined to a specific storage area or converted to a state where the contaminant is permanently contained within a solid. |
| Engineering Capping | Involves completely sealing off the contaminated soil and then covering it with cement or other hard surface. This breaks the potential for contaminant and receptor to meet. This method usually involves excavating soil above the contaminated area to complete the capping. The contaminated area will then be sealed off and soil may then be used to cover the contaminated area. Depending upon the level of contamination, construction may then take place upon this site. This treatment does not treat the contaminant, as it creates a small landfill onsite. |
| Ex-situ bioremediation | The contaminated soils are excavated from the ground and treated in specially designed bio-piles. Bacteria are then used to destroy the contaminant. Nutrients, air and water can be controlled to increase microbe activity and biodegrading of soils. |
| Ex-situ offsite disposal | Is the excavation and disposal process of taking contaminated soils to hazardous landfills. |
| Ex-situ offsite treatment centre | The soil can be taken to a soil treatment centre; The soils may possibly be returned to site or recycled for use elsewhere. |
| Ex-situ onsite | This type of treatment is when the contaminated soil is excavated from the ground and treated on site. Equipment is transported to the site to complete the treatment onsite, and return the soils to the ground. |

6) Glossary (cont): Definitions of the Terms and Materials

| | |
|-------------------------------|--|
| Ex-situ vitrification | Very similar to in-situ vitrification. Ex-situ vitrification heats excavated soils to temperatures of 1000-1700°C depending upon the contamination. At this temperature contaminants are destroyed or trapped in the glassy product formed during cooling. This forms a product with low contaminant leaching characteristics, which is therefore safe to use in the construction process. |
| Extraction | The process of using simultaneous extraction of contaminated ground water and soil vapour. This can be completed by dual phase or multi phase extraction. Multi phase extraction can also deal with lubricants and crude oils. Extraction operates using vacuum processes. |
| Geomembrane walls | Include clay or plastic membranes. These act to encapsulate contaminants. These can be used to prevent the migration of gas particularly into ground water. |
| Incineration | Involves heating the soils to temperatures between 880-1200°C to destroy or detoxify contaminants, removing all humic components. Rotary kilns are commonly used for this. |
| In-situ | This is where the soil is not excavated from the ground and the treatment is administered in the ground. This therefore is an on site treatment process. |
| In-situ bioremediation | Used where excavation of soils is not practical. This process involves the injection of air and water to convey oxygen and possibly nutrients into the contaminated land. This stimulates the bacteria degrading the contaminant. |
| In-situ electrolysis | Uses an electric current to decontaminate soils. During this process an acid is produced in the anode area, which travels throughout the contaminated area and desorbs the contaminants from the soil particles. |

6) Glossary (cont): Definitions of the Terms and Materials

| | |
|--|--|
| In-situ vitrification | Uses electricity to melt the waste and surrounding, then cooling it to form glass. Contaminants not destroyed by the heat are encapsulated within the glass so that they cannot leach into the surrounding soil or groundwater. This mass created remains in the ground where it was treated, and is simply covered over with topsoil. |
| Monitored natural attenuation | The natural process of cleaning up pollution in soils and groundwater. This process can occur in the following ways, microbes using the pollution as food, chemicals can mix with the soil holding them in place, dilution, and evaporation. No action needs to take place, except for careful monitoring. |
| Other chemical treatments | Hydrolysis; this breaks down the organic material using water. Chemical dechlorination uses reductive agents to remove chlorine from hazardous molecules to form less hazardous compounds. |
| Parts per million | Refers to the number of contaminated particles per million. Low parts per million means low contamination. |
| Permeable reactive barriers | Act to confine the contaminant within a specified area. There will also be a treatment zone where the water is allowed to slowly migrate through the barrier. The treatment area absorbs the pollutants and converts them into harmless by-products. |
| Physical processes of remediation | The removal of the contaminated soil by excavation and disposing of this in a landfill site. The process of removing the soil and treating in a different place is not defined as a physical process. This would be categorised as an ex-situ process. Physical process is what is known as the traditional 'dig and dump' method in the industry. |
| Phytoremediation | Uses plants to degrade contaminants, fix them to the ground, to accumulate within plant tissue or to release into the atmosphere. |

6) Glossary (cont): Definitions of the Terms and Materials

| | |
|---|---|
| Remedial treatments | Include all treatment processes, but excludes excavation and disposal which is a treatment. |
| Slurry walls | Formed using a specially formulated mix of cementations and bentonite materials to provide a structure that offers extremely low permeability to protect the environment by preventing the groundwater flowing. |
| Soil Solidification/ Stabilisation | Mixes cement with the soil to react with water to form a physical bond that immobilises contaminants, hence preventing leaching. During stabilisation the contaminant is chemically changed to form a less soluble and more stable hydration product. |
| Soil vapour extraction | A physical process of removing organic contaminants from the soil by inducing localised vacuum. This is designed to remove volatile hydrocarbons. |
| Soil washing | Removes the contamination from the excavated soils. Scrubbing the soil with a wash solution completes this. The contaminant is separated from the soil and transfers to the wash solution. |
| Thermal desorption | Requires soils to be excavated and then heated to temperatures of around 600°C. At this temperature the contaminants are removed from the soils by evaporation. Condensation, scrubbing, filtration or destruction at higher temperatures then deals with the waste gases produced. This process primarily treats organic compounds. The soils may be re-used depending upon the temperature used and concentration of contaminant. |
| Thermal processes | Use heat to remove or destroy contaminants. This process will therefore usually be carried out ex-situ. Thermal desorption usually treats organic contamination although can also treat mercury contaminated soils. Heat and steam injection is included within this category. |

7) Glossary: Definitions of Clients

Developers

Companies that purchase land with the intention of redeveloping the site for residential, industrial or business purposes. Developers employ consultancies to determine if remediation needs to take place and contractors to complete the remediation if appropriate. There will usually be a change in land use as developers are using pre-used sites and redeveloping them into something more useful.

Government bodies

All developments ultimately controlled by the government, and where appropriate local government spending upon assessment and remediation of property owned by them. Examples of these developments include new hospitals, schools and transport being built upon contaminated land. The government will award the construction of the site to a building contractor that will undertake the work of building on the site and employing a consultancy and remediation contractor to complete the assessment and treatment of the site. This client also includes local authorities dealing with particularly contaminated sites, and regional development agencies (RDA) redeveloping a site.

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7) Glossary (cont): Definitions of Clients

Industry

Companies who own a site and need to clean the site. For this reason they will employ consultancies to determine whether the suspected contaminated site needs treatment, and employ contractors to complete the work if appropriate. Companies include fuels, manufacturing and any company who may have operated bad practice in the past, where accidents have happened or where underground leaks of harmful substances may have gone undetected. Usually there is no change in land use for this clients land. If industry were selling the land for redevelopment, it would usually be developers who purchase and develop the land.

Other

Insurance companies and domestic clients. Insurance companies can be clients to assessment and remediation companies if a policy was taken out to protect a client from future contamination problems. The insurance company then employs consultancy firms to analyse the scope for claim and then a remediation contractor if the insurance company is responsible for this process. Domestic clients include households that have experienced small-scale problems with domestic heating systems; usually being oil leaks left undetected.

2.4 Abbreviations

| 8) Glossary: Abbreviations used in the report | |
|---|--|
| BCC | British Chambers of Commerce |
| BS EN ISO | British Standard, European Norm, International Standard Organisation |
| Cont | Continue |
| DEFRA | Department for Environment, Food and Rural Affairs |
| DTI | Department for Trade and Industry |
| EA | Environment Agency |
| EU | European Union |
| Fax | Facsimile number |
| GDP | Gross Domestic Product |
| MCERTS | Monitoring Certification Scheme |
| MNA | Monitored Natural Attenuation |
| MS | Market Share |
| neg | Negligible |
| NLUD | National Land Use Database |
| M³ | Cubic metres |
| ONS | Office of National Statistics |
| PFI | Public Finance Initiative |
| RDA | Regional Development Agency |
| RMI | Repair, Maintenance and Improvement |

8) Glossary (cont) : Abbreviations used in the report

| | |
|-------------|--------------------------------------|
| Tel | Telephone number |
| UK | United Kingdom |
| UKAS | United Kingdom Accreditation Service |
| USA | United States of America |
| VAT | Value Added Tax |
| WAC | Waste Acceptance Criteria |
| £ | Pound Sterling |
| € | Euro |
| \$ | US Dollars |
| Δ | Percentage Change |

SAMPLE REPORT

3. PESTEL Analysis

3.1 Political

- The government has **plans** for the amount of **housing** that needs to be built in the coming years to accommodate the increasing population and demand for housing. Currently the government aims that 60% of new residential properties be built on brown-field land. This is a significant driver for the assessment and remediation market as most brown-field sites contain some contamination. The **government's target** is already being met and exceeded, significantly stimulating the market. Indeed trade sources commonly state the market for residential developments is the main driver behind the market for contaminated land assessment and remediation.

- **Planning regulations** and obtaining planning permission had a significant impact upon the market for contaminated land assessment. Indeed more assessments taking place inevitably results in more treatments taking place. Trade sources report that many planning authorities are requiring the phase one desk study to take place for the redevelopment of Brownfield sites. This aims to identify the previous land use of the site, and therefore if any further investigation may be needed.

- Sites that have **suspected contamination** require assessment to

analyse the risk and if remediation work needs to take place. This is becoming the normal way of working, as sites suspected of contamination will not obtain planning permission without appropriate risk reduction taking place. The increased assessment work taking place in most cases increases the amount of work for remediation companies, as more sites are identified as contaminated.

- The Government was fully behind the **2012 Olympic bid**, and this support was a significant factor in putting forward the bid. Trade sources state that the Olympics will have a significant impact upon the demand for assessment and remediation work during the forecast period, as the 500-acre Olympic park being built in East London will include brown-field sites. Furthermore the Olympics will increase the transport and leisure facilities in the area, increasing the demand for housing. The increased demand for housing will put pressure upon brown-field site redevelopment, again stimulating both the assessment and remediation market. Furthermore the Olympic organisers are aiming to avoid excavating and disposing of contaminated soils, meaning that there is scope for environmentally friendly techniques to be used.

- **Regional Development Agencies**

(RDA) have a significant impact upon the market for contaminated land assessment and remediation as they primarily redevelop brown-field sites. Indeed, RDA's prefer the use of sustainable and environmentally friendly methods of remediation. Therefore the use of excavation and disposal is infrequently used by RDAs. As a result, the use of remedial techniques by RDAs has been a significant factor in the increasing use and awareness of remedial techniques.

- **Tax Rates**

Tax rates affect the contaminated land assessment and remediation market mostly quite indirectly. Fuel taxes affect the transportation of soils, and other taxes may have some impact upon companies. The important tax for contaminated land companies is the landfill tax. This directly affects the decision to dispose of soils in hazardous landfills. Increasing landfill tax is making this practice increasingly expensive.

3.2 Economic

3.2.1 UK Economic Indicators

| 1) Table: UK Economic Indicators, 2004-2006 | | | |
|--|------|------|-------|
| Description | 2004 | 2005 | 2006* |
| Annual Average: | | | |
| - GDP | | | |
| - Household Consumption | | | |
| - Average Earnings | | | |
| - Business Investment | | | |
| - Exports | | | |
| - Imports | | | |
| - Manufacturing Output | | | |
| - Services Output | | | |
| - Construction Output | | | |
| - RPIX | | | |
| - CPI Inflation | | | |
| - ILO Unemployment Rate, % average | | | |
| Units : % change, % rate | | | |
| Notes : (a) = forecast | | | |
| Source : MSI analysis of BCC, ONC and Bank of England data | | | |

- Overall the UK economy has benefited the market for contaminated land assessment and remediation. Indeed growth throughout much of the economy has stimulated investment by government, companies and private individuals. Further, growth in the UK economy has also attracted many workers from abroad into the UK. This has stimulated demand for housing, which in turn stimulates demand for redevelopment of brown-field land for housing.

- Cost of fuel**

The cost of fuel impacts the market for contaminated land remediation treatments. Indeed oil prices affect the costs of transporting soil from one

location to another. This applies specifically to excavation and disposal techniques especially now that there are fewer hazardous landfill sites available. This also applies to regional treatment centres as soils may need to be transported to a regional treatment centre to be treated. However the price of fuel should not affect the regional treatment segment significantly now that assessment methods have become more accurate, meaning that less soil needs to be transported.

- The cost of fuel also affects some treatments directly. Some in-situ processes require large amounts of electricity and thermal treatments require a large amount of heat.

Trade sources report that the cost of fuel has meant that some projects have not used treatments that require large amounts of fuel.

● **Interest Rates**

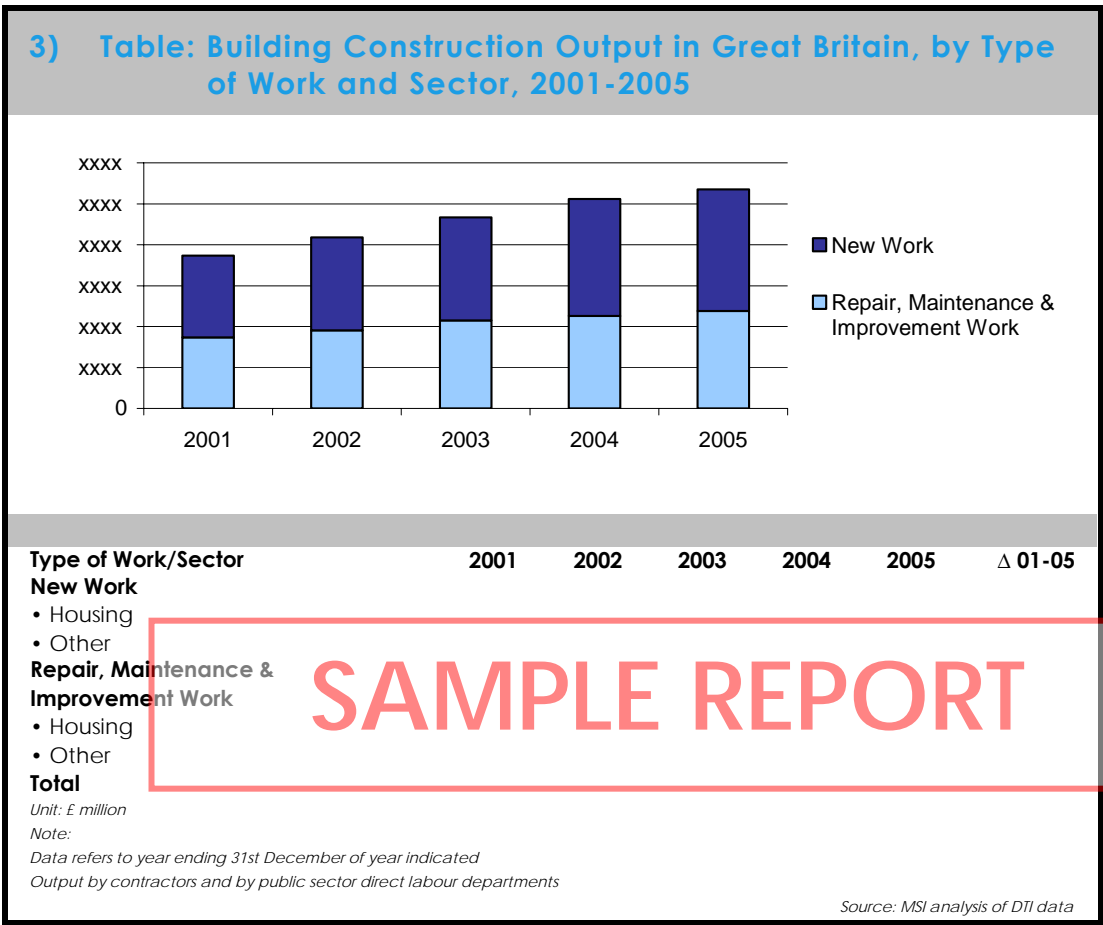
Low interest rates have meant that borrowing has been very high. However this has resulted in high consumer debt. This is not sustainable and has contributed to decreased consumer spending, with many high

street retailers reporting disappointing sales. Overall this has restrained the market for building developments, as overall growth forecasts from many sectors have not been particularly positive. As new building work is very important to the contaminated land market, decreasing consumer spending will not stimulate new developments for commercial and industrial premises.

| 2) Table: UK Interest Rates, 2003-2006 | | | | | | | | | | | | |
|---|---------------|-----|-----|-----|-----|------|------|-----|-----|-----|-----|-----|
| | Jan | Feb | Mar | Apr | May | June | July | Aug | Sep | Oct | Nov | Dec |
| 2003 | SAMPLE REPORT | | | | | | | | | | | |
| 2004 | | | | | | | | | | | | |
| 2005 | | | | | | | | | | | | |
| 2006 | | | | | | | | | | | | |
| Unit: % base rate | | | | | | | | | | | | |
| Source : MSI analysis of Bank of England data | | | | | | | | | | | | |

3.2.2 Housing and non-residential building construction output

3.2.2.1 Total Building Construction Output, by Type of Work and Sector, 2001-2005



• The value of new build construction output increased by 4% in 2005. Indeed high demand for housing and high demand for commercial and industrial properties meant that the new work sector experienced continued growth throughout the review period. Statistics for the first two quarters of 2006 suggest that new construction output will grow by 4% or more in 2006. The growth of the market can

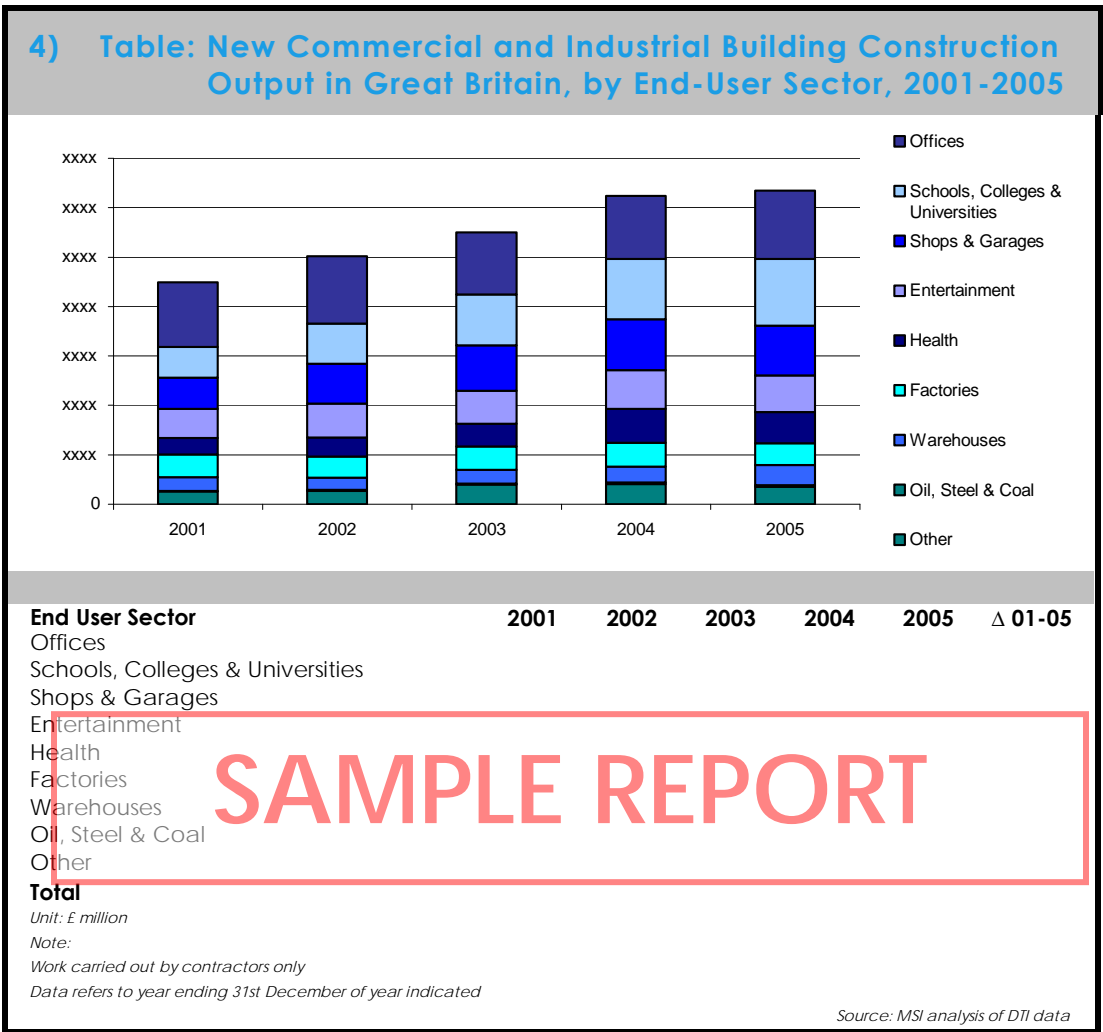
be attributed to the rising costs and expenditure on building in the UK, rather than a significant increase in the number of dwellings being built.

• High house prices and a shortage of available housing have meant that the value of housing RMI output has experienced 36% growth from 2001 to 2005. In 2005 the RMI market grew by 3%, the lowest rate of growth recorded during the review period.

Data for the first two quarters of 2006 suggest that there will not be any growth in the RMI sector during the

year. This is likely to be a result of the reduction in consumer confidence and increased consumer debt.

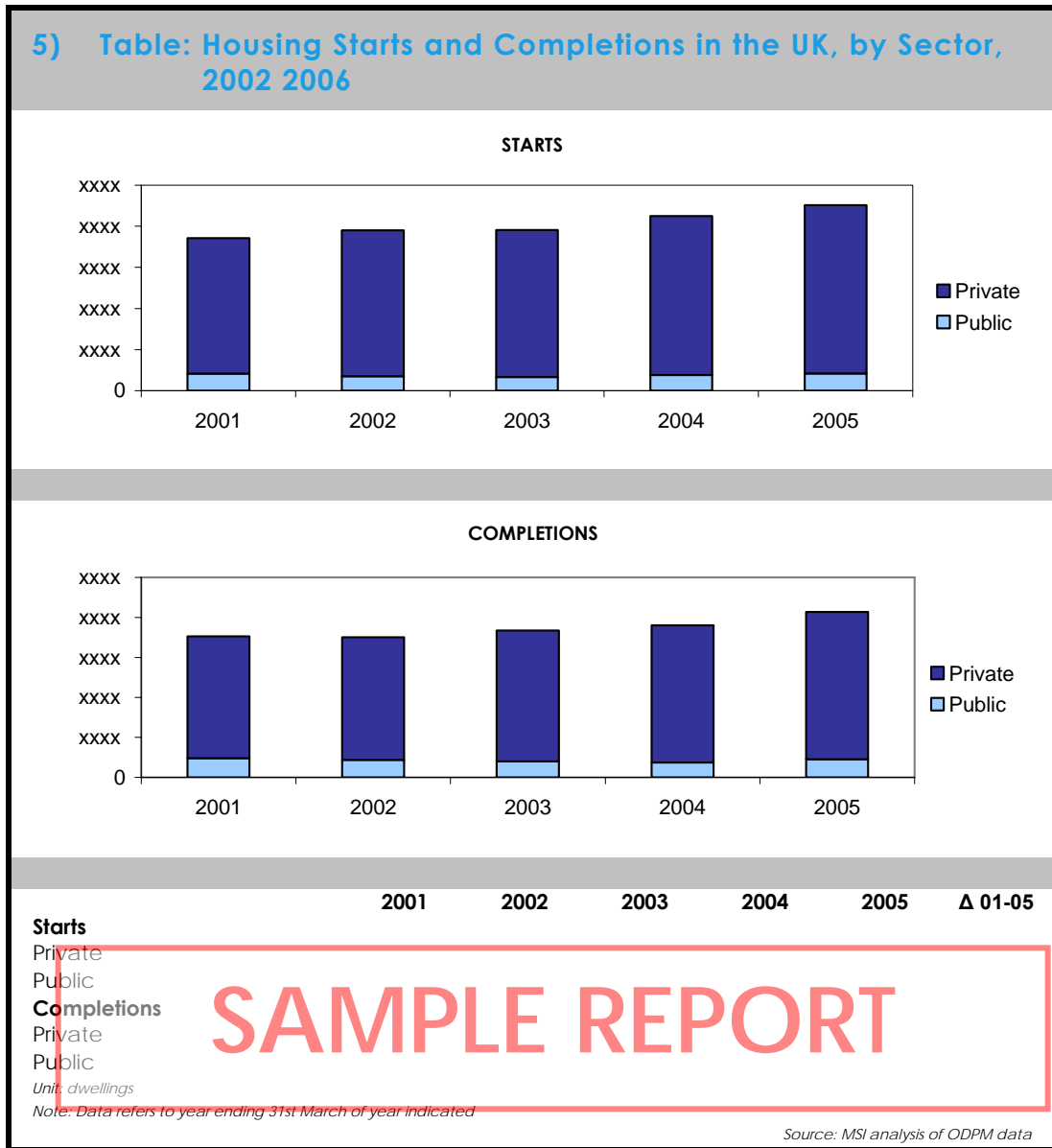
3.2.2.2 New Commercial and Industrial Building Construction Output in Great Britain, by End-User Sector, 2001-2005



• The overall value of commercial and industrial building construction output increased by 41% between 2001 and 2005. However, the rate of growth has slowed, with growth of just 2% being recorded in 2005. Despite the overall growth in the market, rates of growth in different segments has varied significantly, ranging from very strong growth in some sectors to only marginal growth or decline in other sectors. The two largest segments of offices and schools, colleges and universities both

experienced growth in 2005. Warehouse construction grew by 26% during 2005; oil, steel and coal also experienced strong growth in 2005. However construction output in the other non-housing sectors decreased in 2005. Higher energy and raw material costs are partially to blame for the decreases in some of the sectors. In 2006 public sector investment is expected to increase, and this is likely to continue the growth in construction output in schools, colleges and universities and also to benefit the health sector.

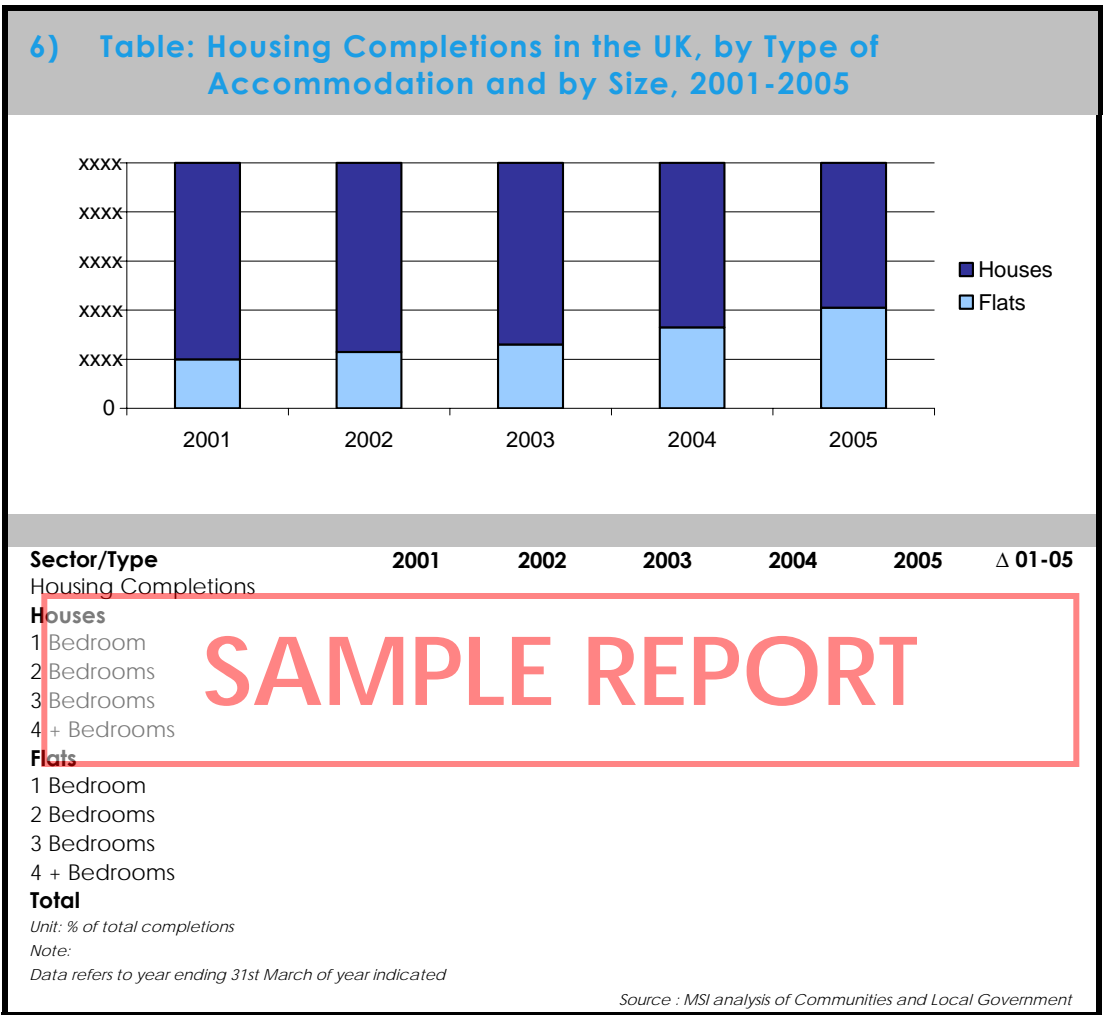
3.2.2.3 Housing Starts and Completions in the UK, by Sector, 2002-2006



● Housing starts and completions in all sectors experienced growth in 2005. Increases in housing prices and the lack of affordable housing has pushed the government to encourage building a number of social houses and key worker

accommodation in regions affected by high levels of prices. This has stimulated public sector starts and completions. High demand for housing also stimulated growth in private sector housing completions.

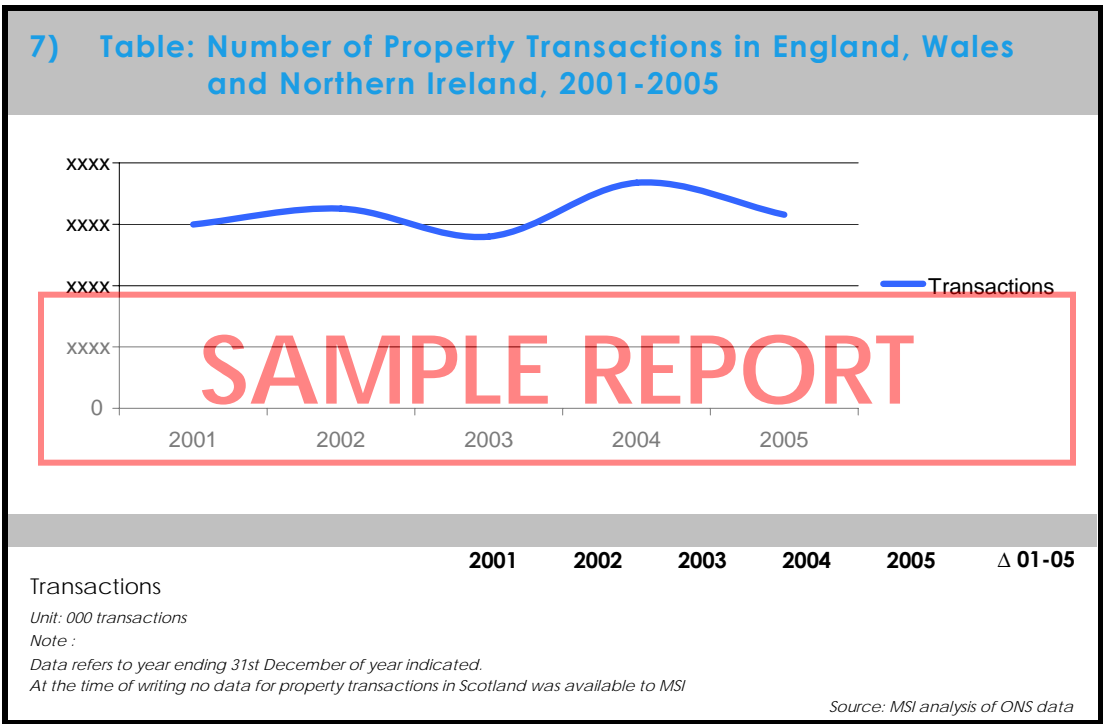
3.2.2.4 Housing Completions in the UK, by Type of Accommodation and by Size, 2001-2005



● The total number of housing completions increased by 17% between 2001 and 2005. Although houses remained the largest sector, the proportional importance of flats increased strongly between 2001 and 2005. The shortage of both housing and land has stimulated the building of flats, as flats offer the benefit of providing higher density of units. This is particularly important in urban areas where space is limited and land prices are high. The increase in the

construction of flats is also a reflection of the changes in demographic trends in the UK. Later marriage, smaller families, increased separation and divorce rates, greater life expectancy and people remaining single for longer stimulates the demand for flats rather than housing. Also high house prices have meant that flats are chosen as a cheaper alternative, particularly for first time buyers.

3.2.2.5 Number of Property Transactions in England, Wales and Northern Ireland, 2001-2005



● The number of property transactions depends upon a number of factors. Interest rates, housing prices, employment levels and consumer confidence all affect the

number of transactions. The number of transactions is likely to increase beyond 2005 as a result of an increase in the number of households in the UK.

3.3 Social

- **Social responsibility** has not had the effect of reducing the developer's use of excavation and disposal as much as expected during the review period. The landfill directive and associated regulations has made it more difficult for developers to excavate and dispose into hazardous landfills, yet this still occurs. Landfill is easy and straightforward, furthermore it allows developers to work on the site quickly.

- **Consultancies** operating in the contaminated land sector are becoming more **socially responsible**. Consultancies acknowledge that excavation and disposal is not a sustainable option. Indeed consultancies are offering clients multiple remediation options, reflecting the changing way in which society views waste. There is now much greater awareness of recycling and sustainability. This also applies to treating contaminated sites. However there are also business considerations such as the perceived questionability about the reliability of treatments and the time they can take.

- Being **environmentally responsible** is affecting the way that companies behave. Industry now acts in a much more environmentally friendly way than in the past. This includes the way that they work and the cleaning up of contaminated sites. Environmental responsibility has resulted in many

industries, particularly oil and gas companies, assessing the contamination and risks and cleaning up the sites. However the treatment of contamination tends to happen when the site is at the end of its operational life or there is significant risk.

- Increased concerns over **liability** means that the risk of contamination spreading to adjacent sites is now commonly considered. Assessment needs to consider if contamination may have spread to adjacent sites, and if action needs to take place to rectify contamination. Furthermore this is another reason why waste acceptance criteria are used in hazardous landfill, as the environmental impact of the land around the landfill is very important.

- **Media pressure** can have an effect upon the treatment of contaminated land. Usually media will not pick up on contaminated land treatment work taking place. However where there is derelict land that puts human health or the environment at risk, the media will be much more interested, particularly when owned by a large company. This and the notion of social responsibility helps drive the treatment of sites.

3.4 Technological

- During the review period there has been no significant new treatments that have impacted the market. However there has been significant improvement in **treatment effectiveness** and **acceptance**. Indeed, in the past, the UK market has suffered from some clients not trusting the effectiveness of the treatments. However the improvements in the application of treatments, has meant that slowly clients are beginning to accept treatments as effective. For example, introducing agents to bioremediation techniques to increase oxygen levels has stimulated the market for this product. It is expected that the forecast period will see the further development of treatments, making them more efficient and effective.

- **Consultancies** have also improved their **effectiveness**, and they are now more knowledgeable about treatment applications. Furthermore they are able to offer more options with greater cost benefit analysis to allow for better decisions to be made. The improvement in consultancy is due to the development of computer packages, to make analysis quicker and in greater depth, meaning they can offer a better service at the same cost.

- **Treatment centres** are expected to have a significant impact upon the market during the forecast period. At the time of writing there is only one treatment centre in the UK, with a further site soon to open. Many clients want to get contaminated soils off site quickly to enable

construction to go ahead. This means that when the technology of treatment centres is more wide spread this option would be very desirable.

- The use of **computer programme** to help analyse risk assessment in terms of cost benefit analysis has increased during the review period. Some companies have been using industry wide available programmes whereas some leading companies have developed their own systems. By improving the service offered to clients the market has benefited overall, and companies use this to their own advantage.

- There has been a high level of investment in **new treatment's** including the development of existing techniques and the introduction of new techniques, particularly since the 2004 Landfill Directive. Indeed there are many university waste management research centres developing new methods of treatment. There are also many contractors developing new treatments. This investment in research has not brought any fundamentally new treatments to the market during the review period that has made a significant impact. It is likely that new treatments during the forecast period will operate in niche markets. However, the expansion of what techniques can treat which contaminants has slowly increased. Indeed there are many institutions looking to improve and develop existing techniques. By doing this, consultants can offer clients a greater number of effective options.

3.5 Environmental

- The **2004 Landfill Directive** has been the most important tool in improving environmental standards. Not only has the directive reduced the number of hazardous landfill sites, but it has also increased the amount of investment in, and use of, environmentally friendly remediation techniques. This is key to driving up standards in the sustainable treatment of contaminated sites. Trade sources explain how landfill is not sustainable, showing how the directive was essential.

- Now that there are significantly fewer hazardous landfill sites, with none in Wales or the Thames region, disposing of soils to landfill has become a more polluting activity. This is due to the significantly **increased distances** that soils have to be transported. As this is mainly done by road, the pollution from using fossil fuels in large vehicles is not desirable. The Landfill Directive did not aim to increase pollution by making soils travel further to landfill, however the sustained popularity of landfill has meant this has happened.

- **WAC testing** has also meant that the disposal of waste into hazardous landfill is more regulated. The environment has benefited from the WAC, because wastes that pose the most threat to the environment have been banned from landfill. Waste soils that are land filled must meet criteria to ensure that the leaching content is low enough so that it does not threaten the surroundings. WAC testing has made it more difficult to landfill, and therefore this has

stimulated the use of remediation treatments.

- Some treatments have not seen expected growth during the review period due to environmental reasons; even though they avoid landfill the **environmental outcomes** are not desirable. All types of thermal treatments and in-situ electrolysis require fuel to operate. This creates pollution by burning the fuels. Furthermore, particularly with incineration, the contamination is let off into the atmosphere, which again is an undesirable outcome.

- Flooding is a significant environmental issue that affects the contaminated land market. This is relevant when **ground or surface water** may become contaminated. The problem is when ground water level rises this can increase the risk of contamination entering the water table. Therefore assessment must be made with the consideration that the ground water level may change. The risk of flooding has stimulated the assessment and treatment market for contaminated land. Indeed it is an additional risk that needs to be assessed and action may need to be taken.

- The UK has experienced increases in the **average temperature**, with warmer and drier summers. This helps biological types of remediation, as the warmer temperature is required for the treatment to work at its optimum. This is likely to continue to stimulate the market for biological

treatments, particularly during the summer months.

- **Soil treatment centres** are expected to grow in popularity during the forecast period, with many more opening across the country. Trade sources explain that in some

cases operators are looking to open these near to rail lines, thus reducing the environmental impact of transporting contaminated soils by road. Indeed while few such treatment centres exist, soils will have to be transported long distances.

3.6 Legislative

- The EU **Landfill Directive** from 2004 has significantly affected the UK market for the treatment of contaminated land. It has restricted the amount of hazardous landfills, thus stimulating the market for other remedial treatments. Trade sources report that there are eight hazardous landfills in the UK, located as follows:

- Cheltenham, Gloucestershire
- Crewe, Cheshire
- Huntington, Cambridgeshire
- Skelmersdale, Lancashire
- Swindon, Wiltshire
- Teeside (two sites)
- Winterton, North Lincolnshire

After July 2004 the **landfill price** increased dramatically from an estimated £10-20 per tonne of hazardous waste to over £100 per tonne.

- **Remedial treatments** are more environmentally friendly and more sustainable than using landfill. Indeed the Landfill Directive was designed with the aim of increasing sustainability in waste management.

- Since the 2004 Landfill Directive Government **taxes on landfill** have increased. Indeed the current rate is £xx per tonne, and the cost will increase by £x per tonne per year to £xx per tonne in 2010. Landfill taxes make it more costly for contractors to dispose of contaminated soils in hazardous landfills. Indeed hazardous landfill operators have charged higher prices since the reduction in the number of landfills available. However landfill operators have been

aware of the alternative offered by remedial treatments, resulting in landfill prices staying competitive with remedial treatments. However after the Landfill Directive, remedial treatments have become a much more economically viable option due to the increase in hazardous landfill costs.

- **Waste Acceptance Criteria (WAC)** is concerned with regulating the waste that goes to landfill. As part of the legislation it aims to ban certain types of waste from landfill, and applying acceptance criteria to waste destined for landfill. EU-wide acceptance criteria were adopted in 2002. There have also been amendments to the WAC in 2004 and 2005 that are now in force. Indeed some forms of waste need to be treated to change them into a less leaching state. WAC does not apply to non-hazardous landfill.

- **Mobile plant licenses** allow the mobile plant to have a license rather than the contractor having to obtain a license to complete each treatment. This means that the plant can move sites, completing treatments without having to apply for a license each time. This cuts out large amounts of administrative tasks for both the contractor and regulators. Furthermore many trade sources state that mobile plant licences are not made overly difficult to obtain, as they are designed to increase the use of remedial treatments.

- Many laboratory-testing facilities are obtaining **MCERTS accreditation**. This is a relatively new legislation and there are an increasing number of laboratories obtaining this. Indeed, from 1 March 2005, the Environment Agency will only accept soil analyses from MCERTS accredited laboratories. MCERTS is the Environment Agency's monitoring and certification scheme for chemical testing on contaminated soils for selected determinants. The accreditation system is designed to ensure more common practices are used, resulting in more consistency between laboratories. Trade sources report that the accreditation is not compulsory, but is becoming essential in order to stay competitive within the market.

- **Part IIA** of the Environment Protection Act 1990 includes the definition of contaminated land, how it is to be identified and dealt with. This came into force in April 2000. The legislation also gives local authorities new duties and powers in respect to the inspection, identification, and remediation of land within their area. This also includes the identification of special sites that are sites designated as contaminated land and are monitored and kept on a register. It is the responsibility of the local authority

to identify special sites. Once this has been done the EA becomes the enforcing authority.

- The Pollution Prevention and Control Act (PPC), and the Integrated Pollution Prevention and Control Act (IPPC) both serve to reduce pollution from bad **industrial practices**. Indeed this regulation serves to reduce pollution in operating sites, but also deals with potential pollution from site closures.

- The **Water Directive** will come into force towards the end of the forecast period. This relates to the quality of water, therefore where groundwater is an issue this directive will have an impact upon assessment and the remediation technique chosen in the future.

- The **REACH directive** (Registration, Evaluation and Authorisation of Chemicals) will come into force in 2007. This will restrict the availability of many hazardous chemicals. This will not directly affect the contaminated land market, but will reduce the amount of contamination taking place.

4. Factors Affecting the Market

| 1) Analysis: Factors Affecting the Market for Contaminated Land Assessment and Remediation, 2002-2006 | |
|---|---|
| Drivers | Restraints |
| <ul style="list-style-type: none">• Residential development• Government and EU policy• Regional Development Agencies• Environmental responsibility• Risk and liability• Planning regulations• Treatment development• Land value• UK economy• Olympic Games | <ul style="list-style-type: none">• Time• Costs and land value• Risk• Local councils• Government policy impact on small sites |

SAMPLE REPORT

Source: Trade and MSI analysis

4.1 Drivers

• Residential development

Residential development has had a significant impact upon the contaminated land market. It is estimated that 74% of new housing was built on brown-field land in 2005, beating the government's target of 60%. Many Brownfield sites contain contamination; this must be completely removed for the purpose of residential developments. The strong demand for housing has meant that unused inner city industrial sites have been redeveloped. This has driven demand for remediation work during the review period. The shortage of green field sites alongside the availability and government preference for building on Brownfield sites has stimulated the contaminated land assessment and remediation market.

The demand for housing has also been driven by the growth of the UK population.

• Government and EU policy

Government and EU policy has worked to persuade industry to use methods of remediation that are more environmentally friendly. This includes the 2004 Landfill Directive and the introduction of landfill taxes. This makes remediation techniques cost competitive with excavation and disposal in landfill sites. This is having the effect of expanding the market for remediation techniques as developers are choosing more environmentally friendly techniques.

- **Regional Development Agencies**

Regional development agencies (RDAs) are involved in large-scale projects and often involve Brownfield sites. Furthermore RDA's prefer to use environmentally friendly techniques rather than excavation and disposal. This has been an important market driver for the assessment and remediation market.

- **Environmental responsibility**

Environmental responsibility has had a major impact on the market for contaminated land treatments. Indeed policy changes have encouraged businesses to act in an environmentally responsible manner. By acting in this way the overall market and the use of specific treatments has increased. Environmental responsibility has stimulated the market for biological treatments, particularly as this is cost effective if time permits.

- **Risk and liability**

Risk and liability has driven the market for contaminated land assessment and remediation as companies are concerned about the long term problems of contamination re-occurring after treatment for redeveloped residential sites or contaminating adjacent sites. Indeed this has driven the market to increase accuracy and stimulated the long term monitoring market.

- **Planning regulations** also stimulates the assessment market. Trade sources state that in some cases a desktop study and site walkover is standard practice in order to gain planning permission. Where contamination is suspected, a full assessment of a site is required. These

requirements have affected the assessment market increasingly throughout the review period.

- **Treatment development**

During the review period, no significant new treatments have been introduced onto the market. However existing treatments have been developed and established as reliable and effective within the UK market. This has allowed clients to invest in remediation work with minimised risk. Further, it is believed that work is on going to develop and improve existing treatments and to launch new treatments.

- **Land value**

Land value is an increasingly important aspect to business owners. The sale of contaminated brown-field sites achieve much lower prices than that of green belt land. It is vital that land being redeveloped is cleared of contamination in order to obtain the optimum price for the development. Buyers of developed land seek to avoid or reduce the risk of liability of clean up costs of contamination identified at a later date and therefore will be willing to spend the required money to do the job properly.

- **UK economy**

The UK economy has been strong during the review period, seeing high levels of employment and low levels of inflation. This has meant that the demand for land for residential and business use has been high. In turn this has resulted in high demand for the redevelopment of Brownfield sites.

- **Olympic Games**

London winning the bid to host the Olympic Games in 2012 has begun to have a positive effect upon the UK market for contaminated land treatments. At the end of the review period the Olympic Games in 2012 has only begun to affect the consultancy and planning side of the

market, as major treatments and development have not begun to start in significant numbers. However, the preparations for the Olympic Games are expected to have a significant impact on the market for contaminated land assessment and treatment during the forecast period.

4.2 Restraints

- **Time**

Environmentally friendly remediation techniques often take longer than traditional techniques such as the excavation and disposal of contaminated soils. This particularly applies to biological treatments that can take years to complete. Other treatments also tend to take longer than excavation and disposal. Developers are the most time conscious clients, and they make up a significant part of the market, resulting in remediation treatments often being overlooked by a significant part of the market in favour quicker excavation and disposal methods.

- **Costs and land values**

The cost of assessment and remediation is an important part in the economic viability upon remediation and development of a site. Developers and Regional Development Agencies both have cost concerns. It will only be desirable to remediate a site if the cost of doing so is beneficial in respect to the land value of the site. Therefore the increasing cost of landfill and the relatively expensive costs of other remediation technologies have resulted in constraining the market, particularly after the July 2004 Landfill Directive.

- **Risk**

Risk is a significant issue with clients of consultancies and contractors, and clients are not willing to experiment with unproven methods. Therefore it can be difficult for companies to introduce new techniques to the

market. Trade sources explain that to get a foothold in the market with a new treatment it is often necessary to work at a loss. The project can then be detailed in a case study. However, to gain acceptance of a treatment's effectiveness can take a long time. This restrains the market, hampering the introduction of new techniques, simply because clients are concerned about the risk it poses to their project.

- **Local councils**

Local authorities can have a constraining effect upon the market. In England they have now identified the contaminated sites within their areas, meaning that only the maintenance of this information is required. Also local authorities have made very few compulsory clean up orders. Furthermore local authorities have the power to turn down planning applications and place remediation conditions on developments. This has the effect of constraining the market for remediation work. Overall the government is pro-Brownfield redevelopment, however the development will not be able to go ahead if there are environmental concerns not being addressed. Furthermore trade sources report that there is an element of regulators asking a lot of questions for remedial technologies, which is time consuming and delays the project. Whereas excavation and disposal can still be allowed to go ahead with less questioning if it is shown it is an effective option. This particularly applies to developers wishing to finish a project quickly.

- **Government policy impact on small sites**

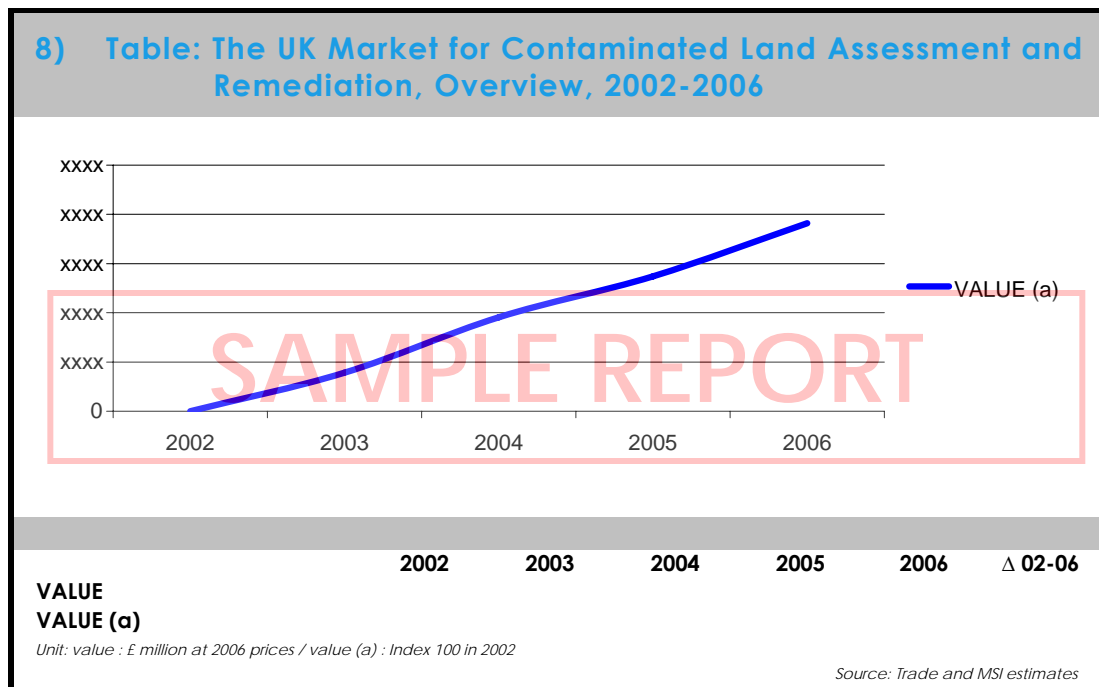
Government policy impact on small sites is aimed to stimulate the market for remedial technologies. However it has had the effect of constraining the overall market. This is due to the significant rise in landfill costs making it uneconomically viable to develop small brown-field sites. Indeed small

sites are often uneconomically viable to remediate onsite, as bringing treatment plant to site is costly. Furthermore treatment centres have not been available to take contaminated soils. Towards the end of the review period this has meant that it has become more difficult to remediate small sites.

5. Market Size

5.1 Market Size and Trends

5.1.1 Overview, 2002-2006



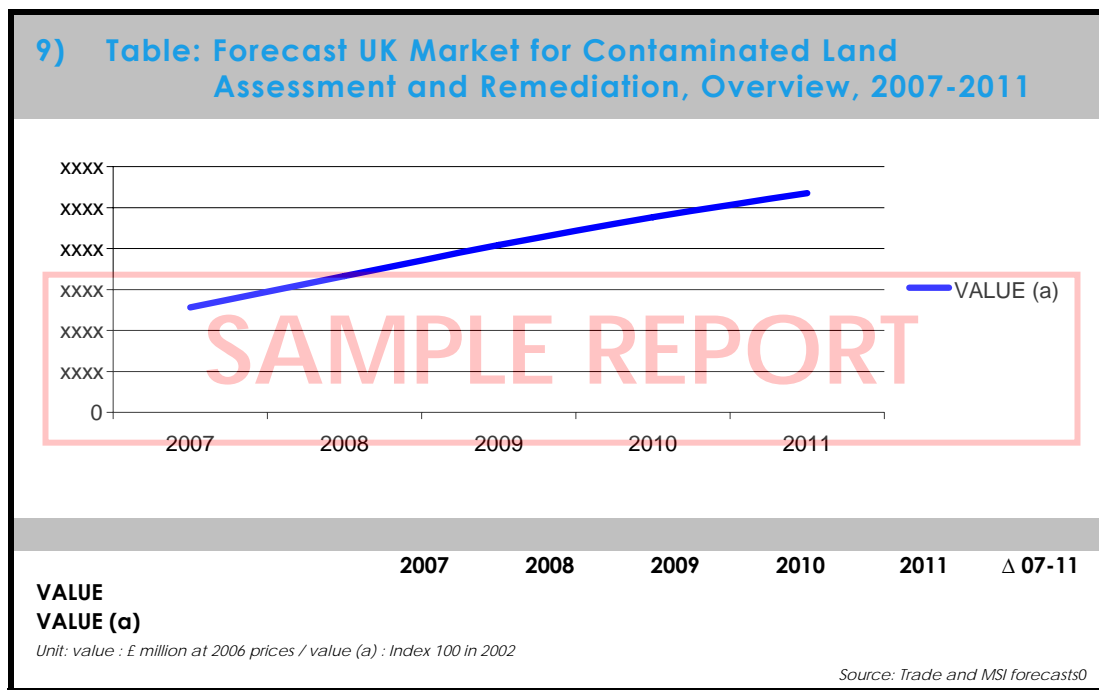
- During the review period the overall market for contaminated land assessment and remediation experienced strong growth, despite a slight decline in 2005. There are a number of factors that contributed to this. Overall there was strong demand for assessment and remediation of sites for the purpose of **redevelopment**. The sites were being used mostly for residential properties, although commercial use was also a common reason for redevelopment during the review period.

- The **2004 Landfill Directive** had a significant impact upon the market growth and the choice of remedial treatments. 2004 saw strong growth as many companies are reported to have rushed through large amounts of excavation and disposal work into landfill before the prices of landfill increased significantly. This caused strong growth in the market in 2004, but had the effect of resulting in a slight decline in the market in 2005. Further, there was uncertainty about changing from proven excavation and disposal techniques to less well

known but more environmentally
friendly remediation technologies

which also contributed to
constraining the market in 2005.

5.1.2 Forecast Overview, 2007-2011



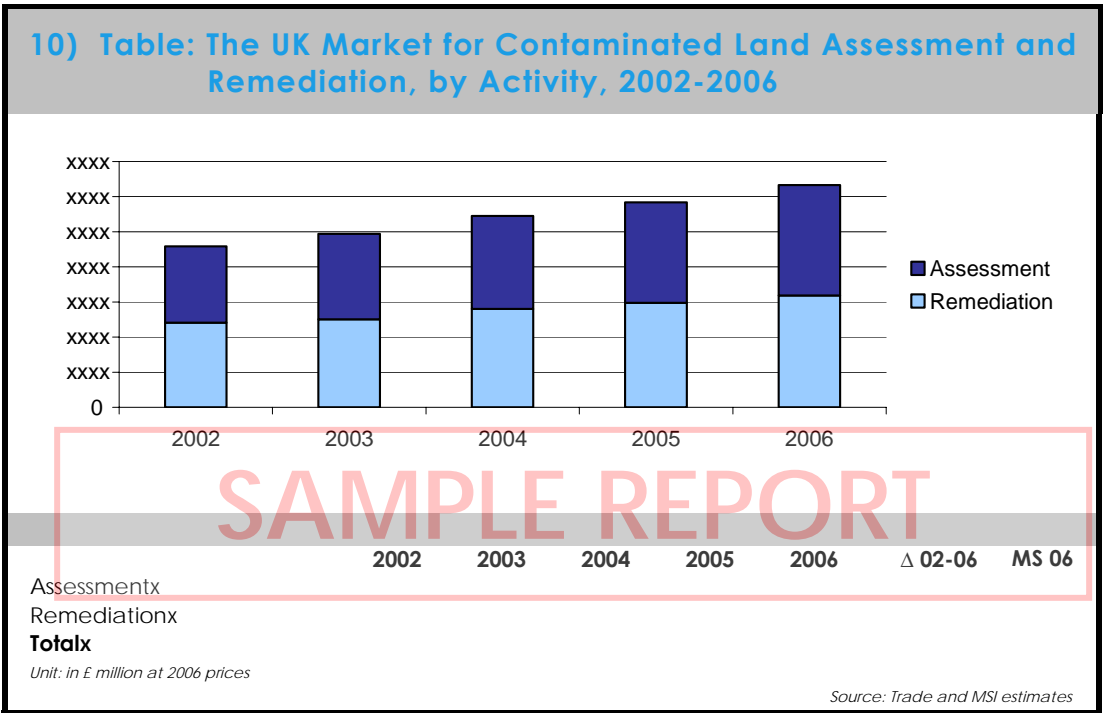
- During the forecast period the overall market for contaminated land assessment and remediation will continue to experience strong growth albeit with a declining rate of growth. There are a number of factors that will contribute to this. The continuing need for **residential development** is expected to continue to stimulate the market for contaminated land assessment and remediation, although other developments such as the Olympics will also have a significant impact.

- The strongest growth during the forecast period is expected for 2008. After this time the growth in the rate of market growth will begin to decrease. The reason for this is that there will be some price decreases, as contractors learn how to remediate more **cost effectively**, competition within the market will

increase and the amount of Brownfield development begins to decrease. These factors will be offset to some extent by the strong demand resulting from developments associated with the Olympic Games.

- Trade sources state that there are many Brownfield sites requiring redevelopment, and often treatment, however the supply will not last forever. **Recent industrial practices** have improved, and this means that fewer sites will become contaminated. Therefore it is believed that the market, particularly for remediation, cannot be sustained in the long term beyond the forecast period.

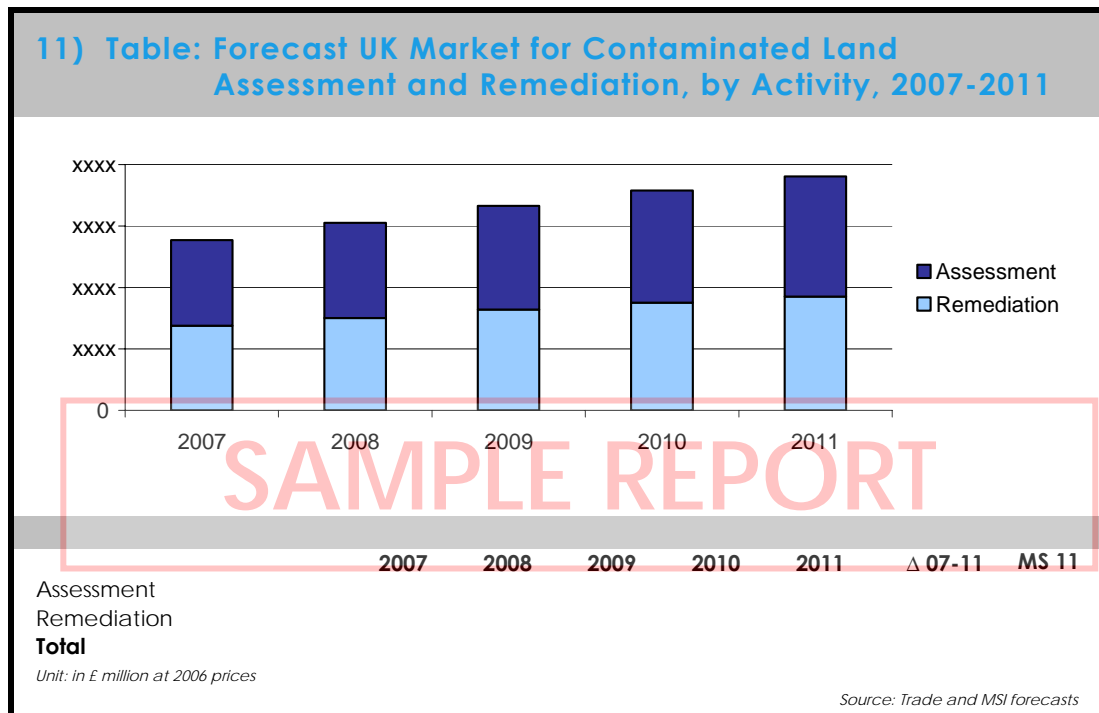
5.1.3 by Activity, 2002-2006



- The contaminated land assessment market has seen strong growth during the review period. Indeed, the assessment market has grown at a stronger rate than the remediation market. Trade sources state that the **investment in assessment** means that money can be saved in the remediation element of the site. With increasingly accurate assessments of sites, it is possible to determine if a site actually need remediation work more precisely, this resulting in fewer sites being treated. More significantly, where a site can be assessed more accurately and in more depth, savings on the remediation of a site can be significant.

- The 2004 Landfill Directive had an impact on the relative growth rates of the contaminated land assessment and remediation markets. Indeed, remediation work involving landfill was brought forward into the first half of 2004, resulting in less remediation work in the second half of 2004 and the first part of 2005. At the same time, less assessment work was carried out in 2004, reflecting the work which had already been brought forward and in anticipation of the higher costs of remediation work later in the year.

5.1.4 Forecast, by Activity, 2007-2011



- The contaminated land **assessment** market is expected to experience strong growth during the forecast period. The assessment market will continue to grow at a **stronger rate** than the remediation market.

- Residential developments** will continue to be the main driver of demand for contaminated land assessment during the forecast period. Further this is important for the assessment market, as residential properties must be assessed in detail to initially check if the site is contaminated, and to check that the site has been effectively treated after remediation. Residential properties are the most important property type to ensure remediation is effective. Indeed this not only affects the health

and safety of the occupants, but also the land value.

- The beginning of the forecast period will be stimulated by the assessment work needed for the **2012 Olympics Games**. The assessment market will experience continued strong growth in the forecast period, however the rate growth will decrease. This decreasing growth in value will be a result of increased competition and declining prices, rather than decreasing amount of assessment work. Indeed it is expected that assessment companies offering better value services will play a greater role in the market during the forecast period.

- The remediation market is expected to continue growing during the forecast period. However

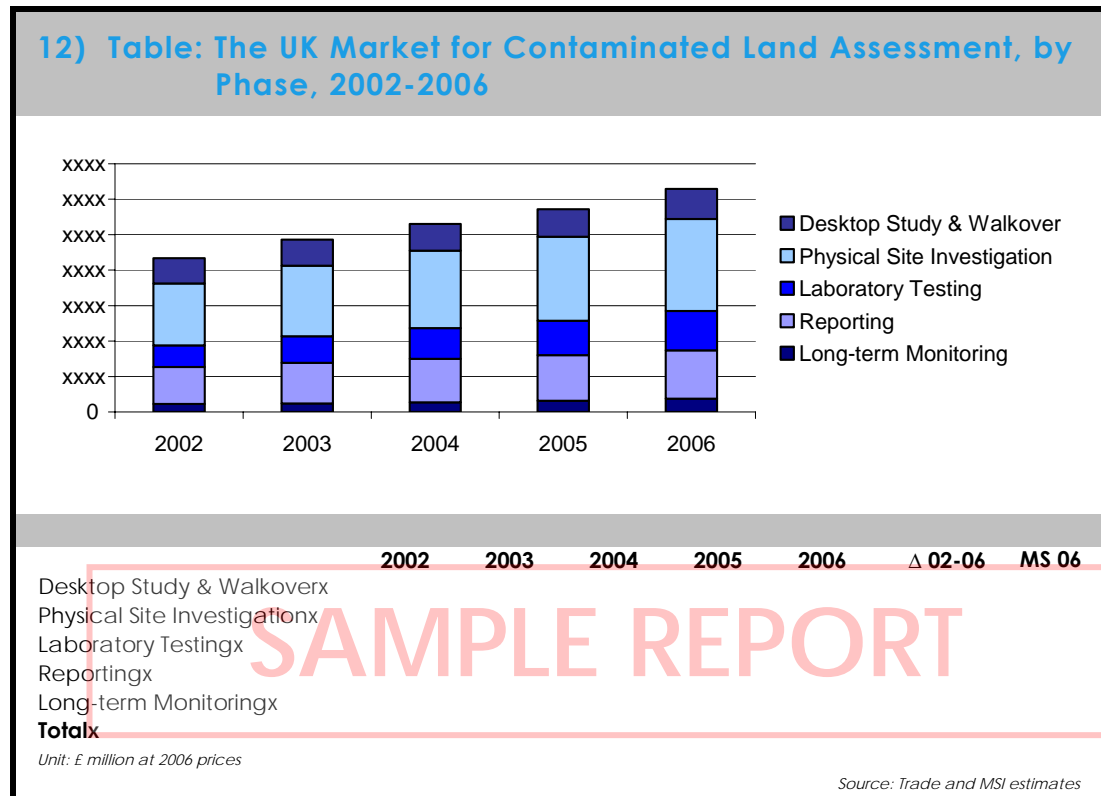
increased accuracy and detail of assessments will restrain the growth of this market. As assessments determine more accurately where the

contamination is located, the **remediation** can be more **targeted** and hence save time and money.

5.2 Market Segmentation

5.2.1 Assessment

5.2.1.1 By Phase, 2002-2006



- The market for the initial desktop and walkover study has not been strong during the review period. This is a very important part of the process but there has not been any significant growth in the value of this phase. Indeed the costs of this phase have not increased. Indeed **competition** within this sector has meant that **prices** have stayed low. This assessment phase saw particularly weak growth in 2004, when there was uncertainty about the future of the remediation market.

- There has been significant growth in the value of the physical site investigation segment, as a result of the **increased amount of investigation** into sites aimed at increasing the accuracy of the investigation. Early in the review period, only a few samples would be taken, but throughout the review period the number of samples being taken has increased. The costs of drilling boreholes and obtaining samples were not reported as increasing, meaning that the market

growth comes from the increased number of samples being taken.

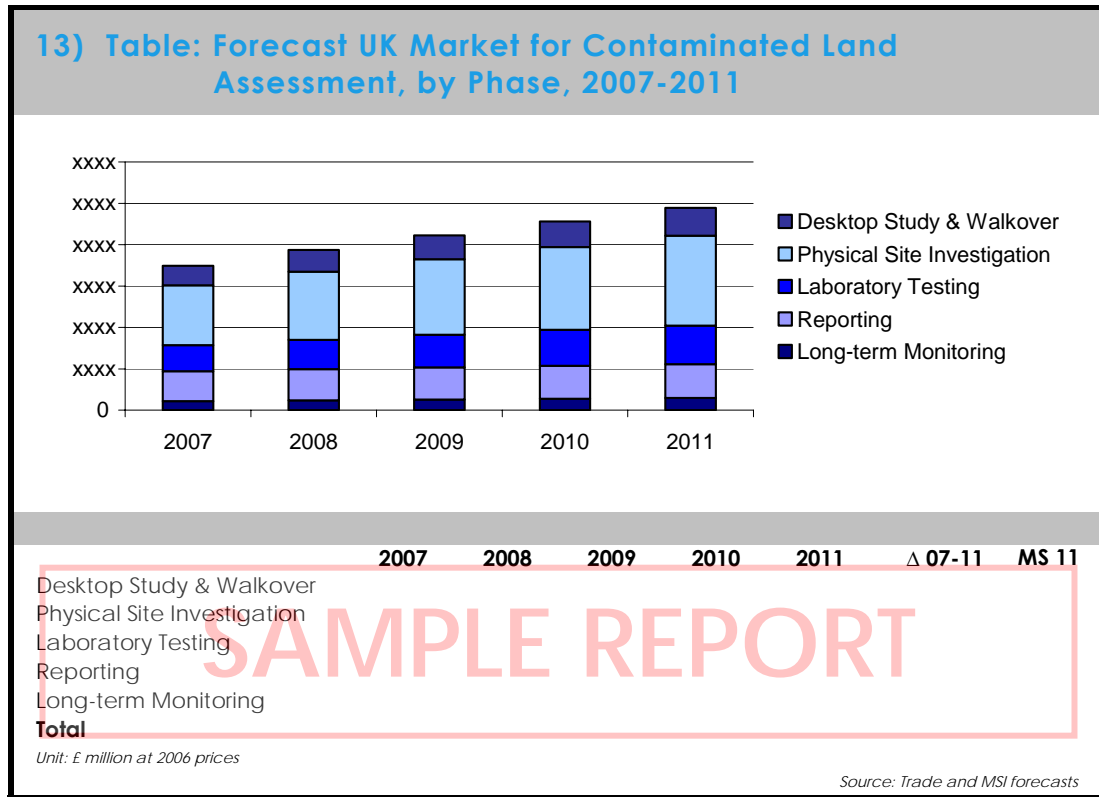
- The lab-testing phase has been stimulated by the increase in the **number of samples** taken for testing. This is to increase accuracy of the analysis of the site. There have not been any price increases for this phase, indeed some trade sources state that prices have decreased. However overall the market has increased as a result of the increased number of samples being tested, and the new services offered by labs. Particularly towards the end of the review period, labs have been able to offer faster testing, more accurate testing and testing for more contaminants, and this has stimulated strong value growth within this phase of the market.

- There has been growth within the reporting sector as reporting techniques have improved. The increased site investigation and samples tested has inevitably led to **increased reporting work**. Further, within the reporting stage, towards the end of the review period, consultancy firms began to offer

improved services. This includes more analysis of options for remediation and detailed cost benefit analysis. The market would have grown considerably more if consultancies charged proportionally higher prices for the new services. However trade sources report that these improved services increased the quality of reporting, rather than increasing the cost significantly. Therefore the increase in value is a result of increased assessment work, and partially due to increased costs.

- The long term monitoring phase has experienced strong growth as a result of an increase in the amount of this activity. Long term monitoring is usually needed where **ground water**, is concerned, however increased concern about **liability** has also led to an increase in the long term monitoring of sites. The strong market growth in 2006 can be attributed to the increase in the use of remediation techniques other than excavate and disposal. As clients were mostly new to these techniques, an increase in the value of long term monitoring work resulted.

5.2.1.2 Forecast, by Phase, 2007-2011



- The growth of the assessment market during the forecast period will be driven by the growth in the market for desktop and walkover study. For every assessment taking place, a **desktop and walkover** study is needed. Trade sources expect that a desktop study will need to be completed more frequently, even for sites where contamination is only possible rather than likely. The desktop study is not expected to become more expensive. The forecast strong growth in **physical site investigations** will be attributed to the growth of the assessment market overall, but also to the increased detail of site investigations expected during the forecast period. Many consultancies believe that investment in the site investigation saves money in the remediation of the site.

Therefore more money will be spent on the physical site investigation segment which will result in faster growth than the overall assessment market. Although the cost per sample obtained for testing has not risen for the physical site investigation, it is more detailed investigation that is taking place that is stimulating the value of the market. Growth in this market is expected to peak in 2008, in part reflecting strong demand from projects associated with preparations for the Olympic Games in 2012.

- More detailed physical site investigations will also stimulate the value of the **laboratory testing phase**. As more samples are being taken during the physical site investigation, there will be more work for the laboratories to complete. As well as

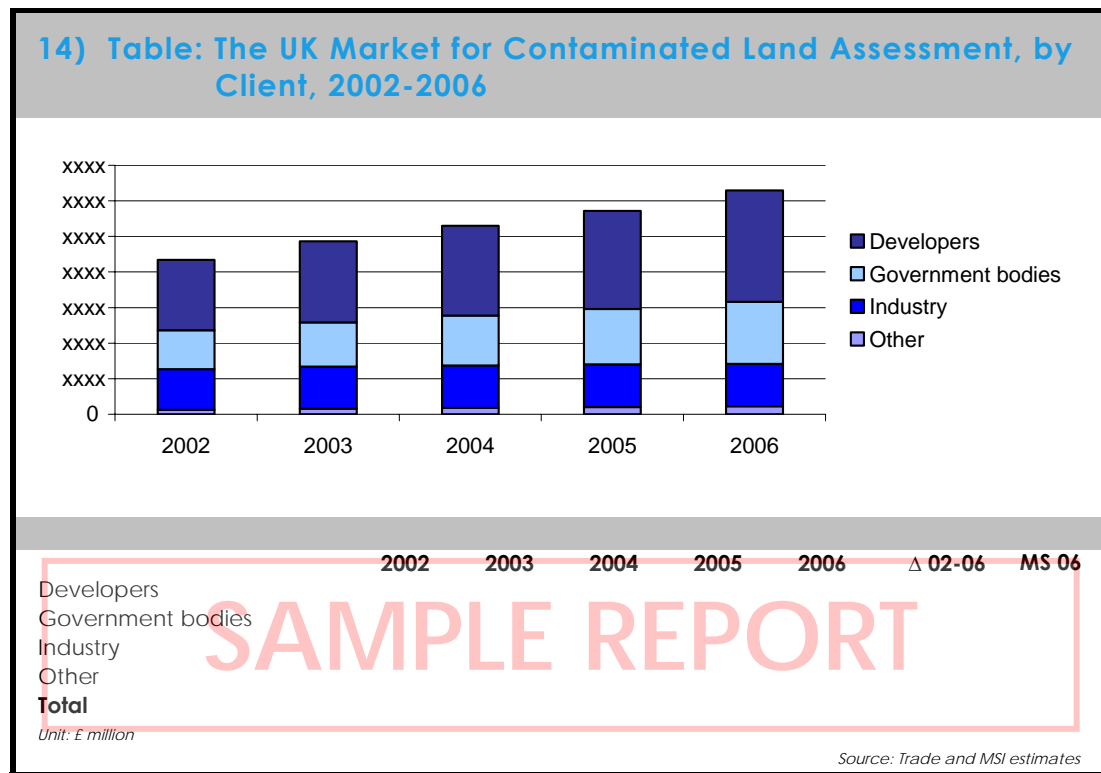
being more work for laboratories to complete, it is also expected that laboratories will improve their services dramatically. There are expected to be improvements in the techniques, such as being able to identify very small concentrations of contaminant in a sample, within a shorter time period. Also the very strong growth for this phase can be attributed to the added costs of onsite testing. This is expected to have a significant impact upon the laboratory phase, as currently on site testing is not a facility commonly offered.

- The **reporting phase** is expected to grow during the forecast period as a result of the growth of the assessment market and the increasing amounts of information to analyse. However the reporting phase is expected to grow more slowly than the assessment market overall. This is a result of the cost of reporting remaining stable and actually decreasing in terms of the service offered for the price charged.

During the review period some consultancies were beginning to improve the service offered and during the forecast period the services offered are expected to improve further and will be offered by more companies. This will include using computer programs to create risk assessment models to provide detailed remediation solutions. Competition will be a key reason driving up the quality of reporting and keeping the costs down within this phase.

- The market for **long term monitoring** is expected to grow strongly during the forecast period. In the early part of the forecast period it is expected that the long term monitoring phase will grow faster than overall assessment market as a result of the increase in the number of clients wishing to monitor a site more closely. The main driver for this segment will be concerns about liability.

5.2.1.3 By Type of Client, 2002-2006



- During the review period the market for contaminated land assessment has been strongly driven by **developers**. This includes developers for both residential, industrial and commercial buildings. Developers usually require a consultancy to assess the condition of the land, as they usually do not have the capabilities to do this themselves. In some circumstances it can be a condition of a planning application that the site is partially or fully assessed before redevelopment work can take place. Trade sources state that the demand for residential accommodation is the main driver behind the demand for assessment from developers.

- In 2003 there was a strong demand for assessment from

developers in order to complete work before the middle of 2004 when the Landfill Directive came into force. In 2004 and 2005 there was a slow down in the rate of growth, reflecting the volume of work that had been brought forward and as the **Landfill Directive** left **uncertainty** with the development of Brownfield sites. However the demand for residential properties and developers looking for sites to redevelop resulted in increased rate of growth in 2006. Indeed the 2004 Landfill Directive significantly affected developers as this client group mainly used excavation and disposal.

- It is notably **RDAs** with in the Government client sector that stimulated the market for assessment during the review period. There was

an element of local councils assessing land as part of their identification of contaminated sites, but this was small in comparison to the work created by RDA's. RDA's typically do not undertake as many projects as a developer might, yet RDA's typically undertake projects that are on a large scale.

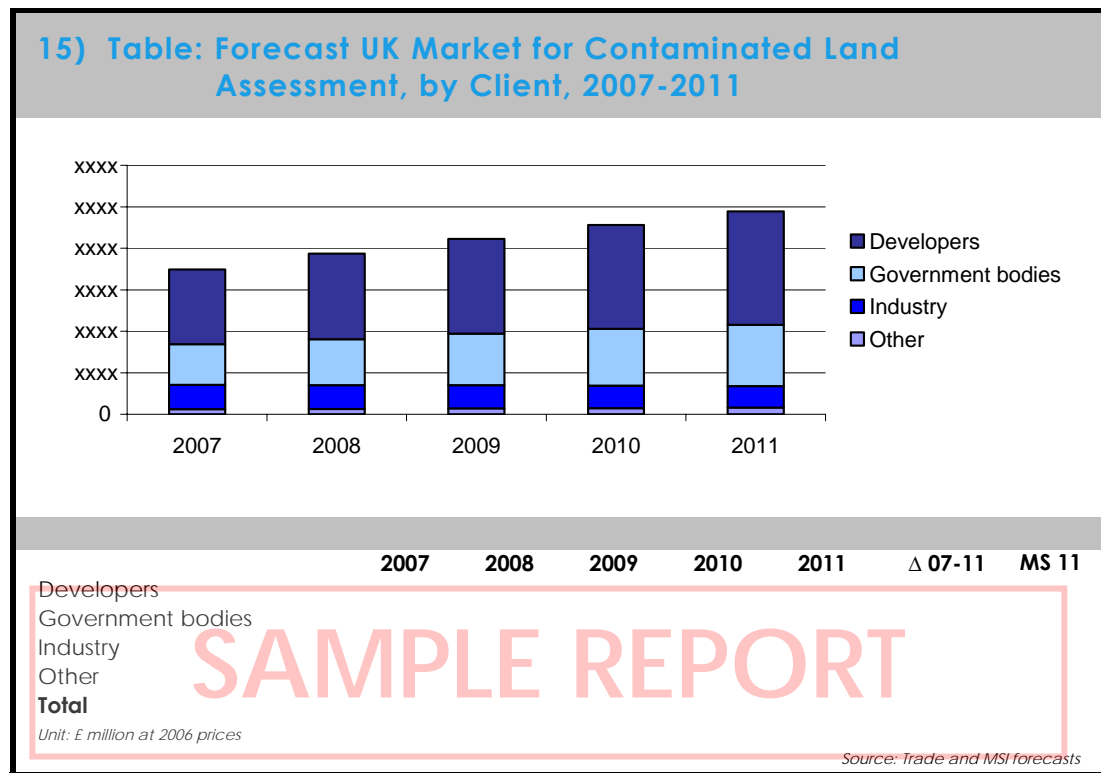
- Demand from RDA's was not affected by the 2004 Landfill Directive as much as developers, as RDA's try to use more **environmentally friendly** techniques and do not choose excavation and disposal as frequently as developers. Furthermore RDA's continue with plans for the redevelopment of sites regardless of the Landfill Directive, whereas other organisations were more concerned about the effect that the directive may have.

- During the review period assessment work for **industry** was not particularly strong. Although this is a significant market, there was not the same growth for this market as there was for developers and government bodies. The size of the market reflects the fact that there is a considerable amount of industry that is cleaning up land resulting from previous bad practices. However industry is the client only if they are cleaning up land that they intend to keep. If the land is going to be redeveloped, then developers would typically be

the clients of the assessment company. Indeed developers are eager for land in any state for redevelopment. The previous land use gives a good indication into the possible contamination level of the site, thus limiting the risk for developers. Furthermore the cost of remediation is insignificant in comparison to the profit potential of redeveloped sites. Also with the improvement of assessment techniques towards the end of the review period, it is reported that some industrial clients are willing to keep contaminated sites where the risk can be analysed precisely and it can be determined that the risk will not affect other sites or pose risk to humans or animals.

- Other bodies such as **insurance companies** and **domestic clients** make up the remainder of the market. This small market, is very important to a small number of companies operating in this sector. Insurance companies are a small part of the market, particularly at the beginning of the review period. Insurance can be used to increase the value of a site by reducing the risk associated with contamination. This was not commonly used at the beginning of the review period and only grew slightly throughout the review period.

5.2.1.4 Forecast, by Type of Client, 2007-2011



- **Developers** are expected to become increasingly important in the assessment market for contaminated land. This will be to meet demand for new housing and commercial and industrial buildings. It is also expected that developers will begin to assess and redevelop land used by industry rather than this being done by industry itself. This is a result of industry being able to risk assess more accurately and therefore not completing as much assessment and treatment work. Developers wanting more Brownfield sites to redevelop will result in developers completing this work rather than industry. Developers will be responsible for the strongest growth in demand for assessment work in 2007 and 2008, partially as a result of the market gaining confidence in remedial

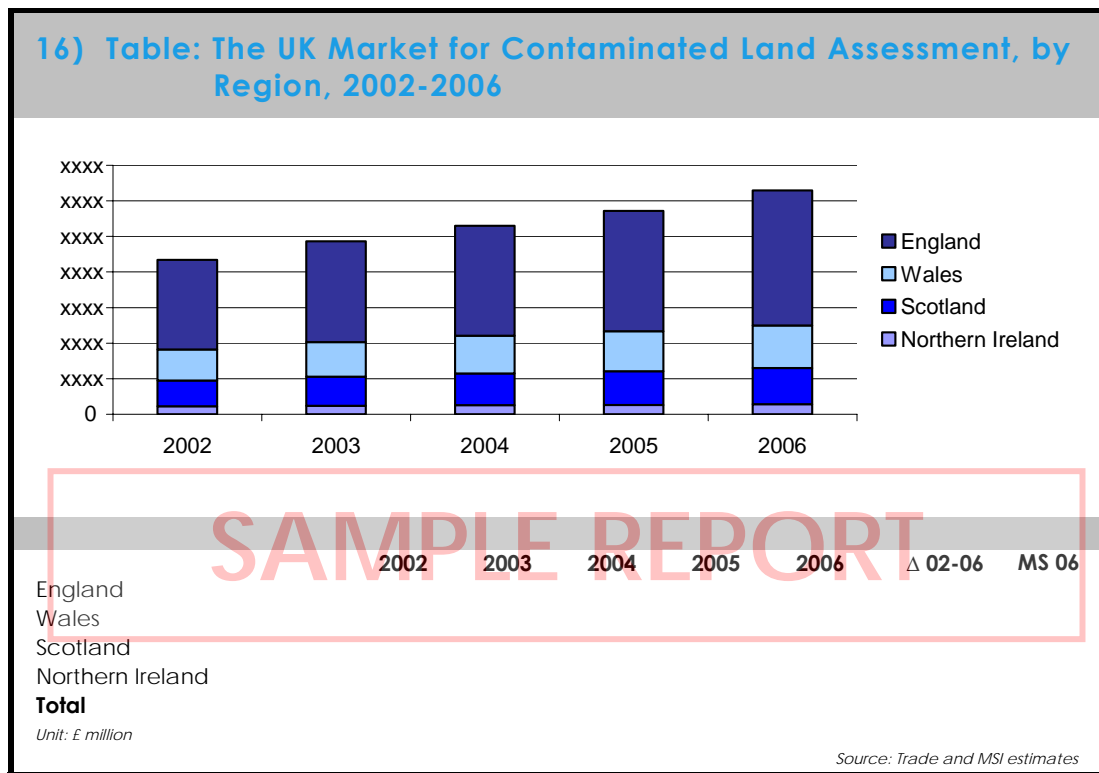
treatments after the introduction of the Landfill Directive and the need for assessment for sites needed for the developments associated with the Olympic Games.

- Government bodies, particularly **RDAs** are expected to generate strong growth within the assessment market as they are expected to continue redevelopments of derelict parts of towns and cities.
- The effect of increased accuracy of assessment and the willingness of industry to carry more calculated risk will make the market for assessment from **industrial clients** decline slowly. The effect will mean that remediation work will not be carried out, which will mean that there are no post remediation assessment costs. This will act to reduce the size of the

market. Developers will also replace industry as a client, as developers have more to gain from redeveloping sites and selling them on. Industry only assesses and remediates a site if it poses unacceptable risk or they need the site for new purposes. Industry is expected to assess sites but not remediate them immediately if the risk is considered to be acceptable. However this will extend the market for industrial customers, as sites will be left untreated for longer and will require assessment again in the future.

- It is expected the client segment of other clients is expected to grow during the forecast period. **Insurance** is likely to become a larger part of the segment. More parties taking out the insurance either to protect their own interests or to add value to the property can explain this. The insurance market will stimulate the assessment market particularly, as the insurance companies will want proof if there is a claim made. Small **domestic** problems are not expected to increase significantly.

5.2.1.5 By Region, 2002-2006



- England is the largest, most densely populated area and has the most Brownfield sites. England has also recorded the strongest growth in demand for contaminated land assessment during the review period compared to the other countries. This is a result of the demand for redevelopment of sites for both housing and commercial buildings being highest in England. After the 2004 Landfill Directive, and as remediation technologies began to become more common, the assessment market grew strongly in England in 2006.

- **Wales** is a much smaller country than England but has a **strong industrial past**. This has particularly driven the market for contaminated land assessment in south Wales. The

market in Wales experienced slow growth in 2005, as the market was uncertain. There are no hazardous landfills in Wales since 2004 and the distance to transport soils is too far to economically excavate and dispose. In 2005 the use of remediation treatments was still an unknown entity to many clients, resulting in slow assessment growth in 2005.

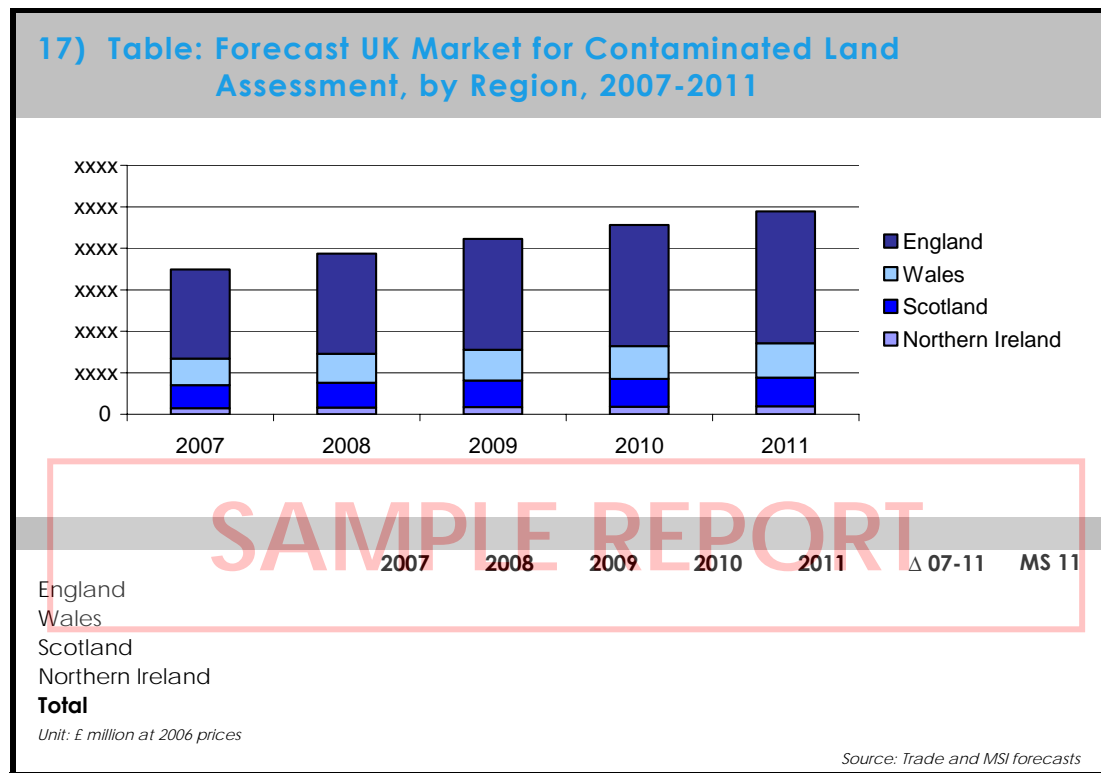
- Trade sources report that **Scotland** is close behind Wales in terms of the size of the assessment market for contaminated land. Scotland is a larger country than Wales, but does not have an industrial past spread throughout the country. This particularly applies to the highlands and tourist areas. The 2004 Landfill Directive resulted in slower market growth. Similar to Wales there was

uncertainty within the market, which slowed down growth.

- The contaminated land assessment market in Northern Ireland is a very small part of the market. The market may be growing during the review period, albeit at a slower rate

than other countries. Northern Ireland has a **shorter industrial past** than the rest of the UK. The 2004 Landfill Directive did slow down growth in the market within this country, as there was uncertainty as to how the market would develop.

5.2.1.6 Forecast, by Region, 2007-2011



- The high **land values** and high demand for **housing in England** will stimulate the assessment market throughout the forecast period. The government's target of building 60% of new housing on Brownfield land will only serve to stimulate the market for assessment. Indeed most Brownfield sites will be assessed, as there is always a possibility of contamination on these sites. It has been suggested that the government's target should be higher, in order to drive urban regeneration, particularly in city centres. Trade sources also expect that the 2012 Olympic Games are going to have a significant impact upon the market for assessment in England. This explains the stronger growth in 2007 and 2008 when most of the assessment work is expected to

take place. The Olympics developments are being built on previously used land, and therefore are likely to require a significant amount of assessment work.

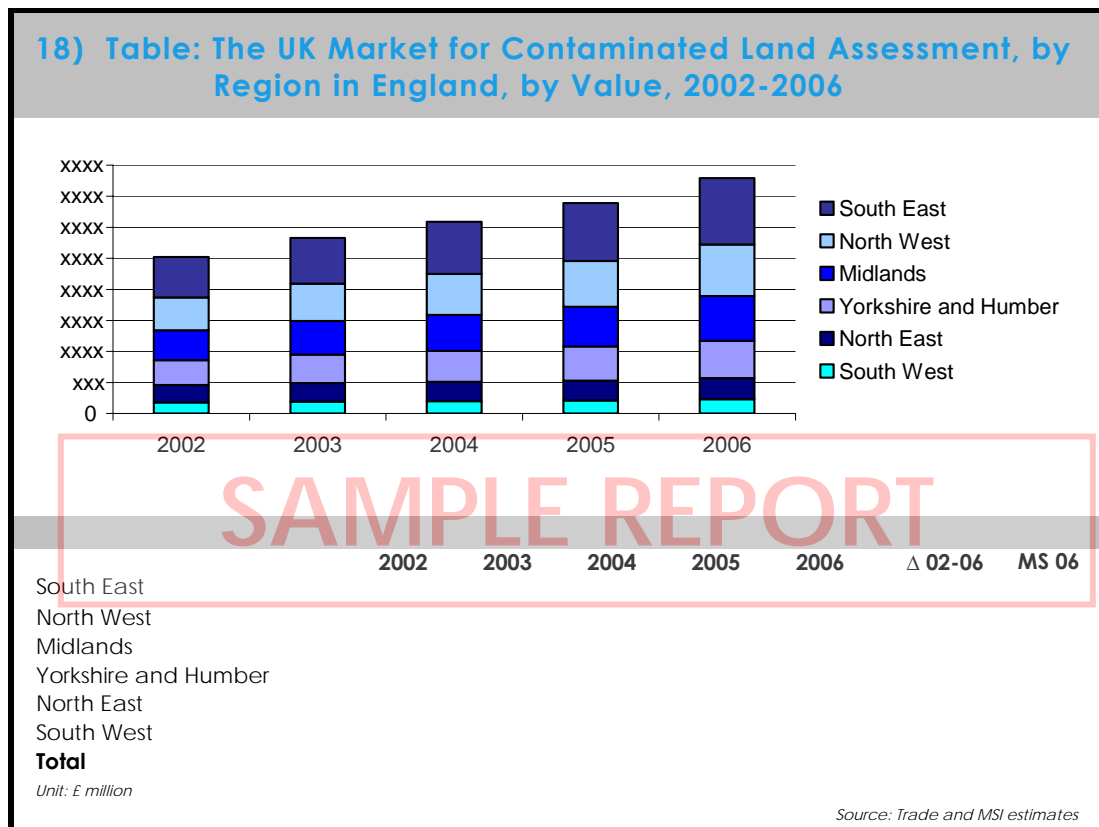
- The assessment market in **Wales** is expected to see strong growth during the forecast period. Wales is expected to continue to assess previously used industrial land for a mixture of residential and commercial developments. The future of the Welsh economy could have a strong future due to the country not introducing university top-up fees. By not doing this, the number of students going to Welsh universities is increasing, and in the long term this will mean more students working in Wales and boosting the economy and demand for housing.

- Scotland is expected to see significant growth in assessment work during the forecast period. Around Glasgow and Edinburgh there is an industrial past that will continue to stimulate the market for assessment. At the beginning of the forecast period growth will be strong as a result of increased confidence in the use of remediation techniques. Towards the end of the forecast period it is expected that the market in **Scotland** will experience slower growth as the legacy of the country's industrial past is beginning to be

cleaned up more than in other countries. Even so, the market for assessment will continue to grow.

- The market for assessment in **Northern Ireland** during the forecast period will remain a small market. There is not a particularly strong industrial past in the country, however there is demand for redeveloping Brownfield sites where they exist, which is stimulating growth within the market.

5.2.1.7 By Region in England, 2002-2006



- The **South East** is the largest region in England in terms of contaminated land assessment and has seen the strongest market growth as a result of high **demand for land** and **housing**. Land prices in the South East are the highest in the country as a result of the demand for housing and land, and this has stimulated the market for assessment in the South East.

While building on Brownfield land costs more, it can be easier to obtain **planning permission** for these sites. High land values in the South East mean that it makes economic sense to redevelop these sites, including spending on assessing the sites. In other areas of England it may not make economic sense if the

redeveloped land cannot be resold at a profitable price after assessment and remediation costs.

- The **North West** is a significant market for land assessment due to **densely populated** areas including Liverpool and Manchester, and the **strong industrial past** that these areas have experienced. The market in the North West has also been stimulated by RDA activity.

- The **Midlands** is a smaller market than the South East and North West, yet is driven by the same forces. The Midlands does not have as strong an **industrial past** as the North West, or quite a high demand for **housing** and high land value as the South East. Yet

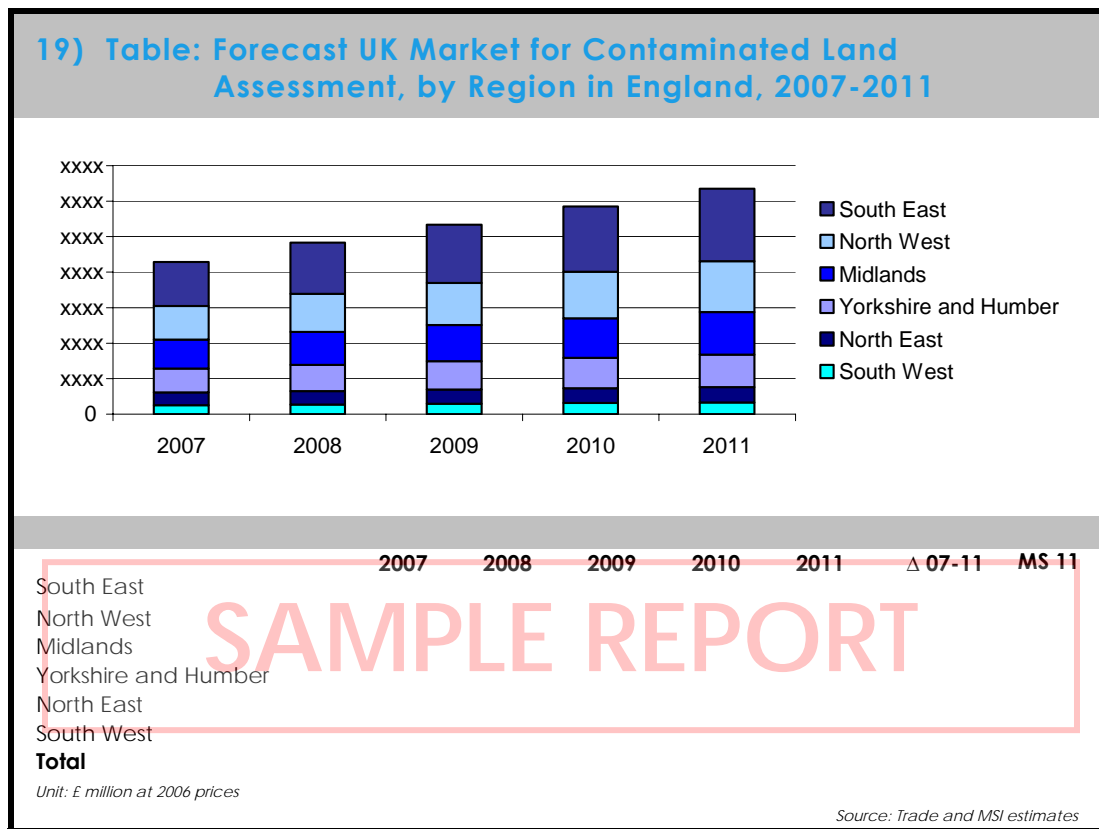
the combination of these forces has meant that the assessment market in the Midlands is significant, and has seen strong growth during the review period. However, the Midlands experienced a more notable slowdown in growth in 2004 in comparison to the above regions, as neither of the driving forces in this area stimulated the market when the Landfill Directive left some uncertainties within the market.

- **Yorkshire and Humberside** has less industrial past and **lower land values** than many other regions. Although the cities of York, Leeds and Hull are significant in creating land assessment work, this is not on the same scale as major cities in other regions. Hull has large shipping ports where a large number of containers are shipped in and out, however this activity does not significantly stimulate demand for industrial premises in this area as there is a good motorway network that allows for products to be transported for use across the country.

- The **North East** is not a large market for land assessment. The reason for this is that the area does not have an **industrial past** as strong as areas such as the North West, and **land values** in the North East are low. After redevelopment of a site in the North East, the land value may not be high enough to make the project profitable, if assessment and remediation need to take place.

- The **South West** does not have a significant industrial past. Indeed areas such as Cornwall and Devon have **very little industrial past** and the economy of these areas is dominated by **tourism**. During the review period house prices have been strong, although not in comparison with the South East. Therefore this region has a small market share, although quite strong land values have meant that growth in demand for contaminated land assessment in this region has been quite strong.

5.2.1.8 Forecast, by Region in England, 2007-2011



- The **South East** is expected to continue to be a strong market for contaminated land assessment. High land values will continue to make assessment and remediation work economically viable and the most profitable region for redevelopment. Demand for housing will also continue to stimulate the South East assessment market.

In 2007 and 2008, assessment work for the **2012 Olympic Games** will have a significant effect on the market in the South East. After the majority of the assessment work directly associated with the Olympic Games has been completed in the early part of the forecast period, growth in demand for assessment work will slow.

However, growth will continue, in part driven by demand for housing in areas now being served by newly developed transport infrastructure.

The **North West** is expected to continue to have strong growth in demand for assessment work during the forecast period. Projects such as Liverpool Football Club's new Stanley Park site and the redevelopment of the surrounding area including Anfield, and the redevelopment of the former Manchester City's stadium will contribute to the growth of this segment. The growth of the North West assessment market will not be as strong as in the South East, as lower land values will not drive the market to the same extent. However the industrial past of the area will ensure

that there continues to be strong demand for assessment work in this region.

The growth within this market will begin to slow towards the end of the forecast period as the area's **strong industrial past** is beginning to be cleaned up; however this process is likely to continue long after the forecast period.

Demand in the **Midlands** area will also grow as a result of the increased confidence in remediation technologies. Indeed the Midlands' combination of industrial past and reasonably high land values will drive demand for assessment work.

Yorkshire and Humber will also respond well to the increased confidence in remediation technologies, and will result in an increase in the need for assessment work. However, the viability of many projects will depend on land values,

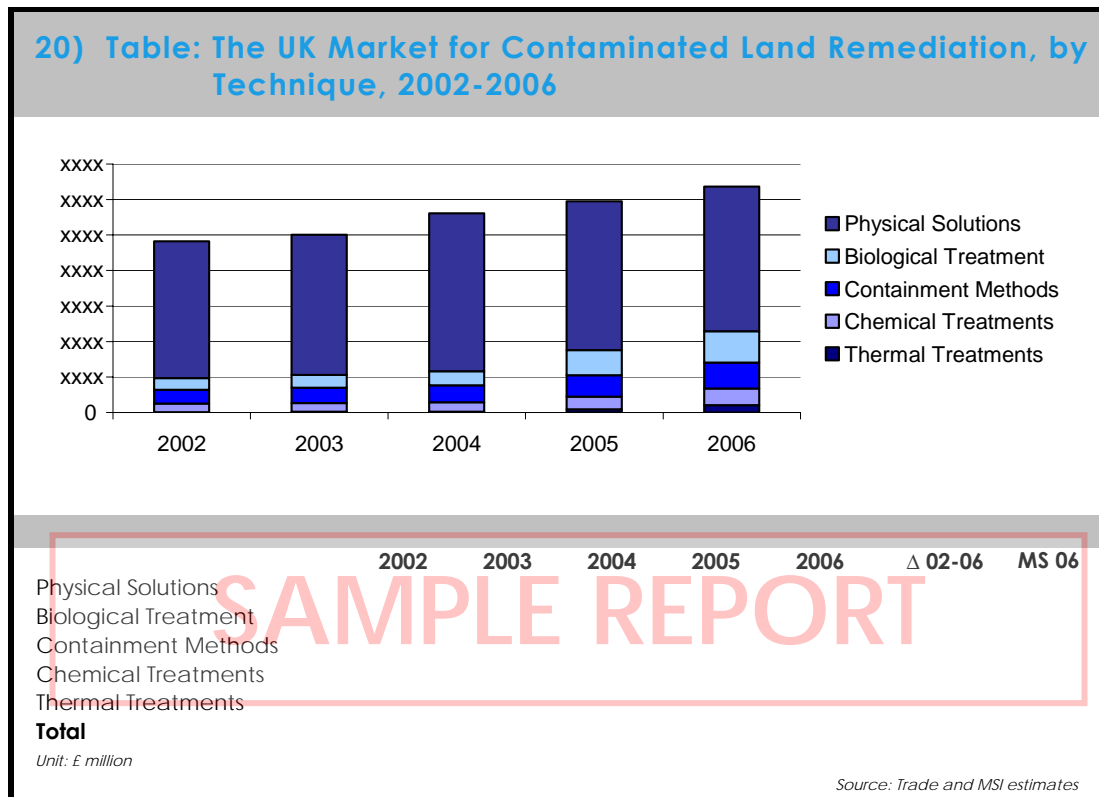
which are significantly below prices in other areas of the country.

- The market for contaminated land assessment in the **North East** is expected to grow constantly throughout the forecast period, however at a slower rate than in other regions of the UK. The reason for this is that this area does not have the sufficiently strong **land values** to make redevelopment of contaminated sites economically viable.

- The lack of a former strong **industrial past** will mean that the **South West** market for contaminated land assessment will stay quite small. However as land values in the region are quite strong there is expected to be a quite strong growth within the region for the assessment of Brownfield sites, where they exist.

5.2.2 Remediation

5.2.2.1 By Technique, 2002-2006



- The **excavation and disposal** method dominates the **physical solutions** market, although there is also the soil vapour extraction method that will also be discussed, but is not as influential. In the first two years of the review period excavation and disposal was the main method used throughout the whole contaminated land remediation market.

In the first half of 2004 there was substantial growth in the use of the excavation and disposal technique. This specifically related to the imminent implementation of the **Landfill Directive**.

In the second half of 2004 and 2005 there was much less contaminated waste going to landfill because the cost was so much higher. Haulage costs also increased significantly, as there was a decrease in the number of sites. Although the cost of excavation increased, suggesting the market value would also increase, the amount of work decreased, meaning the market value decreased. Indeed a large amount of work was rushed through in the first half of 2004.

In 2005 there was a significant decrease in the amount of **contaminated soils** going to **landfill** and a decrease in the amount of

excavation and disposal work. In 2006 prices of landfill for hazardous soils to an estimated £xx-xx per tonne. This had the effect of increasing the amount of excavation and disposal work, but the market value decreased as the cost of disposal decreased.

Small construction sites are affected more significantly by the price of landfill. Indeed trade sources state that usually small sites have applied the excavate and disposal method. The reason for this is that other remediation techniques are generally not economically viable. Prices for landfill initially went extremely high as landfill operators believed they were the only option. However landfills soon realised that remedial technologies were able to compete with landfills, as the cost of landfill went much higher. For this reason landfill prices decreased in order to compete with remedial technologies.

Soil vapour extraction was a very small part of the physical solutions segment in 2002. However towards the end of the review period this increased as the effect of the Landfill Directive meant clients increasingly considered and used other treatments. Soil vapour extraction is not a technique that can be used on all sites and only works for a range of hydrocarbons. For this reason soil vapour extraction did not increase its market share dramatically during the review period.

- At the start of the review period **biological treatments** made up just 7% of the total remediation market. There was often little reason to choose a slow and expensive biological treatment that would hold up the redevelopment. This

particularly applied to developers who tend to be very time conscious. Further, as developers increasingly are becoming the driver behind the contaminated land market, biological treatments did not make up a significant proportion of the market. When the Landfill Directive began to affect the market, biological treatments became increasingly used.

In 2005 and 2006 there was very **strong growth** in the use of biological treatments. Industry and government bodies were the main users, but developers also began to see the advantages of biological treatments. This treatment is environmentally friendly and in light of the increased landfill costs also became more cost competitive, as biological treatments do not usually require large amounts of equipment or fuel. Furthermore biological treatments were already being used, particularly by industry, where they were not in a rush to redevelop a site. So there was already knowledge within the UK that this treatment can be applied effectively.

Bioremediation is the main biological treatment used. This is used mainly in-situ as this avoids the need to excavate the soils. However the ex-situ technique increased towards the end of the review period as this allows for the treatment to be conducted elsewhere on the site, allowing for redevelopment to begin. The in-situ technique has also been improved, with methods of speeding up the process being introduced.

The use of **air sparging** increased during the review period, but only in proportion to the increased environmental considerations now in

place. Air sparging is only relevant to groundwater and therefore was not boosted by the Landfill Directive to any great extent. The use of **monitored natural attenuation** (MNA) increased towards the end of the review period. The reason for this is that some sites were not treated due to the introduction of the Landfill Directive and therefore MNA was used. MNA is not commonly chosen method and therefore did not see significant growth, as it is very slow. However MNA occurs when a site is contaminated and monitored, and the contamination is slowly decreasing.

Other biological treatments including **bioslurping**, **bioventing** and **phytoremediation** represent small parts of the biological market. The reason for this is that bioslurping and bioventing are too expensive and are often not understood well enough. Phytoremediation is often too slow and not a proven process in many instances.

- **Containment methods** were the second largest method used to treat contaminated land in 2002. The market for containment methods saw strong growth throughout the review period, with stronger growth after the 2004 Landfill Directive when clients looked for alternatives to landfill. The growth in the use of containment methods was limited by the understanding that the contaminant still exists.

Slurry walls, engineering capping and geomembrane made up a large proportion of the containment segment. At the beginning of the review period, however their use did not grow as strongly as the containment techniques that directly

deal with the contaminant. The reason for this slower growth is that these techniques do not treat the contaminant. This creates risk that in the future the method may fail, and leak contaminant to adjacent soils or water.

Permeable reactive barriers act to confine the contaminant and treat it over a period of time within a specific treatment area. This method has increased in its use as clients search for alternatives to landfill. Some clients do not like an in-situ method like this, as it is not possible to see the change happen quickly.

In-situ vitrification has seen the strongest growth within the containment segment. It was also a relatively new and emerging treatment during the review period. However this treatment requires producing large amounts of heat, and using fuels that create pollution. This is not desirable and has limited the growth of this treatment. However developers have shown interest in this treatment as the contaminant can be encapsulated in a block form. In some cases this can be used on site as a hardcore base for footing, roads or paths, but is generally buried in a chemically stable, leach resistant compound. Ex-situ vitrification is a very similar process, but is done out of the ground. As there are few facilities to complete this operation offsite, and is quite a small part of the containment segment.

- **The use of chemical treatments** has grown throughout the review period. However the Landfill Directive has had the most effect of stimulating the use of these treatments. The strong increase in demand came

from clients looking for alternatives to landfill and biological treatments that can be very slow.

In-situ electrolysis increased its use during the review period, as it can be an effective method used in the right circumstances. However this method needs electricity and in some cases this can make the treatment expensive.

Soil washing has seen strong growth during the review period. Soil washing is an attractive option as it decontaminates the soil that can then be reused onsite. However some trade sources state that this option is not desirable, as it does not always reduce the contaminant to a satisfactory level. Also there is some hesitation from some clients in using the wash solution containing chemicals which can leave the soil with other contaminants. Even though this may not be totally valid, where this concern exists it will inevitably constrain the market.

Soil solidification and stabilisation is a technique that has seen strong growth during the review period as more knowledge and acceptance of the treatment is established. Other chemical treatments including oxidation, extraction, reduction and hydrolysis make up the remainder of the segment, although quite a small proportion each. These treatments lack testing in the UK to prove that they work and can be cost effective.

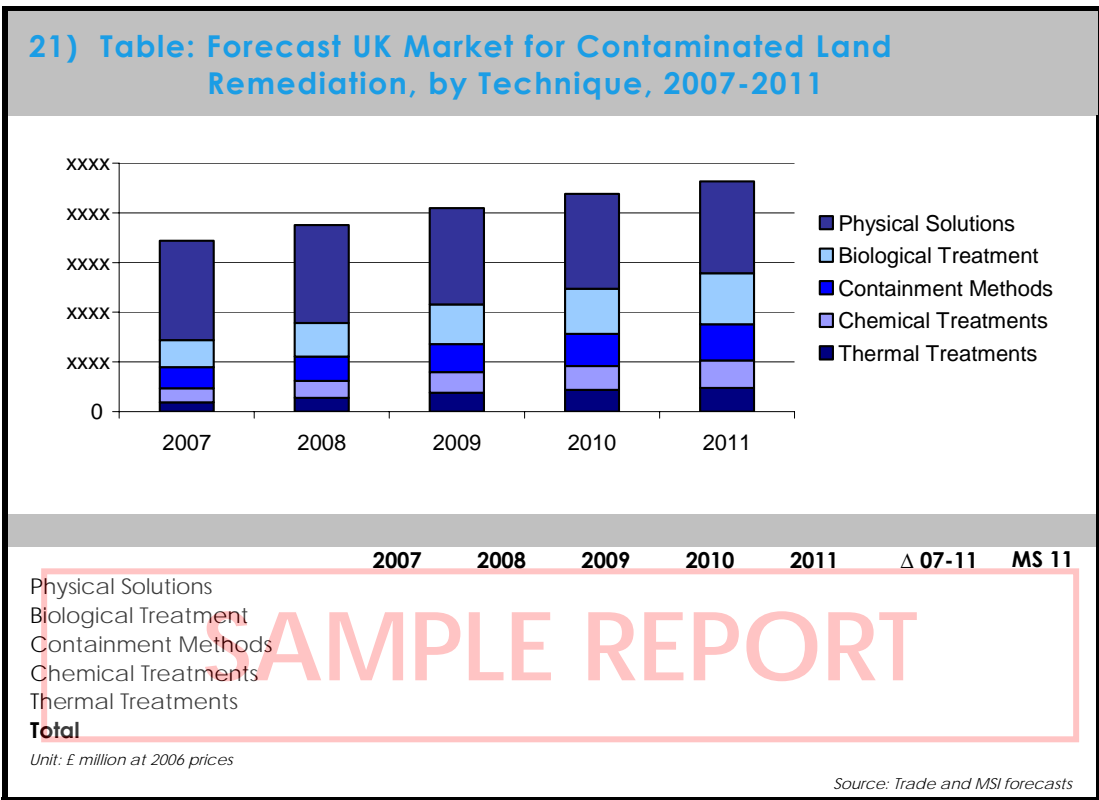
- At the beginning of the review period **thermal treatments** made up a

negligible share of the market, however this increased as a direct result of the Landfill Directive. Before the Landfill Directive, thermal treatments were not used on the grounds that the energy requirement, which results in high levels of pollution, was too high. However after the Landfill Directive the search for alternative treatments meant that thermal treatments were considered much more seriously. The advantage of thermal treatments is that the contaminant is almost completely destroyed; indeed many state that thermal treatments are the most effective.

The **downside of thermal treatments** is that they can cost too much and can leave the soil scorched and unusable. Despite this, the growth of thermal treatments was very strong. They still make up the smallest part of the market as a result of the pollution the process produces. Trade sources report that thermal treatment equipment can also be unreliable. It can be difficult to keep the right temperature and this can make the process take time.

Thermal desorption and incineration are the main types of thermal treatments. Thermal desorption and incineration require high temperatures yet were used increasingly during the review period. However these processes produce undesirable waste gases. Heat and steam injection is also a thermal process, but trade sources state that this treatment is not commonly used.

5.2.2.2 Forecast by Technique, 2007-2011



During the forecast period the use of **physical solutions** will decline. It is unclear whether landfill prices will increase or decrease, but landfill taxes are expected to increase. Therefore it is expected that it will become more costly to take contaminated soils to landfill. Even so, the market value is expected to decrease, as there is less material going to landfill. It is also expected that legislation will evolve to continue to divert soils away from landfill and stimulate sustainable methods. Also improvements in the accuracy of assessment mean that it will be easier to distinguish between the contaminated and safe soil. This will also contribute to reducing the market for excavation and disposal.

Other sustainable treatments will continue to become more and more price competitive, and at the same time will become more established and trusted. The market for physical techniques will still be the most commonly used technique, even at the end of the forecast period. This is partially due to developers who do not have time or are not interested in sustainable remediation techniques. It is also down to the fact that many sites require excavation in order to build basement structures or large footings. In this case excavation and disposal is the easy option, as excavation will occur anyway.

The use of **soil vapour extraction** has grown during the forecast period in response for the search for sustainable environmentally friendly

techniques. However the limited range of contaminants that it can treat will restrict the growth in the use of this technique.

- The market for **biological treatments** will see strong growth throughout the forecast period, with stronger growth at the beginning of the period. Biological treatments already began to see strong growth during the review period, and this will benefit the growth of this treatment during the forecast period as it helped build trust in the reliability of the treatment method. The drive towards the use of sustainable environmentally friendly techniques has been the main driver behind the growth of this segment. Further, this treatment is cost effective. The main users of this treatment will continue to be industry and government bodies. Developers are often under more time pressure than other clients, and therefore the growth in use of biological treatments by developers will be slower than for other clients.

Bioremediation will continue to be the main biological technique used. It is expected that the use of ex-situ bioremediation will see the strongest growth within this segment. The reason for this is the expected increase in the number of soil treatment centres. Soil treatment centres are ideal for ex-situ bioremediation as the soils can be placed in controlled bio-piles where the remediation can take place. The treatment centre will then re-use the soils in other sites. Ex-situ bioremediation centres will have a significant impact upon the market, as they are environmentally friendly and allow the redevelopment to continue. Therefore even developers are expected to use ex-situ

bioremediation to an increasing extent.

The use of other biological techniques is expected to increase but more slowly than ex-situ bioremediation. **In-situ bioremediation** and **monitored natural attenuation** are the slowest techniques. This will limit the growth in the use of these treatments, although these treatments and other biological treatments will see good growth due to their environmentally friendliness.

- The use of **containment methods** will experience strong growth during the forecast period, although not as strong as for some other methods. The issue that the contaminant is not always treated, and often simply contained, will continue to limit the growth in the use of this treatment.

The use of permeable reactive barriers will see more growth than the methods that do not treat the contaminant, such as slurry walls, engineering capping, geomembrane walls, in-situ vitrification and ex-situ vitrification. The process of in-situ vitrification may cause migration of soils into clean soils and will limit the future site use. This process can only be used for near surface soils that will also limit the growth of this technique.

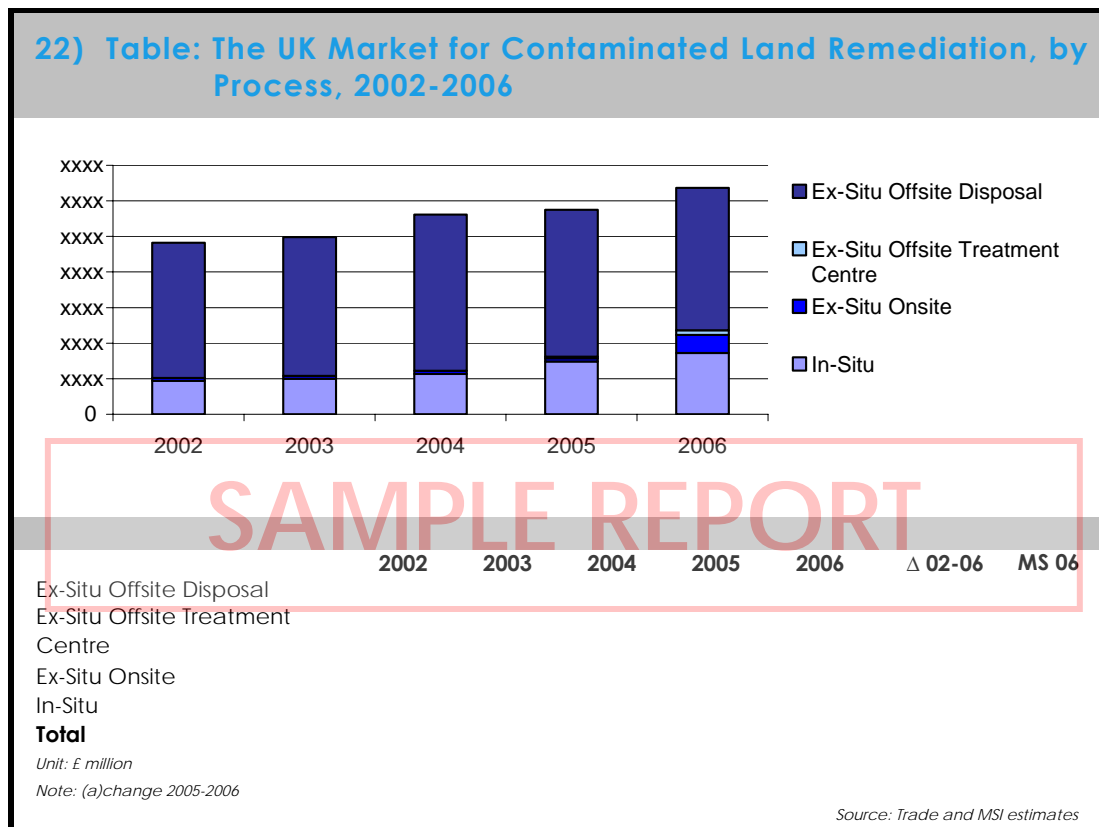
The market for **containment systems** will show strong growth as in some situations it is the best option. However the impact of soil treatment centres will only benefit ex-situ vitrification within the containment segment, as other containment treatments are predominantly completed onsite.

- The use of **chemical treatments** will see strong growth during the forecast period as this treatment can provide an effective treatment of contamination. The mobile plant licenses that make it easier to take plant to sites will benefit the chemical treatment segment. The aim for sustainability and environmental friendliness means that onsite treatment is more desirable. It is expected that more mobile soil washing plants will be in operation during the forecast period. This will also have the benefit of allowing the soil to be re-used onsite immediately.

The use of **in-situ electrolysis** is not expected to increase as strongly as **soil washing**, as this treatment requires high amounts of energy which makes this process costly. The use of soil solidification/stabilisation is likely to grow quite strongly as it immobilises the contaminant effectively. Other chemical treatments will also benefit from the mobile plant licences that will continue to make it easier to transport the plant needed to sites.

- The market for **thermal treatments** is expected to show continued strong growth during the forecast period. The effectiveness of thermal treatments is the reason for their increased use. However this type of treatment remains the smallest segment of the market as the energy required and the pollution generated is considered unacceptable to some. Increased assessment accuracy and detail will mean that less soil will need to be treated, as it will be possible to identify contaminated soils more accurately. This will mean that it will be possible to only treat the contaminated soils. This will reduce the cost and pollution created by thermal treatments and result in stimulating this segment. The treatment's growth is also expected as a result of increased reliability of thermal treatment equipment. Extremely high temperatures are needed for this treatment, and it is expected that modified treatment will be able to complete this task more reliably and scorch less soil.

5.2.2.3 By Process, 2002-2006



● **Ex-situ offsite disposal** was the main method of dealing with a contaminated site during the review period. This process directly deals with the **excavation and disposal** to landfill method. The approach of the Landfill Directive meant that the use of ex-situ offsite disposal increased by 13% in 2004, with much of this growth in the first half of the year. The Landfill Directive, landfill tax and other measures that aimed to benefit sustainable environmentally friendly techniques meant that 2005 and 2006 saw decreases in the value of the ex-situ offsite disposal segment. The decrease is primarily due to the decrease in the amount of excavation and disposal work, however increased landfill prices did

offset this decline in the value of the market to some extent.

The Minosus storage facility in the Winsford salt mine offers an alternative to landfill in the North West of England and at the same time acts as a restraint on the use of onsite remedial techniques. The salt mine is a large **storage facility** for stable contaminated compounds, therefore acting in a similar way to landfill. This has special licensing to allow it to store the contaminants. This storage facility has acted to limit the decrease in the ex-situ offsite disposal segment. However this is only one facility in the whole of the UK, and therefore will not be practically accessible for many parts of the country.

- Up to 2004 there were no **ex-situ offsite treatment centres** in the UK. In response to the 2004 Landfill Directive, a new contaminated soils treatment centre was launched by Biffa and Biogenie and became operational in 2005. It is reported that the service opened in the second half of 2005, but did not operate at full capacity immediately. In 2006 this service became more used and the market continued to grow.

Towards the end of 2006 a soil treatment centre will open, operated by Terramundo, a joint venture between Augean and DEC. The aim of this centre is to treat soils using physico-chemical treatment before going to landfill, rather than a recycling system.

- At the beginning of the review period there was little growth in **ex-situ onsite** treatment, as this was not considered an established process. This was due to the preference to take soils away from site to be disposed of. Furthermore treating soils onsite was not cost effective in comparison to excavation and disposal methods.

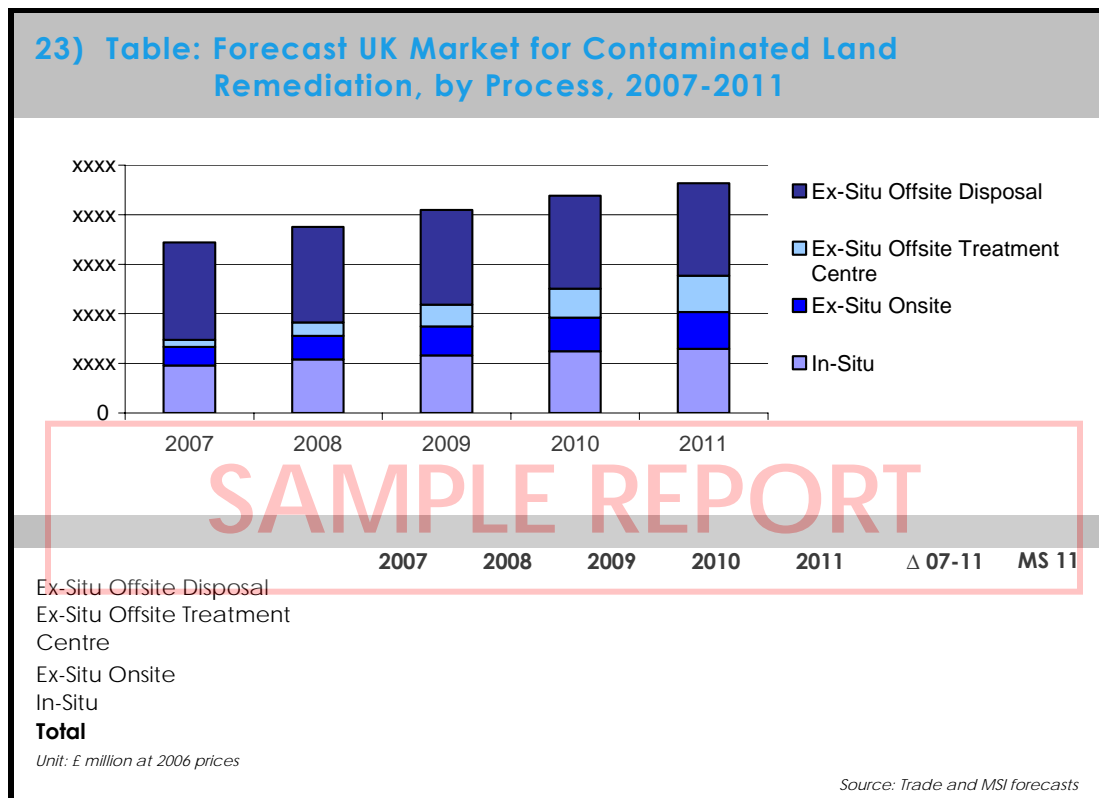
The 2004 Landfill Directive had the inevitable effect of increasing the use of ex-situ onsite techniques. However the mobile plant licensing system, which licensed the plant rather than the site, made it much easier for contractors to complete onsite ex-situ

processes. The 2004 Landfill Directive and the mobile plant license combined to stimulate the development and establishment of this technology. Indeed there was significant growth in 2005 and 2006 for this technique, although it was from a very small base.

- **In-situ techniques** were the second most commonly used type of process during the review period. Indeed certain techniques such as most containment methods and treating groundwater are in-situ techniques. The 2004 Landfill Directive stimulated the growth for these processes as the cost of landfill increased, competing in-situ techniques became a more attractive possibility.

The advantage of in-situ techniques is that they are **cost effective** and **sustainable**. However there is an element of risk with in-situ techniques as a result of not removing the contaminated soils; therefore some contamination could be missed during treatment. For example, during the process of in-situ vitrification there is the possibility that the heat migrates contaminant away from the treatment area. This has limited the growth in the use of in-situ techniques. Indeed many clients are wary of in-situ techniques, as it is not possible for them to see the change happening.

5.2.2.4 Forecast by Process, 2007-2011



- The use of **ex-situ offsite disposal** techniques is forecast to decrease in market value during the forecast period. The reason for this lies with legislation that makes it increasingly difficult to dispose of hazardous waste to landfill and the increasing landfill tax, making this process more costly. Even though the cost of landfill will increase, the overall market value will decrease as a result of the decreasing use of this process. Furthermore sustainable environmentally friendly techniques will become more established and cost less during the forecast period.

It is expected that other processes will ensure that this process becomes redundant in time. It is expected that the use of ex-situ offsite disposal will

decrease to a point where it is very rarely used. However it is important to note that some projects require soils to be excavated for basement structures, therefore it will continue to be an easy option to dispose of this waste into landfill.

- Strong growth is expected to occur for **ex-situ offsite treatment centres** as a result of more treatment centres opening. In order for this type of process to be a success, there needs to be national coverage of treatment centres. This would require up to 100 new treatment centres opening, providing a combined wide range of offsite treatments. Trade sources believe that this would be a preferred option, as it works similarly to landfill in that contaminated soils

can be taken to the centre and left for the contractor to deal with, thus leaving the client free to continue with the redevelopment. The advantage of this process is that it is environmentally friendly, so long as transport distances can be minimised. Also during the forecast period it is expected that there will be an increase in the range of treatments provided at treatment centres. This might include expansion from biological treatments to include thermal, chemical and ex-situ containment.

- The move towards sustainable treatments will benefit **ex-situ onsite** processes greatly. As the process is completed **onsite** it means that the soils can be reused on the site itself. This save transporting the soils to landfill or treatment centres. Indeed onsite technology improved during the review period and is expected in develop further in the forecast period. The mobile plant licensing system will make it increasingly easy for contractors to move plant to sites.

The limiting factor of this process is that **space** is required to complete the operation. Indeed soil needs to be excavated, treated in another space and possibly stored in a different place onsite, thus requiring large amounts of space to complete this process.

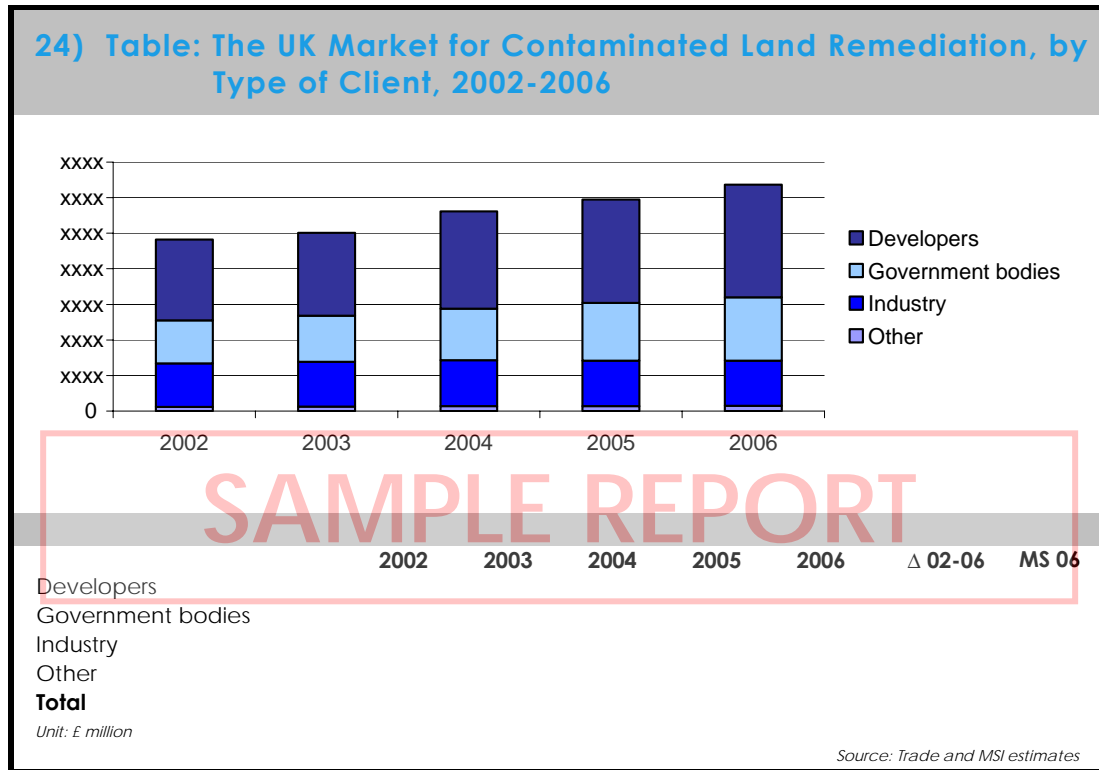
Most techniques can be completed onsite, but any pollution generated will be a constraining factor for this process during the forecast period.

With the need for new homes to be built on Brownfield sites, there will be increasing amounts of urban redevelopment, making localised pollution issues increasingly important.

- **In-situ techniques** will benefit from the move towards environmentally sustainable techniques during the forecast period. In-situ techniques will continue to be developed and established as effective and cost effective during the forecast period. As in-situ techniques do not disturb the ground, they are more sustainable and avoid excavation problems. Indeed many Brownfield sites will have underground gas, water, fuels systems and electric cables. This will drive demand for in-situ techniques that avoid excavation of soils.

Mobile plant licensing will continue to stimulate demand for in-situ onsite treatments. As sometimes-significant plant is required for in-situ techniques, mobile plant licensing will increasingly make it easier for contractors to offer this service. Space will again be a limiting factor for onsite techniques, although not as much for in-situ techniques as ex-situ techniques. The reason for this is that in-situ techniques do not require excavation and storage of soils, and therefore the process can be completed on a relatively small site. The main constraining factor for this process is that it is completed onsite and therefore holds up the redevelopment.

5.2.2.5 By Type of Client, 2002-2006



- During the review period **developers** have been a very important part of the market as the market is driven strongly by demand for residential properties. In 2002 to 2003 the developers segment was relatively stable, with only a 3% growth, but in 2004 growth was much stronger with the imminent arrival of the 2004 Landfill Directive. Developers used excavation and disposal as the main method of dealing with contaminated land. This meant that developers rushed to get as much waste into landfill before the directive increased the costs of landfill.

After 2004 there was less growth within the **developers** segment. Indeed the bringing forward of waste that went to landfill in the first half of 2004 meant that there was less work

in 2005. There was still strong growth within the developers segment as the demand for residential properties remained strong, developers were obliged to use other treatments. Yet it is reported some developers continue to excavate and dispose of contaminated soils due to a lack of trust in remedial treatments and the fact that excavation and disposal is easy.

- Within the **government bodies** sector, **Regional Development Agencies** (RDA's) are the driver behind the remediation sector. Local councils would not usually be responsible for the costs of remediation of a site. When councils determine a site as contaminated it would usually be the responsibility of the owner to remediate the site.

RDA's remediate a site when they are developing an area. The Landfill Directive did not have such a strong effect upon RDA's, as these bodies tend to use more environmentally friendly techniques. The reason for this is that RDA's tend not to be under so much time pressure as, say, developers.

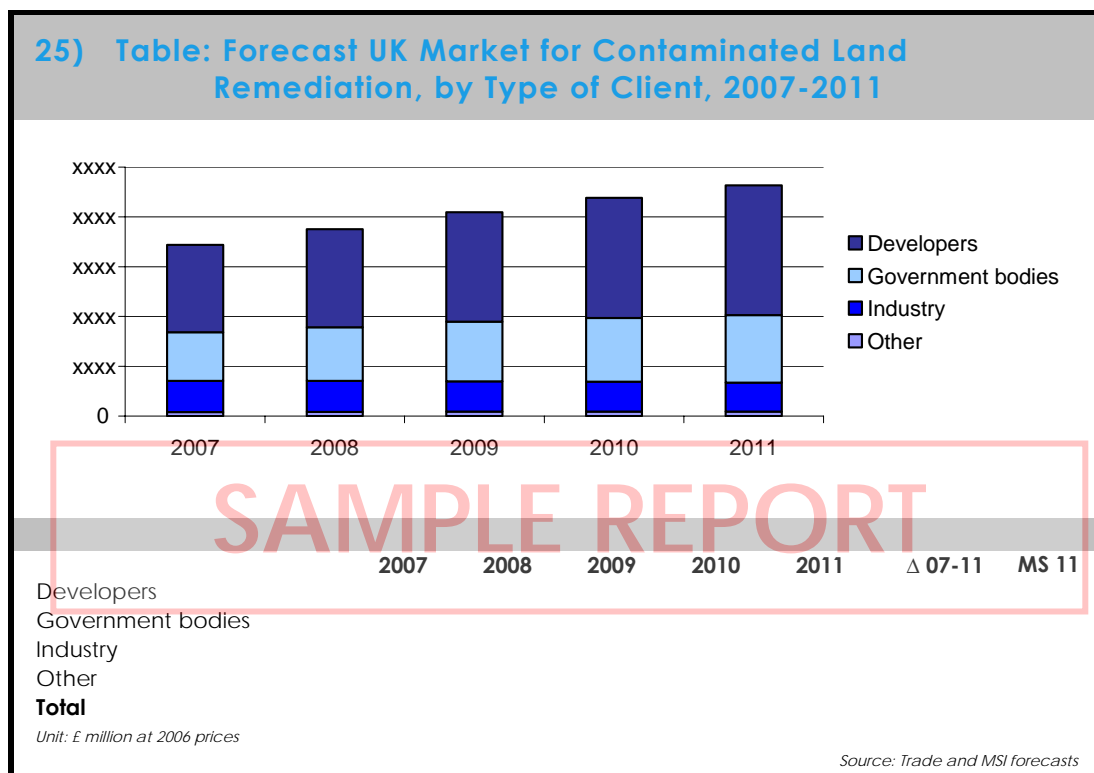
- The **industry** segment has not seen particularly strong growth during the review period. Indeed there was some decrease in the amount of industry remediation towards the end of the review period. The main reason for the decrease in the amount of remediation work is the increased reliability and accuracy of assessment. This has resulted in more industry being able to carry calculated risks of holding contaminated sites, rather than treating them immediately.

The effect of the Landfill Directive meant that where industry would previously of excavated and disposed of contaminated soil, this

often became too costly to do. Where industry is completing remedial work it is often using biological treatments, as there are fewer time pressures and the treatment is relatively cost effective.

- During the review period other clients such as **insurance companies** and small **domestic clients** were a small part of the market. Domestic issues were not a growing market, as new oil and gas central heating boilers and associated products are reliable. Therefore this market is primarily made up of problems from old systems. The insurance market has been the source of growth in this market. This is a result of increased concern about being liable for sites, and having environmental insurance can increase the value of a site. Further, during the review period, treatments were new to many clients and trust had not been established. This stimulates the market for insurance and the resulting insurance remediation work.

5.2.2.6 Forecast by Type of Client, 2007-2011



- **Developers** are becoming increasingly important within the market for contaminated land remediation as demand for housing is expected to be very strong during the forecast period and that developers will increasingly build on Brownfield sites.

Between 2008 and 2010 the developers segment will also be stimulated by the **Olympic Games development**. It is expected that developers will complete large amounts of such work. Further, around the Olympic site there will be increased demand for housing as a result of the improved transport links and sports facilities.

The growth for this segment will slow towards the end of the forecast

period. This is a result of the Olympic Games development remediation being completed and the overall cost of remediation treatments decreasing.

- **RDA's** are expected to continue to complete many projects during the forecast period where remediation of land is required. Indeed with the government target of house building on Brownfield land, it is likely that more and more RDA work will require remediation work. Towards the end of the forecast period it is expected that growth in the RDA segment will slow down. This is mainly as a result of the decrease in the costs of remediation.

- During the forecast period it is expected that the amount of **industry**

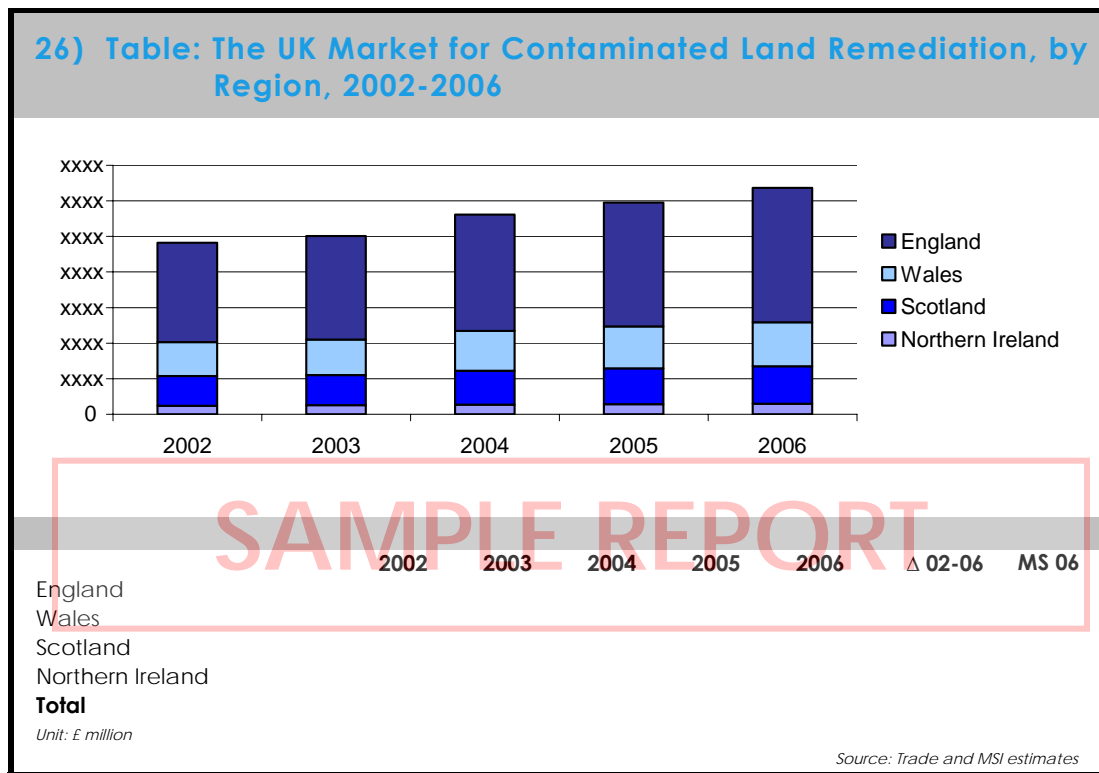
remediation work will continue to decrease at a slow rate. This will continue to become due to industry being able to carry more risk as assessment continues to become more accurate and reliable. The market size for industry is still significant, although it is expected that towards the end of the forecast period there will begin to be a reduction in the number of industry sites that require treatment.

Developers will also contribute to the decrease in the market value of industry. Developers are expected to become increasingly important clients for remediation companies. Further developers are expected to begin to increasingly purchase contaminated sites owned by

industry. This will be a result of developers looking for more sites to redevelop. As developers become more experienced with remediation technologies, trust will build in the use of them. This will stimulate developers dealing with industrial sites.

- In the forecast period **insurance** companies will continue to stimulate the market. However this growth was limited by the increased trust in treatments. Throughout the forecast period environmentally friendly treatments will become more reliable and trusted. This will reduce the overall need for insurance. There is not expected to be any significant growth in the domestic client segment during the forecast period.

5.2.2.7 By Region, 2002-2006



- The remediation market in England will grow at a slower pace than the assessment market, reflecting the increasing number of investment companies making assessments. Indeed investment in assessment can save money overall through decreased remediation costs. Nevertheless, the strong growth of the remediation market in England reflects the strong demand for the redevelopment of sites, particularly for residential properties.

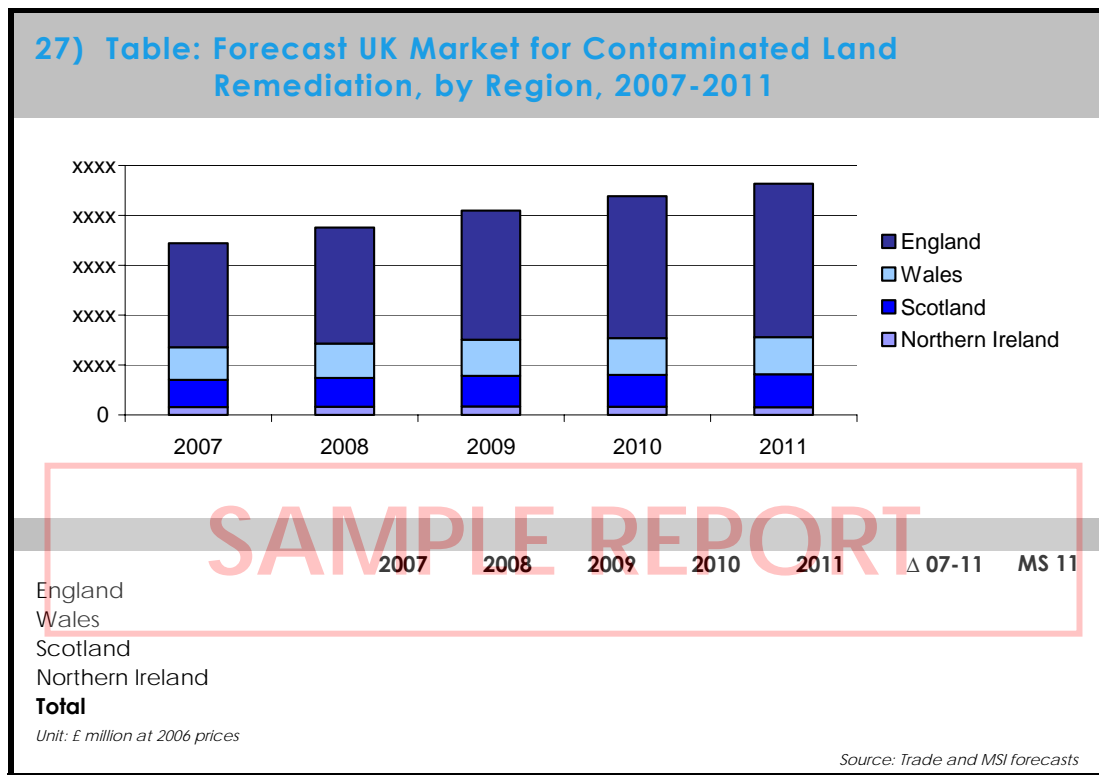
- Trade sources report that the Landfill Directive affected Wales more than other countries since Wales does not have its own hazardous landfill sites and transport links in other areas where landfill sites are available can be long and therefore expensive. The stronger

growth in Wales compared to some other regions reflected the need to use more expensive remediation technologies.

- The high cost of landfill in some areas of Scotland, reflecting the sparsely populated nature of much of the region, has meant strong investment in assessment in order to minimise remediation costs wherever possible.

- The remediation market in Northern Ireland is small, reflecting the relative lack of Brownfield sites and the high level of investment in assessment to save money in the remediation stage.

5.2.2.8 Forecast by Region, 2007-2011



- In **England**, strong housing demand and the Olympic Games will stimulate the remediation market during the forecast period. Housing demand is expected to be strong throughout the forecast period, and an increasing amount of this is expected to be built on Brownfield land requiring remediation treatment. The Olympic Games are expected to have a major effect in England, stimulating the remediation sector particularly in the 2008 to 2010 period. Further, throughout England there is expected to be many large and small-scale projects completed by both developers and RDA's. This will continue to stimulate the remediation market in England.

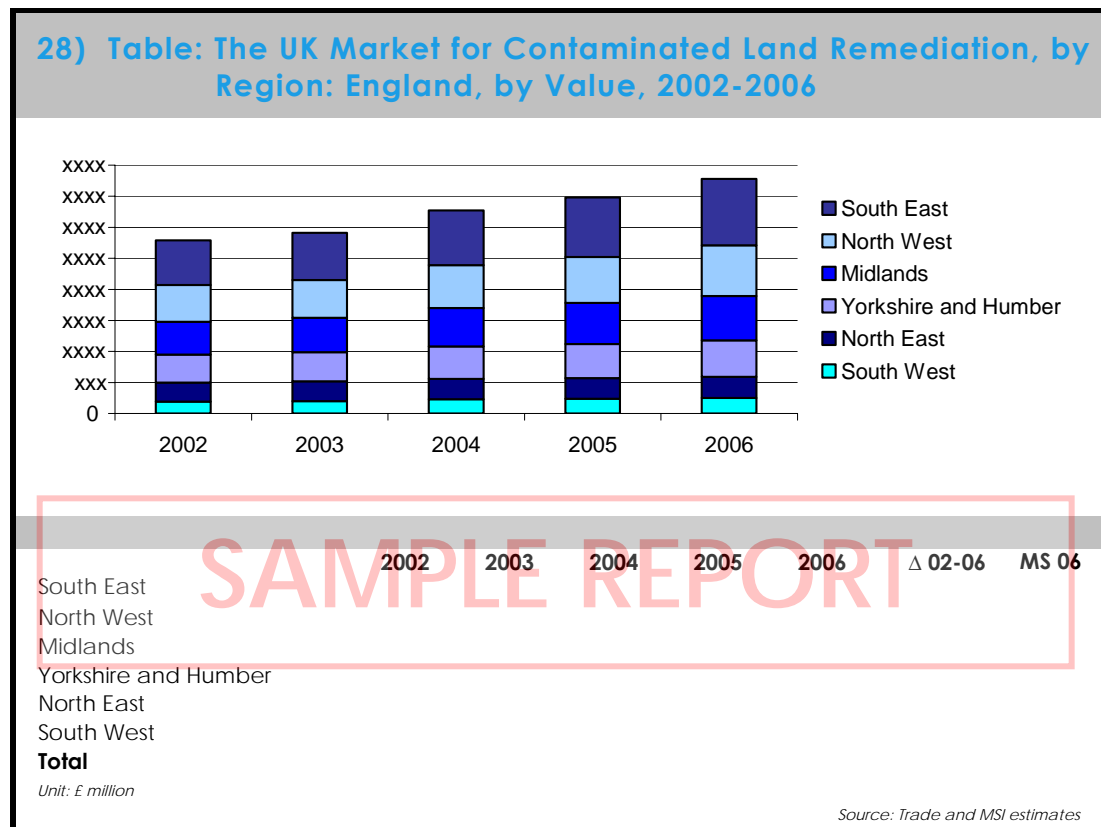
- Demand for housing is not expected to be as strong in **Wales** as in England. Most of the remediation is expected to happen in south Wales, where the population is denser making demand for housing higher. South Wales also has a stronger industrial past, creating more opportunities for redevelopment.

- The **Scottish** market is expected to experience growth during the forecast period. The strongest growth is expected in 2009, but after this time it is expected that the costs of remediation will decrease as competition increases and the treatments are refined.

- The **Northern Ireland** market value will continue to grow up to 2009. This is a result of increased confidence in the use of environmentally friendly techniques, meaning more Brownfield and contaminated sites will be treated. However towards the

end of the forecast period the market value will begin to decrease as a result of the number of contaminated sites decreasing and the prices of remediation treatments also decreasing.

5.2.2.9 By Region in England, 2002-2006



- The **South East** is the largest market for remediation in England, reflecting strong demand for housing, industrial and commercial properties. **High land values** in the South East also make it more profitable to complete remediation work.

- The **North West** has seen strong growth during the review period. This is mainly as a result of the industrial past in the region that requires remediation work, with a larger proportion of industrial clients in this region. It is also reported that RDA work has also been a factor stimulating this region. The North West does not have as high land values as the South East. However there is quite a high demand for housing and

business properties in most parts of this region that stimulates demand for redevelopment work.

The North West's industrial past means that a higher proportion of redevelopment work is completed on industrial Brownfield sites. These are highly likely to have required remediation work during the review period.

- The **Midlands** has a strong industrial past that has required large amounts of remediation work during the review period. Land values and demand for housing in this area is strong. Remediation has been driven by the combination of the two above factors.

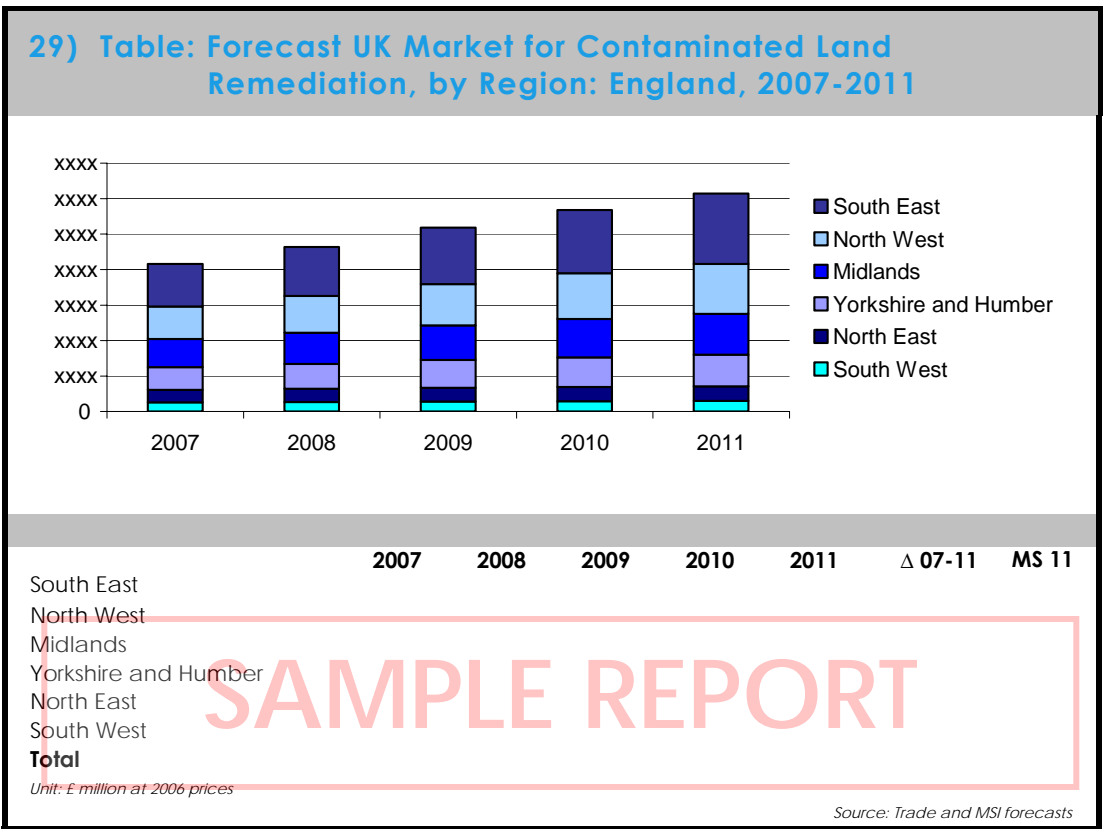
- **Yorkshire and Humberside** does not have the drivers of a significant industrial past and high demand for housing to drive demand for remediation work. Therefore the growth in remediation work in this region was slower than the above regions. However the cities included within this area such as Leeds, Hull and York have driven the demand for remediation, as these are densely populated areas. However some areas of this region do not have high land values, and this has restrained the remediation market in this region.

- Trade sources report that while the **North East's** industrial past is a market driver, this is constrained by lower land values and housing

demand. Although there was growth within the assessment market this did not result in growth of the remediation market in 2005. The high landfill costs meant that in 2005 there was less remediation work, as landfill costs decreased in 2006 the North East experienced growth in the value of the remediation market.

- The **South West** does not have a strong industrial past driving the remediation market. The growth of the market in the South West region was sustained by higher land prices and housing demand which stimulated the redevelopment and remediation of Brownfield sites.

5.2.2.10 Forecast, by Region in England, 2007-2011



- Housing demand and high land values will continue to stimulate the **South East** remediation market. Further, continued high demand for housing will stimulate demand for more commercial and industrial premises.

The **2012 Olympic Games** will be a strong driver in the market for remediation in the southeast in 2008-2009. Trade sources expect that these are the years when most remediation work will take place. The following years will see the completion of the building work for the event. After the remediation work for the Olympic Games is complete, the rate of growth in the South East remediation market will slow down.

- It is expected that as the **North West** continues to clean up its industrial past there will be strong growth within this segment. It is expected that housing demand will be strong in the North West, as the economy grows in this region. Although land values are likely stay lower than in the South East, it is expected that this will not deter remediation companies from this region.

The North West remediation market is also expected to be stimulated by projects such as Liverpool Football Club's new Stanley Park site and the redevelopment of the surrounding area including the current stadium at Anfield. Also the redevelopment of the former Manchester City stadium

is also likely to contribute to the growth of remediation in this segment. The growth within this region is expected to slow towards the end of the forecast period as there is expected to be less Brownfield sites available for redevelopment and the cost of remediation is expected to decrease.

- In the forecast period the **Midlands** will be a market with strong increases in the amount of remediation work being carried out. Indeed the region's reasonably strong industrial past will continue to stimulate the market, as there will also be a strong demand for residential and other properties in this area. As the Midlands has demand for housing and a significant stock of Brownfield sites, the government target of 60% of housing to be built on Brownfield sites will also stimulate the remediation market in this region.

- **Land values** are not expected to increase to an extent of making

Yorkshire and Humberside region highly profitable to complete remediation work. Therefore growth within is not expected to be large. It is expected that remediation of more modern industrial sites will contribute to the growth of the remediation market.

- **Low land values** will continue to limit the growth of the **North East** region.

- The **South West** will not increase as rapidly as in other regions. This is due to the lower amount of Brownfield sites that will be available for redevelopment in this region. The growth will be primarily driven by reasonably high land values in this region which will make redevelopment of sites profitable. The lack of availability of Brownfield sites will restrain the market, but high land values and demand for housing will stimulate the market.

6. Regional Market Analysis

6.1 England

- A recent questionnaire conducted by the Department for Environment, Food and Rural Affairs (DEFRA) indicated that 309 out of 362 (85%) local planning authorities including eight national parks provided information for 2005. The remaining authorities have in most cases provided information for 2004. So overall there is relatively **up to date information** upon all authorities.

- It is now common practice that local authorities have developed **inspection strategies** in England. These outline how they aim to remediate contaminated land within their area. Furthermore the inspections will include the designation of special sites. Special sites are defined as sites that are in serious contamination. The 2005/2006 data from the DEFRA website suggests that under part IIA following detailed investigation 222 sites were designated as contaminated. In the same study two sites were determined by the environment

agency, not the local authority as special sites.

- The Environment Agency (EA) reports in 2002 that there may be as many as **100 000 sites** affected by contamination to some degree in England and Wales. It is estimated that between 5% and 20% of these sites may require action to ensure that unacceptable risks are minimised.

- The NLUD survey provides a useful insight into the **extent of contaminated land in England**. The survey includes data on the amount of previously developed vacant land and the amount of derelict land, which, in particular has a high chance of being contaminated. Derelict land is defined as land so damaged by past industrial use that it is incapable of beneficial use without treatment.

2) Table: Previously Developed Land in England, by Land Type, 2005

| Government Office Region | Previously developed vacant land | Derelict land and buildings | Vacant buildings |
|--------------------------|----------------------------------|-----------------------------|------------------|
| North East | | | |
| North West | | | |
| Yorkshire and the Humber | | | |
| East Midlands | | | |
| West Midlands | | | |
| East of England | | | |
| London | | | |
| South East | | | |
| South West | | | |
| Total | | | |

*Note: Data relates to situation at 31 March 2005
Unit: Hectares*

Source : MSI analysis of NLUD data

- Comparing the 2002 data with the 2005 data, there has been an overall **increase in all derelict and vacant land** types. The total area of derelict land and buildings grew from xx xxx hectares to xx xxx hectares in 2005. In most of the government office regions the area of derelict land and buildings has increased, apart from the North East and London. For the North East this is a very small decrease. The number of hectares of derelict land and buildings in London fell from xxx in 2002 to xxx in 2005. This reflects significant redevelopment and remediation work, such as the Thames Gateway redevelopment. Indeed the high demand for space in London means that derelict land is much more likely to be redeveloped than anywhere else in the country.

- The **North West and West Midlands** has also seen notable increases in the amount of derelict land or buildings between 2002 and 2005. The reason for this increase is the closure of large manufacturing sites.
- The **East of England** and **South West** regions have also seen notable increases in the amount of derelict and vacant land between 2002 and 2005.
- A survey by NLUD also shows how what types of previously used land were redeveloped into new uses during 2005.

3) Analysis: New Land Use of Land Redeveloped in England, 2004 and 2005

| Previous Land Use | New Land Use : | | | | |
|--|----------------|-----------------------------|--|-----------------------------------|---------------------|
| | • Residential | • Industrial and Commercial | • Community services, recreation and leisure | • Transport, minerals and defence | • All New Land Uses |
| Residential | | | | | |
| Industrial and Commercial | | | | | |
| Community services, recreation and leisure | | | | | |
| Transport, minerals and defence | | | | | |
| Vacant and derelict | | | | | |
| Total | | | | | |

Unit: % of total that was redeveloped,

Source : MSI analysis of NLUD data

• The table shows that some 52% of formerly used land being redeveloped was for residential use. The single biggest source of this land was formerly vacant and derelict land, although previously industrial and commercial land was also a significant source of such land.

• This is significant for the contaminated land treatment market, as it is very important that land used for housing is completely contaminant free.

6.2 Scotland

- The Scottish Executive conducts a **vacant and derelict** survey and the latest survey were conducted in 2005. Under the definitions used in the survey, all sites that are known or suspected to be contaminated are defined as being derelict rather than vacant.
- The survey identifies 171 **derelict sites** covering 1 186 hectares that are known to have contamination. However the actual figure is likely to be much higher as the contamination status of 9 383 hectares of urban vacant and derelict land was unknown. The following table shows this.

4) Analysis: Contamination Status of Derelict and Urban Vacant Land in Scotland, 2005

| | Derelict Land | | Urban Vacant Land | | Total | |
|---|---------------|--------|-------------------|---------|-------|---------|
| Contamination Status | Area | Number | Area | Numbers | Area | Numbers |
| Known Contamination | | | - | - | | |
| Tested and found not to be contaminated | | | | | | |
| Unknown | | | | | | |
| Total | | | | | | |

Unit: Hectares and number of sites
Source : MSI analysis of Scottish Executive data

- The survey shows the large amount of derelict and urban vacant land in Scotland on which the level of
- contamination is unknown, identifying a significant potential for further assessment work

5) Analysis: Contaminated Land in Scotland, by Contamination Type, 2005

| Derelict Land where Contamination is Known | | | |
|--|-----------|------------------------------|--------------|
| Contamination Type | Area (ha) | % of Derelict Land (by area) | No. of Sites |
| Arsenic | | | |
| Asbestos | | | |
| Cadmium | | | |
| Chromium | | | |
| Coal | | | |
| Coal Tars | | | |
| Copper, Nickel, Zinc | | | |
| Cyanides | | | |
| Gases | | | |
| Phenols | | | |
| Sulphates | | | |
| Other combustible materials | | | |
| Other contaminants | | | |
| Unknown | | | |
| Total | | | |

Unit: Hectares, Number of sites

Source : MSI analysis of Scottish Executive data

• The data shows coal to be the single largest contaminant, although this is found on just xx sites. A large

number of small sites are yet to have their contaminant identified.

6) Analysis: Known Contaminated Land in Scotland, by Local Enterprise Company, 2005

| Derelict Land where Contamination is Known | | | |
|--|-----------|---|-----------------|
| Local Enterprise Company | Area (ha) | % of Contaminated Derelict Land (By Area) | Number of sites |
| Ayrshire | | | |
| Borders | | | |
| Dumfries & Galloway | | | |
| Dunbartonshire | | | |
| Edinburgh & Lothian | | | |
| Fife | | | |
| Forth Valley | | | |
| Glasgow | | | |
| Grampian | | | |
| Lanarkshire | | | |
| Renfrewshire | | | |
| Tayside | | | |
| Highlands and Islands | | | |
| Total | | | |

Unit: Hectares, Number of sites

Source : MSI analysis of Scottish Executive data

- Two areas, Fife and Ayrshire, together account for some 46% of the area of derelict land in Scotland where contamination is known.

- The Scottish Executive also details **preferred or intended uses** of derelict

and urban vacant sites. This shows that 23% of total derelict and urban vacant land is intended to be used for residential use, 19% for general industry and 10% for manufacturing.

6.3 Wales

- There is a significant **absence of up to date data** for the amount of contaminated land and derelict sites in Wales. This is primarily due to a lack of funding given for such schemes in Wales. The Environment Agency (EA) reports in 2002 that there may be as many as xxx xxx sites affected by contamination to some degree in England and Wales. It is reasonable to suggest that England makes up a much larger proportion of this figure. If Wales makes up 5% of this figure, then there are at least x xxx sites with potential contamination. The only available data to MSI for Wales detailing derelict land by county is from 1993, and therefore does not give an accurate reflection of the current state of contamination in Wales.

- The land regeneration network provides some **qualitative information** behind the reasons for contamination in Wales, and although the statistics are from 1988, the article was written much more recently. Wales does have a large legacy of contaminated land due to its industrial past, with the south Wales regions including West Glamorgan and Mid Glamorgan accounting for a significant amount of contamination. Metal mines, coalfields, chemical works, steelworks, lead mines and gasworks cause the majority of contamination in Wales.

6.4 Northern Ireland

- Northern Ireland has still not implemented the **contaminated land regime**, and therefore is behind in identifying the extent of contamination and the number of contaminated sites in the province. Northern Ireland has had a briefer industrial past in comparison to the rest of the UK, and this should mean that contaminated land issues should not be as significant in comparison to other regions.

- A **land quality survey** conducted in 1997 by the Environmental Department for Northern Ireland shows that there is in the region of

xx xxx sites which have previous use that may have caused contamination. At the time of writing this figure is being updated. It is difficult to analyse if this figure provides an accurate reflection of the level of contamination. Indeed the figure only represents sites that have previous use that may cause contamination, and therefore these sites may not all be contaminated. Furthermore there may be more sites unidentified still in use which are contaminated, and sites where contamination has not been identified.

7. Industry Overview

- The UK contaminated land assessment and remediation industry is **fragmented** and consists of several companies offering a broad range of services and smaller companies specialising in niche markets. There are a number of large companies that specialise in a broad range of land contamination techniques. Most large companies offer contaminated land services as part of a range of activities. The market also includes some small independent consultancies and specialists.

- Since the 2004 Landfill Directive there has been a reduction in the number of companies offering **excavation and disposal** services. Indeed Biffa Waste services has formed an alliance with Biogenie to provide a treatment centre. This has allowed Biffa Waste Services to reposition itself in the market for contaminated land assessment and treatment and help Biogenie gain a stronger position in the UK market.

- In the **assessment** market, there is a mix between small companies that deal with contaminated land and larger consultancy firms who have arms that deal with contaminated land assessment.

- The turnovers of the **large companies** who operate in the contaminated land assessment market do not necessarily represent their importance in the contaminated land market, or their market share in the assessment

market, as these companies provide many other consultancy services. In contrast, smaller consultancy companies often operate on a regional basis.

- Many of the companies in the assessment market operate as **consultants**, who analyse any need for remedial treatment. These companies then refer the work to remedial contractors. From this point most consultancy firms oversee the remediation work. Indeed they usually provide testing to ensure that the remediation work is effective and can be validated. In some circumstances, particularly with ground water work, these companies also carry out any necessary long term monitoring. Leading assessment companies include:

- AMEC
- WS Atkins
- Entec
- Mott MacDonald
- URS Corporation

- As part of the assessment, **laboratory testing** is often not completed by the company that carries out the overall assessment and reporting. Laboratories receive the samples for testing, and then provide the consultancy firm with the results from the testing. There are a few laboratories offering nationwide coverage and there are many other much smaller laboratories that only operate on a local or regional basis. These smaller laboratories usually take work from local projects, but tend to

also accept work from the rest of the country if it is available. It is becoming the normality for laboratories to be MCERTS and UKAS accredited to ensure consistency in the way that soils are tested. Leading laboratory testing companies include:

- Alcontrol Geochem
- Analytical and Environmental Services (AES)
- Severn Trent Laboratories (STL)

● In the **remediation** sector there are several large companies that can undertake large projects. Often this is part of large **redevelopment projects**. Most large contractors who provide remediation solutions usually also provide consultancy. Examples of large contractors providing primarily remediation treatment include:

- Churngold Remediation
- DEC
- Keller
- Land Clean
- Edmund Nuttall

There are many **small companies** within the industry that specialise in certain techniques. However, the fact that such companies do not offer a full range of services limits the company to working on certain sites. Examples of companies specialising in one or a few treatments include:

- Beech Soil Stabilisation, the remediation arm of the Beech Group, provides in-situ soil stabilisation services
- Diogen specialises in stabilisation chemicals for in-situ soil remediation and stabilisation
- Some companies provide both **assessment and remediation**. These

companies tend to be quite large and provide a complete service. Examples of some of the leading companies include:

- Arcadis
- Bilfinger Berger
- Norwest Holst
- RSK ENSR

● There are also some **specialist drilling companies** operating in the UK who provide the boreholes for obtaining soil or water samples. Geotron UK is mentioned by trade sources as a main drilling contractor. However some consultancies have the capabilities to do this themselves, which can save on costs.

● There have been some **overseas companies** entering the UK market during the review period. These include Bio-Genie from Belgium; Deep Green (UK) was set up to offer mobile and fixed thermal treatments. It is expected that more companies from continental Europe will enter the UK market, particularly as some countries are considered to be more advanced in the use of remedial technologies than the UK.

● Competition within this market has increased; there have been new entrants into the market, although the increasing size of the market has meant that existing players have not necessarily lost sales.

● Assessment companies and laboratories can be in competition with each other in both offering laboratory work. Indeed some assessment companies are able to offer their own laboratory testing. However most assessment companies do not offer laboratory

testing and laboratory testing companies do not normally offer full assessment services. However **remediation** companies often specialise much more narrowly upon certain techniques. Therefore these companies tend not to be in direct competition. Different techniques can be proposed as alternatives for the same contamination, so in some circumstances the companies may be in competition even though they provide different remediation options.

- There are some **barriers to entry** that make entering the market difficult. Assessment and consultancy companies need the correct expertise, and need the track record to prove their capabilities.
- **Laboratories** need both trained staff and a good reputation. Clients of laboratories will tend to use the

same laboratory for each sample, requiring quick turnaround and reliability.

- **Remediation contractors** need to be able to provide a proven track record that the treatments that they provide are effective. Whether the client is a consultancy or developer they will only choose contractors that can show their methods are time efficient, cost efficient and reliable in their outcome. Remediation contractors do this by providing details of previous work in the form of case studies.
- Developers have been principally involved in housing developments, although some developers are involved in commercial property developments.

8. Market Leaders

- Within the UK market for contaminated land assessment and remediation, no individual company accounts for a significant **market share**. However large companies that operate in construction markets and contaminated land usually have more power and resources to win contracts. These companies tend to win large projects driven by developers. Small and medium sized companies that operate on a regional basis tend to win contracts for their specialist knowledge in specific treatments.

MSI believe that the leading companies within the market for contaminated land assessment and treatments include:

- AMEC
- WS Atkins
- DEC
- Entec
- EnvironmentalResources Management
- Mott MacDonald
- Edmund Nuttal

SAMPLE REPORT

9. Pricing Strategies

- There are slightly different ways in which companies can **set their prices**. One pricing strategy is shared risk between the contractor and the client. This means that if there is a problem and costs rise then both the contractor and the client share the cost. The advantage of this method is that the contractor can set lower prices compared to shouldering full risk, and clients do not take the full risk for the contractors work. This results in the client paying to share the risk with the contractor, but the client's risk is reduced. This method of shared risk demonstrates an example of collaboration to benefit both parties.

- The alternatives are **client risk and contractor risk**. In practise these are not so common. Contractors do not wish to take on the full risk, as if anything goes wrong this could involve substantial cost to them, resulting in them having to charge high prices to cover themselves for projects that go wrong. Similarly, clients are prepared to save money by shouldering increased risk, particularly when there is the possibility of unforeseen costs, without carrying the full risk themselves.

- By **sharing risk** between the client and contractor additional costs and savings are then shared between the groups. Some in the industry know this as sharing 'pain and gain'. This pricing strategy is often used more commonly by small and

medium-sized companies and for developers that do not have the capital in reserve if things go wrong. This method of pricing is also more appropriate where the treatment is not a foregone outcome and further treatment may need to be applied.

- A common way for **remediation contractors** to set prices is by quoting a price that is dependant upon the outcome of the assessment of the site. This is a simple way to give clients a price. The risk is that the quote may not be accurate and unforeseen problems may occur. Indeed some suggest that some treatments are now well established, and so accurate quotes can be given. However this does not apply to many untried and untested treatments in the UK.

- Most **consultancy firms** charge **by the hour** for the consultant's time. This is usually done by estimating the consultant's time and producing a quote for this. The consultancy will also add the cost of a drilling contractor. The cost of drilling depends upon the number of boreholes required and the depth required.

- **Laboratories** set their prices depending upon the number of samples to test and the number of contaminants the client wishes to test for. This depends upon the outcome of the desk study. If the desk study shows one type of bad practice then

it may only be necessary to test for one contaminant. There is also some variability in costs when clients require the test results to be completed faster.

- Companies do not tend to reduce prices to **maintain work volume**. The strategy chosen is to

offer more services for the same money. For example laboratories offer faster testing, more sample testing for the same cost. Assessment companies now provide more options, and more detailed qualitative and financial analysis of different options.

10. Service Mix

- Within the industry, the **largest supplier** of remediation techniques is building contractors who undertake remediation as part of their other operations. This has previously tended to be simple excavation and disposal of contaminated soils. However this is beginning to change. Building contractors are requiring the specialist knowledge of remediation companies to undertake more environmentally friendly techniques, whereas previously the building contractor would have excavated the site and disposed of contaminated soils themselves.

- The market also includes some companies that provide both **assessment and remediation** services. These companies have a competitive advantage as they can complete the whole job, however they do not specialise in either assessment or remediation.

- **Specialist assessment** consultancies work for the client to provide solutions to the contaminated site, or diagnose the site as not contaminated. The assessment companies make treatment recommendations and often find the remediation contractors to complete the work. The assessment companies often monitor the work being carried out, and are involved in the final testing of the site. Some assessment companies also provide laboratory services, however these are rarely on site. Where relevant the assessment company will return to the site to ensure that the treatment is working,

for perhaps 6-12 months depending upon the treatment.

- There are also **specialist drillers** within the industry that drill the boreholes for sample testing; the assessment companies contract in these companies.

- **Specialists laboratories** are an important part of the industry. The laboratories are able to give increasingly accurate information about the contamination within the soil samples. This is the basis for deciding upon the treatment required.

- **Specialist remediation** contractors provide the remedial work for the site, and tend not to get involved with the consultancy and testing of the site. Many specialist contractors only deal with one remedial treatment; in this case their work is very limited. Larger companies tend to be more flexible and offer greater choice. Most specialist remediation contractors are small in size, as they tend to offer a limited range of treatments. They tend to be small companies as they do not get involved with other activities such as construction or consultancy.

- There is arguably a lack of fully integrated companies that can undertake the whole process of assessment and remediation. Even when excavating and disposing of soils, this will usually require a haulier to transport the soils on behalf of the

assessment or remediation contractor. If there were more companies offering consultancy, laboratory and on site testing, drilling and sampling, and a wide range of

remediation techniques the market would change dramatically. Indeed if one company could offer a complete package, costs would be lower as would admin and delays.

11. Mergers & Acquisitions

- There has been some activity in terms of changes in company ownership and operations. However this applies to small companies rather than larger ones. During the review period there has been an increase in the overall number of companies involved in the market. This is due to many small companies entering the market such as laboratory testing facilities, and small consultancy companies.

- As of the 20th January 2006 Casella Group was re-branded as Bureau Veritas. The Casella Group has been part of Bureau Veritas since June 2005, since when the Casella Group has slowly been integrating its activities with Bureau Veritas.

- Terrsula was formed in 2005 as a joint venture between ESL, CEL International, and Euro Dismantling. The companies came together to form Terrsula in response to the perceived need to develop and

market and provide cost effective treatments. ESL is a soil and groundwater specialist, CEL International focuses on engineering and project management, and Euro Dismantling is a demolition and remediation contractor. Permeable reactive barriers are the focus of the company's activity.

- Dew Construction exited the contaminated land market during the review period to concentrate on construction activities.

- Sirius was established in 2003 to provide Brownfield development services.

SAMPLE REPORT

12. Company Profiles

12.1 ALcontrol Laboratories UK

| ALcontrol Laboratories UK | | | |
|---------------------------|---|----------------------|--------------------|
| Address | Units 7-8 Hawarden Park Manor Road Hawarden Deeside CH5 3US | Activity | Laboratory Testing |
| Telephone | 01244 528700 | Turnover 2006 | £xx.x million |
| Fax | 01244 528701 | | |
| URL | www.alcontrol.co.uk | | |

Source : MSI analysis

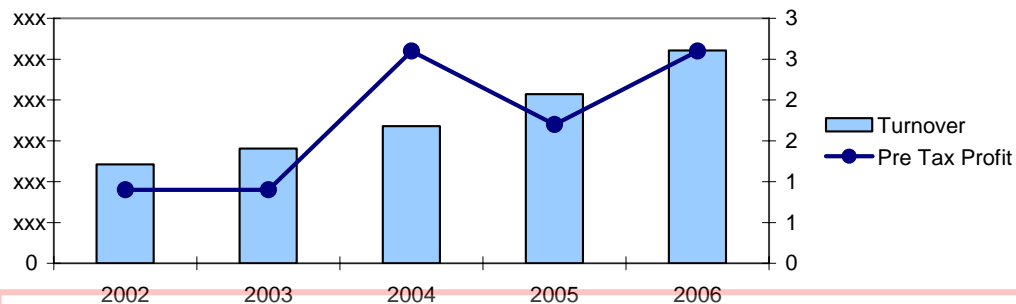
- The company's principal activity is providing environmental and food analysis services for clean water, effluent, contaminated land, food and air. ALcontrol UK's ultimate parent parent undertaking and controlling party ALcontrol Holdings Limited, a company incorporated in the UK.

- ALcontrol Laboratories UK claims to be one of the largest independent testing laboratories in Europe. The company has 20 laboratories in the UK, Ireland, Netherlands, France and Sweden.

- ALcontrol Laboratories UK provides a service to the environmental and food markets. The company has the facilities to analyse soils and associated waters, air, potable water and asbestos. The company can also provide in-situ soil gas analysis.

- In 2006 ALcontrol Laboratories UK reported a turnover of £xx.x million (£xx.x million). Pre-tax profits increased to £x.x million (£x.x million). These results produced a profitably level of 5%.

30) Table: Financial Summary of ALcontrol Laboratories, 2002-2006



SAMPLE REPORT

Turnover

Pre Tax Profit

Profitability

Unit: £ million

Note: Year end is March

Source: ALcontrol Laboratories

12.2 Alfred McAlpine

| Alfred McAlpine | | | |
|------------------|--|----------------------|------------------|
| Address | Kinnaird House 1 Pall Mall East London SW1Y 5AZ | Activity | Support Services |
| Telephone | 020 7930 6255 | Turnover 2005 | £xxxx million |
| Fax | 020 7839 6902 | Employees | xxxx |
| URL | www.alfredmcalpineplc.com | | |

Source : MSI analysis

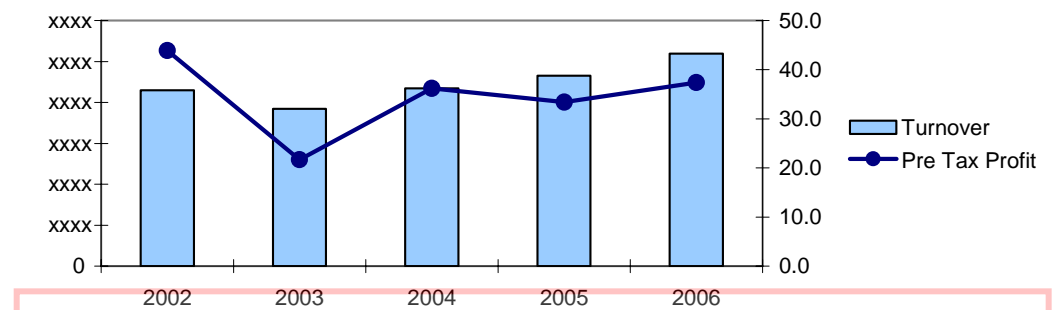
• Alfred McAlpine provides support services for business and employs over xxxx people. The company operates in a wide range of markets including public, regulated and private. The services that the company provides include the following:

- Facilities Management
- Health & Safety Solutions
- Project Services
- Utility Services
- Highways Services
- IT Services
- Slate

• Within project services the company breaks its activities down into civil engineering, construction services, investment and development and PFI. Within civil engineering, Alfred McAlpine undertakes Brownfield regeneration and land remediation projects.

• In 2005 Alfred McAlpine reported a turnover of £x xxx.x million (£x xxx.x million). Pre-tax profits increased to £xx.x million (£xx.x million). These results produced a profitably level of 4%.

31) Table: Financial Summary of Alfred McAlpine, 2001-2005



SAMPLE REPORT

Turnover

Pre Tax Profit

Profitability

Unit: £ million

Note : Year end is December

Source : Alfred McAlpine

12.3 AMEC

| AMEC | | | |
|------------------|--------------------------------------|----------------------|---------------------------------|
| Address | 65 Carter Lane London EC4V 5HF | Activity | Project management and services |
| Telephone | 020 7634 0000 | Turnover 2005 | £x.x billion |
| Fax | 020 7634 0001 | Employees | xxxxx |
| URL | www.amec.com | | |

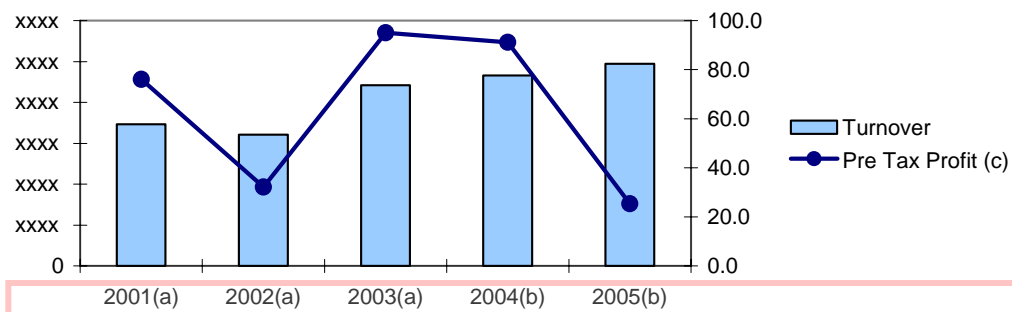
Source : MSI analysis

- AMEC plc is an international project management and services company that designs, delivers and supports infrastructure assets for customers across the public and private sectors. AMEC employs more than 20,000 people working from a network of offices throughout the UK, US and Canada, as well as regional offices and projects worldwide. AMEC's shares are traded on the London Stock Exchange where the company is listed in the Support Services sector (LSE : AMEC.L)

- In 2005 AMEC completed two acquisitions in its oil and gas and nuclear businesses. AMEC acquired Paragon Engineering Services and NNC Holdings

- In 2005 AMEC reported a turnover of £x.x billion (€x.x billion). Pre-tax profits declined to £xx.x million (€xx.x million). These results produced a profitably level of 1%.

32) Table: Financial Summary of AMEC, 2001-2005



SAMPLE REPORT

2001(a) 2002(a) 2003(a) 2004(b) 2005(b) Δ 01-05

Turnover

Pre Tax Profit (c)

Profitability

Unit : £ million

Notes :

Year end is December

(a) The figures for 2001 to 2003 were prepared under UK GAAP and have not been restated

(b) The figures for 2004 and 2005 are prepared under adopted IFRS

(c) Adjusted profit before income tax

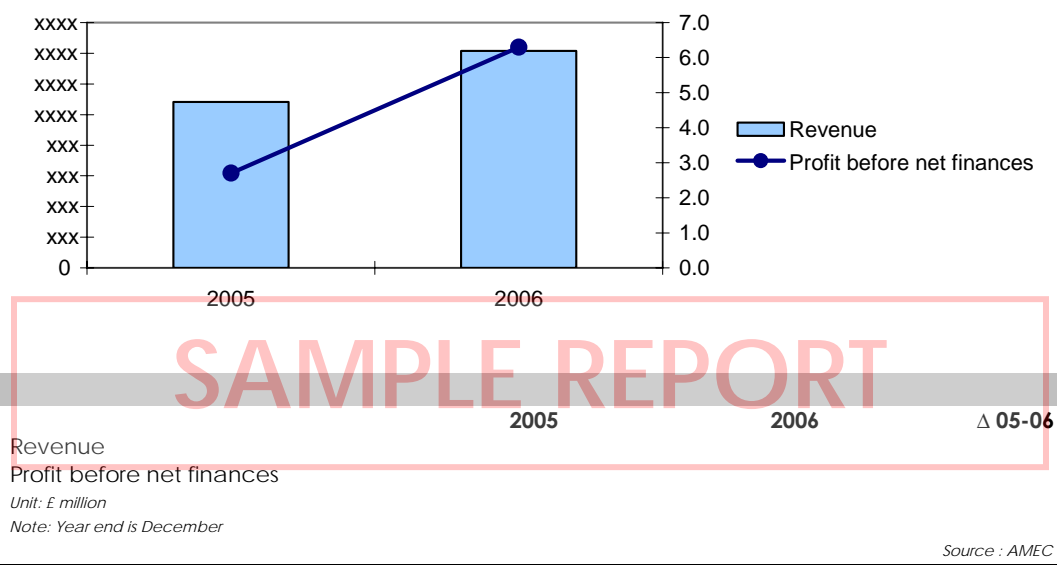
Source : AMEC

• AMEC Earth and Environmental business is the consultancy part of AMEC that specialises in the following sectors:

- Contaminated land investigation assessment
- Remediation

- Environment impact assessment
- Building and occupational health
- Energy efficiency
- Archaeology and ecology

33) Table: AMEC Earth and Environmental's Revenue, 2005-2006



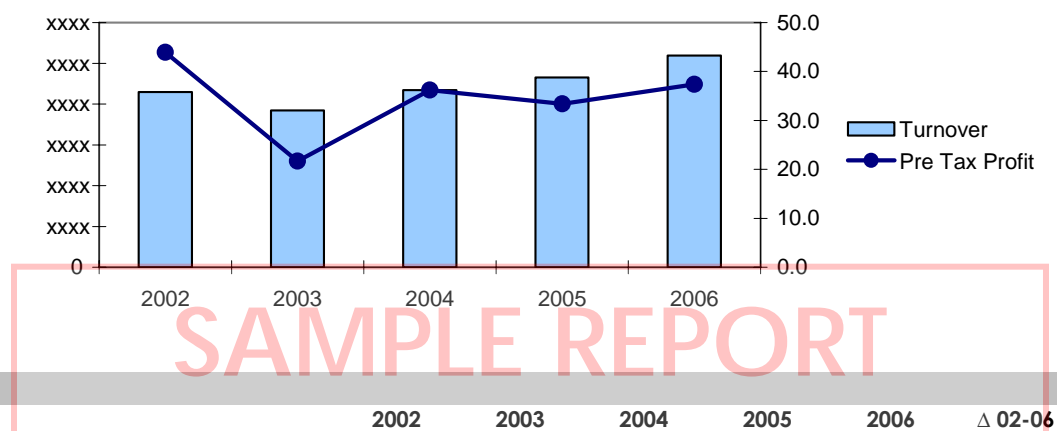
12.4 Atkins

| Atkins | | | |
|------------------|---|----------------------|---------------|
| Address | Woodcote Grove Ashley Road Epsom Surrey KT18 5BW | Activity | Consultancy |
| Telephone | 01372 726140 | Turnover 2006 | £xxxx million |
| Fax | 01372 740055 | Employees | xxxxx |
| URL | www.atkinsglobal.com | | |

Source : MSI analysis

- As set out with its Annual Report 2006, Atkins claims to be the largest engineering consultancy in the UK, the largest multidisciplinary Consultancy in Europe and the fourth largest design firm in the world. Atkins employs approximately xx xxx people.
- Atkins operates in a range of markets including, aviation and defence, highways and transportation, power, education, manufacturing, rail, government, nuclear, telecom, health, oil and gas and water.
- In the contaminated land sector, WS Atkins undertakes the following consultancy based activities:
 - Due Diligence
 - Site Assessment
 - Landfill Gas Assessments
 - Risk Assessment Modelling
- Remediation Strategies and options Appraisal
- Detailed Remedial Design and Project Management
- Compliance and Legislation Advice
- Expert Witness Services
- Data Management and GIS
- The company's specific expertise includes hydrocarbons, heavy metals and radioactivity, ground and landfill gases, industrial and domestic waste and contaminated groundwater.
- In 2006 WS Atkins reported a turnover of £x xxx.x million (£x xxx.x million). Pre-tax profits increased to £xx.x million (£xxx.x million). These results produced a profitably level of 5%.

34) Table: Financial Summary of Atkins Group, 2002-2006



Turnover
Pre Tax Profit
Profitability

Unit: £ million

Note : Year end is December

Source : Alfred McAlpine

12.5 Bachy Soletanche

| Bachy Soletanche | | | |
|------------------|---|----------------------|---------------|
| Address | Henderson House Langley Place Higgins Lane Burscough Lancashire L40 8JB | Activity | Remediation |
| Telephone | 01704 895686 | Turnover 2004 | £xx.x million |
| Fax | 01704 895581 | | |
| URL | www.bacsol.co.uk | | |

Source : MSI analysis

• Bachy Soletanche is the UK subsidiary of the French-based Soletanche Bachy Group. The company claims to be one of the world's leading contractors in foundation and underground engineering. The company's principal activity is geotechnical and ground engineering. Bachy Soletanche provides a number of services and techniques including:

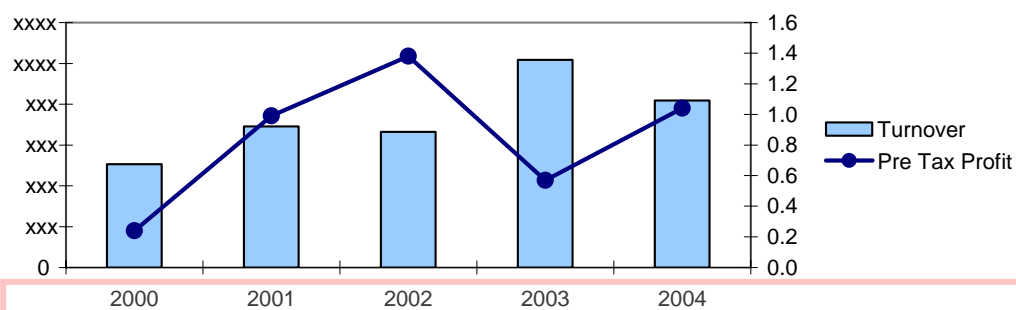
- processes
- environment
- foundations
- walls
- civils
- tunnelling
- ground improvement

• The environment part of the company is involved with a range of land contamination remediation techniques that can be carried out both in-situ and ex-situ. These include the following:

- slurry wall cut offs
- slurry walls with HDPE membranes
- thin cuts offs by vibwall
- gas venting
- active ground barriers

• In 2004 Bachy Soletanche reported a turnover of £xx.x million (£xxx.x million). Pre-tax profits increased to £x.xx million (£x.xx million). These results produced a profitably level of 1%.

35) Table: Financial Summary of Bachy Soletanche, 2000-2004



SAMPLE REPORT

2000 2001 2002 2003 2004 Δ 00-04

Turnover

Pre Tax Profit

Profitability

Unit: € million

Note: Year end is December

Source : Bachy Soletanche

12.6 Biffa Waste Services

| Biffa Waste Services | | | |
|----------------------|---|----------------------|-----------------|
| Address | Coronation Road Cressex Business Park High Wycombe Buckinghamshire HP13 3TZ | Activity | Waste managment |
| Telephone | 01494 521 221 | Turnover 2005 | £xxx million |
| Fax | 01494 463 368 | Employees | xxxx |
| URL | www.biffa.co.uk | | |

Source : MSI analysis

- The primary activity of Biffa Waste Services is waste collection, landfill and special waste services in the UK. The company employs x xxxx people and operates across the UK. The ultimate parent company of Biffa Waste Services is Severn Trent. However in April 2006 the Severn Trent board announced that it plans to de-merge its UK integrated waste management business, Biffa Waste Services. This will create two separately listed companies; Biffa Waste Services will become Biffa Plc. Severn Trent sold Biffa Belgium to Veolia Environmental Services for £xx million in June 2006. Severn Trent is expected to complete the sale of its testing laboratories for remediation processes, operating under the name of Severn Trent Laboratories (STL), in December 2006.

- Biffa set up a strategic alliance with contaminated land specialists, Biogenie Site Remediation, to provide companies with a way to remove soils from site, whilst at the same time achieving diversion from landfill. This off site treatment centre became operational in November 2005. According to the company, the

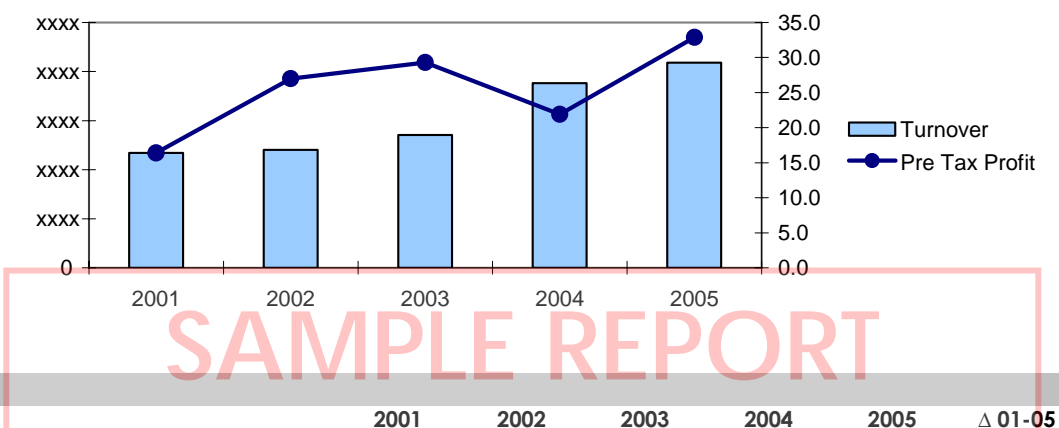
alliance brings together Biogenie's expertise in operating soil treatment facilities with Biffa's distribution network and client base.

- Biffa Waste Services can provide a range of in-situ and ex-situ treatment techniques, including the following:

- Filtration and separation plant for the removal of hydrocarbons, metals and solids
- Activated carbon and catalysed oxidation to treat a broad range of contaminants
- Air strippers for ammonia and solvent removal
- Adjustment of pH for metal removal
- Chemical and biological treatment
- Heavy duty vacuumation capabilities

- In 2005 Biffa Waste Services reported a turnover of £xxx million (£xxx million). Pre-tax profits increased to £xx.x million (£xx.x million). These results produced a profitably level of 8%.

36) Table: Financial Summary of Biffa Waste Services, 2001-2005



Turnover
Pre Tax Profit
Profitability

Unit: £ million

Note : Year end is March

Source : Biffa Waste Services

12.7 Bilfinger Berger Environmental

| Bilfinger Berger Environmental | | | |
|--------------------------------|--|----------------------|--------------|
| Address | Laser House 75-79 Guildford Street Chertsey Surrey KT16 9AS | Activity | Remediation |
| Telephone | 01932 577 290 | Turnover 2004 | £x.x million |
| Fax | 01932 571 917 | | |
| URL | www.bilfinger.co.uk | | |

Source : MSI analysis

- The principal activity of Bilfinger Berger Environmental is remedial engineering work. The directors regard Bilfinger Berger a company registered in Germany, as the ultimate parent and controlling party. In 2002 Bilfinger Berger Environmental was formed to separate the remediation technologies from the construction side of the business. In 2005 Bilfinger Berger Environmental opened a new office in Manchester to expand its operations into the North of England and Scotland.

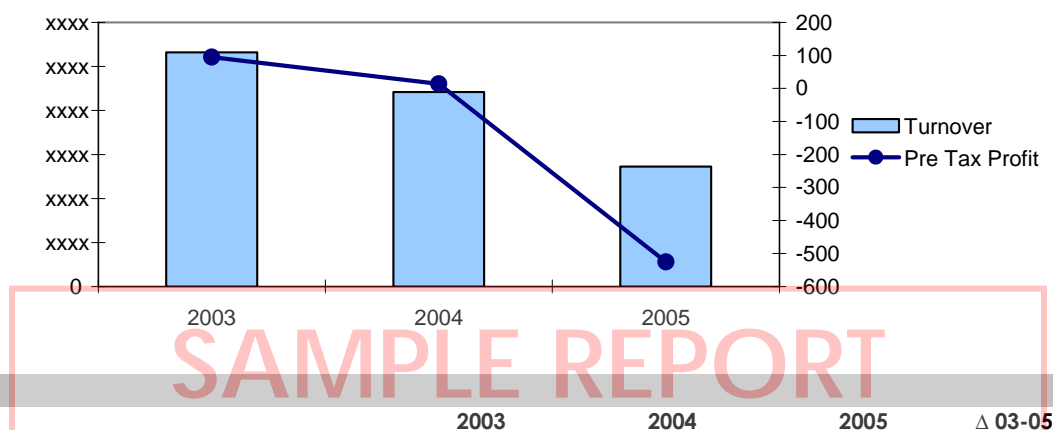
- The company provides a wide range of remediation techniques for the redevelopment of contaminated land. The company offers a wide range of techniques including thermal desorption, bioremediation (windrow turning and ex-situ static

methods), soil vapour extraction, air sparging, soil washing and stabilisation solidification.

- The company has a range of clients including petrochemical, chemical industries, government, institutional bodies, developers, consultants and local authorities. The company also supplies specialist plant equipment.

- Bilfinger Berger AG launched Bilfinger Berger Environmental in the UK in summer 2002. As this is a new start-up company for Bilfinger Berger AG, operating profits and return on investments are not anticipated until 2007/2008 period.

37) Table: Financial Summary of Billfinger Berger Environmental, 2003-2005



Turnover

Pre Tax Profit

Profitability

Unit: € 000

Notes:

Year end is December ;

(a) 18 month period to December

At the time writing no subsequent accounts for the company were available to MSI

Source : Billfinger Berger Environmental Ltd

12.8 Bureau Veritas

| Bureau Veritas | | | |
|------------------|--|----------------------|-----------------------------|
| Address | Tower Bridge Court 224-226 Tower Bridge Road London SE1 2TX | Activity | Verification Consultancy |
| Telephone | 020 7550 8900 | Turnover 2005 | €xxxx million |
| Fax | 020 7089 7084 | Employees | xxxxx |
| URL | www.bureauveritas.co.uk | | |

Source : MSI analysis

- Bureau Veritas is a professional services company specialising in independent verification and advice in the areas of Quality, Health and Safety, Environment and Social Accountability. In total the company has a global network of over 600 offices and laboratories across 150 countries with over xx xxx employees.

- Bureau Veritas provide independent advice on a wide spectrum of markets dealing with health, safety and environment. The firm provides consultancy and laboratory services to ensure that environmental liabilities are controlled. The chemistry testing and analysis sector provides a wide range of services related to contaminated land, including:

- combined geotechnical, environmental and groundwater investigation
- pre-acquisition or development assessment
- management of contamination, remediation and verification projects
- specialist expertise in liaising with the relevant regulators including local authorities and the

Environmental Agency

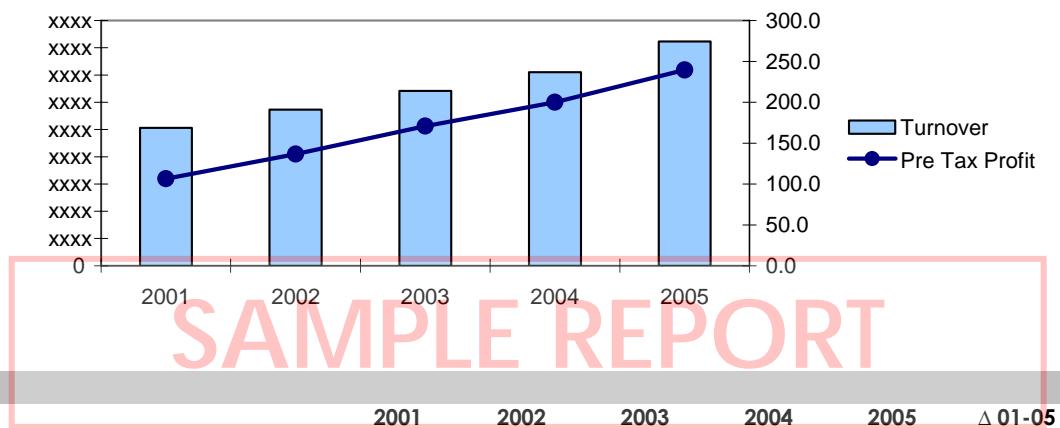
- specialist expertise in the Application of the Part IIA regime
- waste and soils classification

- Bureau Veritas' in-house laboratories support with a full range of chemical and soils testing capabilities :

- MCERTS Accreditation
- asbestos analysis
- water analysis – leachates, ground water, surface water, bottled water
- specialist organics testing, including oils, fuels, volatile materials, pesticides and herbicides
- concrete and building material analysis
- site gas and air monitoring

- In 2005 Bureau Veritas reported a turnover of €x xxx.x million. Pre-tax profits increased by €xxx.x million. These results produced a profitably level of 15%.

38) Table: Financial Summary of Bureau Veritas, 2001-2005



Turnover
Pre Tax Profit
Profitability

Unit: € million

Note : Year end is December

Source : Bureau Veritas

12.9 Churngold Remediation

| Churngold Remediation | | | |
|-----------------------|---|----------------------|--------------|
| Address | St. Andrews House St. Andrews Road Avonmouth Bristol BS11 9DQ | Activity | Remediation |
| Telephone | 0117 916 0510 | Turnover 2006 | £x.x million |
| Fax | 0117 916 0511 | | |
| URL | www.churngold.com/remediation/ | | |

Source : MSI analysis

- The principal activity of Churngold Remediation is the remediation of contaminated sites throughout the UK and South Africa. Churngold Remediation is part of Churngold. Churngold operates in the following sectors:

- Construction
- Remediation
- Transport
- Corporate

- Churngold Remediation categorises its treatments into four types:

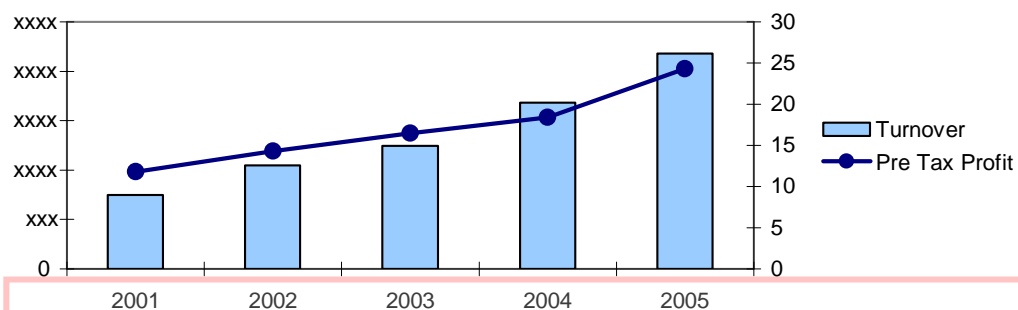
- Physical technologies – This includes permeable reactive barrier walls and capping, white Karbon absorption media, pump and treat, dual phase vapour extraction, soils/sediment washing, soil scrubbing
- Biological technologies – This includes ex-situ and in-situ bioremediation, direct oxygen

infusion, oxygen release compounds and hydrogen release compounds

- Thermal technologies– This includes steam injection, steam enhanced extraction, electrical resistive heating and ex-situ thermal desorption
- Other technologies – In-situ chemical oxidation, geo chemical stabilisation/fixation, foaming bitumen recycling and phosphate induced metals stabilisation

- In 2006 Churngold Remediation reported a turnover of £x.x million (£x.x million). Pre-tax profits amounted to £x.xx million (£x.xx million). These results produced a profitably level of 2%.

39) Table: Financial Summary of Churngold Remediation, 2002-2006



SAMPLE REPORT

Turnover

Pre Tax Profit

Profitability

Unit : £ million

Note : Year end is December

Source : RPS Group

12.10 DEC

| DEC | | | |
|------------------|---|----------------------|------------------------------|
| Address | Greenstede House Wood Street East Grinstead West Sussex RH19 1UZ | Activity | Environmental Contractors |
| Telephone | 01342 323 000 | Turnover 2005 | £xx.x million |
| Fax | 01342 326 000 | Employees | |
| URL | www.decnv.com | | |

Source : MSI analysis

- DEC claims to be one of Europe's largest and most experienced environmental contractors. DEC is a Belgian owned company.

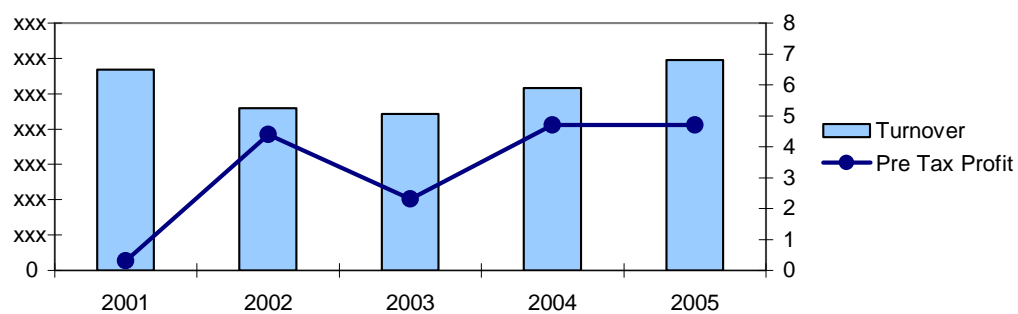
- The techniques that DEC offers includes:

- Soil washing
- Bioremediation
- Thermal desorption
- Fixed treatment facilities for contaminated soils/sediments
- In-situ treatments for soils and groundwater
- Dredging
- Treatment of contaminated sediments

- A new treatment centre is set to become operational in the last quarter of 2006. This centre is named Terramundo and is a joint venture between DEC and Augean; the centre will be located at Augean's Port Clarence landfill site. This facility will offer physio-chemical treatment primarily for soils that cannot be sent directly to landfill.

- In 2005 DEC reported a turnover of €xx.x million. Pre-tax profits amounted to € x . x million. These results produced a profitably level of 17%.

40) Table: Financial Summary of DEC, 2001-2005



Turnover
Pre Tax Profit
Profitability
Unit : € million
Note : Year end is December

2001 2002 2003 2004 2005 Δ 01-05

SAMPLE REPORT

Source : DEC

12.11 Edmund Nuttall

| Edmund Nuttall | | | |
|------------------|--|----------------------|------------------------------|
| Address | St James House Knoll Road Camberley Surrey GU15 3XW | Activity | Civil engineering contractor |
| Telephone | 01276 63484 | Turnover 2005 | £xxx million |
| Fax | 01276 66060 | | |
| URL | www.edmund-nuttall.co.uk | | |

Source : MSI analysis

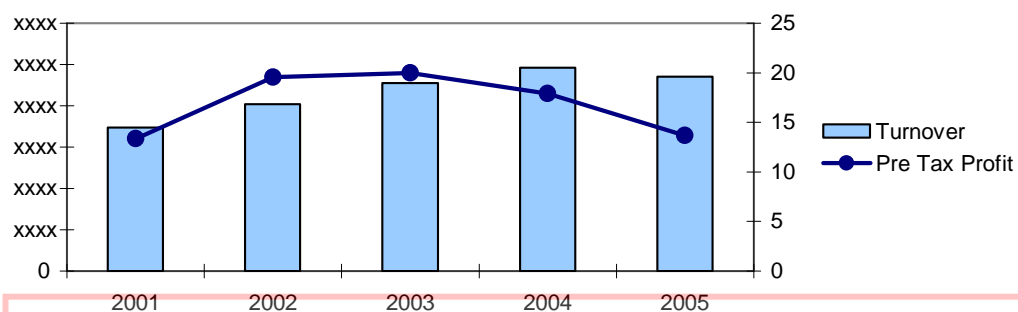
- Edmund Nuttall is primarily involved in civil engineering, operating via a network of regional offices. Edmund Nuttall's parent company is Royal BAM Group.

- Within the contaminated land assessment and remediation market, the company's capabilities include initial contaminated site investigation, materials testing and the provision of the following types of remediation:

- bioremediation
- encapsulation
- soil washing
- soil vapour extraction
- ground water treatment
- ground stabilisation

- In 2005 Edmund Nuttall reported a turnover of £xxx.x million (£xxx.x million). Pre-tax profits decreased to £xx.xx million (£xx.xx million). These results produced a profitably level of 3%.

41) Table: Financial Summary of Edmund Nuttall, 2001-2005



SAMPLE REPORT

Turnover

Pre Tax Profit

Profitability

Unit : £ million

Note : Year end is December

Source : Edmund Nuttall

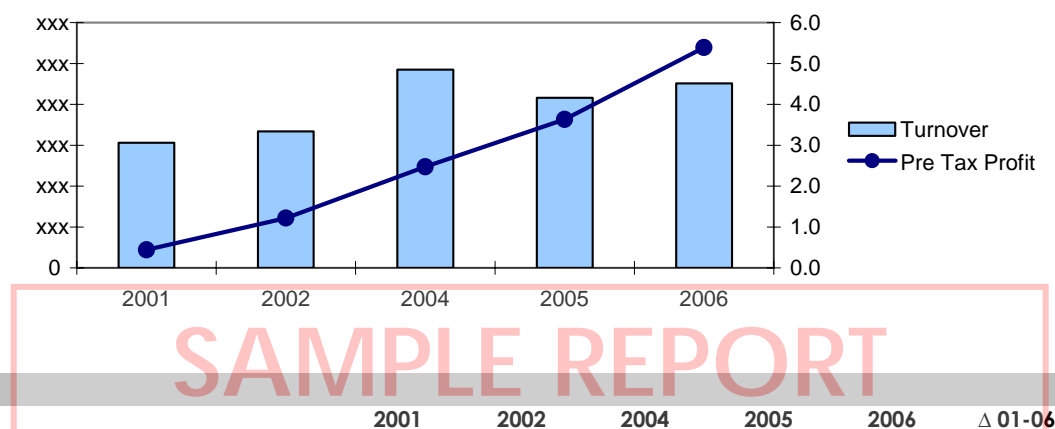
12.12 Entec UK

| Entec UK | | | |
|------------------|--|----------------------|---|
| Address | Northumbria House Regent Centre Gosforth Newcastle-upon-Tyne Tyne & Wear NE3 3PX | Activity | Environmental Consultancy and Engineering |
| Telephone | 0800 371 733 | Turnover 2006 | £xx.x million |
| Fax | 0191 272 6592 | | |
| URL | www.entecuk.com | | |

Source : MSI analysis

- The principal activity of the company is the provision of environmental and engineering consultancy. Entec UK operates from xx offices in the UK. Entec UK was subject to a management buy-out in 2005.
- Entec's expertise is in engineering, environment and safety. Entec undertakes desk studies, site investigations, risk assessment, remediation planning and design, soil and groundwater remediation, insurance and aftercare planning.
- Entec's contaminated land services include the following:
 - investigation and clean up of pollution spills on sensitive operational sites
 - liability assessments in relation to land acquisition or divestment
 - decontamination of former military and heavy industry sites
 - clean-up of land contaminated by radioactivity
 - development of derelict sites for commercial use and residential housing
 - urban regeneration and renewal
- In 2005 Entec UK reported a turnover of xx.x million (£xx.x million). Pre-tax profits were £x.x million (£x.x million). These results produced a profitably level of 8%.

42) Table: Financial Summary of Entec UK, 2001-2006



Turnover
Pre Tax Profit
Profitability
Unit: £ million
Note :
(a) : Year end is December ;
(b) : 15 months ending March ;
(c) : Year end is March
At the time writing no subsequent accounts for the company were available to MSI

Source : Entec UK

12.13 Environmental Resources Management

| Environmental Resources Management | | | |
|------------------------------------|--------------------------------------|----------------------|------------------------------|
| Address | 8 Cavendish Square London W1G 0ER | Activity | Environmental Consultancy |
| Telephone | 020 7465 7200 | Turnover 2005 | £33.4 million |
| Fax | 020 7465 7272 | Employees | xxx |
| URL | www.erm.com | | |

Source : MSI analysis

• Environmental Resources Management's (ERM) principal activities are the provision of environmental, risk and health and safety consulting services. ERM employs over xxx people across xx countries.

• ERM's site investigation and remediation team has experience in a range of services in the following areas:

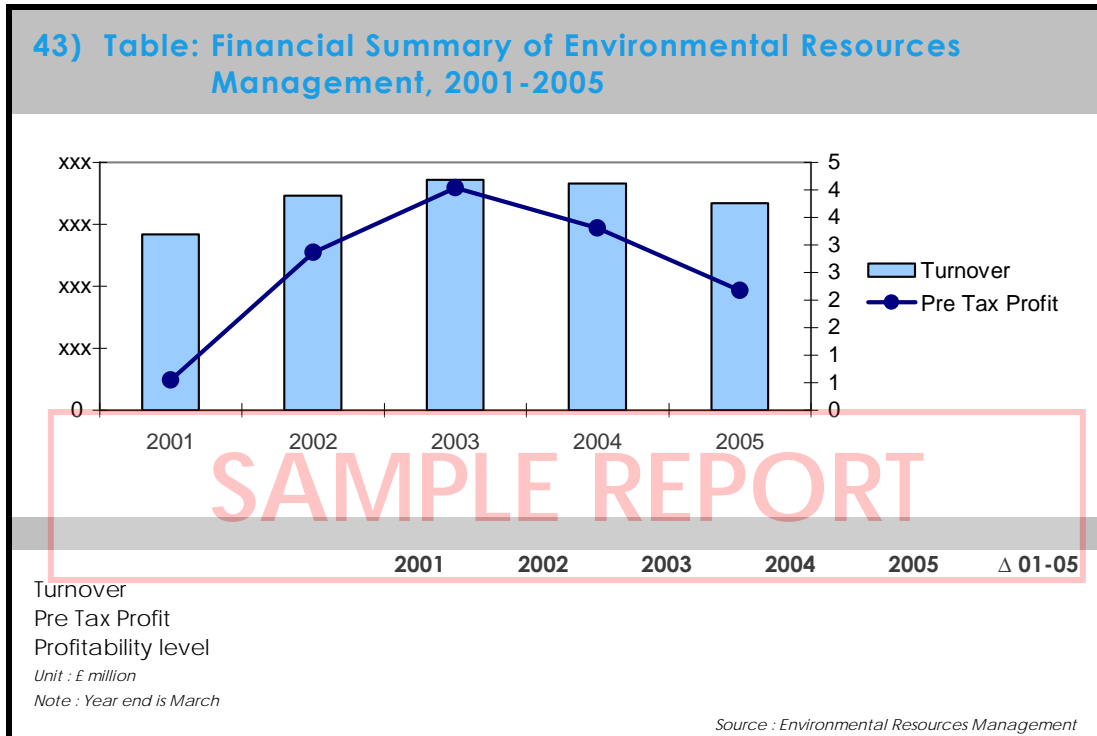
- Phase I and II environmental assessments
- Site investigation
- Risk assessment
- Program management and contractor oversight
- Brownfields/site redevelopment
- Corrective action
- Remediation
- Construction management
- System operation and maintenance
- Decontamination and demolition
- Excavation, transportation and disposal
- Site closure
- Modelling

• ERM has the capability to deal with a wide range of contaminants including oil and petroleum products, tars, toxic metals, pesticides, PCBs and chlorinated solvents. Indeed to do this ERM offers a wide range of remediation techniques:

- In-situ, ex-situ and enhanced bio-remediation
- Reductive dechlorination
- Monitored natural attenuation
- In-situ chemical oxidation
- Dual phase vacuum extraction
- Air sparging
- Sparging barriers
- Bioventing, biosparging
- NAPL recovery
- Bioslurping or multi-phase extraction
- Reactive barrier walls (zero valent iron)
- In-situ thermal systems
- Groundwater pump and treat and point of use systems
- On-site thermal desorption of soils
- On-site and off-site incineration
- Material segregation and contaminant removal
- Engineered cover systems
- Landfill gas control

- Leachate treatment and control
- Design, build and operation of remediation equipment
- In 2005 Environmental Resources Management reported a turnover of £xx.x million (£xx.x million). Pre-tax

profits decreased by 34% during the same period to £x.xx million (£x.xx million). These results produced a profitably level of 6%. A financial summary of Environmental Resources Management between 2001 and 2005 is shown in the following table.



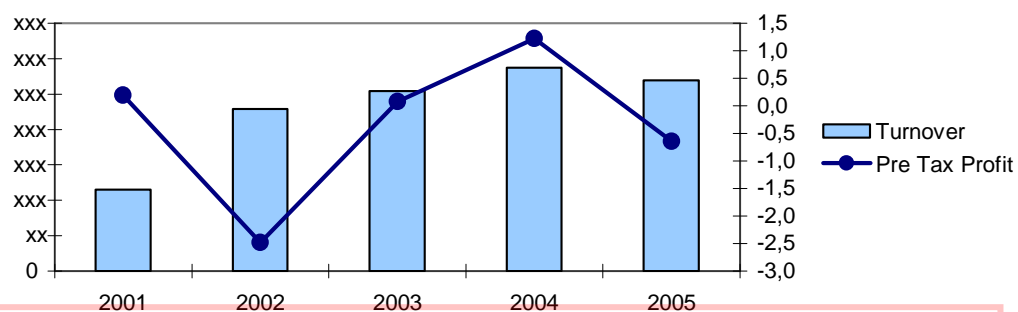
12.14 Enviros

| Enviros | | | |
|------------------|--|-----------------------|------------------------------|
| Address | Regus House 1010 Cambourne Business Park Cambourne Cambridge CB3 6DP | Activity | Environmental Consultancy |
| Telephone | 0870 1652 400 | Turnover 2004 | £xx.x million |
| Fax | 0870 1652 424 | Employees 2005 | xxx |
| URL | www.enviros.com | | |

Source : MSI analysis

- The company's principal activity is the provision of professional services and software solutions in respect of sustainable development and environmental issues concerning land, air, water and waste.
- The development and regeneration team of Enviros deals with the management of adding maximum value to a development scheme. This includes the management, cost and liability reduction of contaminated land.
- The group operates from nine offices in the UK and one office in the Republic of Ireland, plus subsidiaries in Canada, Czech Republic and Spain. Enviros employs over xxx people in 2005 in ten offices in the UK, Ireland and two offices in mainland Europe (Barcelona and Prague).
- In 2005 Enviros reported a turnover of £xx.x million (€xx.x million) and a loss of £x.xx million (€x.xx million).

44) Table: Financial Summary of Enviros, 2001-2005



SAMPLE REPORT

Turnover

Pre Tax Profit

Profitability level

Unit : £ million

Note : Year end is December ; (a) : year end is March ; (b) : 8 month period ending December 2001

Source : Enviros

12.15 Fugro

| Fugro | | | |
|------------------|--|----------------------|-------------|
| Address | Fugro House Hithercroft Road Wallington Oxfordshire OX10 9RB | Activity | Consultancy |
| Telephone | 0870 402 1400 | Turnover 2004 | £x million |
| Fax | 0870 402 1499 | | |
| URL | www.fugro.co.uk | | |

Source : MSI analysis

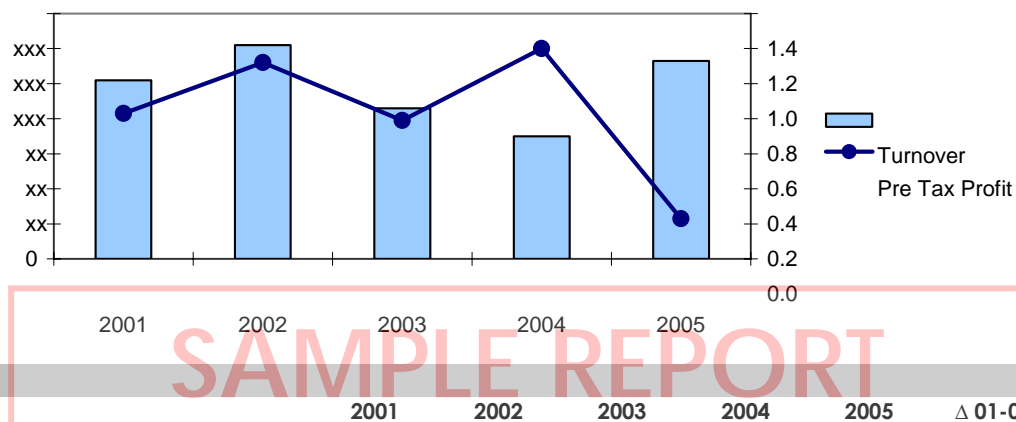
- The principal activity of the company is the provision of data collection, testing and consultancy services in the fields of geotechnical engineering and structural monitoring. Fugro's clients include civil engineering, oil and gas, and renewable energy industries in the UK and abroad. Fugro claims to be the world's largest integrated geotechnical, survey and geosciences company. Fugro is controlled by Fugro Holdings, which in turn is a subsidiary of Fugro NV, a company incorporated in the Netherlands. Fugro Engineering Services is the part of Fugro that deals with geotechnical and geo-environmental site investigations.

- Fugro Engineering Services offers a range of services within the following areas:

- Land site investigations
- Coastal site investigations
- Cone penetration testing
- Geoenvironmental services
- Geophysics and pile testing
- Unexploded ordnance clearance services
- Consultancy
- Drilling services
- Laboratory testing

- In 2004 Fugro reported a turnover of £xx.x million (£xx.x million). Pre-tax profits declined to £x.xx million (£x.xx million). These results produced a profitably level of 2%.

45) Table: Financial Summary of Fugro, 2001-2005



Turnover

Pre Tax Profit

Profitability

Unit : £ million

Note : Year end is December

Source : Fugro

12.16 Keller Ground Engineering

| Keller Ground Engineering | | | |
|---------------------------|---|----------------------|---|
| Address | Oxford Road Ryton-on-Dunsmore Coventry CV8 3EG | Activity | Foundation and Geotechnical Engineering |
| Telephone | 024 7651 1266 | Turnover 2005 | £xx.x million |
| Fax | 024 7630 5230 | | |
| URL | www.keller-ge.co.uk | | |

Source : MSI analysis

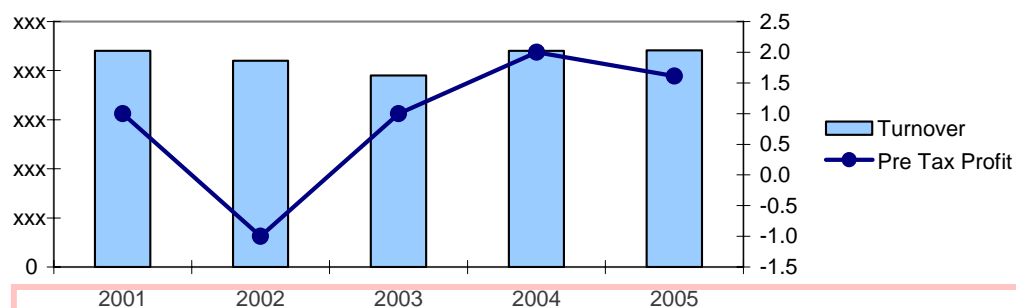
- The principal activity of Keller is specialist foundation and geotechnical engineering and contracting. Keller is part of the Keller Group a company registered in England and Wales. The Keller Group operates in the USA, across Europe, Australia and various other parts of the world.

- The company provides treatment solutions for contaminated soil and groundwater. The company specialises in in-situ remediation techniques combined with advanced foundation solutions. The land remediation areas that Keller specialise in include:

- Groundwater cut off barriers
- Landfill gas barriers
- Landfill gas venting trenches
- Soil washing
- Permeable reactive barriers
- Ground barriers
- Bioremediation
- Hydro fracture
- Slurry walls

- In 2005 Keller reported a turnover of £xx.x million (£xx.x million). Pre-tax profits increased by 63% during the same period to £x.xx million (£x.xx million). These results produced a profitably level of 4%.

46) Table: Financial Summary of Keller Ground Engineering, 2001-2005



SAMPLE REPORT

Turnover
Pre Tax Profit
Profitability level
Unit: € million
Note : (a) : restated
Year end is December

Source : Keller

12.17 Land Clean

| Land Clean | | | |
|------------------|---|-----------------|-----------------|
| Address | Manor Barn Hawkley Road Hawkley Liss Hampshire GU33 6JS | Activity | Decontamination |
| Telephone | 01730 712000 | | |
| Fax | 01730 712001 | | |
| URL | www.landclean.net | | |

Source : MSI analysis

- The main activity of Land Clean is the contractor service of contamination treatments, water treatments, plant and machinery hire and emergency response.

- Land Clean deals with the whole process of decontaminating a site. This includes assessment, treatment and aftercare. The company provides biological, physico-chemical, thermal and containment treatments. The company also has a

dedicated department for treating contaminated water. Furthermore Land Clean claims to be the first company in the UK to operate indirect and direct fired thermal desorption plants.

- At the time of writing no financial accounts were available for Land Clean.

12.18 Mott MacDonald

| Mott MacDonald | | | |
|------------------|--|----------------------|----------------------------|
| Address | St Anne House 20-26 Wellesley Road Croydon Surrey CR9 2UL | Activity | Engineering Consultancy |
| Telephone | 020 8774 2000 | Turnover 2004 | £xxx.x million |
| Fax | 020 8681 5706 | Employees | xxxxx |
| URL | www.mottmac.com | | |

Source : MSI analysis

- The company's principal activity is that of engineering consultancy services. Mott MacDonald's ultimate parent company is Mott MacDonald Group. The company operates in 100 countries and employs over 8000 people.

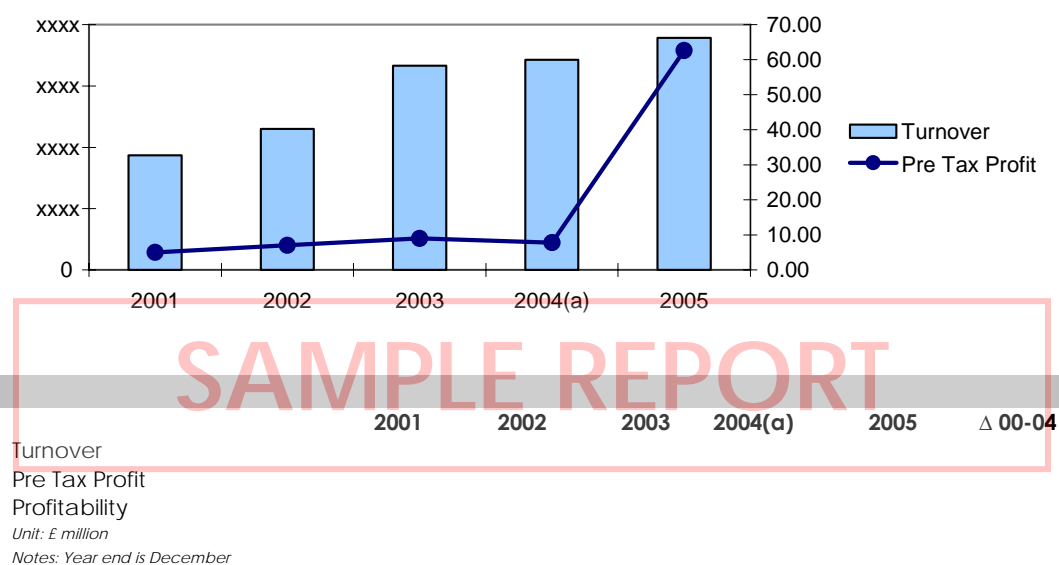
- Mott MacDonald offers a range of consultancy services in the following markets:

- Buildings
- Communication
- Education
- Environment
- Health
- Industry
- Oil and gas
- Power
- Transport
- Urban Development
- Water

- The company offers a full range of contaminated land services such as strategic policy studies, investigation, remediation of single sites and environmental due diligence. The company's clients include national and local governments, industry, utilities, transport authorities, commercial companies, contractors, banks, funding agencies and private individuals.

- In 2005 Mott MacDonald reported a turnover of £xxx.xmillion (£xxx.x million). Pre-tax profits rose significantly during the same period to £xx.xxmillion (£xx.xx million). These results produced a profitably level of 17%.

47) Table: Financial Summary of Mott MacDonald, 2000-2004



12.19 RPS Group

| RPS Group | | | |
|------------------|---|----------------------|------------------------------|
| Address | Centurion Court 85 Milton Park Abingdon Oxfordshire OX14 4RY | Activity | Environmental Consultancy |
| Telephone | 01235 438 151 | Turnover 2005 | £xxx.x million |
| Fax | 01235 438 188 | Employees | xxxx |
| URL | www.rpsplc.co.uk | | |

Source : MSI analysis

- The principal activity of RPS Group is the provision of environmental consultancy and related services including environmental planning, environmental sciences, health and safety, occupational hygiene and design. The company employs over 3000 people and operates in the UK, Ireland, Netherlands, Australia, USA, Canada and Malaysia.

- The RPS group provides the following services:

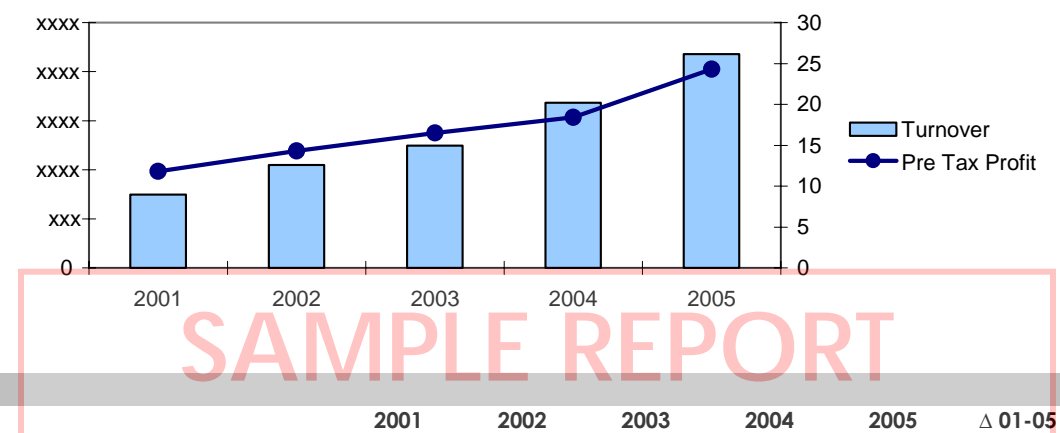
- Building and Urban Design
- Corporate Social Responsibility/Environmental Management
- Ecology
- Energy
- Engineering Consultancy
- Environmental Impact
- Health and Safety
- Laboratory Services
- Regeneration
- Town & Country Planning

- Transport Planning
- Waste Management
- Water Management

- The contaminated land services provided include detailed intrusive investigation based upon the information from the desk study, remedial investigation to provide additional data to support risk assessment models, quantitative risk assessment modelling for human health and environmental risk. The company also undertakes asbestos surveys, ordinance detection and radioactive substances surveys.

- In 2005 RPS Group reported a turnover of £xxx.x million (£xxx.x million). Pre-tax profits increased to £xx.x million (£xx.x million). These results produced a profitably level of 11%.

48) Table: Financial Summary of RPS Group, 2001-2005



Turnover

Pre Tax Profit

Profitability

Unit : £ million

Note : Year end is December

Source : RPS Group

12.20 Shanks Group

| Shanks Group | | | |
|------------------|---|----------------------|------------------|
| Address | Dunedin House Auckland Park Mount Farm Milton Keynes Buckinghamshire MK1 1BU | Activity | Waste Management |
| Telephone | 0800 282 877 | Turnover 2005 | £xxx million |
| Fax | 01908 650 694 | | |
| URL | www.shanks.co.uk | | |

Source : MSI analysis

- Shanks Group claims to be one of Europe's largest independent waste management companies. The group serves customers in the UK, Belgium and the Netherlands. Shanks Group has national coverage with many locations throughout the UK. Shanks Group offers a wide range of waste management solutions from waste from heavy manufacturing to household waste.

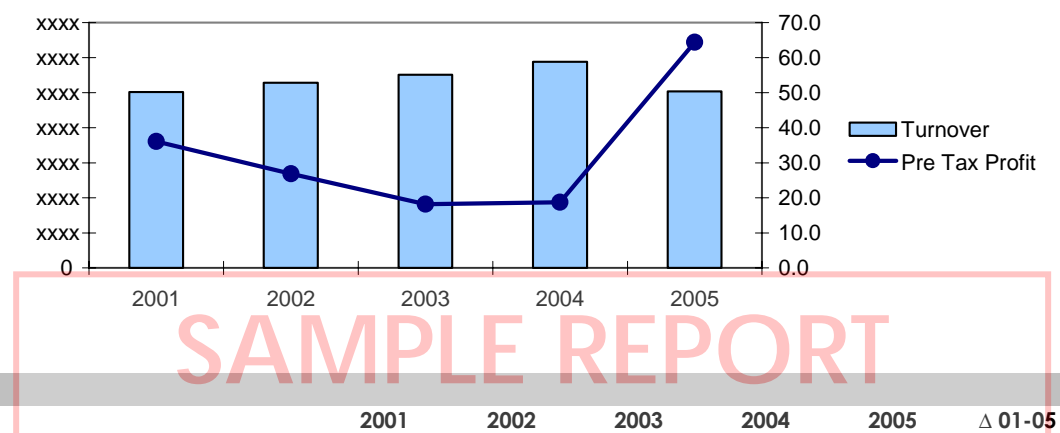
- Shanks offers the following remediation technologies:

- Ex-situ bioremediation by Bio-logic

- Soil washing
- Excavation, haulage and disposal
- Containment
- On-site water treatment
- Sludge/water removal by tanker
- Stabilisation
- Incineration

- In 2005 Shanks Group reported a turnover of £xxx.x million (£xxx.x million). Pre-tax profits increased to £xx.x million (£xx.x million). These results produced a profitably level of 4%.

49) Table: Financial Summary of Shanks Group, 2001-2005



12.21 URS Corporation

| URS Corporation | | | |
|------------------|--|----------------------|---------------|
| Address | St George's House 5 St George's Road London SW19 4DR | Activity | Consultancy |
| Telephone | 020 8944 3300 | Turnover 2005 | £xxxx million |
| Fax | 020 8944 3301 | Employees | xx xxx |
| URL | www.urscorp.com | | |

Source : MSI analysis

- The URS Corporation offers a wide range of consultancy services within the construction industry. The company claims to be the industry leader in the following sectors:

- Environmental Consulting
- Transport services
- Strategic facilities management
- Engineering design
- Mergers and acquisitions consultancy
- Corporate responsibility consulting
- Economics and property development

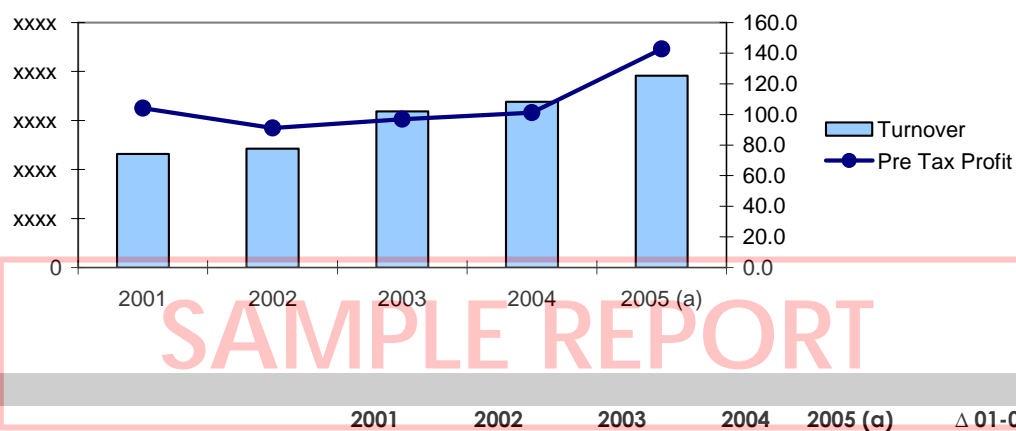
- URS Corporation is an American owned company, with the European and headquarters in London. The company has European operations in the UK, Belgium, France, Germany, Ireland, Italy, Netherlands, Spain and Sweden. The company operates in 20 countries employing approximately xx xxx people with a network of xxx offices. The company provides

services to central, state and local government agencies, as well as private clients in the chemical, manufacturing, pharmaceutical, forest products, mining, oil and gas, and utilities and industries.

- The URS Corporation is involved with environmental consultancy, in the UK and in the UK claims to be the industry leader in liability management and corrective action for contaminated land and groundwater. Examples of remediation capabilities include monitored natural attenuation and soil vapour extraction.

- In 2005 URS Corporation reported a worldwide turnover of \$x xxx million (£x xxx million). Pre-tax profits increased by 34% during the same period to \$xx.x million (£xx.x million). These results produced a profitably level of 2%.

50) Table: Financial Summary of URS Corporation, 2001-2005



Turnover

Pre Tax Profit

Profitability

Unit : \$ million

Notes :

Year end is October

(a) : Year end is December

Source : URS Corporation

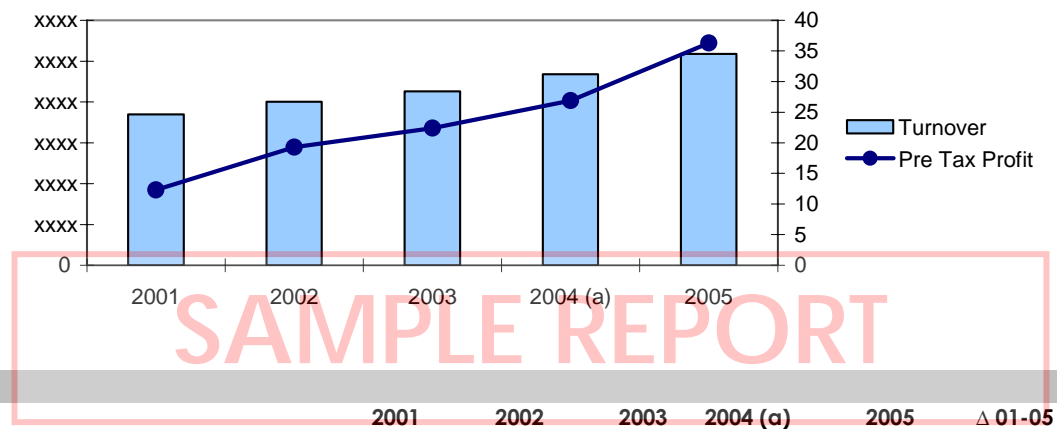
12.22 Veolia Environmental Services

| Veolia Environmental Services | | | |
|-------------------------------|--|----------------------|---------------------|
| Address | Veolia House 154A Pentonville Road London N1 9PE | Activity | Waste Management |
| Telephone | 020 7812 5000 | Turnover 2005 | £xxx.x million |
| Fax | 020 7812 5001 | | |
| URL | www.veoliaenvironmentalservices.co.uk | | |

Source : MSI analysis

- The principal activity of Veolia Environmental Services is the provision of waste management services to the public and private sectors, including waste collection, recycling, disposal and environmental cleansing. In February 2006 Onyx Environmental Group became known as Veolia Environmental Services. Onyx had previously been the waste management division of Veolia Environment.
- The company provides a range of refuse collection, recycling, waste treatment and street cleansing services through xx local authorities in the UK. The company also operates a number of landfill sites, materials recovery facilities, transfer solutions, civic amenity sites, energy recovery facilities and compost sites.
- Veolia also operates Minosus, a safe underground storage facility within a worked out area of a rock salt mine for the permanent disposal of a range of solid and granular hazardous wastes. The company offers this as an alternative to landfill. Waste stored here is treated to some extent, so as to make it into solid or granular form.
- In 2005 Veolia Environmental Services reported a turnover of £xxx.x million (€xxx.x million). Pre-tax profits increased by 89% during the same period to £xx.x million (€ xx.x million). These results produced a profitably level of 6%.

51) Table: Financial Summary of Veolia Environmental Services, 2001-2005



Turnover
Pre Tax Profit
Profitability

Unit : £ million

Notes :

Year end is December

(a) : restated

Source : Veolia

13. SWOT Analysis

| 7) Analysis : SWOT Analysis of the UK Contaminated Land Assessment and Remediation Market | | | |
|---|--|---|--|
| Strengths | | Weaknesses | |
| <ul style="list-style-type: none"> • Landfill Directive • Developers • Brownfield sites • Bioremediation • Reporting and risk analysis • South East economy | | <ul style="list-style-type: none"> • Physical treatments • Developers • Thermal Treatments • Containment methods • Basement structures • Limited effectiveness of treatments • Assessment inaccuracies | |
| Opportunities | | Threats | |
| <ul style="list-style-type: none"> • Regional Treatment Centres • On-site Soil Testing • Olympic Games • Expanded Treatment Application • Dealing with new contaminants • Domestic leakages | | <ul style="list-style-type: none"> • Long Term Supply of Brownfield Sites • Developers Preferring Greenfield Land • Inaccurate Assessments • New Regulations | |

Source : MSI and Trade Analysis

13.1 Strengths

The following factors have been identified as strengths in the UK market for contaminated land assessment and remediation.

• Landfill Directive

The Landfill Directive will continue to encourage remediation technologies to be used rather than excavation soils being disposed of to landfill. As there are fewer sites for landfill, this makes it more costly to transport and dump soils in landfill. The Landfill Directive has stimulated the use of a wider range of remediation

techniques, and their wider use has increased client confidence in the effectiveness and reliability of such techniques. The wider use of remediation techniques will also mean contractors will be able to provide the techniques with more expertise and efficiency.

• Developers

Developers have been a key source of market growth during the review period. Developers have been principally involved in housing developments, although some

developers are involved in commercial property developments.

- **Brownfield sites**

The government's target of building 60% of new homes on Brownfield sites was met and exceeded during the review period. In 2005 74% of new homes were built on Brownfield sites. Many Brownfield sites contain contamination and require treatment to become suitable for housing. This has stimulated the market during the review period.

- **Bioremediation**

There has been a steady increase in the use of bioremediation during the review period. This is due to the technique being reliable and cost effective. Furthermore this treatment does not cause any major negative side effects such as noise or pollution, although the length of time taken to complete the process is a major draw-back. New technology has been increasingly used in the UK. This particularly applies to bioremediation. Chemical agents are being added to increase oxygen levels to speed up the process.

- **Reporting and risk analysis**

Consultancies have been able to offer improved reporting and risk

analysis of the contamination within the site and better advice on the best way forward. This is initially due to a better understanding of contaminants, simply due to being more experienced. Improvements in the desk study have meant that better sampling can take place. By doing a more thorough desk study, and by undertaking more sampling, more detailed information has led to better reporting. Also the increasing use of computer software has improved speed and outcome of risk analysis. Consultancies have developed more detailed cost benefit analysis of an increased number of alternative treatments during the review period, to give the client more choice.

- **South East Economy**

In the South East, demand for housing and non-residential developments has been high during the review period. Further, this is a densely populated area with many Brownfield sites resulting in high demand for assessment and remediation work. As land values are high, remediation work can more easily be economically justified.

13.2 Weaknesses

The following factors have been identified as weakness in the UK market for contaminated land assessment and remediation.

- **Physical Treatments**

There has been a reduction in the use of physical treatments, during the review period as a consequence of the introduction of the Landfill Directive.

- **Developers**

When a site is being developed and contamination is present, developers do not have the time to operate long-term remediation. Therefore the use of on-site treatments is often not an option for many developers.

- **Thermal treatments**

Can be extremely effective in eliminating contamination. However this comes at a cost. The fuel used and pollution released into the atmosphere has made this an unattractive and often uneconomical treatment.

- **Containment methods**

Some containment methods are not appropriate for some developments. This depends upon the certainty that all contamination has been contained, and the effectiveness of the containment method in keeping the contaminant contained. There have been many cases of clients not selecting containment methods as they believe that the contaminant is still there, and could cause problems in the future. This is not always true, yet this point has been largely

misunderstood during the review period.

- **Basement structures**

In many large urban developments the building will comprise of a basement structure containing underground storage, parking or other space. This will therefore require the excavation of soils regardless of contamination status resulting in on-site remediation not being a viable option.

- **Limited effectiveness of treatments**

The effectiveness of treatments can be limited to a small range of contaminants. The only technique that is regarded as effective for all contaminants is excavation and disposal although this technique only moves the contaminant to a new location rather than treating it. A client's choice of treatments is therefore limited by the contaminant that is identified. Indeed during the review period many companies have specialised in one treatment, and have offered it as being able to treat nearly all contaminants. However, this occurred less towards the end of the review period as awareness improved.

- **Assessment inaccuracies**

There may be certain inaccuracies in the assessment and analysis of a site. There may be inaccuracies in the previous use information available. If this is the case then the testing of soils may not be completed in the correct way resulting in contamination being missed that could cause problems in the future. Also during the early part

of the review period, fewer samples were taken and tested than towards the end of the review period, and this

did result in some poor site assessments.

13.3 Opportunities

The following factors have been identified as opportunities in the market for contaminated land, assessment and remediation.

- **Regional treatment centres**

Are expected to largely replace the previous use of landfill sites. Soils will be able to be excavated and treated using a range of remediation techniques. The soils will then be returned to the site or replaced by previously recycled soils. This method of working will make remediation on small sites more cost effective.

- **On-site soil testing**

There is a significant potential market for on-site soil testing. The reason for this is that on-site testing avoids the need for physically taking samples to laboratories and hence can be quicker. Furthermore there is a potential for more soil testing in-situ rather than at laboratories. However, laboratories are reported to be apprehensive towards the use of on-site testing. Indeed specialist equipment and controlled conditions are required for this process and these are much more difficult to create on-site. However the benefits for the consultancy of site testing is likely to lead to the development of on-site capabilities.

- **Olympic Games**

The Olympic Games will provide large amounts of both assessment and remediation work. This is expected to be the largest redevelopment project that the UK

has seen for a long time. At the time of writing contracts for work have not been finalised.

- **Expanded Treatment Application**

The range of contaminants Treatments will be developed and refined to expand the range of contaminants that they can treat. This will make the market more competitive providing the client with a wider choice.

- **Dealing with new contaminants**

As industry develops and new processes and products are developed, so will new types of contaminants. The more recent contaminants such as, oil, rubbers, petroleum products, and pesticides can usually be catered for by current treatments. New bio-fuels are designed to be an environmentally friendly alternative to petrol and diesel, however the rapid production of this fuel in the future could lead to new forms of contamination. LPG is an example of a new fuel being used which is new to many retailers and could present contamination in the future.

- **Domestic leakages**

Companies that deal with domestic heating fuel leakages explain that this is a sector mostly left untouched by the big companies. Indeed companies operating in this sector report large amounts of work. However this market is small in comparison to remediation of Brownfield sites, for example.

13.4 Threats

The following factors have been identified as threats in the market for contaminated land, assessment and remediation.

- **Long Term Supply of Brownfield Sites**

UK industry now operates more environmentally friendly procedures and processes than previously. There are still many contaminated sites in the UK and new sites will occur for many years to come. However in the long term, as industry works more cleanly it is inevitable the number of contaminated sites will decrease.

- **Developers Preferring Greenfield Land**

The priority in developments is often time to complete the project. Brownfield sites take longer to redevelop than building on undeveloped land. If government policy was to change, or the price of redeveloping Brownfield sites becomes too expensive, the assessment and remediation markets would suffer as developers build more on undeveloped land.

- **Inaccurate assessments**

If consultancies produce inaccurate assessments of the extent of contamination, this will result in ineffective treatments. This will also threaten client trust in remediation technologies. This may also contribute to limiting the growth of the market.

- **New Regulations**

Currently regulations are designed to make environmentally friendly techniques easier to complete, and more cost competitive. However the forecast period could see this change, with the emphasis changing towards ensuring the site have been treated with 100% accuracy. This would result in increasing administrative barriers making the process more complicated and longer. This would result in limiting the growth of the redevelopment market on brown field sites. Excavation and disposal would also be more difficult to complete, leading to a preference for building on undeveloped land.

SAMPLE REPORT

15. Trade Associations

1) Information: Trade Associations active in the UK Contaminated Land market

Association for Consultancy and Engineering (ACE)

Alliance House
12 Caxton Street
London
SW1H 0QL
Tel : 020 7222 6557
Fax : 020 7222 0750

British Expertise

1 Westminster Palace Gardens
London SW1P 1RJ
Tel : 020 7222 3651
Fax : 020 7222 3664
URL: www.britishexpertise.org

CIRIA

Construction Industry Research Information Association

Classic House
174 - 180 Old Street
London EC1V 9BP
Tel : 020 7549 3300
Fax : 020 7253 0523
URL: www.ciria.org.uk

Institute of Environmental Management and Assessment

St Nicholas House
70 Newport
Lincoln
LN1 3DP
Tel : 01522 540 069
Fax : 01522 540 090
URL: www.iema.net

Institute of Waste Management

9 Saxon Court
St. Peter's Gardens
Marefair
Northampton NN1 1SX
Tel : 01604 620426
Fax : 01604 621339
URL: www.ciwim.co.uk

National Centre for Groundwater and Contaminated Land

Olton Court
10 Warwick Road
Olton
Solihull
West Midlands
Tel : 0121 711 5885
Fax : 0121 711 5925

United Kingdom Accreditation Service

21-47 High Street
Feltham
Middlesex TW13 4UN
Tel : 020 8917 8400
Fax : 020 8917 8500
URL: www.ukas.org

16. Trade Magazines

2) Information: Trade Magazines active in the UK Contaminated Land market

Construction News

151 Rosebery Avenue
London EC1R 4GB
Tel : 020 7505 6868
Fax : 020 7505 6867
URL : www.cnplus.co.uk

Contract Journal

Quadrant House
The Quadrant
Sutton
Surrey SM2 5AS
Tel : 020 8652 4805
Fax : 020 8652 8958
URL : www.contractjournal.com

The Engineer

49-50 Poland Street
London W1V 4AX
Tel : 020 7292 3705
URL : www.theengineer.co.uk

Environment Business Magazine

Faversham House
232a Addington Road
South Croydon
Surrey CR2 8LE
Tel : 020 8651 7100
Fax : 020 8651 7117
URL : www.environmentbusiness.net

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Land Contamination and Reclamation

EPP Publications
6 Eastbourne Road
Chiswick
London W4 3EB
Tel : 020 8400 1601
Fax : 020 8747 9663
URL : www.epppublications.pwp.blueyonder.co.uk

New Civil Engineer

151 Rosemary Avenue
London EC1R 4GB
Tel : 020 7505 6666
Fax : 020 7505 6667
URL : www.nceplus.co.uk

Surveyor

Hemming Group
32 Vauxhall Bridge Road
London SW1V 2SS
Tel : 020 7973 6400
Fax : 020 7233 5053
URL : www.surveyormagazine.com

Waste Management

IWM Business Services Ltd
9 Saxon Court
St. Peter's Gardens
Marefair
Northampton NN1 1SX
Tel : 01604 620 426
Fax : 01604 604 467

17. Trade Exhibitions

3) Information: Trade Exhibitions active in the UK Contaminated Land market

International Clean Up (ICU)

1-3 May 2007

NEC Birmingham

Faversham House Group Ltd

Faversham House

232a Addington Road

South Croydon

Surrey CR2 8LE

Tel : 020 8651 7100

Fax : 020 8651 7117

URL : www.sustainabilitylive.com

18. Related Research

MSI has the following related market reports now available for purchase:

| 4) Information: Related MSI research now available | | | |
|--|---------------------------------------|-----------|-----------|
| Type | Titles | Published | Languages |
| English Market | | | |
| MSI Data Report | Waste Management: UK | 2004 | English |
| MSI Data Report | Environmental Consultancy: UK | 2003 | English |
| French Market | | | |
| MSI Étude | Contaminated Land: France | 2006 | French |
| MSI Étude | Waste Management (Industrial): France | 2005 | French |
| MSI Étude | Environmental Consultancy: France | 2004 | French |
| German Market | | | |
| MSI Studie | Contaminated Land: Germany | 2002 | German |

SAMPLE REPORT