Leicester
City Council

Cabinet 25th June 2001

Environmental Protection Act 1990: Part IIA
Contaminated Land Inspection Strategy for the City of Leicester.

Report of the Director of Environment & Development and Commercial Services.

1. Purpose of Report

This report introduces the Contaminated Land Inspection Strategy for the City of Leicester. This Strategy has been prepared to comply with Section 78(1) of the Environmental Protection Act 1990 which requires each Local Authority to adopt and implement a strategy for the identification and remediation of contaminated land within its area. External consultation, which forms part of the strategy adoption process, has now taken place and has been incorporated into the document.

2. Recommendations

Cabinet is requested to formally adopt the Contaminated Land Inspection Strategy for the City of Leicester.

3. Summary

The Strategy details the new regulatory role for local authorities dealing with contaminated land and outlines how the City Council will discharge duties imposed by the Act by targeting risks to human health and pursuing the 'polluter pays' principle. A scientific, risk based approach will ensure that all potentially contaminated land will be dealt with objectively, regardless of ownership.

In addition to its regulatory role, the City Council has legal obligations for any contaminated land risks arising from land within its ownership. Liability will also be retained for land, which is contaminated as a result of City Council activities, regardless of current ownership, unless specific liability exclusions are in place. The Strategy details how City Council liabilities will be dealt with in the future, however it essentially formalises an area of work that the Pollution Control Group has been undertaking for some 12 years. Included is a review of an extensive Supplementary Credit Approval (SCA) funded program of work already undertaken to ensure the safety of former corporation landfill sites. The outcome of this work is that the most significant and acute risks to human health thought to have once existed in the City have been addressed in advance of this new regime.

4. Legal and Financial Implications

Whilst it is not possible to pre-empt the outcome of the forthcoming inspection process it is likely that further City Council liabilities will be identified for types of contamination not previously considered.

In view of the far reaching implications of this new regime an Officer Working Group has been set up to ensure that all corporate implications of this new regime all properly addressed.

Contaminated land identification and remediation is an expensive process. Costs can often exceed the market value of the land in question. However, the need to undertake this work is a question of existing fact. Implementation of the strategy will not add to the amount of contaminated land, the historic liabilities which have been incurred and must now be met, or the costs of meeting these liabilities. What the strategy will do is put all contaminated sites in the City into perspective and ensure that they are all addressed fairly using objective, risk based criteria. Remediation can result in an increase in land values.

Revenue

Extra costs will be incurred in both administering the strategy and carrying out certain basic, non-intrusive investigations. These costs will be a mixture of staff, I.T., and equipment costs. The Government recognised that there would be additional costs to local authorities arising from the regime and allocated approximately £25,000 through the SSA for this.

Although there is provision in the law for the City Council to carry out work in default to remediate sites, it is envisaged that this would only occur in the most extreme circumstances where there was contamination which posed an acute risk to health. Even if work in default were to be undertaken, any costs incurred would be recoverable.

The programme may throw up a future need for intrusive investigations for which no funding is presently identifiable. This would be for sites where there was an indication that contamination was present but there was not sufficient evidence to sustain enforcement action. In these cases, the City Council may need to undertake some additional work by way of intrusive investigation to obtain sufficient evidence of the contamination to be able to sustain legal action. This point is being raised with the DETR as a part of the national implementation of strategies but may be an issue that will require further consideration in the future.

Capital

Major site investigations and remediation projects on City Council land (project costs to date have ranged from £20,000 to £2,000,000) have been funded by Supplementary

Credit Approvals (SCAs). These are project specific and do not have any impact on other revenue or capital expenditure. It is understood that SCAs will continue to be available for future projects. It should be noted that the projects already undertaken are believed to have already addressed the potentially highest risk sites in Council ownership.

Third Parties

As indicated in the report, the aim is to apportion remediation costs using the polluter pays principle. This will be likely to lead to existing landowners / industry having to incur costs in removing historical contamination for which they are responsible.

5 Alterations from the Draft

A copy of the draft strategy was supplied to members of cabinet in May. Those pages, which have changed significantly from this draft, are attached with the amendments shown in italics. A full copy of the final version of the strategy is in the members' library and additional copies can be obtained from Pollution Control Group.

The significant changes from the draft are:-

p45 – Section 3.9 - Spatial Data Currently Held on the GIS

Two further GIS enhancements are proposed for July 2001.

p48 - 50 - Section 4.3 - Contaminant Source Identification

Soon to be available allotment data will assist the identification of high priority grid squares. This identification process will now be completed by September 2001. Pages 48 - 50 and 71 have been revised accordingly.

p70 - Section 9.1 - Implementation of Part IIA

This section has been rewritten to further clarify the national position.

p95 - Appendix C. - The Site Prioritisation Model Scoring System

This Appendix has been rewritten to provide a fuller technical explanation of the numerical scoring contained within the prioritisation model.

6 Background Papers

Reports of the Director of Environment and Development. *New Statutory Regime for the Investigation & Remediation of Contaminated Land.* Property Sub-Committee 8th August 2000 & Environment Committee 9th August 2000.

Officer to contact: Andy McParland
Pollution Control Group Ext: 6441

Revisions to Contaminated Land Inspection Strategy for the City of Leicester. Consultative Draft. April 2001

Revised page 45

Integrated and Local Authority Air Pollution Control registers	Process information for all such processes in the city.

By July 2001 the GIS will be enhanced to include:

- Historical Ordnance Survey maps including the years: c1901, c1921, c1931
- ***Scheduled archaeological site data.***
- ***Allotment data already held by the City Council***

All information provided by the Environment Agency in relation to Source Protection Zones, water quality and waste management will be evaluated and where appropriate also included by this date.

Consideration will also be given the purchase of an applied geological map of the City when such a product becomes commercially available in the near future.

<u>Revised page 48</u>

4.3 Contaminant Source Identification

To assist the systematic identification assessment of the City location of vast number of potential sources, the following method has been adopted.

A map of the City has been subdivided by the overlaying of a 500-metre grid using the GIS. With reference to the current local plan, Leicester City Council (1994), each square is ranked in terms of the likelihood of contaminated land existing **and** affecting human receptors at dwellings or allotment gardens.

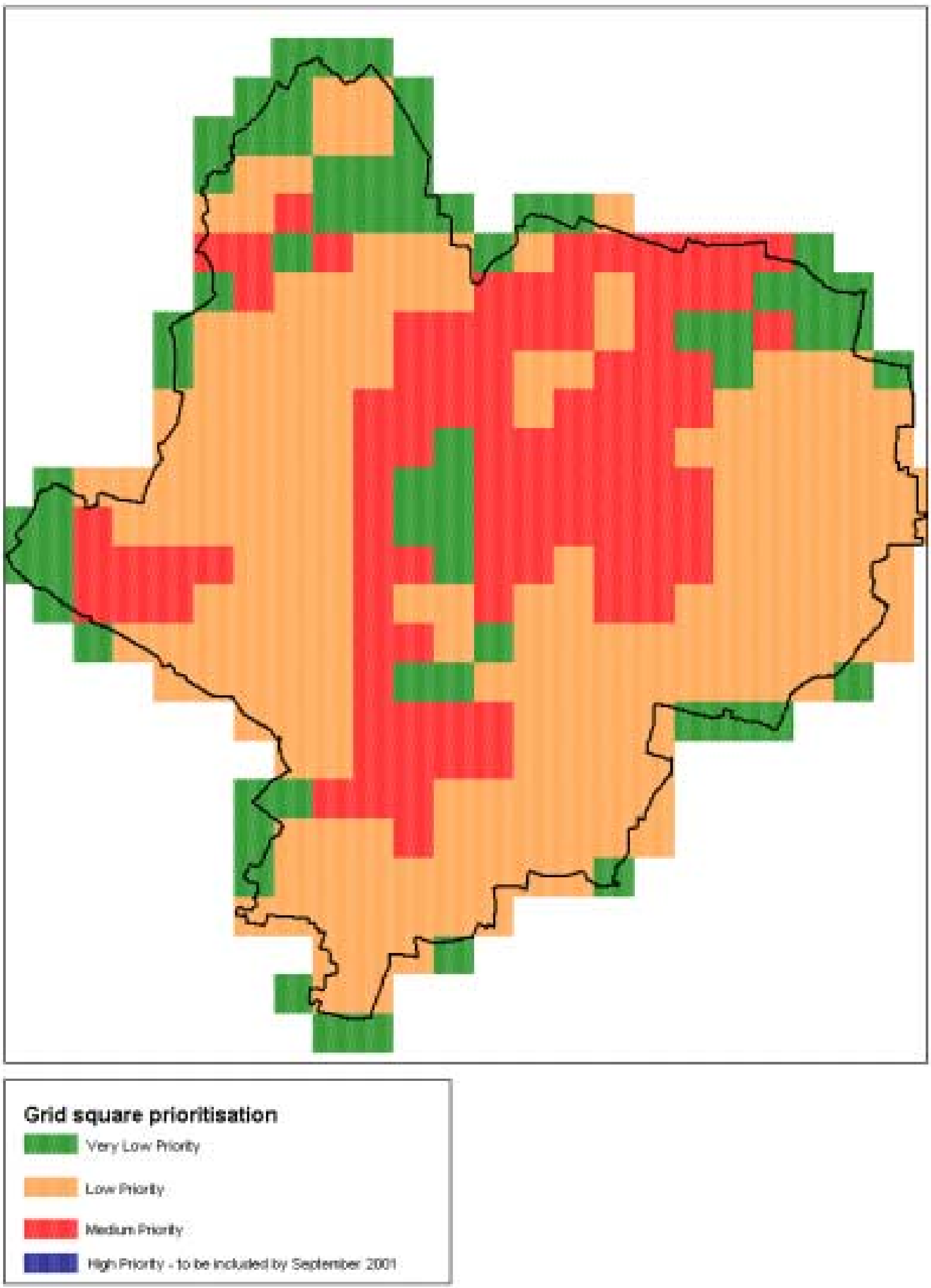
Classification	***Landuse***
High Priority*	Gridsquares containing primarily residential areas or current allotment uses which occupy the area of any former industrial or employment area.
Medium Priority	Gridsquares incorporating both primarily residential **and** primarily employment areas
Low Priority	Gridsquares incorporating the remaining, primarily residential areas
Very Low Priority	All other Gridsquares

The outcome of this classification is shown in Figure 6**.**

****The task of designating High Priority Gridsquares will commence in July in accordance with the implementation timetable detailed in section 9.3.***

Revised page 49 **(Colour Map to Follow)**

Figure 6 Gridsquare Ranking for Contaminant Source Identification



Revised page 50

In addition to targeting human health as the main priority, this system also ensures that much of the City's sand and gravel, minor aquifer is given an enhanced priority by virtue of the fact that industrial development has tended to follow this flood plain strata. This same permeable strata is also the City's most significant geological pathway for mobile contaminants.

The GIS based, desktop identification of contaminant sources will comprise a four stage iterative process working through the gridsquare groups in order of descending priority.

From July 2001 the task of ***identifying and*** reviewing for all HIGH priority gridsquares will commence. The location and boundary of each previous or existing, potentially contaminative use will be identified by manually reviewing the layers of GIS data detailed in section 3.9, which coincide with each grid square. The following additional information sources will be examined:

- Sites where known pollution incidents have occurred e.g. fuel or solvent spillage
- Sewage slurry spreading on former agricultural land
- Petroleum Licensing records for Leicester indicating the location of all previous or currently licensed petroleum tanks
- Local trade directories
- The Development Control database and archives
- Existing Environmental Health files
- Any other available site investigation data
- Borehole data
- Applied geological maps

A map polygon will be created for each source identified and all available data relating to that source use will be entered into the GIS linked land quality database.

Once each gridsquares within this group have been visited, the data will be processed as detailed in section 4.4. After such time the above exercise will be repeated for **MEDIUM, LOW** and then **VERY LOW** priority groups respectively.

Revised page 70

9.1 Implementation of Part IIA

A total of £21 million is available in 2001 - 2002 for the combined local authorities and Environment Agency capital programmes. In addition £12 million per year has been added to the "Environmental Protection and Cultural Services" components national totals for Standard Spending Assessments to assist Local authorities in meeting their revenue expenditure under Part IIA. This was announced by the Environment Minister, Michael Meacher in July 1998. (Department of the Environment, Transport and the Regions (2001)).

Revised page 71

9.3 Proposed Timetable for the Implementation of the Part IIA Regime in Leicester

Whilst it is not possible to pre-empt the amount of work that will be generated by the forthcoming desktop inspection exercise, or predict the resource implications of any technical or legal complications which may ensue, the following timescales are considered achievable based on existing available resources.

Task	Target
• **Production and publication of statutory contaminated land strategy** • **Database enhancement**	**By July 2001**
• ***Designation of high priority gridsquares***	***By September 2001***
• **Designation of high priority gridsquares** • **Desktop inspection of all the high priority gridsquares.** • **Identification of potentially contaminated sites and prioritisation for further investigation.** • **Detailed inspection and assessment of such sites.** • **Determination of contaminated land within priority group** • **Commence moves to secure remediation of contaminated land**	**By September 2002**
• **Desktop inspection of all the medium priority gridsquares.** • **Identification of potentially contaminated sites and prioritisation for further investigation.** • **Detailed inspection and assessment of such sites.** • **Determination of contaminated land within priority group** • **Commence moves to secure remediation of contaminated land**	**By September 2003**
• **Desktop inspection of the remainder of the City.** • **Identification of potentially contaminated sites and prioritisation for further investigation.** • **Detailed inspection and assessment of such sites.** • **Determination of contaminated land within priority group** • **Commence moves to secure remediation of contaminated land**	**By 2006**

<u>Revised Appendix C</u>

To be inserted following page 100

PRIORITISATION OF SITES BASED ON POTENTIAL RISKS TO GROUNDWATER

Groundwater is considered in terms of its value as a drinking water supply source.

The valuation of a sites impact on groundwater is therefore estimated having regard to:

- the groundwater class (i.e. is the site located within Groundwater Source Protection Zone);
- the level of aquifer protection provided by overlying geology;
- the chemical properties of the contaminants, mainly mobility (based on K_d or K_{ow}), toxicity and degradability.

Groundwater Class

For the purposes of the system, the extent of a groundwater problem is dependent mainly on the groundwater class. The method suggests that groundwater classes be divided up as follows:

i. Area with special drinking water interest
ii. Areas with drinking water interest
iii. Areas with borderline drinking water interest

Aquifer Protection

This refers to the degree of protection provided to the aquifer by the overlying geology. For example, an aquifer overlain by a thick clay layer will be much less vulnerable to contamination than one overlain by sand and gravel. The level of aquifer protection afforded is described in terms of three classes, namely;

i. None;
ii. Some;
iii. Good protection.

As geology can be highly variable even at site level, the method suggests that the degree of protection of the aquifer conferred by the site geology be assessed using site specific information.

Chemical Properties

Assessment of organic contaminants mobility is based on the log K_{ow} (Octanol-water coefficient) while for inorganic contaminants, it is based on the K_d. A low log K_{ow} or K_d indicates that the contaminant is highly mobile and vice versa. Examples of highly mobile organic compounds are Benzene and Trichorethylene (log $K_{ow} < 3$). Examples of organic compounds with medium mobility are Xylene and Napthalene (log K_{ow} between 3 and 4), while low mobility organic compounds include PAH's (log K_{ow} of approx. 5,09). Lead is an example of an immobile inorganic compound (K_d approx. 50).

In terms of threats to groundwater, the toxicity of a compound is evaluated based mainly on regulatory drinking water quality standards. Chemicals are placed into one of three toxicity indicator classes (high medium and low) based on the chemicals target concentration (i.e. Permitted Concentration and Values in drinking water).

The degradability of a chemical also greatly influences the final risk score. Compounds that are easily degraded (i.e. Benzene) will seldom migrate more than 500m away from the source whereas highly mobile chemicals such as Tri and Tetrachloroethylene may often be found many kilometres away from the source contamination. Again each chemical is placed into one of three degradability indicator classes (high medium and low) and assigned a degradation score (NB: compounds with high degradability are assigned low scores and vice versa).

Each chemical present or likely to be present on the site is therefore assigned a *Chemical Hazard Score*, which is calculated as the sum of the toxicity, mobility and degradation indicator scores assigned to it. The chemical having the highest chemical hazard score is used in the calculation of the final site risk score.

Groundwater Risk Score

A final risk score for the site is arrived at by summing the scores awarded for each of the above site characteristics.

The method for prioritisation of sites based on risks to groundwater is summarised in figure A.

A	GROUNDWATER CLASS		
CLASS	Area with special groundwater interest	Area with groundwater interest	Area with borderline groundwater interest
Score	12	6	0

B	Degree of aquifer protection		
Protection	None	Some	Good
Score	6	3	0

Score	6	3	0

C
Class →

F	FINAL SCORE A+B+max(C+D+E)		
FINAL SCORE	Area with special groundwater interest	Area with groundwater interest	Area with borderline groundwater interest
Max. **Min.**	32 13	26 7	20 1

D	Toxicity		
Limit Value	< 1 µg/l	1-10 µg/l	> 10µg/l
Score	4	2	0

E	Degradability		
Class	High	Medium	Low
Score	1	2	4

Figure A*: Method for prioritisation of sites based on risks to groundwater*

PRIORITISATION OF SITES BASED ON LAND USE ASSOCIATED HAZARDS

Due to the differences in the nature of the potential hazards likely to be encountered, the methodology makes a distinction between

a) current or former industrial sites - where risks are mainly contact related;
b) waste disposal and landfill sites - where risks are associated mainly with explosive and/or toxic gases.

However, the site should be characterised for both categories of risk, where both exist.

Current and former Industrial Sites

Using the method, a score is obtained for risks associated with direct contact (i.e. skin contact and ingestion of contaminants). The main factors influencing the score a site receives are:

- contaminant properties – mainly the volatility and toxicity of the contaminants;
- the risk of receptors coming into contact with the contaminants - depends primarily on the sensitivity of the landuse;
- *special conditions* existing at the site that may make the contaminants more or less accessible.

Contaminant Properties

The toxicity of a contaminant in relation to the direct contact pathway (skin contact and ingestion) is evaluated based on regulatory soil quality standards. Where these are not available, the method recommends the use of factors such as Tolerable Daily Intake (TDI) and /or Acceptable Daily Intake (ADI), Preliminary Tolerable Daily Intake (PTWI) and Preliminary Tolerable Weekly Intake (PTWI) to calculate limit values. Each chemical is placed into one of three toxicity indicator classes (high, medium and low) and assigned a direct contact related toxicity score (see table 1).

***Table 1**. Derivation of chemical toxicity score for direct contact pathway*

Class	**Soil Quality Criteria (mg/kg)**	**ADI, TDI, PMTDI Carcinogenic µg/kg body weight**	**ADI, TDI, PMTDI Non-Carcinogenic µg/kg body weight**	**PTWI µg/kg body weight**	**Score**
High	< 10	< 0.4	< 20	< 2.8	**8**
Medium	10 – 200	0.4 - 8	20 - 40	2.8 - 56	**4**
Low	> 200	> 8	> 400	>56	**2**

Limit values for chemicals can be calculated using the following assumptions:

An average child ingests 0,2g of soil per day up to a maximum of 3g /day. Children with Pica ingest up to 10g/day. An average adult ingests approximately 0.025g/day up to a maximum of 0.1g/day. The ingestion pathway is most critical for children as they have low body weights and ingest the largest amounts of soil.

$$\text{Limit value (mg/kg)} = 50\% * \frac{[\text{TDI } (\mu g/kg \text{ bw. per day}) * \text{bodyweight (kg)}]}{[\text{daily exposure (kg /day)}]}$$

The evaluation of the toxicity of a chemical via the *inhalation pathway* is based mainly on Danish regulatory air quality standards (known as B- values). These standards lay down the permissible concentrations in air, of contaminants typically found in soil. B value chemicals consist of two groups, with those in group 1 being considered as very hazardous and those in group 2 as moderately hazardous. Using the B-values as target concentrations, chemicals are again placed into one of three toxicity indicator classes, (high, medium and low) and are assigned inhalation related toxicity scores accordingly (see Table 2).

__Table 2:__ Derivation of chemical toxicity scores for inhalation pathway

Class	**Permitted Concentration**	**B – Value Group 1**	**B – Value Group 2**	**Score**
High	< 1μg/m^3	<= 1μg/m^3	< 10 μg/m^3	**4**
Medium	1 – 200 μg/m^3	> 1μg/m^3	10 – 200 μg/m^3	**2**
Low	> 200 μg/m^3		200 μg/m^3	**0**

The assessment of a chemicals volatility is based on its Henry's constant (H). The method distinguishes between three volatility classes (see Table 3):

i. very volatile;
ii. volatile;
iii. non-volatile.

__Table 3:__ Classification of contaminant volatility

Class	**Henry's Constant (H)**	**Score**
Very Volatile	$H > 1* 10^{-4}$	4
Volatile	$1* 10^{-4} > H > 1* 10^{-6}$	2
Non-Volatile	$H < 1* 10^{-6}$	0

Following on from the above, volatile contaminants are assigned an inhalation related chemical hazard score, which is calculated as being the sum of indicator scores assigned to the chemical in relation to its toxicity and volatility (see Table 4).

__Table 4:__ Derivation of inhalation related Chemical Hazard Score

	Toxicity		
Volatility	**High**	**Medium**	**Low**
High	8	6	4
Medium	6	4	2
Low	4	2	0

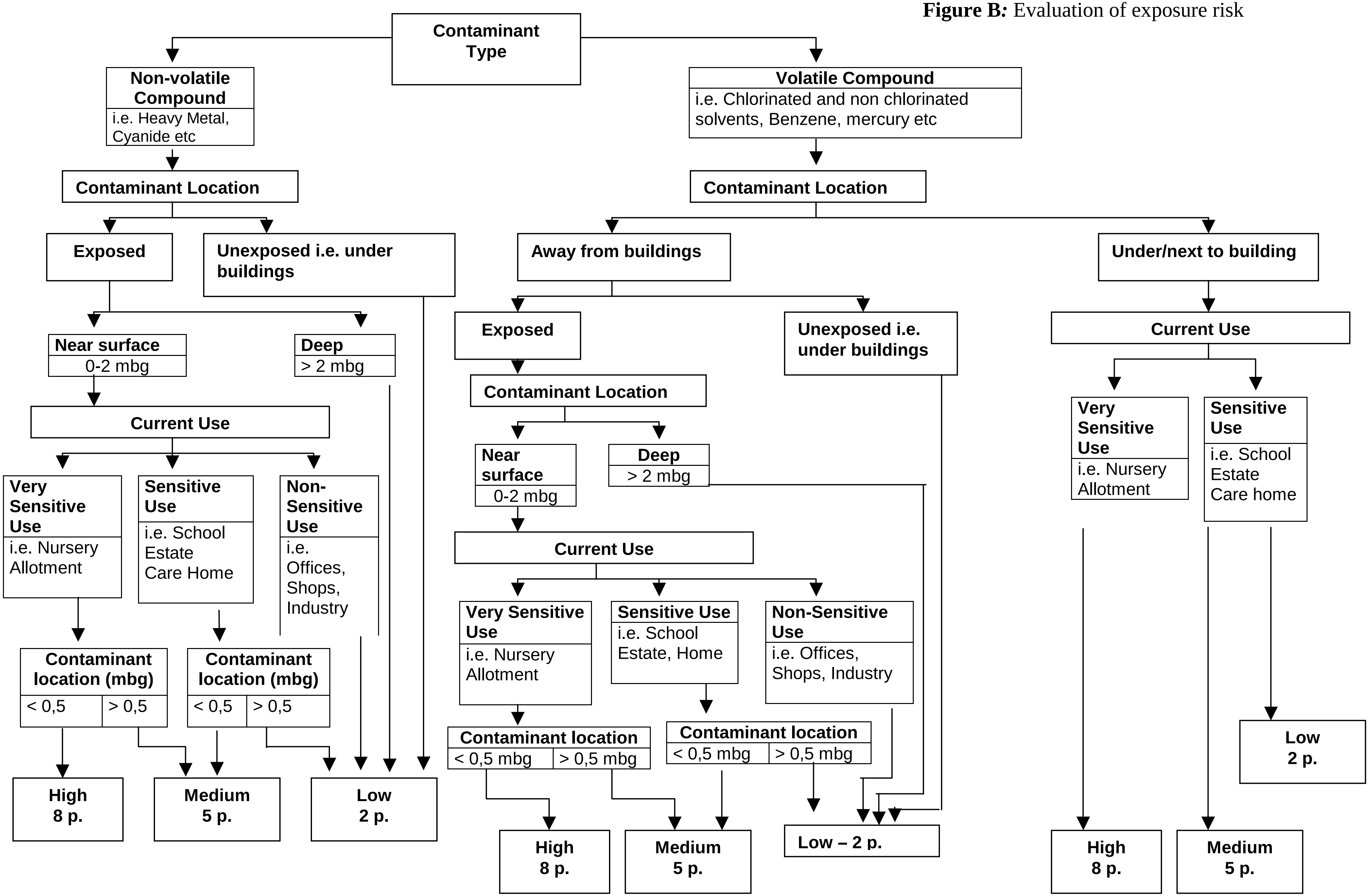
The direct contact and inhalation related chemical hazard scores are then summed to give a total hazard score for the chemical.

As in the case of the Groundwater component, the chemical with the highest *total Chemical Hazard Score* is used in the calculation of the final risk score for the site.

Exposure Risk

In addition to the above, the potential for humans being exposed to the contaminant is evaluated having regard to factors such as its location, its depth and the sensitivity of the land use. The process for evaluation of exposure risk is summarised in figure B below.

Figure B: Evaluation of exposure risk



Special Conditions

Subsequent to calculation of an exposure risk score, the final risk score for the site is arrived at by cross-referencing the hazard and exposure scores and considering any special conditions existing on the site that indicate an increased or reduced level of hazard.

Special conditions on a particular site would include any specific local circumstances that would have an effect on the characterisation, but are not covered in the preceding sections. They could for example include evidence of visible soil contamination or signs of plant failure. The method again divides this criterion into 3 classes (aggravated, neutral and favourable circumstances).

The method for characterisation of industrial sites is summarised in the Figure C.

Chemical Hazard Score	**Exposure**		
	8	**5**	**2**
8	16	13	10
6	14	11	8
4	12	9	6
2	10	7	4
0	8	5	2

↓

	Special Conditions		
Class	**Aggravated**	**Neutral**	**Favourable**
Score	2	0	-2

↓

	Final Score
Max. Score **Min. Score**	18 0

Figure C: *Procedure for deriving risk scores for current and former industrial sites.*

Waste Disposal and Landfill Sites

Sites that have been subject to landfilling are divided up into two categories:

a) Sites *without* landfill gas generation potential (i.e. sites where no organic material has been deposited) - these sites are assessed using the same methodology as that described for industrial sites above.

b) Sites *with* landfill gas generation – these are typically waste disposal sites (WDS) where organic material (i.e. animal, vegetable, paper, textiles, wood) has been deposited.

Landfill gas

Assessment of landfill gas associated risks considers possible harmful health effects and explosion in a building. The assessment is based on the WDS gas generation capacity, the distance from the WDS to buildings and the type of use the buildings are being put to.

The most important factors governing a WDS gas generation capacity include its volume, age and the nature of the waste. Generally a WDS cannot be considered to be dormant unless its age is over 30 years (i.e. since close down). Although the WDS age is not considered in the initial risk characterisation, it is useful when prioritising sites with the same final risk score.

A range of other factors influence gas migration and entry into buildings (i.e. geology, pressure in the landfill, cover, underground pipes, distance to buildings and building construction etc). However, most of this information will not be available unless a field survey has been conducted.

Assessment of potential for gas migration is therefore based mainly on the distance from the WDS to the nearest building of interest and the size of the WDS. The method distinguishes between 3 different situations:

i. Buildings are located directly on the WDS
ii. Buildings are close to the WDS

iii. Buildings are located far from the WDS

The method also distinguishes between the sensitivity of the building use, which is divided into:

i. sensitive (nursery, residential etc) and;
ii. less sensitive uses (shop, industry, offices etc).

The gas transport model used merely gives an estimate of transport time from the WDS to a given point and should be viewed as a qualitative tool. It assumes a situation where low pressure channels are available for transportation of the gas and does not take into account factors such as dilution, dispersion or circulation of gas.

Calculation of scores for buildings outside the WDS have been made under the following further assumptions:

- The methane concentration in the WDS is at least 50% v/v
- 20% of the methane in the WDS will move towards buildings during a pressure drop
- a pressure drop of 6 kPa occurs
- the pressure drop can last up to 2 days
- there is no resistance to gas entry into the building
- the soil is composed mainly of fine sand with a gas porosity of 0.2.

In general a pressure drop of 6 kPa can result in a gas front moving approximately 50m in two days provided the WDS has a minimum capacity of 130,000m^3 (20% of methane in the WDS contributes to the gas front).

When prioritising sites with reference to landfill gas related hazards, it should not be assumed that the building nearest to the WDS would automatically produce the highest risk score. For example, buildings far away from the site with a sensitive use can produce a higher score than a building with an insensitive use close to the site. If there is a surface watercourse between the WDS and the building, the building should be treated as though it was situated far away from the WDS.

Table 5: *Exposure scores for sites with landfill gas associated hazards*

	V >= 130,000m^3	**V < 130,000m^3**	**Exposure Score**
Building on WDS			**12**
Building close to WDS	a<= 50m	a <= 50*V/130,000	**8**
Building far from WDS	a > 50m	a > 50*V/130,000	**0**

Figure D below summarises the procedure for characterisation of WDS.

Fill Type

WDS/landfill *with* organic waste

WDS/landfill *without* organic waste

0 p.

	Site Capacity		**Score**
	V > 130,000 m^3	**V < 130,000 m^3**	
Buildings far from site buildings	a > 50m	a > 50*V/130,000	0 p.

Or:

Buildings close to site	a < 50m	a < 50*V/130,000	8 p.
Buildings close to site	a = 0m	a = 0m	12 p.

V =Site's waste capacity
A: distance from site

Sensitive Use	**Less Sensitive Use**
Building with continuous occupation Nursery, School Industry where naked flame is used	Offices, Shops, industry Public buildings (i.e. library, sports hall etc)
6 p.	4 p.

Final Score = Exposure + Sensitivity of Use

Max. Score = 18 p.
Min. Score = 0 p.

Figure D: Procedure for derivation of final prioritisation score for waste disposal sites

SURFACE WATER

Surface waters are characterised mainly on the basis of their desired quality objectives and their distance from the pollution point source. However, quality objectives for water bodies in the UK are closely linked to drinking water quality objectives. Sites that are close to surface water bodies with high quality objectives receive high scores.

As for the other components, the method when considering surface water also takes into account the contaminants chemical properties (mobility, toxicity and degradation). However, due to the lack of acceptable eco-toxicological guideline values, the contaminant hazard score used for surface water component are the same as those used for groundwater component, with the exception that the degradation processes occuring in surface water will be primarily aerobic.

The above factors become irrelevant if the water body has been subject to proven episodes of contamination arising from the site. In such cases, the final risk score is based entirely on the water body’s desired quality objective. The procedure for characterising sites according to their impact on surface waters is summarised in figure E.

Proven Contamination?

Yes

Quality Objective	Score
High	25
Medium	23
Low	20

Final Score: Min = 20; Max = 25

No

Distance (m)	Quality Objective (QO)	Score
< 100	All watercourses	5
100 – 200	High QO	4
100 – 200	Medium QO	3
100 –200	Low QO	2
> 200	All watercourses	1

Mobility, toxicity, Aerobic Degradation

Final Score: Min = 2; Max = 19

Figure E: *Summary of procedure for deriving surface water risk scores*

TERMINOLOGY

The following gives short definitions of the meaning of certain terms as they are used in the report and in this document.

*Contact Risk***:** refers to the possibility that humans will come into contact with polluted soil or gases. The possibility of humans coming into contact with polluted water is not considered in the methodology.

Degradation: refers to breakdown of potentially hazardous contaminants to their harmless derivatives in the natural environment.

Hazard: a substance, property or situation that in particular circumstances could lead to harm. The hazardousness of a chemical is valued according to its mobility, toxicity, degradability and volatility.

Mobility: the mobility of a contaminant in soil is defined relative to groundwater velocity and is a function of dispersion, sorption, ion exchange, solubility etc.

Pathway: the mechanism by which the receptor and source can come into contact.

Receptor: the entity that is vulnerable to the adverse effects of the hazardous substance or material.

Risk: a combination of the probability, or frequency, of occurrence of a defined hazard and the magnitude of the consequences of the occurrence.

Risk characterisation: a preliminary evaluation of risks on a site. Risk characterisation differs from risk assessment in that the level of information required to carry out a characterisation can be a fraction of that required to carry out a risk assessment.

Risk Screening: identification of all major hazards and receptors

Source: the hazardous site, substance or material

Source strength: refers to the gas generation ability of a waste disposal site at any given moment.

Toxicity: refers to the relative ability of a particular chemical substance to cause harm to a living organism. The toxicity of the chemical is dependent on the environmental receptor being considered.

Volatility: This is defined as the propensity of a chemical to vapourise and is measured using Henry's Constant.