CONTAMINATED LAND INSPECTION STRATEGY

2014

Required under the provisions of the
Environmental Protection Act 1990 Section 78B

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Executive Summary

Runnymede Borough Council's (the Council) Contaminated Land Inspection Strategy was first approved by the Leisure and Environment Committee on 21st June 2001. This updated document replaces the previous strategy, incorporating regulatory and corporate changes since 2001. This document also details progress in implementing the strategy and the revised approach to addressing contaminated land within the Borough in light of budgetary restraints and identified priorities for the future.

This strategy will outline how Runnymede will meet its statutory duties to investigate potentially contaminated land in the Borough as laid out in the Statutory Guidance from Defra, Contaminated Land Statutory Guidance April 2012 (Ref. 1).

Contents

Executive Summary 2

1. Strategic Aims and Objectives 5

1.1 Aims and objectives of the Strategy 5

1.2 Development of the Strategy 5

1.2.1 Consultation on Strategy revisions 6

1.2.2 Public consultation 6

2. Background and Legislation 7

2.1 General Policy of Runnymede Borough Council 8

2.1.1 Sustainable Community Strategy and Corporate Plan 8

2.1.2 Planning Policy Environmental Sustainability 8

2.1.3 Enforcement 8

2.1.4 Public Access to Information 9

2.1.5 Addressing potential land contamination 9

2.2 Definition of Statutory Contaminated Land under Part 2A of EPA 1990 10

2.3 Pollutant linkages 10

2.4 Regulatory role of local authorities under Part 2A of EPA 1990 11

2.4.1 Major changes to legislation since 2001 11

2.4.2 State of Contaminated Land in England and Wales 13

2.4.3 Regulatory Role of the Environment Agency 13

2.4.4 Interaction with other regulatory regimes 14

3. The Borough of Runnymede 15

3.1 Geographical Location 15

3.2 Description of the Borough and its History 16

3.3 Population Distribution 17

3.4 Details of Runnymede's Ownership of Land 17

3.5 Current Land Use Characteristics 17

3.6 Protected Natural Habitats 17

3.7 Key Property Types 18
3.8 Geology 18
3.9 Hydrogeology and groundwater 19
3.10 Key Water Resources and Water Quality Issues 20
3.11 Current and Past Industrial History 20
3.11.1 Runnymede Re-development History 20
3.12 Known Information on Contamination 21

4. Procedures 23

4.1 Internal Management for Inspection 23
4.2 Local Authority Interests 23
4.3 Information Collection 23
4.4 Information and Complaints 24
4.4.1 Maintaining appropriate confidentiality 24
4.5 Information Evaluation 25

5. LIAISON AND COMMUNICATION STRATEGIES 26

5.1.1 Owners, Occupiers and other interested parties 26

6. PROGRAMME FOR INSPECTION 27

6.1 Inspection of the Borough for Contaminated Land sites 27
6.1.1 Compliance with the statutory guidance 27
6.2 Dealing with Contaminated Land – Actions to date 27
6.2.1 Runnymede's Priority Sites 27
6.2.2 Runnymede targets in regard to the inspection process 28
6.2.3 Local authority powers of entry. 30
6.2.4 Risk communication Strategy 30
6.2.5 Hardship and cost recovery 30

7. References 32

8. Appendices 33

Appendix A STM Prioritisation Methodology 34
Appendix B - Guidance Table A (Statutory Guidance) 41

1. Strategic Aims and Objectives

1.1 Aims and objectives of the Strategy

In relation to land contamination, the Strategy aims to:

- identify unacceptable risks to and protect human health and controlled waters;
- protect and prevent damage to buildings, certain ecosystems and property including commercial livestock and crops;
- encourage voluntary remediation of contaminated land;
- seek to bring brownfield sites back into beneficial use;
- seek to ensure that the cost burdens faced by individuals, companies and the Council are proportionate, manageable and economically sustainable; and
- seek to ensure that land that the Council currently or formerly owned or occupied is identified and risk assessed to determine any contamination-related responsibilities and liabilities.

The Council will take a site-by-site precautionary approach to dealing with any risks thought to be or found to be present on a site. At the same time the Council will aim to avoid a disproportionate approach to such risks dependant on site conditions and circumstances.

We will use a cost-benefit approach to taking action, to satisfy our corporate budget responsibilities as well as our statutory obligations. We will approach contamination in the Borough with an aim to achieve the maximum benefit to our residents.

1.2 Development of the Strategy

Local Authorities are required by statutory guidance to develop a strategic approach to the identification of contaminated land by creating a published strategy document. The statutory guidance requires the approach to:.

- be rational, ordered and efficient;
- be proportionate to the seriousness of any actual or potential risk;
- seek to ensure that the most pressing and serious problems are considered first;
- ensure that resources are concentrated on investigating areas where the authority is most likely to identify contaminated land; and

- ensure that the local authority efficiently identifies requirements for the detailed inspection of particular areas of land.

1.2.1 Consultation on Strategy revisions

Internal consultation for this revision of the strategy will be circulated to Environmental Health, Building Control, Planning, Legal Services and Asset Management departments for review and comments, which if relevant, will be incorporated. Councillors will also be notified of the revision of this strategy and it will be submitted to the Leisure and Environment Committee for their consideration.

1.2.2 Public consultation

This revision of the strategy will be posted on the Council's website www.runnymede.gov.uk.

2. Background and Legislation

Since the publication of the 11th Report of the Royal Commission on Environmental Pollution in 1985, the Government has sought to address the sustainability issues arising from brownfield and contaminated land. In January 1990 the House of Commons Select Committee on the Environment (1990) published its first report on contaminated land.

Defra's predecessor, the Department of the Environment (DoE), issued the consultation paper, Paying For our Past (1994a). This led to the policy document *Framework for Contaminated Land publication 1994*, which emphasised amongst other points the "polluter pays principle" and the "suitable for use approach", that concern should be related to past pollution only and that action should only be taken where the contamination posed actual or potential risks to health or the environment.

The legislation was first published in June 1995 in the form of Section 57 of the Environment Act which amended the Environmental Protection Act 1990 by inserting Part IIA (DoE, 1995), which eventually came into force as statutory guidance in April 2000.

Part IIA of the Environmental Protection Act 1990 placed a duty on local authorities to inspect and 'determine' sites in their areas for the purposes of identifying 'contaminated land' (as formally defined) and introduced a statutory regime for its inspection and remediation. Local Authorities were required to take a written strategic approach so that any land which required detailed inspection would be identified in a rational, ordered and efficient manner. The Council's contaminated land strategy was approved in June 2001 outlining the priority actions and statutory responsibilities to be undertaken by the Council.

As well as updates to the statutory guidance which underpinned the determination process, there have been numerous changes to the way Contaminated Land is considered and approached for inspection since 2001, such as the Defra document 'The Way Forward'.

A major change has been the recent 2011 Defra review of the contaminated land regime in England for the first time since its introduction in 2000. The purpose was to consider whether improvements could be made to the regime, taking into account the experience of nearly ten years of delivery and the latest scientific evidence. The review found that the primary legislation (Part 2A of the Environmental Protection Act 1990) remained fit for purpose and there was a strong need to keep it but that there were flaws in the accompanying statutory guidance which had undermined the effectiveness of the regime and created considerable regulatory uncertainty. The revised guidance was adopted in April 2012.

2.1 General Policy of Runnymede Borough Council

Contaminated land can impact on property transactions, may cause marketing; planning and building control issues and generate the need for maintenance and/or works activities across the Borough. The strategy should encompass all of these areas and provide a clear framework within which all of the Council's departments can operate.

There are several Council policies within which this strategy will be implemented.

2.1.1 Sustainable Community Strategy and Corporate Plan

This inspection strategy is produced taking into account the Council's principal aim, set out in the Council's Sustainable Community Strategy and Corporate Plan, which is:

'To play an effective role in enhancing the quality of life for residents and providing an attractive environment for businesses and visitors'.

2.1.2 Planning Policy Environmental Sustainability

The Council seeks not only to minimise environmental damage but also to actively promote enhancement to the quality of life provided within the Borough.

Sustainable development is regularly reviewed within the Runnymede Borough Council Annual Monitoring Report (AMR). The report uses data indicators provided by the Regional Sustainability Framework (RSF) (published 2008) to present a variety of data relevant to Runnymede and its Sustainability Appraisal Report (SAR). The majority of RSF data indicators contain targets from which sustainable development is monitored.

There are 25 RSF objectives covering economic, environmental, resource and social data areas. Within these objectives, indicators are identified to provide a basis for monitoring and review. Where appropriate, targets have been identified to provide a guide to the speed and direction in which the indicators should move to achieve the objectives.

National and local planning policy encourages the use of previously developed land and buildings. The Council affirms, through the Contaminated Land Strategy and our other polices, that development requirements should be provided firstly through previously developed land and buildings, thus regenerating areas and avoiding use of greenbelt areas.

2.1.3 Enforcement

The contaminated land regime will be administered in line with statutory guidance and the Enforcement Policy of the Council's Environmental Service Department as laid out in *Runnymede Borough Council Environmental Protection Enforcement Policy 2013* (available at www.runnymede.co.uk). This Policy lays out the methods and procedures adopted by the Council's officers when enforcing legislation.

2.1.4 Public Access to Information

The Council has a duty to disclose some information received in the course of its contaminated land investigations, if such information has been received by the Council in a public manner.

In the UK, the EU Directive on Public Access to Environmental Information has been implemented through the Environmental Information Regulations 1992 (EIR) (Ref. 2) These Regulations require all information held by central or local government to be publicly accessible. There are exemptions for reasons of commercial confidentiality, international relations and public and national security. The Regulations exclude internal communications and unfinished documents; judicial matters and personal data.

Information requests regarding environmental factors, are chargeable, however this charge must be reasonable.

2.1.5 Addressing potential land contamination

Potentially contaminated land is addressed by RBC through two routes, the National Planning Policy Framework and Part 2A of the Environmental Protection Act 1990.

National Planning Policy Framework

The National Planning Policy Framework (NPPF) was released on 27 March 2012 to replace Planning Policy Statement 23: Planning & Pollution Control (PPS 23).

Contaminated land in Runnymede has, to date, been dealt with mostly through the development control process. The possibility of land being contaminated is a material planning consideration, which means when a planning application is submitted, the Council, as the local planning authority, has to consider if contamination has been properly considered and will be dealt with appropriately (making the land suitable for the proposed use and addressing any wider environmental risks).

The developer or applicant needs to satisfy the Council, as the planning authority, that potentially contaminated land has been investigated and, if necessary, remediated to the point where it would not meet the definition of statutory contaminated land.

In 1988 the Town & Country Planning (General Development) Order required local planning authorities to consult with waste disposal authorities if development was proposed within 250m of land which had been used to deposit refuse within the previous 30 years. Since March 2010, every planning and building control application address is checked against potentially contaminated land Geographic Information System (GIS) mapping to identify any potential sources of contamination or sensitive receptors within 250m and alert the relevant Council department of any issues to be considered during the application.

The Council encourages pre-application discussions and is proactive in providing pre-application advice.

Part 2A of the Environmental Protection Act 1990

The Council will carry out pro-active works under Part 2A of the Environmental Protection Act 1990, to identify contaminated land within the Borough which is outside

of the planning process and would not be addressed through the National Planning Policy Framework.

2.2 Definition of Statutory Contaminated Land under Part 2A of EPA 1990

The statutory definition of ‘contaminated land’ is:

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

- significant harm is being caused or there is significant possibility of such harm being caused;
- significant pollution of controlled waters is being caused or there is a significant possibility of such pollution being caused".

Within this document, land that has not been formally determined as contaminated land under Part IIA of EPA 1990 will be referred to as ‘potentially contaminated land’. Land which has been formerly determined will be referred to as 'statutory contaminated land'.

2.3 Pollutant linkages

The definition of contaminated land for the purposes of Part 2IA is based upon the principles of risk assessment.

Risk is defined as the combination of:

- the probability, or frequency, of a defined hazard (for example, exposure to a property of a substance with the potential to cause harm); and
- the magnitude (including the seriousness) of the consequences

This risk must be assessed in terms of a **source – pathway – receptor** relationship where:

Source means a substance or substances in the ground (contaminant) such as heavy metals at concentrations which could affect health or the environment;

Receptor means people, controlled waters or property which could be affected if exposed to the contaminants;

Pathway means a way for the contamination source to come into contact with the receptor, such as children eating heavy metals in soil or people eating fruit or vegetables grown in soils containing contaminants.

For an area to be determined as statutory contaminated land, a source, receptor and a pathway have to be present. Land could not be determined if a source of and receptor were present, but no pathway existed, as harm to the receptor would then not be likely.

2.4 Regulatory role of local authorities under Part 2A of EPA 1990

The responsibility for regulating the contaminated land regime is assigned to local authorities, to identify contaminated land and for most sites, to establish the appropriate person(s) to bear responsibility for any remediation required, overseeing that remediation and recording regulatory actions.

Land which has been investigated and has been found to meet the statutory definition of contaminated land and those areas which have then subsequently been remediated will be entered onto the Contaminated Land Register. This is a public register and information may be accessed from this register at any time. As no Part 2A investigations have been completed, and no remediation notices have been issued, there are currently no entries on the Council's Contaminated Land Register.

The Council has been required to carry out two tiers of inspection; a strategic inspection to prioritise sites in order of risk, which has been completed, followed by detailed inspections of sites which have been identified as requiring further works.

The local authority duty to identify contaminated land is stated in Section 78B of the EPA 1990 as follows:

- Every local authority shall cause its area to be inspected from time to time for the purpose of:

    i. Identifying contaminated land; and

    ii. Enabling the authority to decide whether any land is land which is required to be designated as a "Special Site".

- To determine whether any particular site meets the statutory definition of contaminated land contained in the legislation and statutory guidance.

- To act as the enforcing authority for all land, unless the site is determined as a "Special site" in which case the Environment Agency becomes the enforcing authority ('Special Sites' are certain categories of statutory contaminated land that are considered to be particularly difficult to deal with, such as those impacted by chemical weapons, explosives etc.)

2.4.1 Major changes to legislation since 2001

Since 2001, the following major changes to contaminated land legislation have been introduced:

- in 2004 the legal definition of groundwater was amended, so that only groundwater below the water table is now considered as controlled water for the Part 2A contaminated land regime;

- in August 2006 the Part 2A contaminated land regime was extended by further legislation and guidance, principally to include radioactivity;

- the principal technical guidance for the contaminated land regime has been produced by the Environment Agency. Of most use to local authorities is that

guidance which constitutes the Contaminated Land Exposure Assessment (CLEA) regime. The CLEA model estimates the risks to people from contaminants in soil on a given site over a long duration of exposure, provides concentrations of contaminants in soil below which the risks are considered minimal and provides a starting point to help assess risk; critical to the regime is the use of the CLEA Exposure Model to derive Soil Guideline Values (SGVs). SGVs for a range of substances have been developed and published (first published 2001) by the Environment Agency and are commonly in use for generic site risk assessments. SGVs are derived by estimating the level of a substance in soil that will result in an amount of that contaminant entering a human body that is equal to the relevant Health Criteria Values (HCV). SGVs are thus scientifically based generic assessment criteria to help evaluate long-term risks to human health from chemical contamination in soil and therefore are a vital tool in assessing whether or not land is contaminated land. Individuals may also use the CLEA model to derive their own SGVs to reflect more site-specific circumstances, or may use other models as long as it can be demonstrated that they comply with UK legislation;

- in 2006, Defra published a discussion paper entitled "Soil Guideline Values: the Way Forward". The paper discussed various ideas for how the non-statutory "CLEA" technical guidance (first published by the Environment Agency and Defra in 2002) might be amended to make it more useful to assessors conducting risk assessments and to help decide whether land qualifies as contaminated land under Part 2A of the Environmental Protection Act 1990. The paper stated that levels of contamination in excess of Soil Guideline Values (SGVs) in "CLEA" guidance should not be seen as automatically indicative of "contaminated land" for the purposes of Part IIA, but rather as "trigger values" exceedences of which may be of concern for human health. The responses to consultation on this document were published in 2008;

- in 2008, Defra and the Environment Agency withdrew all the technical guidance relating to SGVs and their usage stating that they "no longer fully reflect the revised approach". Revised CLEA documentation began to emerge in August 2008 with the final updated package being produced in January 2009. Publication of revised SGV reports with associated toxicological reports and discussion documents about their derivation commenced in March 2009 and there are currently 11 SGVs published by the Environment Agency;

- in December 2010 a consultation was launched on changes to the contaminated land regime under Part 2A of the Environmental Protection Act 1990 seeking views on proposals for updating and revising the Statutory Guidance and on minor proposed amendments to the Contaminated Land (England) Regulations 2006 and the Contaminated Land (Wales) Regulations 2006;

- in April 2012, revised statutory guidance was issued, the main changes being:

    - four categories to help decide when land is and is not contaminated (CS1-4), where Category 1 and 2 meet the Significant Possibility of Significant Harm (SPOSH) definition and Category 3 and 4 would not be contaminated land. CS4 screening levels for some contaminants have been released to enable

decisions to be made on whether low risk sites should be removed from prioritisation.

- Part 2A can now be used in relation to significant pollution of controlled waters.
- radioactively contaminated land has been removed from the statutory guidance.

2.4.2 State of Contaminated Land in England and Wales

In February 2009, the Environment Agency published their second statutory report on the state of contaminated land for England (and the first report for Wales),

Conclusions from the report included:

- land contamination in England and Wales is mainly dealt with through the planning system with local authorities estimating that only around 10 per cent of contaminated sites are dealt with under Part 2A;
- the cost of inspecting sites in England and Wales, including sites determined as contaminated land, designated special sites and sites that did not need to be determined, is around £30 million;
- by the end of March 2007, 781 sites had been determined under Part IIA, including 35 designated as special sites. Of the 746 contaminated land sites (but not special sites), local authorities reported that 144 had been completely remediated; and
- local authorities reported that the remediation of most contaminated land sites starts more than one year after the site has been determined and that the time it takes to remediate sites can range considerably between a number of months to many years.

The most recent survey of this type was completed in February 2014. The results of this latest survey are not currently available.

2.4.3 Regulatory Role of the Environment Agency

Local authorities and the Environment Agency both have regulatory responsibilities under Part 2A as follows:

- the Environment Agency provides generic and site specific information and local guidance where needed both pre-and post-determination;
- the Environment Agency shares environmental information with local authorities to assist them with implementing their Part 2A “inspection strategy” and inspection of potential contaminated land sites;
- for certain classes of sites, including but not limited to, where it has been identified that there is “significant pollution of controlled waters”, these will be designated as "special sites". In these cases she regulatory role is transferred to the Environment Agency following initial identification by the Local Authority (although in practice the Environment Agency will usually be involved in the early identification process too);

- the Environment Agency has a strategic role and carries out technical research to develop relevant and up-to-date guidance on risk assessment.

2.4.4 Interaction with other regulatory regimes

Aside from the planning regime, there are several other regulatory regimes that are intended to deal with many aspects of pollution and contamination, and which overlap with the operation of Part 2A. These are as follows:

Building Control Regulations 2010

In accordance with the Building Regulations 2010 Part C: Site preparation and resistance to contaminants and moisture (Amended 2013), officers are required to take account of land contamination. They must assess what measures are required to safeguard against specific contaminants, which may have adverse effects on buildings, building materials and services. These regulations only require Building Control to take account of where contamination may directly contact actual buildings and services as opposed to over the whole development site.

The Council's contaminated land officer(s) will comment and offer advice on Building Control Applications if they are located in areas of potential contamination to ensure new buildings and future occupants are protected from the effects of any potential contamination.

Environmental Permitting Regulations 2010

In 2007 the Regulations combined the Pollution Prevention and Control (PPC) (now IPPC) and Waste Management Licensing (WML) regulations.

Pollution from larger industrial installations such as refineries, breweries and cement works is regulated under the Pollution Prevention and Control regime. This regime implements the EU Directive on Integrated Pollution Prevention and Control (IPPC) (2008/1/EC). Each installation is required to have a permit containing emission limit values and other conditions, with an aim of minimising emissions of pollutants to air, water or land, as well as addressing energy efficiency and waste minimisation.

The Regulations now include water discharge and groundwater activities, radioactive substances and provision for a number of Directives, including the Mining Waste Directive. These regulations control activities at licensed disposal and waste processing sites. At these locations provisions are in place to prevent current or future land contamination occurring. Part 2A will not normally apply where contamination has resulted from land subject to a waste management licence.

The Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009

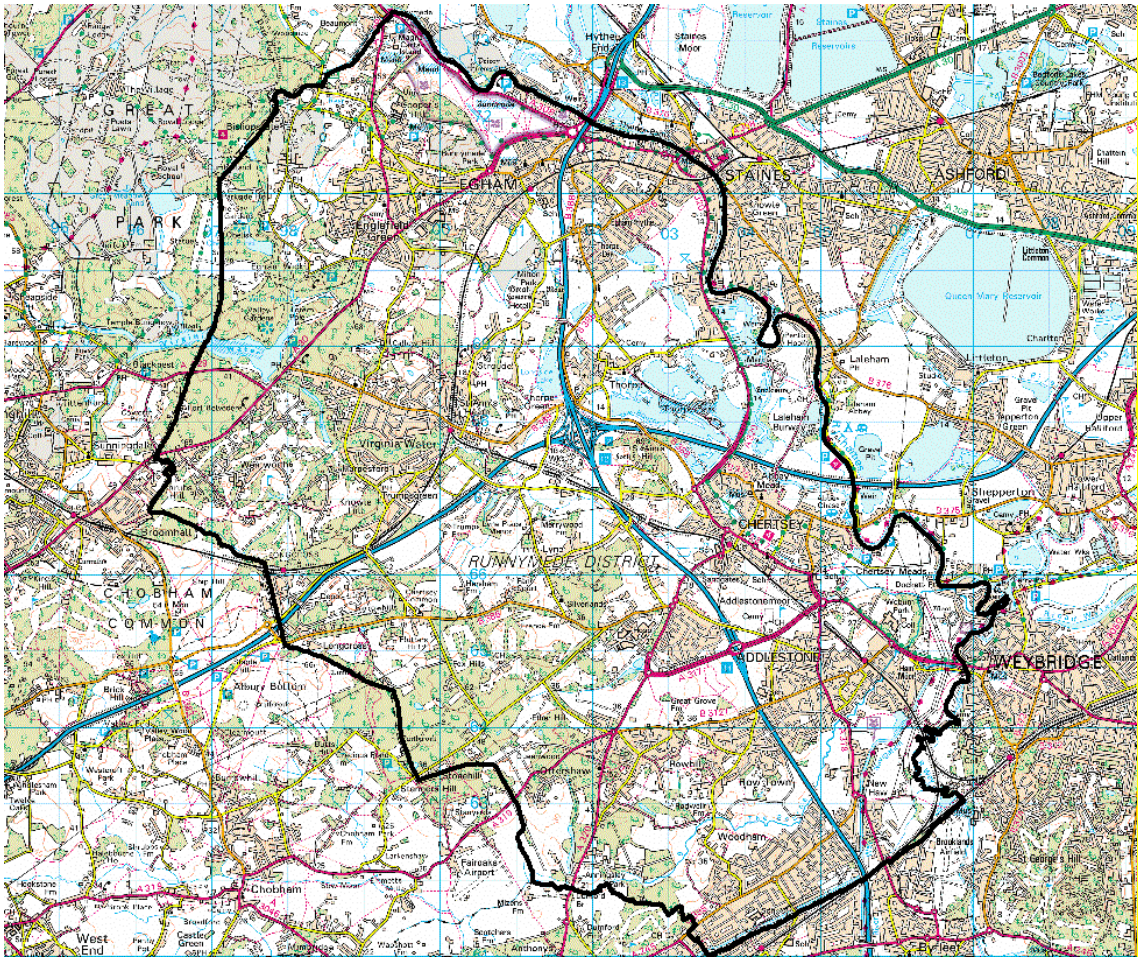
Under this provision the Environment Agency has powers to take action to prevent or remedy the pollution of controlled waters, it also covers discharges to sewers, surface waters and groundwater.

3. The Borough of Runnymede

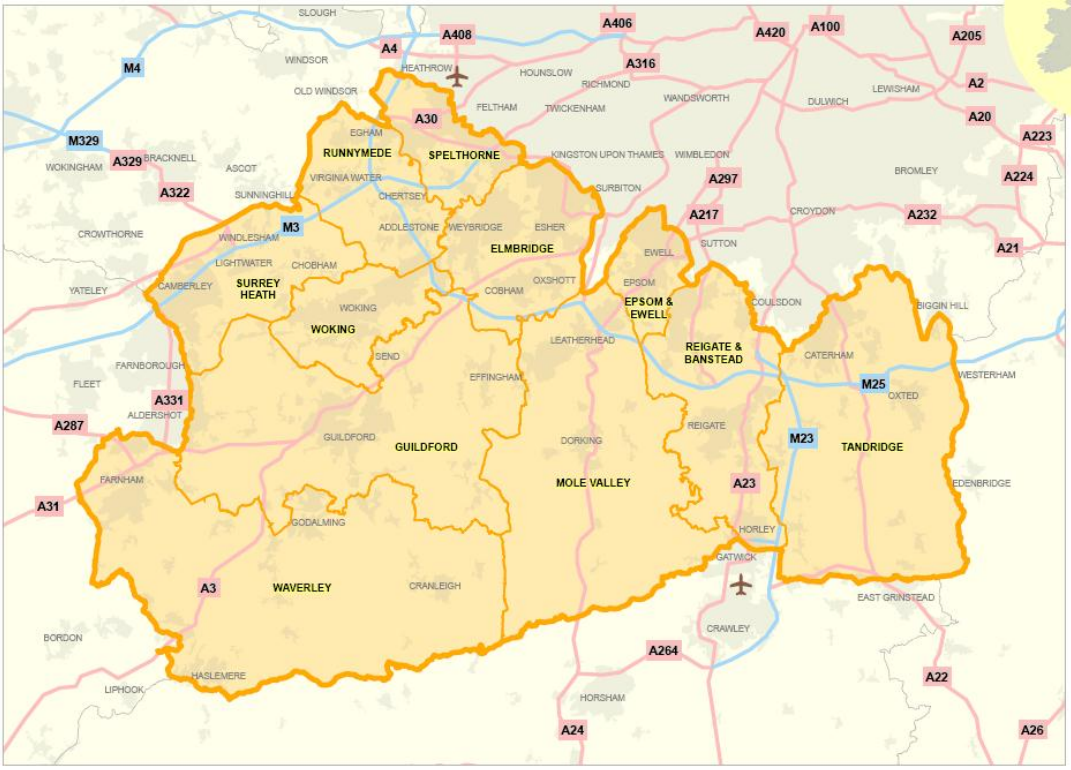
3.1 Geographical Location

The Borough of Runnymede lies in the north western part of Surrey approximately 20 miles south west of central London. The M25 and the M3 motorways quarter the Borough. The Rivers Thames and Wey form its northern and eastern edges respectively

Figure 1 and 2: Location Maps for the Borough of Runnymede



County of Surrey:
District Boundaries



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3.2 Description of the Borough and its History

The Borough covers an area of 7,804 hectares and contains three main towns - Chertsey, Egham and Addlestone. Chertsey is an historic town, which has a famous Abbey dating from Saxon times. Egham lies close to the historic Runnymede Meadow, site of the sealing of the Magna Carta in 1215. Addlestone is the Borough's youngest centre, having only grown into a town in the 19th Century.

The Borough has been subject to heavy exploitation of its natural gravel and sand deposits for many decades. Approximately 572 hectares (9%) of the Borough's area is affected by exploitation of gravel and sand deposits, with another 142 hectares targeted for future extractions. The empty pits arising from the mineral extraction have mainly been utilised by land-filling with domestic and inert commercial waste. There are also a number of sites with historic industrial uses scattered around the Borough ranging from former small-scale foundries to old gas works sites.

3.3 Population Distribution

The population of the Borough is 80,510 (Office for National Statistics, 2011). Approximately 50% of the Borough's inhabitants live in the three main towns of Egham, Chertsey and Addlestone (Surreyi data).

3.4 Details of Runnymede's Ownership of Land

The Council has land holdings within the Borough, mostly administered by the Property section and Housing department.

A recent Leisure Service Review in 2010 showed all current Amenity Areas, Parks and Open Spaces in Council Ownership totaled a figure of 354.46 hectares.

3.5 Current Land Use Characteristics

The built environment in Runnymede is essentially residential in nature, due to the Borough's close proximity to London and the good road and rail links that cross the Borough. There are small pockets of industrial land use mainly located on designated industrial/trade estates.

3.6 Protected Natural Habitats

Approximately 6136 hectares (78.6% of the Borough) are within the London Green Belt countryside zone which obviously places restrictions on the types of development within the Borough, resulting with the emphasis on the re-use of land and not developments on Greenfield sites. Runnymede does have some protected locations such as:

- five Sites of Special Scientific Interest (SSSIs) covering an area of 147.5 hectares;
- Langham Pond, Windsor Forest, Thorpe Hay Meadow and Basingstoke Canal;
- it neighbours Chobham Common SSSI and National Nature Reserve;
- two small Special Areas of Conservation (SAC) in Windsor Forest Great Park partly in the Borough;
- Chertsey Meads and the Virginia Water Riverside Walk are both designed as Local Nature Reserves (LNR);
- Ancient Woodlands make up an area of 303.5 hectares of the Borough, mainly in the west of the Borough but also in Ottershaw and Woodham areas;

- a total of 42 Sites of Nature Conservation Importance (SNICs) in Runnymede covering 824 hectares of land; and
- Thorpe Lake Gravel Pi which is both a SPA and a Ramsar Site.

3.7 Key Property Types

There are seven conservation areas designated in the Borough, specifically Basingstoke Canal, Wey Navigation, Chertsey, Egham-The Hythe, Egham-Town Centre, Englefield Green and Thorpe. There are five premises listed on the English Heritage Register of Parks and Gardens of Special Historic Interest. There are 400 listed buildings, nine Scheduled Ancient Monuments and the County Sites and Monuments record contains 246 entries of archaeological interest within the Borough.

3.8 Geology

The underlying geology of the Borough consists of flat-lying, poorly consolidated, sedimentary strata. These strata are geologically young (Tertiary age) but are commonly covered by unconsolidated, more recent (Quaternary) 'drift' deposits (river gravels, alluvium, peat).

Although older, more consolidated lithologies are present at depth (having been encountered in wells and boreholes) Eocene clays and sands dominate the surface exposures. These lithologies tend to be exposed on the higher ground away from the main river valleys.

A simplified strati graphical sequence for these rocks would be (oldest at the base):

Formation	Description
Barton Beds	Sands, with some clays and pebble beds. Although up to 60m in thickness, this unit is only found in the extreme southwest of the Borough.
Bracklesham Beds	12 to 30m of ferruginous sands, with some thin clay layers and pebble beds.
Claygate Beds	Sandy clays representing the transition zone between Bagshot Beds and London Clay (Up to 3m thick, but not always present).
London Clay	Approximately 100m of Grey clays, with thin sand layers

Lower lying areas such as in the river valleys of the Thames and the Wey (including much of Egham, Chertsey, Thorpe, Addlestone and New Haw) have a covering of variable thickness of unconsolidated, recently deposited sand and gravel ('drift') deposits. Some earlier gravel deposits ('Plateau gravels') are also present on some of the higher ground (e.g. west and south-west of Egham and Virginia Water) and probably a much earlier relic of the Thames floodplain (Description of geology provided by Dr Alderton of Royal Holloway College Geology of Department).

3.9 Hydrogeology and groundwater

Runnymede is situated to the south of the River Thames with the River Wey forming its eastern boundary. River terrace deposits, consisting mainly of gravels underlie the comparatively low-lying ground associated with these rivers. The Thames Gravels stratum consists of slightly worn flints, together with pebbles derived from older rocks, whereas gravels associated with the River Wey include a high proportion of sand. These river terrace deposits are highly permeable and are classified as a major aquifer by the Environment Agency. This is because they provide a component of the base flow to local rivers and a local source of water supply. The EA groundwater vulnerability mapping places the majority of the gravel outcrop within the highest vulnerability class.

The only significant abstraction from the gravels for public water supply is at Abbey Mead about 1km north of Chertsey. This source is owned by Three Valleys Water and consists of three wells interconnected by some 366m of collector pipes laid 7mBGL. The catchment for this source is delineated on the Environment Agency Source Protection Maps (Sheets 6 and 12) and includes most of the Thames Gravels within the Borough.

Groundwater movement within the Thames Gravels is likely to be eastwards towards the River Thames although on a local scale this will be disrupted by the extensive gravel extraction, which has taken place and the reclamation of the pits by the disposal of both inert and putrescible wastes. The Borough was the location in the 1950s of the "Egham Experiment" where putrescible wastes were deposited directly into flooded gravel pits at Thorpe.

Away from the flood plains of the rivers Thames and Wey, the Borough is underlain by Tertiary rocks of Eocene age. Much is rolling countryside with open heaths and pine woods, a reflection of the acid soils developed on the Bagshot Formation and the overlying Bracklesham Beds and Barton Beds. These sands with loam, clays and beds of pebbles are classified as a minor aquifer by the Environment Agency (Ref. 3). As the sands and associated soils are generally fine-grained, much of the outcrop is within the intermediate vulnerability class.

Borehole yields are poor and there are no public water supplies derived from these Tertiary rocks. However, they do supply local golf courses and market gardens and springs feed small streams, which contribute to the attractiveness of the countryside. Water quality is also poor and groundwaters typically have high concentrations of dissolved iron.

3.10 Key Water Resources and Water Quality Issues

Much of the Borough's underlying strata are made up of unconsolidated sands and gravels which accommodate a Principal Aquifer to the east and a Secondary Aquifer to the west. Due to the relatively high water table and the upper strata being sands and gravels much of the Borough is within a high or intermediate groundwater vulnerability zone. The main direction of flow of the groundwater is north-eastwards towards the River Thames and the London Basin.

There is a public drinking water abstraction point in the Borough managed by Three Valleys Water at Abbey Mead 1km north of Chertsey town centre. Around this abstraction point there is a Source Protection Zone. Zone I is the highest risk zone and covers much of Chertsey town centre, Zone II reaches from Thorpe to the outskirts of Chertsey and Zone III reaches as far as Addlestone to the south and just north of Thorpe and coincides to the west with the route of the M25. Any contaminants entering the groundwater in Zone I will take approximately 50 days to reach the abstraction point and in Zone II approximately 400 days. It is therefore important that contaminated land within the boundaries of the source protection zones are dealt with sensitively and effectively to ensure contamination is not mobilised into the water supply.

Any contaminated land found to be within the high groundwater vulnerability zone and/or the Source Protection Zones shall be treated as a higher priority than other sites outside these areas due to the risk that controlled waters could become contaminated. Contaminated land sites in these areas are likely to be classed as special sites and pass to the Environment Agency for enforcement.

The Borough also contains a number of other controlled waters such as the Rivers Thames, Wey and Bourne. In addition, there are watercourses and ditches such as the Mead ditch crossing the Borough and many lakes such as Longside, Virginia Water and those lakes in former gravel workings around Thorpe Park. Any contamination from a contaminated site suspected to be affecting these receptors will also be prioritised.

3.11 Current and Past Industrial History

3.11.1 Runnymede Re-development History

The Borough is within the London Green Belt zone, so recent redevelopment has taken place primarily within the existing towns and villages utilising spare or derelict land. This has meant that increasingly potentially contaminated sites are being re-used for redevelopment. Many of the sites in the Borough historically used for industrial type processes remain within the footprints of existing industrial/commercial estates. Historically, there was minimal regulatory control of land use and re-use until the planning control process and regulation was introduced after the war. Therefore, there are limited pre-war records apart from those held by local museums and history societies. As each prioritised potentially contaminated land site is investigated, more extensive historical searches will be carried out, which in turn, will further inform the database. The Council's existing planning records are also a good source of information about previous redevelopment.

Some of the main historical industrial land use types in the Borough include:

- **sand/gravel extraction:** Much of the Borough has been subject to mineral extraction of some type. Many of the pits arising from these extractions have subsequently been used for the land-filling of domestic and inert waste e.g. Callow Hill sandpit, Froggy Pond sandpit etc;

- **railway/gasworks and sewage treatment**: There is one remaining gasworks site in the Borough in Staines, which is still used for gas storage. There were railway sidings and goods yards at Addlestone, Chertsey, Egham and Virginia water adjacent to the railway stations. There has been a large sewage works at Lyne since World War One;

- **numerous foundries/smithys and metal works**;

- An **iron mill** existed at Coxes Lock. Stoneylands Road works produced sheet metal and Rusham road works was used by Foster Wheeler to make commercial boilers;

- **motor vehicles and aeroplane manufacturers**: Lagonda motor cars, Petters diesel engines, Bleriot aeroplanes, Whippet cycle cars, Langs propeller factory, Carden Lloyd amphibious tank manufacturers, Airscrew are just a few of the small scale manufactures that were located in the Borough. Most were found in Addlestone to be close to the airfield and racing circuit at Brooklands;

- **boatyards/timber and chemical works**: Numerous facilities along the River Thames some of which still exist today, e.g. Nichole's boatyard and Tim's boatyard. There were also a number of timber yards and chemical works such as Liberties and Grindly sawmills, Addlestone linoleum Co, Copal Varnish Co, West Surrey Chemical Works and Paripan Paintworks; and

- **DERA (now the Defence Science and Technology Laboratory (Dstl) former tank testing facility, Longcross:** Former MoD military vehicle testing site, circuit track, industrial and commercial former and current uses

There are many other miscellaneous industrial land uses in the Borough. The above are just examples of a few.

3.12 Known Information on Contamination

The Council has completed identification and prioritisation of areas of potentially contaminated land within the Borough. In the absence of a Contaminated Land Officer, this was carried out using STM Environmental Consultants using the approach described in Appendix A. However, new sites are continuously discovered through information received e.g. through planning applications

Between 2001 and 2009 progress in implementing the strategy within the Borough was restricted by the absence of a dedicated contaminated land officer (CLO) and lack of funding allocation for investigations. However, during this time a comprehensive Geographical Information System (GIS) mapping system to aid in the assessment of

risk and the identification of potentially contaminated land areas was put together. Historical land use data have been gathered for the Borough and have been the main tool in the identification of potentially contaminated land. After the appointment of a permanent CLO, new software was acquired (2010) to work alongside the existing GIS, enabling prioritisation of all identified potentially contaminated land sites into a scored list, which instantly updates site status as new information becomes available.

At the time of this review 432 potentially contaminated land sites have been identified, however, a large percentage of these sites will require no more than a very limited desk based assessment to confirm their low prioritisation rank. Using this prioritised list of sites, a programme for more detailed inspections of higher priority sites has been developed, enabling progress of site inspections and investigations to be monitored.

As previously stated, the Council will not be publishing the information on each potentially contaminated land site identified during this process, as it is a work in progress and the status of each site changes with any new information gathered. Information on an area may be requested in accordance with Environmental Information Regulations and associated legislation.

4. Procedures

The following sections refer to the requirements of paragraph B.15(d) in the statutory guidance and should be fulfilled as a minimum requirement.

4.1 Internal Management for Inspection

The Environmental Services Department has taken the lead role for the implementation of the inspection strategy.

The contaminated land strategy is a corporate consideration for the Council, therefore working procedures between Pollution Control, Building Control and Planning and Development Control have been set up to ensure other council departments have regard to the relevant responsibilities they have under the strategy and to ensure an understanding of joint working.

Records held by Building Control, Planning and Development Control and Property Services either in paper form or held digitally are made available to research potential problem sites or to ensure that where new development occurred remediation was carried out.

Legal services will have a significant role in the enforcement of the contaminated land regime. Carrying out land registry searches and the identification of the “appropriate person” are the main areas legal will be involved initially; this role may evolve should there be disputes over enforcement action leading to appeals.

4.2 Local Authority Interests

The Council may have direct responsibilities for contaminated land by virtue of its current or former ownership or occupation of that land. The legislation commits a local authority to apply the same level of enforcement to its own contaminated land as would be applied to other non-council contaminated land. Elected members will be informed at the earliest opportunity of plans to designate any area of Council owned land or land where the council is the “appropriate person” as the Council will be liable for any costs arising for necessary remediation (clean up) works.

4.3 Information Collection

Regard has been made to the information contained in guidance published by the Environment Agency and the Defra on the sources and types of data required and the use of those data to identify potentially contaminated sites, receptors and pathways as well as the location of controlled waters.

Much of the information is available in digital formats for use on GIS databases which reduces the time taken to capture these sources of data. Data will continue to be

collated from Historical maps, aerial photographs, planning and environmental health records and information found in local museums and trade directories.

Defra has published a series of Industry Profiles which provide useful information on contaminative uses and the types of contaminants that may be found resulting from such uses (Ref. 4).

4.4 Information and Complaints

When information or complaints are received the following steps will be taken:

- receipt of information will be acknowledged in three working days;
- the anonymity of the originator of the information will be preserved, until such time as legal action may be considered;
- owners and occupiers of land to which the information relates, or appropriate persons, will be advised that it has been received and how it will be dealt with, with an indication of timescale;
- other regulatory bodies will be informed where information provided relates to matters relevant to other regulatory regimes; and
- advising the person(s) who provided the information and owners / occupiers / appropriate persons previously contacted of the final outcome of the Councils investigation.

4.4.1 Maintaining appropriate confidentiality

Implementing the regime will result in the collection and storage of a wide variety of data and information about the Borough. In addition to the obligations set out in EU legislation governing the availability of environmental data (90/313/EC) on the freedom of access to information, implemented in the UK by the Environmental Information Regulations 1992 (as amended) the general approach has been to provide information where it is complete and has been validated, minimising the risk of the publication of (?) inaccuracies which may cause unnecessary blight and possible litigation.

The existing procedures for dealing with contaminated land enquiries will be reviewed and updated as the development of the land quality database progresses. No direct uncontrolled access to information contained on the land quality database will be permitted by unauthorised persons.

As already mentioned land found to be Statutorily Contaminated Land will be entered onto the Contaminated Land Register, a public document. However a list of land which the council feels may be potentially contaminated land, will be listed on the land quality database, and an incomplete work in progress will not be made available to the public. Information relating to specific areas may however be requested and supplied under the Environmental Information Regulations.

4.5 Information Evaluation

The basic principles of information evaluation are to compare the location of areas of potential contamination with areas where there are sensitive receptors. The geographical coincidence of these two will confirm that two parts of a potential pollutant linkage are in place, showing a need for further investigation.

Land can only be determined as contaminated if the pollutant linkage can be identified and if significant harm is being caused or likely to be caused. The identification of contaminant sources and receptors is vital to the strategy and each one of equal importance as they provide a baseline to research potential pollutant linkages and significant harm.

The receptors are defined in the statutory guidance and are limited to five specific categories only, together with pollution of controlled waters:

- humans;
- buildings;
- commercial crops;
- commercial livestock; and
- certain types of ecosystems.

The statutory guidance also lists the type of harm to these receptors that can qualify as being “significant”. (See Appendix B) taken from the statutory guidance.

5. LIAISON AND COMMUNICATION STRATEGIES

Much of the work proposed in this strategy will be collaborative and liaison and communication with other external bodies and departments within the Council is essential.

5.1.1 Owners, Occupiers and other interested parties

In line with the Statutory guidance the Council's approach to the contaminated land regulatory duties will be to seek in the first instance voluntary action over contaminated land, before considering enforcement action.

The Council's CLO will be the central contact point within the Council on contaminated land issues and therefore will be responsible for ensuring the owners, occupiers and other appropriate persons are informed at each stage of a more detailed investigation into contaminated land regardless of whether there is a formal designation or not.

Specific procedures in the form of a communication strategy will be developed detailing the way in which information will be provided to relevant persons.

The strategy document will be available for viewing at the Council's Offices and via the its website.

6. PROGRAMME FOR INSPECTION

6.1 Inspection of the Borough for Contaminated Land sites

6.1.1 Compliance with the statutory guidance

In developing the contaminated land database, areas of land will be identified where it is likely that pollutants exist. The statutory guidance (B.19-25) requires that a more detailed inspection be carried out to obtain enough information to determine:

- whether a site appears to be contaminated; and
- whether such a site should be also a special site.

The statutory guidance for making such a determination requires detailed inspection through:

- the collation and assessment of documentary information;
- a visit to the particular area for the purposes of visual inspection and, in some cases, limited sampling; and
- and / or intrusive investigations of the land.

6.2 Dealing with Contaminated Land – Actions to date

- A great deal of information has been gathered on many potentially contaminated land sites in the Borough, mostly through planning application submissions and desk based exercises. This information is stored and further utilised within the Contaminated Land database procured by the Council in 2010.
- A database and prioritisation system was seen to be critical for managing Part 2A work as the Council moves forward. The installation of this database has enabled information on each potentially contaminated land site to be instantly recalled and assessed, proving accurate responses to requests for information and increasing the amount of confidence in planning and building control consultations. This information has also enabled the Council to prioritise sites for Part 2A activities as and when they can commence.

6.2.1 Runnymede's Priority Sites

The initial aim of investigation of the Borough is the protection of human health. It is recognised however that there may arise times during the investigation and inspection process when urgent action is required in regard to lower priority aims, therefore the

development of any prioritisation process must allow for such situations to be dealt with as they arise.

Using our GeoEnviron database of potentially contaminated land sites, prioritisation of sites within the Borough is made and can be changed as and when information is acquired on each site.

This STM prioritisation system uses the Source-Pathway-Receptor concept to assess risks. The assessment involves hazard-ranking sites based on their historical industrial uses and their proximity to sensitive receptors (full details in Appendix A) as well as any other information we may hold.

Information regarding land which the Council considers to be potentially contaminated due to its former use or activities is kept on a confidential GIS database, with factual information on individual sites from this database available via EIR requests. Details of which areas are on this list are not available to the public, as it remains a work in progress with information on each site changing frequently as further details are gathered and risk scores changed. Each of the sites on this list has been being prioritised for investigation by the Council using a risk scoring system (discussed in Appendix A). Once resources allow, the sites on this prioritised list will be investigated to assess the risk present if at all and initiate remediation if required.

After the revision of the Statutory Guidance outlining the revised Category Screening levels 1 to 4 for sites, our prioritised sites have now also been assigned *likely* relevant categorisation using *potential* Category Screening levels, based on the information currently held, in the absence of investigative information in most cases.

CS1 - unacceptably high probability of SPOSH

CS2 – High possibility of SPOSH

CS3 – Unlikely to be SPOSH

CS4 - no risk of SPOSH or level of risk is low

Category 4 Screening levels have been released (March 2014) for some contaminants as a way of determining if that site is of any concern or can be removed from prioritisation lists.

As a result of the prioritisation exercise, sites which have the highest scoring, and represent the highest risk to human health, will be approached under Part 2A first.

6.2.2 Runnymede targets relating to the inspection process

Any significant achievements, progress or changes will be reported to the Councillors and relevant Consultees (Appendix C). The prioritisation targets in the original 2001 Strategy are listed below, with progress comments in italics:

- to capture onto the land quality database (Geographical Information System) all sites identified from the historical maps as being potentially contaminated *This has been completed and is an ongoing task;*

- to capture onto the land quality database the location of all receptors listed in Table A (contained in Section 1 of this document) of the statutory guidance in time for prioritisation in 2003. *This has been completed;*

- to identify, examine and capture any other relevant data/information collated from trade directories, historical records held by local museums etc. *This is a partially completed task(?).*Completed and o*ngoing task;*

- desk based site prioritisation process. *Completed in 2009; and*

- the inspection and detailed investigation of sites will begin at the end of 2004 with sites that have been identified as a high priority being targeted first. Phasing in sites of lower priority overtime as the progress is made. Alongside the above targets, the process of identification, prioritization and inspection of the Councils own land interests will be targeted for completion by mid 2003. *This did not occur due to lack of resources and vacant CLO position.*

The revised targets are as follows:

- to ensure the continued compliance and enforcement of the Part IIA provisions of the EPA 1990;

- to establish an anticipated Category Screening level for each site based on information gathered and anticipated risk or actual Category Screening level based on investigative evidence;

- to raising the profile of contaminated land within the Borough with Councillors and other Council departments to establish future support and funding for Phase 1 initial investigations of prioritised sites. Funding was secured through Committee in 2012, however this was subsequently withdrawn in 2014;

- to carry out in-house inspection and complete basic ‘desk study’ reports on the top 20 priority scored sites;

- to continue to populate the database and adjust risk scoring as new information is gathered, to inform risk ratings and keep an accurate record of areas affected by contamination issues;

- to review the Council’s own landholdings and former holdings and assess any liabilities associated with that land and ensure that the Council does not create contaminated land or unknowingly purchase land which may already be affected;

- to ensure that the redevelopment of contaminated sites is adequately controlled and monitored ensuring the site is suitable for the proposed end use; and

- to ensure that the planning process does not create situations where land become contaminated through further streamlining the identification of contaminated land issues to the planning and building control departments.

Continue review of the weekly application lists for applications which may be in areas of potential contamination or be sensitive to contaminated land risks.

6.2.3 Local authority powers of entry.

Section 108 of the Environment Act 1995 gives the local authority the power to authorise its staff or contractors acting on behalf of the Council with the power of entry. From time to time contractors will be required to conduct detailed site investigations as specialist equipment and analysis may be required.

Before the Council carries out an inspection using its powers; it should be satisfied, on the basis of any information already obtained:

- that there is a reasonable possibility the a pollutant linkage exists on the land; this implies that not only must the Council be satisfied that there is reasonable possibility of the presence of a contaminant, receptor and a pathway, but also that these together create a pollutant linkage; and
- further, in cases involving an intrusive investigation, i) that it is likely that the contaminant is actually present, and ii) given the current use of the land, that the receptor is actually present or is likely to be present.

Intrusive investigations

The Council will carry out any intrusive investigations in accordance with appropriate technical guidance for example Environment Agency Guiding Principles on Land Contamination guidance documents (Ref. 5), British Standards BS5930:1999 and BS 10175:2001 (Ref. 6 and 7) and CLR 4 “Sampling strategies of contaminated land”(Ref. 8). All reasonable precautions should be taken to avoid harm, water pollution or damage to natural resources or feature of historical or archaeological interest which might be caused harm as a result of the investigations.

In carrying out an inspection of land, the Council will consider whether the site may be required to be designated a special site in line with the statutory requirements where by the authority would have to liaise with the Environment Agency, other instances may arise where the receptor may be for example a Site of Special Scientific Interest (SSSI) where English nature would be contacted before further action was taken.

6.2.4 Risk communication Strategy

Contaminated land is an emotive subject, The SNIFFER guide ‘Communicating Understanding of Contaminated Land Risks’ (Ref. 9) will form the basis of how the Council will keep stakeholders informed. The Council’s own Risk communication Strategy will be completed ahead of any Part 2A investigation works commencing.

6.2.5 Hardship and cost recovery

Part 2A and the guidance lays out the concept of identifying a party from which to seek reasonable cost recovery from in the situation where the Council has carried out necessary remediation of a statutory site. Finding an ‘appropriate person’ seeking first the Class A person who caused or knowingly permitted a pollutant to be in, on or under

the land, or in their absence, the Class B person who may be the owner or occupier of the land is a lengthy process with consideration for many factors. The guidance also states that this would need to be carried out so as not to cause hardship to those parties.

The Council does not yet have a hardship policy however this will be required to set out how we to recover the cost of remediation of contaminated land from the relevant parties, if required.

7. References

Ref 1. Environmental Protection Act 1990 Part 2A Contaminated Land Statutory Guidance April 2012, Defra.

Ref 2. Environmental Information Regulations 2004:Charging for environmental information (ICO)http://www.ico.gov.uk/~/media/documents/library/Environmental_info_reg/Practical_application/CHARGING_FOR_ENVIRONMENTAL_INFORMATION_V1.ashx

Ref 3. Environment Agency (October 2010) what's in your backyard? www.environment-agency.gov.uk

Ref 4. DoE Industrial Profiles

Ref 5. Guiding Principles for Contaminated Land Environment Agency, 2004 and the superseded Environment Agency Model Procedures for the Management of Land Contamination (CLR11).

Ref 6. British Standard Institution, 1999. BS 5930:1999 Code of Practice for Site Investigations. Milton Keynes: BSI.

Ref 7. British Standard Institution, 2001. BS 10175:2001 Investigation of Potentially Contaminated Sites- Code of Practice. Milton Keynes: BSI.

Ref 8. Environment Agency Sampling Strategies for contaminated land (CLR4)

Ref 9. SNIFFER http://www.sniffer.org.uk/files/5513/4183/8005/Communicating_understanding_of_contaminated_land_risks_guidance_UKLQ13.pdf

8. Appendices

Appendix A
STM Prioritisation Methodology

2008

STM ENVIRONMENTAL CONTAMINATED LAND SITE PRIORITISATION METHODOLGY

CONTENTS

1.0 INTRODUCTION 3
2.0 CONTEXT 4
3.0 DATA COLLECTION AND ANALYSIS METHODOLOGY 4
3.1 GIS Datasets 4
3.1.1 Potential Sites Data 4
3.1.2 Current Ordnance Survey Mapping and Aerial Photography 5
3.1.3 Environment Agency Datasets 5
3.1.4 English Nature Datasets 5
3.1.5 English Heritage Datasets 5
3.2 DOE Industry Profiles 6
4.0 PRIORITISATION METHODOLOGY 7
4.1 Categorisation of Potentially Contaminative Sites 7
4.2 Human Health risk prioritisation 7
4.3 Groundwater Risk Prioritisation 7
4.4 Surface Water Risk Prioritisation 8
4.5 Ecological Risk Prioritisation 8
4.6 Property Risk Prioritisation 8

4.7 Data Deliverables 9
5.0 REFERENCES 10

1.0 INTRODUCTION

The Environmental Protection Act 1990 Part IIA places a duty on local authorities to inspect their areas for the purposes of identifying Contaminated Land. Local Authorities are required to take a strategic approach so that any land which requires detailed inspection is identified in a rational, ordered and efficient manner. Most Local Authorities have decided to undertake a systematic prioritisation of their potential sites in order to help meet this objective.
This document details the methodology used by STM Environmental Ltd when carrying out site prioritisation works on behalf of Local Authorities. It should be read in conjunction with the document entitled "A System for the Prioritisation of Point Sources – GeoEnviron site Prioritisation methodology (1)" which describes the software used in the data capture process.

2.0 CONTEXT

Part IIA of the Environmental Protection Act 1990, which came into force in April 2000, introduced a new statutory regime for the identification and remediation of contaminated land in the United Kingdom. The legislation considers risks from contaminated land to human beings, controlled waters (surface and ground water), protected ecological systems and property. Under the legislation "Contaminated Land" is defined as: "Any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land that: - (a) Significant harm is being caused or there is significant possibility of such harm being caused: or (b) Pollution of controlled waters is being caused, or is likely to be, caused." In order for land to be considered contaminated, there must be a contaminant, a receptor and a pathway (via which the contaminant can reach the receptor) present at the site. When these three components are identified at a site, a *pollutant linkage* is said to exist. **Pollutant Linkage = Source –> Pathway -> Receptor** In order for a local authority to make a determination that a site is contaminated land, it must be satisfied that the pollutant linkage is a *significant pollutant linkage* (i.e. that the land identified is causing or is likely to cause significant harm to humans, habitats, buildings or livestock and crops if remedial work is not carried out). The prioritisation system uses the Source-Pathway-Receptor concept to assess risks. The assessment involves hazard ranking sites based on their historical industrial uses and their proximity to sensitive receptors.

3.0 DATA COLLECTION AND ANALYSIS METHODOLOGY

The data collection exercise was carried out using the GeoEnviron Contaminated Land Management System. GeoEnviron is a database management system specifically designed for Part IIA. It allows for the management of complex site related datasets and is also tightly integrated to GIS allowing for efficient data capture from maps. The principal information sources used in carrying out the survey are summarised below.

3.1 GIS Datasets

A variety of geographical information system (GIS) based datasets were used. These are described below.

3.1.1 Potential Sites Data

Normally the data on potential contaminative uses will have been provided by the Local Authority. This data will usually have been derived from digital historical maps produced by the Ordnance Survey (OS).

3.1.2 Current Ordnance Survey Mapping and Aerial Photography

Ordnance Survey maps along with aerial photography are used to give an indication of the current land use of the potential sites.

3.1.3 Environment Agency Datasets

GIS datasets showing the locations of groundwater source protection zones (SPZ) were available from the Environment Agency. SPZ maps define areas which are considered to form the catchments to public water supplies and certain other private supplies. They show the position of the sources and all subdivisions of their protection zones (Inner, Outer and Total Catchment). They relate purely to groundwater flow below the water table and do not take account of the nature and thickness of the overlying unsaturated zone and cover which may have an important influence on groundwater vulnerability.

3.1.4 English Nature Datasets

English Nature has produced GIS based datasets showing the location of protected areas in England. The datasets analysed as part of the prioritisation are summarised below. *Sites of Special Scientific Interest (SSSI)* - SSSIs cover a wide range of habitats from small fens, bogs and riverside meadows to sand dunes, woodlands and vast tracks of uplands. Special Areas of Conservation (SAC) - SACs are candidates for protection under the EC Habitats and Species Directive (1992) whose aim is to maintain a rich variety of wildlife by protecting vulnerable habitats, and the plants and animals they support. *National Nature Reserves (NNR)* – NNRs are protected wildlife habitats and geological features. They can range in size between five hectares to well over 2,000. All of them are also SSSI and may provide places for educational projects, research and management trials. *Special Protection Area (SPA)* - The EC Birds Directive of 1979 requires member states to establish Special Protection Areas to conserve the habitats of birds which are rare or vulnerable as well as birds that belong to particular migratory species. SPAs are also protected through being SSSI. *Wetlands of International Importance (Ramsar)* - Wetlands are vital for many types of birds, plants and animals. Ramsar sites are also SSSIs. *Local Nature Reserves (LNR)* - LNRs are established and managed by local authorities, under the National Parks and Access to the Countryside Act 1949. For a site to become an LNR it must have natural features of special interest to the local area, and the authority must either have a legal interest in the land or have an agreement with the owner to manage the land as a reserve.

3.1.5 English Heritage Datasets

The following English Heritage GIS datasets are examined:

Listed Buildings - building or other structure officially designated as being of special architectural, historical or cultural significance. In England and Wales the authority for listing 6

is granted by the Planning (Listed Buildings and Conservation Areas) Act 1990 and is presently administered by English Heritage, an agency of the Department for Culture, Media & Sport, and Cadw in Wales (12). *Historic Parks and Gardens* – since the 1980s, there has been a national record of the historic parks and gardens. This record, known as the *Register of Parks and Gardens of special historic interest in England* and now containing nearly 1450 sites, was established, and is maintained by, English Heritage (12). *Protected Wreck Sites* - The Protection of Wrecks Act (1973) allows the Government to designate a wreck to prevent uncontrolled interference. Designated sites are identified as being likely to contain the remains of a vessel, or its contents, which are of historical, artistic or archaeological importance (12). *Scheduled Ancient Monuments* – nationally important sites and monuments are given legal protection by being placed on a list, or 'schedule'. English Heritage takes the lead in identifying sites in England which should be placed on the schedule by the Secretary of State for Culture, Media and Sport. A schedule has been kept since 1882 of monuments whose preservation is given priority over other land uses. The current legislation, the Ancient Monuments and Archaeological Areas Act 1979, supports a formal system of Scheduled Monument Consent for any work to a designated monument (12).

3.2 DOE Industry Profiles

The former Department of Environment (DOE) published a series of guidance documents known as the DOE Industry Profiles. These were used to obtain information on the raw materials, processes, products, wastes and potential contaminants that may be associated with individual industries.

4.0 PRIORITISATION METHODOLOGY

The site prioritisation exercise is carried out using the GeoEnviron Contaminated Land Management System and the prioritisation methodology applied within the system (1). The methodology is summarized below.

4.1 Categorisation of Potentially Contaminative Sites

The first step in the prioritisation is to collate all the information on the potential contaminative uses. Where possible, each site's potentially contaminative use is „compared" to the existing DOE (former Department of Environment) industry profiles, so that an idea of the potential contaminants likely to be associated with the site could be obtained. Based on this information, source hazard scores (ranging from 1 to 6) are assigned to each of the sites with respect their potential impact on human (HHSHS), groundwater (GWSHS), surface water (SWSHS), ecological (EcoSHS) and property (PropSHS) receptors.

4.2 Human Health risk prioritisation

The next step is to identify potential human health receptors for each of the potential sites. This is achieved using the GIS. Each potential site is located on the GIS and its current use assessed by visually examining digital aerial photography and Ordnance Survey mastermap/ landline layers. Each of the current uses identified is allocated a receptor sensitivity score (HHRSS) within the GeoEnviron database (see Prioritisation Spreadsheet). The human health risk score (HHRSK) for each site is then calculated by multiplying the Human Health hazard score (HHSHS) with the Human Health receptor sensitivity score (HHRSS).

4.3 Groundwater Risk Prioritisation

As described above, each site is assigned a groundwater source hazard score (GWSHS) based on the considered potential impact of the contaminative use on groundwater. In order to be able to risk rank sites in terms of their potential risk to groundwater, it is necessary to collect information on the nature of the groundwater receptor underlying the each site. Source Protection Zone digital maps obtained from the Environment Agency are used for this purpose. Source Protection Zones (SPZs) are groundwater source catchment boundaries that the Environment Agency have defined for approximately 2000 groundwater sources such as wells, boreholes and springs used for public drinking water supply. The maps consist of four zones (inner, outer and total catchment and a zone of special interest). SPZs provide an indication of the risk of the groundwater source becoming contaminated by pollution in an area. One of the main factors considered in the establishment of these zones is pollution travel time (i.e. pathway), which is directly influenced by the geology of the area.

Each SPZ is given a groundwater receptor sensitivity score (GWRSS) based its importance as a potable water source. Intersect queries are then performed using GIS to obtain information on the nature of the SPZ underlying each site. Groundwater Risk Scores 8 (GWRSK) for each site is then calculated by multiplying the GWSHS assigned to the site by GWRSS of the SPZ underlying the site.

4.4 Surface Water Risk Prioritisation

As described above, sites are assigned a surface water hazard score (SWSHS) based on the considered potential impact of the contaminative use on surface water receptors. Potential surface water receptors are then identified by carrying out proximity queries in GIS for each of the potential sites using OS landline/mastermap water layers. The queries check for surface water features that lie on site and within 50, 100, 150 and 200 metres of the potential sites. Surface water receptor sensitivity scores (SWRSS) are then assigned to each site based on proximity to a surface water receptor. The surface water risk score (SWRSK) is then calculated by multiplying the SWSHS by the SWRSS.

4.5 Ecological Risk Prioritisation

As described above, sites are assigned an ecological source hazard score (EcoSHS) based on the considered potential impact of the contaminative use on ecological receptors. Potential ecological receptors are then identified by carrying out GIS intersect queries of the potential sites and English Nature datasets. These queries check for ecological zones situated within the boundary of a potential site. Ecological receptor sensitivity scores (EcoRSS) are then assigned to each site based on the presence/absence of an ecological protection zone. The Ecological Risk Score (EcoRSK) is then calculated by multiplying the EcoSHS with the EcoRSS.

4.6 Property Risk Prioritisation

As described above, sites are assigned a property source hazard score (PropSHS) based on the considered potential impact of the contaminative use on property receptors. Potential property receptors are then identified by carrying out GIS intersect queries of the potential sites and English Heritage datasets. These queries check for sensitive properties situated within the boundary of a potential site. Property receptor sensitivity scores (PropRSS) are then assigned to each site based on the

presence/absence of a sensitive property. The Property Risk Score (PropRSK) is then calculated by multiplying the PropSHS with the PropRSS.

4.7 Data Deliverables

There are two options for delivery of the prioritisation results. They can be delivered with the GeoEnviron database so you are able easily manage and update the prioritisation as further information about the sites comes to light. Alternatively it can be delivered as GIS layers and an Excel spreadsheet. The data from the database is transferred into the GIS layers which are in turn exported to and Excel spreadsheet.

5.0 REFERENCES

1. A System for the Prioritisation of Point Sources – GeoEnviron site Prioritisation methodology, STM Environmental Ltd & Geokon EDB A/S, 2003.

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6. The Contaminated Land Exposure Assessment Model (CLEA): Technical Basis and Algorithms – Department of Environment, Food and Rural Affairs, Environment Agency, 2002.

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10. Environment Act 1995, Department of the Environment, Transport and the Regions,

11. Environmental Protection Act 1990: Part IIA, HMSO 2000.

12. English Heritage homepage http://www.english-heritage.org.uk/

Appendix B - Guidance Table A (Statutory Guidance)

Table 1 – Categories of Significant Harm Type of Receptor		**Description of harm to that type of receptor that is to be regarded as significant harm**
1	Human beings	Death, disease, serious injury, genetic mutation, birth defects or the impairment of reproductive functions. For these purposes, disease is to be taken to mean an unhealthy condition of the body or a part of it and can include, for example, cancer, liver dysfunction or extensive skin ailments. Mental dysfunction is included only insofar as it is attributable to the effects of a pollutant on the body of the person concerned. In this Chapter, this description of significant harm is referred to as a "human health effect".
2	Any ecological system, or living organism forming part of such a system, within a location which is: • an area notified as an area of special scientific interest under section 28 of the Wildlife and Countryside Act 1981; • any land declared a national nature reserve under section 35 of that Act; • any area designated as a marine nature reserve under section 36 of that Act; • an area of special protection for birds, established under section 3 of that Act; • any European Site within the meaning of regulation 10 of the Conservation (Natural Habitats etc) Regulations 1994 (i.e. Special Areas of Conservation and Special Protection Areas); • any candidate Special Areas of Conservation or potential Special Protection Areas given equivalent protection; • any habitat or site afforded policy protection under paragraph 13 of Planning Policy Guidance Note 9 (PPG9) on nature conservation (i.e. candidate Special Areas of	For any protected location: harm which results in an irreversible adverse change, or in some other substantial adverse change, in the functioning of the ecological system within any substantial part of that location; or harm which affects any species of special interest within that location and which endangers the long-term maintenance of the population of that species at that location. In addition, in the case of a protected location which is a European Site (or a candidate Special Area of Conservation or a potential Special Protection Area), harm which is incompatible with the favourable conservation status of natural habitats at that location or species typically found there. In determining what constitutes such harm, the local authority should have regard to the advice of English Nature and to the requirements of the Conservation (Natural Habitats etc) Regulations 1994. In this Chapter, this description of significant harm is referred to as an "ecological system effect".

	Conservation, potential Special Protection Areas and listed Ramsar sites); or • any nature reserve established under section 21 of the National Parks and Access to the Countryside Act 1949.	
3	Property in the form of: • crops, including timber; • produce grown domestically, or on allotments, for consumption; • livestock; • other owned or domesticated animals; • wild animals which are the subject of shooting or fishing rights.	For crops, a substantial diminution in yield or other substantial loss in their value resulting from death, disease or other physical damage. For domestic pets, death, serious disease or serious physical damage. For other property in this category, a substantial loss in its value resulting from death, disease or other serious physical damage. The local authority should regard a substantial loss in value as occurring only when a substantial proportion of the animals or crops are dead or otherwise no longer fit for their intended purpose. Food should be regarded as being no longer fit for purpose when it fails to comply with the provisions of the Food Safety Act 1990. Where a diminution in yield or loss in value is caused by a pollutant linkage, a 20% diminution or loss should be regarded as a benchmark for what constitutes a substantial diminution or loss. In this Chapter, this description of significant harm is referred to as an "animal or crop effect".
4	Property in the form of buildings. For this purpose, "building" means any structure or erection, and any part of a building including any part below ground level, but does not include plant or machinery comprised in a building.	Structural failure, substantial damage or substantial interference with any right of occupation. For this purpose, the local authority should regard substantial damage or substantial interference as occurring when any part of the building ceases to be capable of being used for the purpose for which it is or was intended. Additionally, in the case of a scheduled Ancient Monument, substantial damage should be regarded as occurring when the damage significantly impairs the historic, architectural, traditional, artistic or