Causeway Coast and Glens Borough Council

Revised Version: Version 2, 2017

GUIDANCE FOR INTERESTED PARTIES

DEVELOPMENT ON LAND AFFECTED BY CONTAMINATION

Who is this guidance aimed at?

1.0 Landowners, Developers, Consultants, the Planning Department, the Northern Ireland Environment Agency (NIEA) (Regulatory Unit), Building Control Departments and Health and Safety Executive (NI) and any other stakeholder with a regulatory remit to ensure risks due to contamination are appropriately dealt with during the development of sites (Planning/Development Control Process) AND/OR have a role in the preparation/review of land contamination reports required to be submitted in support of planning applications.

What is the aim of this guidance?

2.0 The purpose of this guidance is to provide interested parties with direction, by specifying how land contamination should be assessed, and what level of contamination information will be required.

Failure to act in accordance with this guidance could result in delays to your development, due to delays in the processing of the planning application, in addition failing to provide information as detailed may result in a recommendation for refusal.

Why has this guidance document been reviewed?

3.0 The original guidance was issued in Northern Ireland in 2006 and reflected the UK framework current at that time in relation to the assessment and management of risks due to land contamination.

The 2006 version reflected the UK framework (i.e. Contaminated Land Report (CLR 11), Model Procedures Document, 2004) within which the assessment and management of sites affected by land contamination within the UK is recommended to be undertaken, emulating UK practice. The CLR 11 Model Procedures document remains relevant in NI.

Causeway Coast and Glens Borough Council (Environmental Health Department) therefore advocates that all aspects of investigations into land contamination should follow the CLR 11 Model Procedures Document.

This Guidance has been reviewed in order to reflect planning policy and technical guidance, and aims to provide interested parties with Causeway Coast and Glens Borough Council's policy and approach where land contamination may be present on your site.

What is the extent of the revisions/changes to this guidance document?

Scope and Structure of Guidance
Updates and Additions have been included, namely:

1. Updated Technical Sources/References.

2. Addition – Safe Development of Land Affected by Contamination – Background to Contamination/ The Sources/The Risks/Why It Requires Consideration/Phased Risk Based Approach.
3. Addition – Safe Development of Land Affected by Contamination – NI Planning Policy Context/ Planning/Development Control process.
4. Addition – Safe Development of Land Affected by Contamination – Developer Delivery Risks.
5. Addition – Developer Interaction with Key Stakeholders in the Planning/Development Control Process – Roles/Responsibilities and Regulatory Remit.

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Why is this guidance required?

4.0

Land may be affected by contamination if substances present in, on or under the land are actually or potentially hazardous to people or the environment.

Contamination can cause risks to human health and/or the environment and if not appropriately investigated/evaluated/remediated could pose to unacceptable risks to receptors.

People can be exposed to contamination by different exposure routes, for example breathing in toxic gases, dusts and fibres such as asbestos, ingestion of contaminants in soils or from water and from vegetables grown in soils in people's gardens.

Contamination can be present in different forms, including chemical, biological and radioactive.
Radioactive contamination can occur from natural sources such as Radon Gas.
Causeway Coast and Glens Borough Council (Environmental Health Department) have produced a specific guidance note on Radon Gas available on our website.
New buildings in a Radon Affected Area (Indicative Atlas of Radon Affected Areas for NI (2015) should be scoped for protection measures in accordance with Building Regulations guidance.

As a landowner/developer of a site which may have been affected by contamination, it will be necessary that all potential risks are **Assessed**, **Understood** and finally the site **Remediated and Verified** to demonstrate that it is Suitable for Use and Safe.

Land which is contaminated can be made safe however development of such land can present added challenges.
Dealing with contamination in a Step by Step way (Phased Investigation as explained later in this guidance), means development can be achieved in a sustainable viable and robust manner.

Causeway Coast and Glens Borough Council in recognition that development of such sites present distinct challenges and due to the current policy/guidance vacuum in Northern Ireland have developed this Guidance, which aims to assist in the efficient and expedient processing of planning applications, by providing consistent and transparent advice to interested parties.

It provides interested parties with sufficient information about what is required to be submitted with a Planning Application and additionally how other regulatory regimes interact.

This guide provides information with regard to land contamination and **risks to human health receptors** (as this is the remit of the Environmental Health Department). However it should be noted that other receptors (waterways/buildings/worker health and safety/ecosystems) to land contamination risks exist and these are equally relevant and need to be considered through the planning/development control process.

Why is Land Contamination a Concern?

National Planning Practice Guidance (Department of Communities and Local Governement (2014)) states,

"Failing to deal adequately with contamination could cause harm to human health, property and the wider environment. It could also limit or preclude new development; and undermine compliance with European Directives such as the Water Framework Directive".

The presence of contamination on a Site does not necessarily present **unacceptable risk/s**.

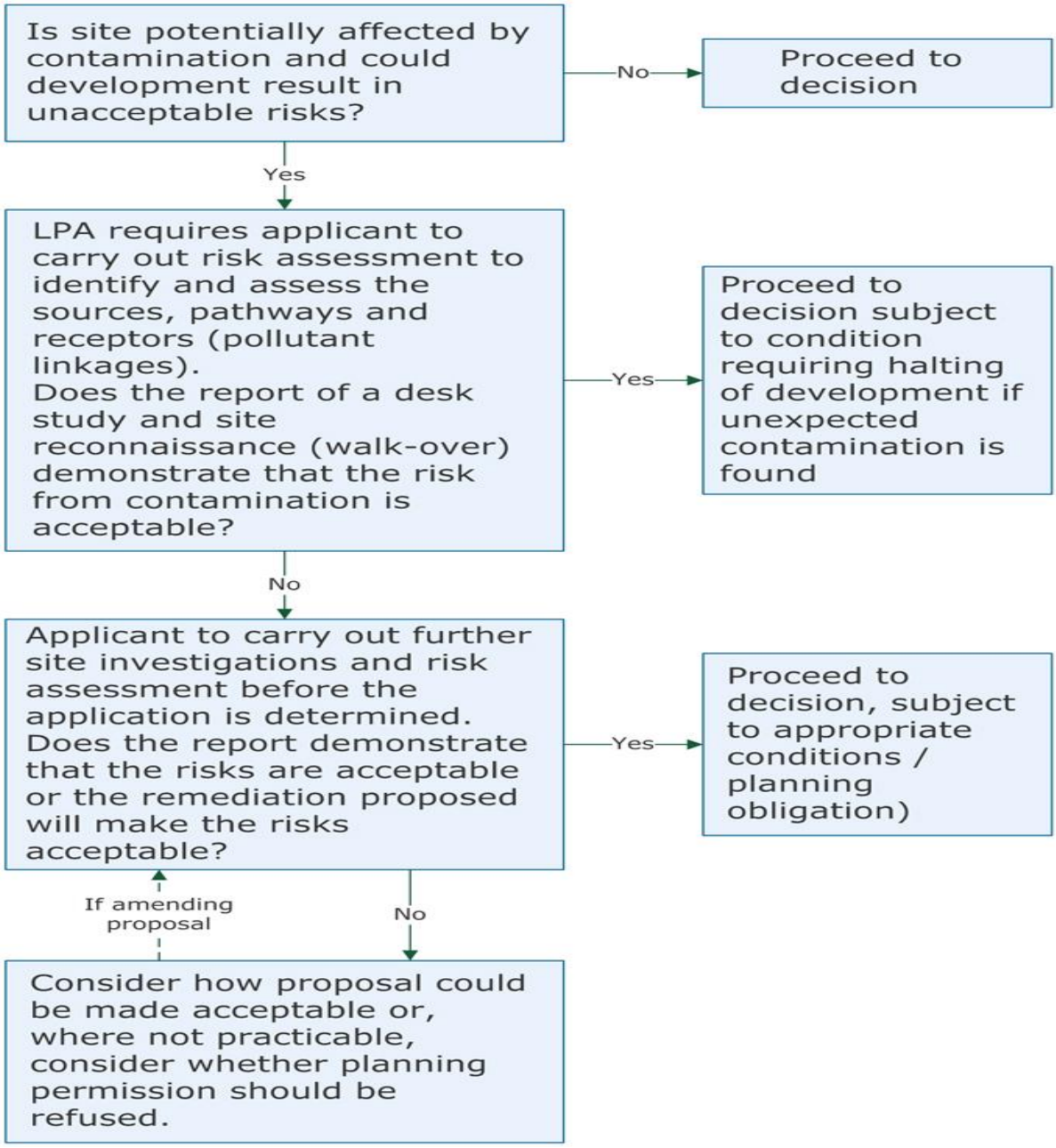
There must be a **Source** of Contamination, a **Receptor** (e.g. people, groundwater, rivers or the wider environment) and a means by which the source can affect the receptor – this is the **Pathway**.

This is known as **Pollutant Linkage** or a **Contaminant Linkage**.

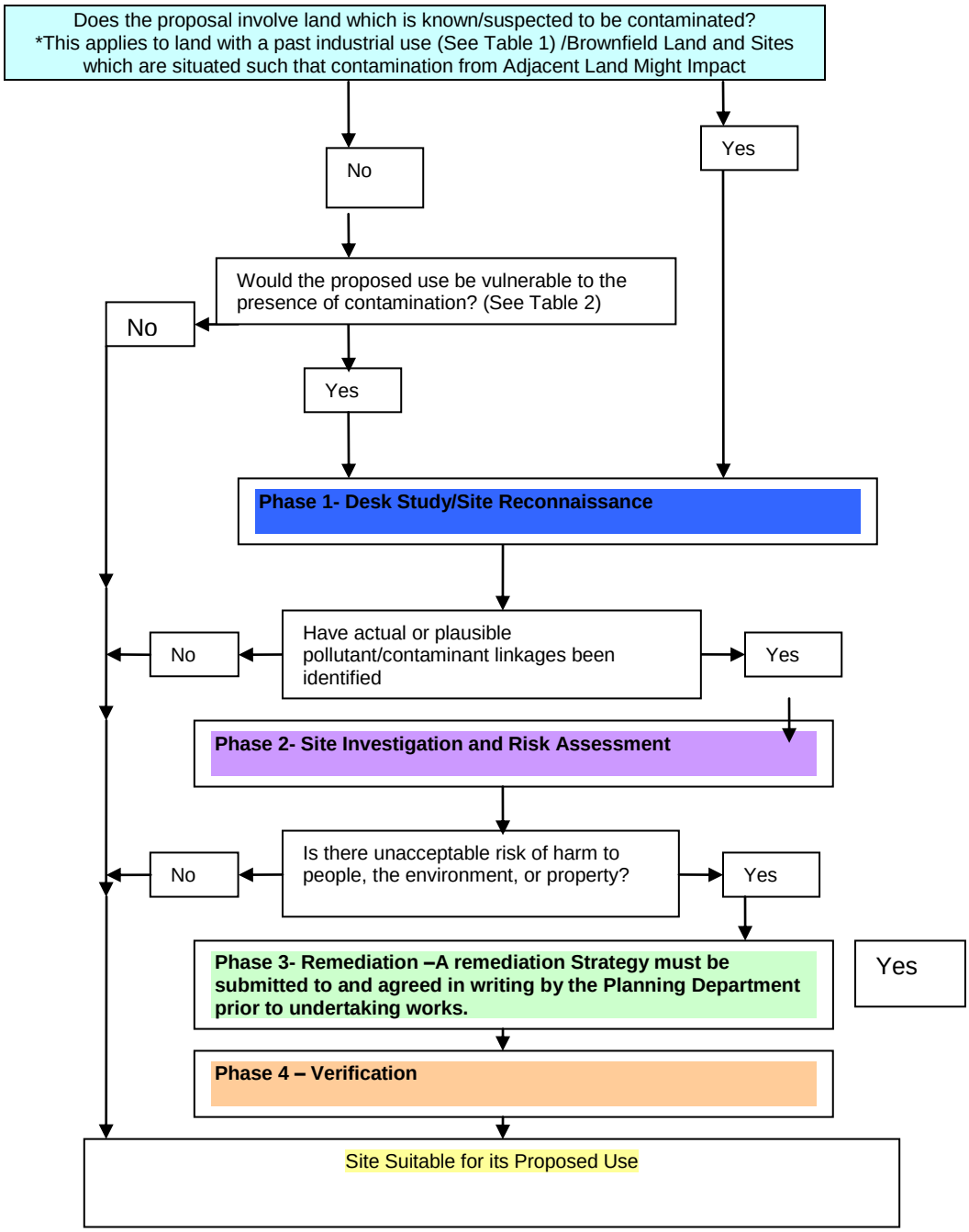
If any of the 3 Facets are missing there can be **No Unacceptable Risk**.

However to determine if there is/are plausible Pollutant Linkages relating to a site, it will be necessary to undertake an Assessment.

The Flow Diagram below outlines the Key Requirements and Identifies the Appropriate Stages at which these Requirements MUST be met.
This is Applicable to any Applicant bringing forward development on land which may be affected by contamination through the Planning Process.


Is site potentially affected by contamination and could development result in unacceptable risks?
No
Proceed to decision
Yes
LPA requires applicant to carry out risk assessment to identify and assess the sources, pathways and receptors (pollutant linkages).
Does the report of a desk study and site reconnaissance (walk-over) demonstrate that the risk from contamination is acceptable?
Yes
Proceed to decision subject to condition requiring halting of development if unexpected contamination is found
No
Applicant to carry out further site investigations and risk assessment before the application is determined.
Does the report demonstrate that the risks are acceptable or the remediation proposed will make the risks acceptable?
Yes
Proceed to decision, subject to appropriate conditions / planning obligation)
If amending proposal
No
Consider how proposal could be made acceptable or, where not practicable, consider whether planning permission should be refused.

Flow Chart – Step by Step (Phased Approach) to the Investigation of Land Affected by Contamination



"Safe Development of Land Affected by Contamination"
Key Background Information for Land Owners and Developers

5.0

UK Government guidance recognises land contamination as a material planning consideration and that the development phase is the most cost-effective time to deal with the problem.

It is the developer's responsibility to ensure that the development is safe and suitable for its proposed use. i.e. the site is remediated/risks managed to a level which is appropriate for the proposed end use.

Background to Contamination

Photo – Depicting Coal Tar* from Former Gas Works Site – Seepage from Underground.
* Coal Tar is a Source of Contamination (Cocktail of Harmful Carcinogenic Substances)

The Sources

Land contamination often lies beneath the ground, a Site on first inspection might appear clean, BUT contamination may be present having originated from polluting historical industrial processes.
Equally it may have arisen due to current/existing land uses (e.g. leaking tanks or accidental spillages or indeed from natural sources (elevated levels of harmful ground gas such as methane (bog/marshy ground, radon or nickel due to geological formations)

Why Bother with Contamination?

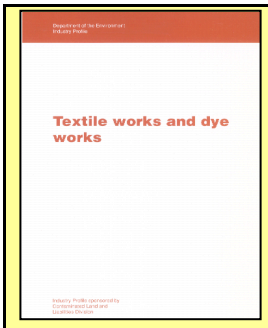
Problems due to contamination arise often because there has been less stringent pollution control and less careful site management in the past, which has given rise to a substantial legacy of sites contaminated by former uses.

Land contamination may be a problem in circumstances when the concentration and environmental availability of any harmful substances/contaminant/s present in any media (soil/water/air) gives rise through a **pollutant linkage** to harm to human health and/or the wider environment.

A Pollutant Linkage **must exist for there to be a risk of harm.**

A useful source of information about what contamination may be present from industrial sources is provided within Department of Environment Industry profile series.

Box 1 – Department of Environment Industry Profiles – Contamination Potential From Industries



The DOE Profiles provide further detail on contamination potential from industries (47 profiles have been published for various industry sectors).
The profiles provide a useful source of technical based information with regard to processes, materials, wastes, potential contamination sources/contaminants of concern linked to industry types.
The profile documents may be accessed and are free to download at:
http://www.claire.co.uk

Land Contamination – Why It Requires Consideration?

The question which then needs to be asked is whether the level of risk to human health due to the presence of pollutant linkage/s is **acceptable** or **unacceptable,** which requires detailed examination and evaluation.

Examples

Humans may be affected by contaminants in soil by direct ingestion of soil/dust inhalation/ingestion of homegrown produce where contaminants may have been taken up by the plant from the soil.
The process of risk assessment examines and evaluates the different exposure pathways to receptors from different contaminative substances.
The risk assessment considers the various forms that the contaminative substance might be present in (solid/liquid/gaseous).
Contamination might also be present in biological or radioactive forms.

Development on a site can introduce a risk if the development process creates new pathways and/or new receptors are created - e.g. Introduction of residential properties (human receptors) to a site affected by contamination.

Where a proposed development introduces a vulnerable/sensitive end use and/or the development site could have been affected by a former potentially contaminative land use the possibility of land contamination should always be considered.

Box 2 – Vulnerable/Sensitive End Use
End uses considered particularly vulnerable/sensitive to potential contamination – include but not exclusively – Housing Schools Hospitals Children's play areas

Land Contamination Step by Step – A Phased Risk Based Approach

Employing a Step by Step Approach ensures that land contamination risks are targeted effectively, in a methodical and cost effective way.
There is NO Requirement to carry out a detailed examination and expensive investigation for every site.
However where the land may be affected by contamination or a vulnerable end use is proposed, as a **MINIMUM** a Phase 1 (Desk Study and Site Reconnaissance (Preliminary Risk Assessment) will be required.

This guidance follows the risk-based framework adopted in the Model Procedures for the Management of Land Contamination – CLR 11 (Environment Agency 2004). An overview of the framework is shown in Figure 1.

Key to Successful Development of Land Affected by Contamination is to Have Knowledge and Evidence of the Following:

1. Is there a source/s of contamination present which is capable of impacting the site?
2. Do the contaminant/s which is/are present pose a risk?, i.e. Is the contamination capable of causing harm?
3. Is/Are there plausible pollutant linkage/s present?, i.e. a means by which the contaminant/s source may cause harm to the receptor/s via an exposure pathway/s
4. Is the harm sufficient to give rise to a risk? – is the risk acceptable or unacceptable?
5. If the risk is unacceptable is there a need to do something about it i.e. remediate?
6. What form of risk management/remediation (including verification) is necessary to make the site Safe and Suitable for Use?

This Guidance provides direction on these questions and provides an overview of the corresponding key activity stages from the Model Procedures (Figure 2), Checklists detailing the content of reports are provided in Appendix A.
Refer to Figure 3 for an overview.

Figure 1

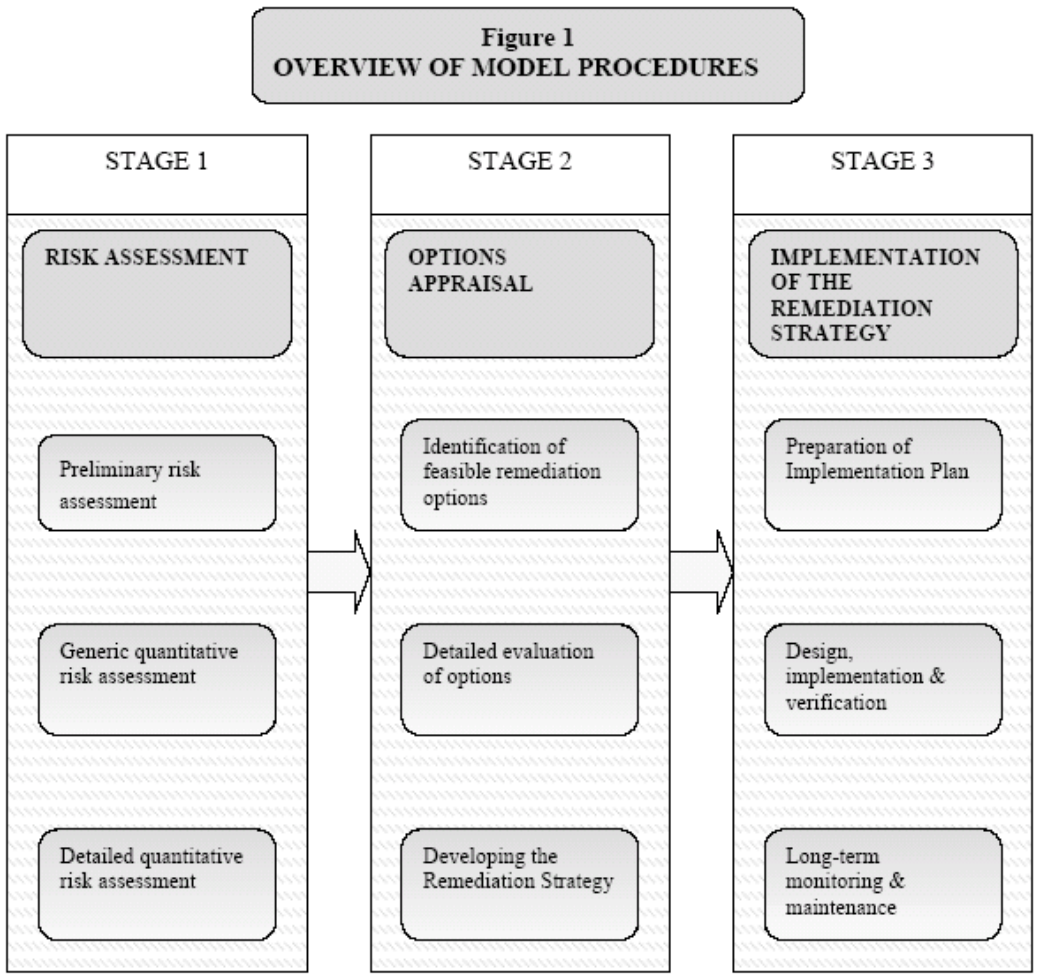
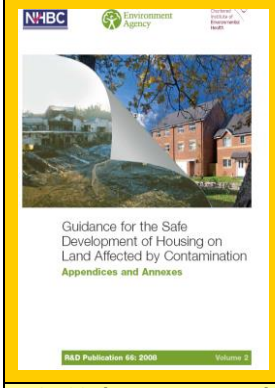
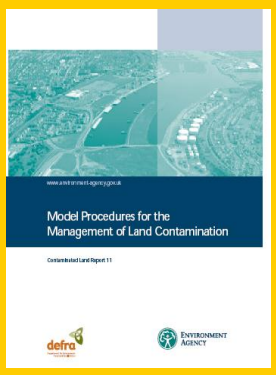


Figure 1
OVERVIEW OF MODEL PROCEDURES
STAGE 1
RISK ASSESSMENT
Preliminary risk assessment
Generic quantitative risk assessment
Detailed quantitative risk assessment
STAGE 2
OPTIONS APPRAISAL
Identification of feasible remediation options
Detailed evaluation of options
Developing the Remediation Strategy
STAGE 3
IMPLEMENTATION OF THE REMEDIATION STRATEGY
Preparation of Implementation Plan
Design, implementation & verification
Long-term monitoring & maintenance

Figure 2 - Land Contamination – CLR 11, Model Procedures, 2004 & R& D Publication 66, 2008 - Guidance for the Safe Development of Housing on Land Affected by Contamination

Terminology used in R&D66: 2008	**Terminology used in Model Procedures (CLR11)**
	
R&D66Phase1: Hazard identification and assessment [Chart 1]	**CLR 11 : Risk Assessment (Preliminary) [Figure 2A]**
The Phase 1 is often referred to as the "desk study", essentially it is the first phase required to identify hazards and assess the risks (preliminary – qualitative). Phase 1 reports may be combined with a phase 2 report. The purpose of the phase 1 is to: 1. Define the site, i.e. (site area, description, history, current land/ adjacent land use/site walkover and environmental setting i.e. (topography/geology/hydrogeology/hydrology). 2. Develop the initial conceptual site model (define the pollutant linkages) 3. Undertake the preliminary risk assessment - If significant pollutant linkages are identified then further works are necessary and a phase 2 required.	
R&D 66Phase 2: Risk estimation and evaluation [Chart 2]	**CLR 11:Risk Assessment (GQRA and DQRA) [Figures 2B and 2C]**
The phase 2 is often referred to as the "Detailed/Intrusive" investigation (risk estimation) along with the quantitative risk assessment (risk evaluation). Generic quantitative risk assessment being the initial screening stage and Detailed quantitative risk assessment being the site specific stage, taking account of on-site derived data/parameters. Phase 1 and Phase 2 reports may be combined, detailed quantitative risk assessment may be undertaken immediately because generic assessment criteria are not available/not suitable for the site. The detailed stage may equally follow the generic stage and combined with a Phase 2 report or may be undertaken and submitted separately or accompanied by a risk management/remediation options appraisal report. The purpose of the phase 2 report is to: 1. Investigate the site – Design of investigation including the techniques/sampling/analysis/moniotirng plan and implementation (the investigation should be directed by the initial conceptual site model defined at phase 1 and to refine it - i.e. have all pollutant linkages been investigated/have new pollutant linkages been identified?. 2. Refine the conceptual site model from phase 1 (confirming presence or otherwise of pollutant linkages/have new pollutant linkages been discovered?) Is there a need to redefine the conceptual site model and/or undertake further intrusive investigation? 3. When the site is adequately characterised – i.e. there is sufficient intrusive investigation/ certainty in data derived and the conceptual site model is suitably refined, then risk evaluation is required to 4. determine the significance or otherwise of the risk. 5. Risk Evaluation – Either Generic Quantitative Risk Assessment (GQRA) or Detailed Quantitative Risk Assessment (DQRA) or a combination of both. 6. GQRA – Utilises comparison of generic assessment criteria **(GAC)** and DQRA – Utilises site-specific derived assessment criteria **(SSAC).** At both stages there must be sufficient and appropriate use of data demonstrating and justifying the suitability of the assessment criteria being used for the site 7. Sources of GAC data and requirements to deriving UK compliant SSAC will be discussed further in this guidance (paragraphs 5.52 -5.54) . Are unacceptable risks identified? – Then further consideration of the risks and how these may be managed/remediated to ensure the site is suitable for use is necessary and a phase 3 is required	
R&D 66Phase 3: Remediation; design, implementation and verification [Chart 3]	**CLR 11: Options Appraisal and Implementation [Figures 3A, 3B, 3C and 4A, 4B, 4C]**

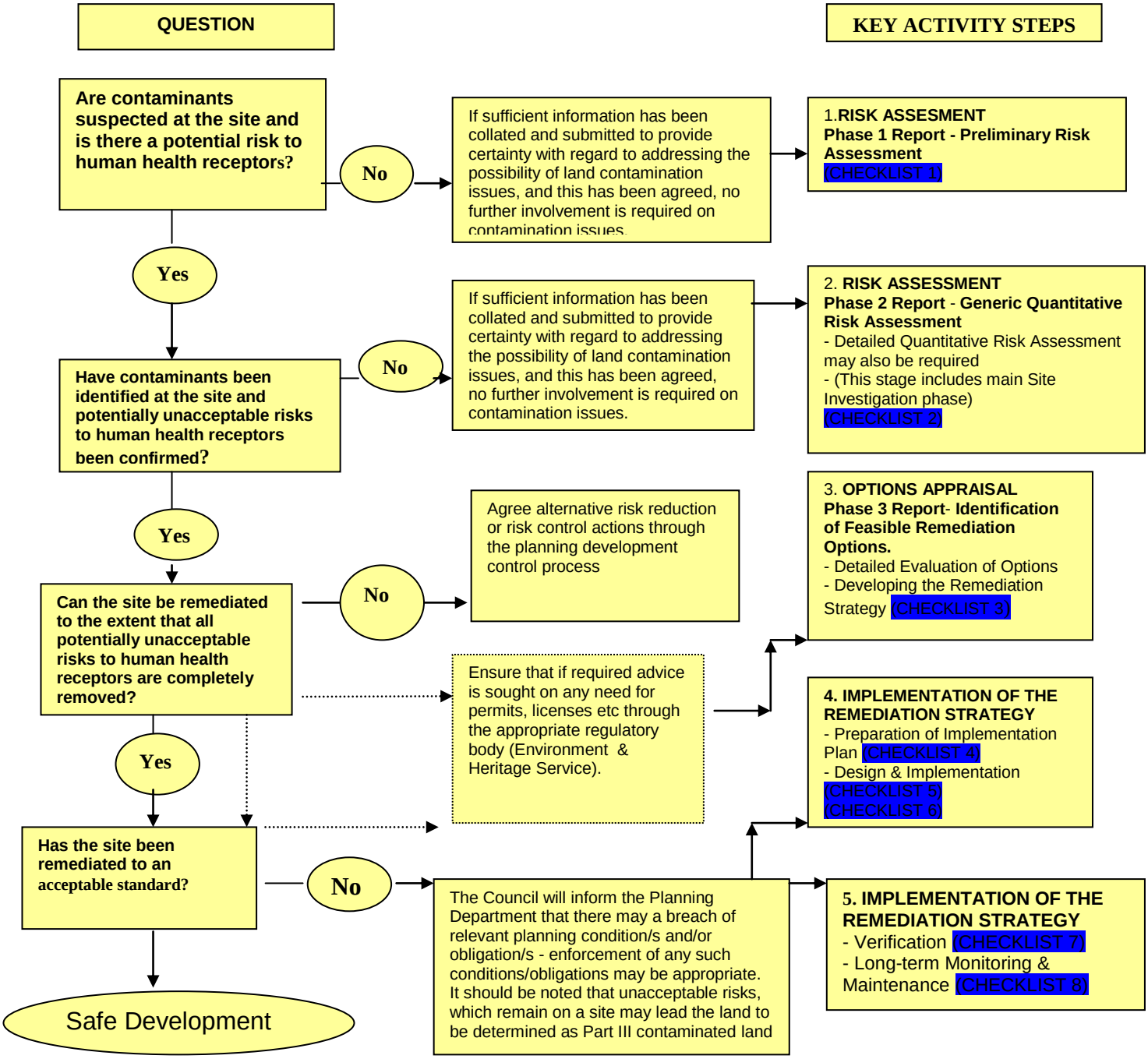
A key provision of planning guidance is to ensure that land is made suitable for its proposed new use.
Thel planning authority must be satisfied that the potential for contamination and any risks arising are properly assessed, that the conceptual site model is sufficiently well designed] "and that the development incorporates any necessary remediation and subsequent management measures to deal with unacceptable risks".
The UK Government's policy i.e. the "Suitable For Use" approach limits the scope of remediation to that necessary to mitigate "unacceptable risks". Inherent should also be the need to ensure that remediation is sustainable to enable appropriate and safe development. It is crucial that the phase 3 demonstrates that the remediation action will effectively manage the risks.
By virtue of the complexities entailed there will inevitably be an overlapping of other legislative regimes such as waste regulation/discharge consents/mobile treatment/plant licensing/permitting/water quality standards/building control/health and safety.
An overview of these legislative regimes and the need for collaboration/interaction will be considered and outlined within Section 7 of this guidance.

The Phase 3 stage includes: the appraisal of remedial options and the selection of the remediation strategy. In addition and of equal importance is how this work will be undertaken and verified?.

1. Appraisal of Options – What suitable remediation/risk management options are available to break the significant pollutant linkages identified and confirmed from the phase 1 and 2 stages? What are the objectives?/Are they suitable to deal with the unacceptable risks at the site? – Feasible/ time/cost/on-site constraints etc/What are the regulatory approvals/controls? What are the preferred options?
2. Determine and Select the Remediation Strategy – Ensure that the remediation targets/objectives are clear/justified and verifiable/ Ensure that the remediation strategy/target/objectives have met with regulatory prior approval/consents/licenses etc. in place.
3. Implement the remediation strategy
4. Long term maintenance/.monitoring – Is there a need to have legal securities – e.g. as part of property deeds/planning controls such as planning obligations
5. Verification - How will the effectiveness be monitored/measured/benchmarked against what standards/ SSAC/env. Quality Standards/Air Quality Standards/Drinking Water Standards?/Frequency of measurement/number of measurements/When will the remediation effectiveness be measured – Pre-development/Post Development/Pre – Occupation/Post Occupation – over what time frame?/ Has regulatory approval been granted? – e.g. certification by the Building Control regulator required/received? Verification/validation of the remediation measures is often required as a planning condition (See Appendix 4 – Generic Planning Conditions/DCLG Model Planning Conditions and in most cases will be submitted as a separate report to the remediation strategy.

FIGURE 3

QUESTIONS THAT NEED TO BE ANSWERED TO SATISFY REQUIREMENTS WITH REGARD TO THE KEY ACTIVITY STAGES FROM THE MODEL PROCEDURES



Step 1 of the Phased Approach – (Phase 1 Report – Checklist 1) Preliminary Risk Assessment.

Desk Study/Site Reconnaissance

Step 1 is necessary in the following cases:

1. Any site where there is potential for contamination to be present
2. Where the proposed development is vulnerable

Included within this guidance is a Checklist, (See Appendix A) this specifies the exact level of information to be contained within a Phase 1 Report.

When Is the Phase 1 Report to be submitted?

If either case applies, Step 1 MUST be completed, for all Planning Applications as accompanying supporting evidence.

The Planning Department will consult the Environmental Health Department as part of the Planning/Development Control process on your submission.

The purpose of a Phase 1 Report is to ensure that there is a robust understanding of the Site's history (land use as existing historical and also the surrounding land use/s), the Site's setting and it's potential to be affected by contamination.
Failure to demonstrate this may result in the Planning Department refusing the application, due to a lack of important information.

A Phase 1 comprises a desk study, a site walkover and a conceptual site model, with the findings compiled in a Phase 1 report.
The results of the Phase 1 will determine whether further investigation (intrusive works) is required.

Desk Study

A desk study is a detailed search of available historical and current records and maps to identify potential on-site and off-site sources of contamination.
It should include information on:

Site location and setting (Include - appropriately scaled and annotated site plan).
Current land uses on and in the surrounding vicinity of the site
Historical land uses on and in the surrounding vicinity of the site (Refer to historical map data and directories).
Mining/Quarrying Activities
Licensed, unlicensed and exempt waste sites (landfills)
Details of spillages or pollution incidents
Environmental permits
Types of Contamination that may be present (e.g heavy metals, petroleum hydrocarbons, polycyclic aromatic hydrocarbons and asbestos)
Ground gases (including Radon)
Naturally occurring contaminants due to Geogenic Sources (Nickel)
Soils and Underlying Geology

Hydrology and Hydrogeolgy Groundwater/surface water vulnerability and any supplies – abstraction and discharge licences Ecology

Site Walkover

A site walkover should be undertaken to build upon the information gained from the desk study. Assessment of the sites layout, nature and setting (including information on the presence and condition of above ground fuel tanks and manholes, deposits of waste materials, asbestos and any hazardous chemicals. The condition of the site and structures including any evidence of spillages/land stress/discoloration/vegetation die back/any asbestos containing materials. Visual or Olfactory Evidence of contamination.

The Conceptual Site Model

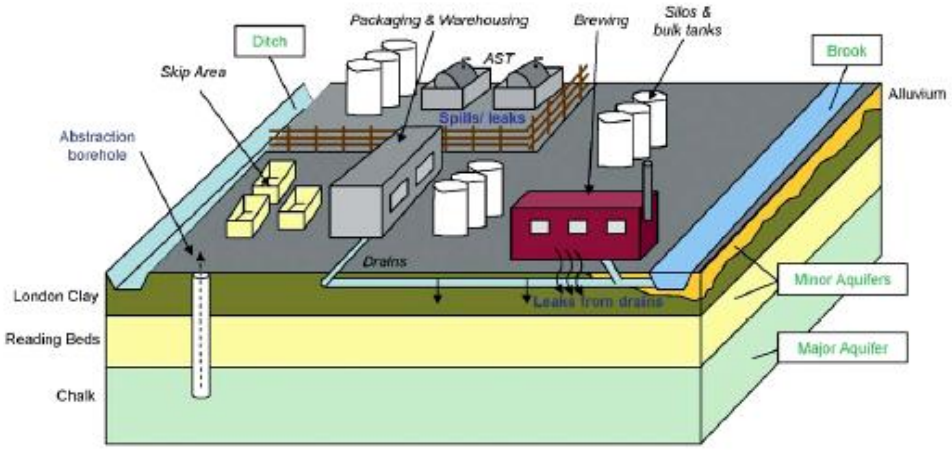


Figure 4 – **Example - Pictorial Representation of an Initial Conceptual Site Model**

Reference Source – R&D Publication 66, 2008

After carrying out a detailed desk study and site walkover, a preliminary conceptual site model should be developed. A conceptual site model is usually a diagram, table or pictorial representation of the plausible pollutant linkages at a site.
Details of any uncertainties or assumptions must be included.

The CSM shall provide:

Sources of Contamination – e.g. on site contamination (tanks, chemicals, asbestos) Landfill on or adjacent to the site.
Pathways, through which the contamination can migrate – Volatilsation/inhalation;Groundwater; Ingestion.
Receptors – e.g. future site users; groundwater; surface water.

Step 2 of the Phased Approach – (Phase 2 Report – Checklist 2) Risk Assessment (Quantitative and Site Investigation).

If Phase 1 indicates that there is a potential for contamination, a Phase 2 investigation will be required. Phase 2 comprises site investigation and risk assessment to determine whether there are any unacceptable risks to human health, property or the environment.

Site Investigation

A Site Investigation should be designed to determine the nature and extent of contamination where it is present/suspected and also areas where it is absent. It is important to refer to the CSM in Phase 1, as this will ensure that all plausible pollutant linkages are investigated.
Investigations should be carried out in accordance with relevant British Standards and current UK Guidance BS10175, BS5930 and CLR 11.

The site investigation works proposed must be recorded in a Sampling Strategy and submitted to Causeway Coast and Glens Borough Council, Planning Department for approval.
The Sampling Strategy should include the following information:

The objectives of the investigation having regard to the CSM, any information gaps highlighted during the Phase 1 must be considered.
Proposed sampling strategy – The information provided MUST justify the sample locations, depths, patterns and numbers. The frequency and duration of sampling and monitoring to be undertaken should be included.
Access constraints (such as presence of buildings on site?) MUST be identified, where constraints exists, additional sampling information MUST be detailed of how these areas will characterise (post demolition).
Demolition of buildings - The potential for asbestos containing material MUST be considered, details should included the steps that will be taken to identify, remove and dispose of the asbestos.
Information details to include the sampling and monitoring methods to be used.
The contaminants and parameters to be assessed.
The likely number of samples (soil, water, leachate and/or ground gas) that will be taken for laboratory analysis
The laboratory methods that will be used, please note that independently accredited laboratories and analytical methods should be used (UKAS/MCERTS)

The sampling strategy should be submitted to and agreed by Causeway Coast and Glens Borough Council /Planning Department before the commencement of

works, early consultation is encouraged in particular for complex sites where contamination may present significant risks/challenges.

Analysis of samples of soils, water and/or ground gases may be required to assess the contamination at the site.
Please note that there are numerous sources of ground gases derived from both natural and human activities. Buried organic matter is of particular concern as it has the potential to generate methane and carbon dioxide so sites located in the vicinity of landfill sites may be at risk from ground gas as gas can migrate off site.
Further information is available for the assessment of ground gas within British Standards:
BS 8576:2013; BS8485; CIRIA C665 and NHBC Guidance on Evaluation of Development proposals on sites where methane and carbon dioxide are present (NHBC 2007).

Risk Assessment

After the approval of the sampling strategy and completion of the site investigation works the preliminary conceptual site model developed in Phase 1 should be reviewed and updated. It is important to consider each plausible pollutant linkage during the risk assessment and decide whether it is active at the site and whether it has the potential to harm the receptor.

Assessing risks to people.

A tiered approach to estimating risk should be followed involving the direct comparison between observed levels of contamination and firstly Generic Assessment Criteria GAC followed by Site Specific Assessment Criteria if deemed necessary.
GAC must be derived from current and authoritative published sources. If other values are used they must be adapted to ensure that they are relevant to UK Policy and the environment. Justification of their use must also be provided and agreed by the Local Planning Authority.

If the observed levels of contamination exceed the GAC then a more site-specific risk assessment may be required. This involves the formulation of the SSAC using Risk-Modelling.
The Contaminated Land Exposure Model (CLEA) is Government supported method that can be used to estimate the exposure to human health from contaminants in soil.
Please ensure the current version is used at the time of submission.
Alternative Risk Models such as RISC and RBCA should be adjusted to ensure compliance with UK Policy and Technical input parameters.
All risk modeling assumptions and uncertainties must be presented, justified and referenced

The assessment of risks to controlled waters and other receptors falls outside of Environmental Health's remit, although this will form part of the investigation and risk assessment but will be under the regulatory control of the DAERA NI/ NIEA Regulatory Unit.
Further advice and documents are available on the Gov.UK website (https://www.gov.uk/government/collections/land-contamination-technical-guidance).

Causeway Coast and Glens Borough Council is aware of specific contaminants such as Nickel which are elevated within the area, due to the natural geology.
At this time a Position Statement is under consideration for future publication, once adopted this will be available on the Council's website.
In circumstances where the nickel concentrations are above the GAC, it would be prudent for the applicant/developer to make early contact with the Environmental Health Department to discuss.

On completion of the risk assessment process, a recommendation should be made as to whether Phase 3 works (Remediation) will be required to remove unacceptable risks and to make the site "Suitable for Use".

If Topsoil is to be imported as part of the development, regardless of whether remediation is required, then it is imperative that the material is "Suitable for Use" and does no contain unacceptable levels of contamination.

Step 3 of the Phased Approach – (Phase 3 Report – Checklists 3 - 6 Options Appraisal/Remediation Strategy and Implementation Plan

If Phase 2 identifies any unacceptable risks then the Phase 3 (known as Remediation) will be required. Remediation involves the "clean up" of the site to ensure that the finished development is "Suitable for Use".
Remediation can take many forms (e.g. removal of the source of contamination or breaking of the pathway by inserting a barrier) and is entirely site-specific.
A remediation stragey should be produced and submitted to the Planning Authority for approval prior to works commencing or any construction works.
A remediation strategy should incorporate an options appraisal, remediation objectives, details of the proposed remediation and verification works, mitigation measures, licenses/consents and contingency measures.

Options Appraisal

An options appraisal considers the advantages and disadvantages of different remediation techniques, in order to establish the best overall approach to remediate a site.
It is important to ensure that the chosen remediation option breaks all of the pollutant linkages that have been shown through the risk assessment process to present unacceptable risks.
Please be aware that some remediation options can take months/years to complete and In addition on-site licenses/permits/discharge consents may be required to undertake remediation, which require prior approval/permissions from other Stakeholders such as NIEA and HSENI, therefore early engagement with such regulators must be factored into the remediation plan.
A dust, odour and noise management plan may be required to prevent adverse impacts during the course of development/remedial works, The plan shall detail monitoring/mitigation and complaint response measures.
CLR11 provides in depth guidance on undertaking an Options Appraisal.

A brief justification of the remediation technique/s selected should be provided in the Remediation Strategy.

Objectives

A summary of the site investigation should be included detailing the nature and extent of the contamination found which is to be addressed through the remedial works. Clearly state the objectives of the remediation works to be undertaken.
Remedial targets/objectives shall be clearly defined, full details of the risk assessment packages used to derive these criteria along with the input and outputs sheets shall be included for prior approval by all regulators prior to implementation.

Proposed Remediation Works

A detailed explanation of the exact works to be undertaken must be given along with the full method of the processes to be used. This should include site plans and drawings to indicate the areas to be remediated. Details of the depths and volumes of the material involved, source of any imported material, volume of remediated material to be re-used

on site and waste disposal locations must also be provided, following full approval by the NIEA.

Remediation measures may have to be incorporated within the development itselfto protect future users from any potential contamination, e.g. gas protection systems, cover systems and specific types of drinking water pipes.
All such requirements should be clearly detailed in the remediation strategy. If all of the details are not known at this stage, then an undertaking must be provided within the remediation strategy to submit these details to Causeway Coast and Glens Borough Council/Planning Department for approval in sufficient time prior to installation.

Remediation proposals must take account of relevant Local Policies/Position Statements etc, relevant to contamination remediation and verification.
The details of relevant persons who will be undertaking and supervising the works must be provided.
Where contamination may give rise to exposure to workers/public, it is implicit that the Remediation will be in full conformance with Health and Safety Legislative requirements.
(See Section x on HSENI Stakeholder Role)

Proposed Verification Works

Details must be included on how remediation works will be verified to demonstrate that the remediation has been successful.
Remedial targets/criteria shall be included in relation to all contaminants identified in the Remediation Strategy.
Soil verification sampling strategy shall be detailed as necessary within the remediation strategy.
All sample analysis will require to be undertaken in UKAS/MCERTS accredited laboratories.
If a gas protection system is required, details of how it will be installed and verified must be included within the strategy, and verification shall be in accordance with BS 8576 and CIRIA 735/768.
Where ground or surface waters are to be monitored, the locations of sampling points must be in accordance with NIEA conformance requirements.
Some sites may require long term verification monitoring and maintenance. The exact timescales for achieving the remediation criteria must be clearly stated in the remediation strategy.
If long term monitoring is necessary detailed information concerning timescales will be required, interim criteria and interim verification/progress reports.

Contingency Measures and Unexpected Contamination

Contingency measures may be required if remediation is unsuccessful or if unexpected contamination is found during the course of works. The remediation strategy should include an undertaking that if such circumstances arise details of the further works required will be submitted to the Planning Department for approval.
A timescale should also be included to state when the contingency details will be submitted. Notification of unexpected contamination shall be inaccordance with the Planning Condition

Step 4 of the Phased Approach – (Phase 4 Report – Checklists 7/8 – Verification

Phase 4 works also known as verification or validation are undertaken following remediation. The purpose is to identify the success or otherwise of remediation works

and to identify whether any further remediation or risk management measures are necessary to ensure the site is suitable for its intended use.
On completion of the remediation works a verification report is required to be submitted to Causeway Coast and Glens Borough Council Planning Department. This will detail the remediation and verification carried out as agreed, including evidence that demonstrates whether the remediation objectives have been met.
Where longer term monitoring is required e.g. groundwater or ground gas an interim monitoring /progress report shall be submitted detailing the works undertaken to date.
Where the sites remediation criteria have not been met details of the contingency work shall be included (further detailed quantitative risk assessment, physical remediation works or mitigation measures).

Objectives

The verification report should include the details and objectives of the remediation works undertaken on site.

Works

A detailed description of all remediation works carried out on site must be included along with any plans, drawings etc to show the areas remediated.
The total volume of any material affected by contamination should also be included along with the volume of imported material and the volume of any materials shich have been sorted or treated on site for re-use.
Full details should be provided of the locations of where verification samples shall be taken, including depths and volumes etc.
Evidence of appropriate installation of gas protection systems shall be included as necessary in accordance with the remediation strategy.

Verification Results

Analytical results for all verification samples should be included within the report with a detailed comparison and interpretation against the remediation criteria which were agreed in the remediation strategy.
If the remediation criteria have not been met further work will be required to ensure that the site is suitable for its intended use.
This may involve undertaking further detailed risk assessment returning to undertaken further remediation at the site or installing some form of mitigation method e.g. a barrier to prevent users being impacted by the contamination. Discussions should be held with the Council as soon as possible one it is known that remediation targets have not been achieved.

Interim Verification

In some cases longer term monitoring will be required to provide verification of remediation works where this is required timescales should be set when agreeing the remediation strategy as to when the interim reports will be submitted to the Planning Department.
Conclusions
The report should detail all the pollutant linkages and how they have been broken or effectively controlled and whether the site is suitable for its intended use. An updated conceptual site model should also be included.

6.0 Northern Ireland Planning Policy Context – Development on Land Affected by Contamination

Background

Government policy has meant that more buildings (including residential and commercial/industrial) will need to be developed on "brownfield land" in the future.

Within Northern Ireland, the Regional Development Strategy *(RDS)*, *Shaping our Future – Regional Development Strategy for Northern Ireland* and NI Planning Policy Statement 12 set out the position with regard to housing development. The RDS prioritises the location of more housing within existing urban areas and it sets out targets of 60% of additional dwellings to be within urban footprints.

"Previously developed land (also commonly referred to as brownfield land) is that which is, or was occupied by, a permanent structure within a defined settlement limit. The term may encompass vacant or derelict lands; infill sites; land occupied by redundant or under-used buildings; a piece of industrial or commercial property that is abandoned or under-used and often environmentally contaminated."

Development of Land Affected by Contamination

In relation to the current RDS documentation there is potential that increased building development (with a vulnerable/sensitive end use) may be steered towards sites where the land may be/have been affected by contamination with the potential for unacceptable risks to the end users of the site and/or the environment.

It should be recognised that the term "previously used/brownfield land" does not necessarily define such land/site as affected by contamination, what may be said is that contamination may be present with the potential to give rise to risks to the end users and/or the environment and thus be a consideration where such land is proposed for redevelopment/change of use.

Planning Policy – Northern Ireland

Currently in NI there is an absence of NI planning policy equivalent to the Planning Practice Guidance "Land Affected by Contamination", 2014; Planning Policy Wales and Planning Advice Note 33, 2004 – Scotland.

In the absence of a NI adopted Policy, Causeway Coast and Glens Borough Council in the content of this Guidance has taken regard to the aforementioned policy and any relevant technical guidance and will adhere to UK policy and approaches.

The Planning Regime – Development on Land Affected by Contamination

In relation to development proposals – i.e. future use of land which would require a specific grant of planning permission, the planning regime (Town and Country/Development Control process) is the relevant regulatory vehicle for dealing with potential land contamination risks.

The task of the planning system is to aim to control development and land use in the future. Consequently for planning purposes the assessment of risks arising from contamination and remediation requirements require to be considered on the basis of both the current use and circumstances and its proposed new use.

Since Local Government Reform 1st April 2015, the Council, Planning Department and elected Committee are the relevant Planning Authority for the majority of Planning Application decisions.

The Department of Finance and Infrastructure is the relevant Planning Authority for Major Applications and will be responsible for specific Planning Legislation, Guidance and Policy.

The Planning Department has a duty to take account of all material planning considerations.

Contamination and its impact on land quality and land use is a material planning consideration.

It is the role of the Planning Department to consider land contamination along with other material considerations when preparing development plans and when determining individual planning applications. As part of this process the Planning Department will consult (Statutory and Non-Statutory consultees) in order to obtain the required advice/expertise on land contamination issues.

Role of the Planning Authority

It is the P**lanning Authority's responsibility** to ensure that it is satisfied that sufficient information has been obtained from the **applicant/developer/owner** about the condition of the land (subject of the planning application), and any potential contaminative sources within the vicinity, which may migrate/move off land not within the development site but may have the potential to adversely affect the development.

PPG 2014, sets out the need to consider potential contamination, at the appropriate stages of the planning process;

- Planning application submission stage i.e. information to be submitted with the application (outline and full)
- Determination of planning applications, i.e. the use of planning conditions and planning obligations and the possible considerations for refusal of such applications.

An area of contention which has frequently come to light from perspective developer's and other interested parties (acting on behalf of the developer) is the seeking of / granting of planning permission **without having first identified and provided adequate information about the contamination status (nature/presence/extent) of contamination, the risks posed and what if any remediation/risk management is feasible (along with verification).**

Providing adequate information at the correct stage in the planning process will decrease potential delays and speed up the application determination process Refer to Figure.2 (Flow Chart – Step by Step Approach.

What is Meant by Adequate/Sufficient Information – Development on Land Affected by Contamination?

The applicant MUST **provide with the application** information as is necessary to determine whether the proposed development can proceed, where contamination is known, suspected or the proposed use is particularly vulnerable (sensitive uses outlined include; housing, schools and hospitals).

The objective being that sufficient detail is obtained which would enable a conceptual exposure model of the site to be developed identifying plausible pollutant linkages. (The conceptual exposure model is discussed later in this guidance)

Where **insufficient information** is provided to the planning authority to enable a decision on the planning application, i.e.

1. Risks have been inadequately identified
2. A suitable and viable remedial option may/may not be available

The planning authority is advised to take the approach that further information is necessary to enable the decision to be made i.e. require further assessment/investigation PRIOR TO DETERMINING THE APPLICATION

Interested parties should therefore utilise the checklists (Appendix A) to ensure sufficient information is submitted..

When is it necessary to submit Land Contamination Report Information?

1. **Outline Planning Application**

The developer/applicant/owner is advised that **sufficient information is necessary with regard to the condition of the land that demonstrates either the site is free from contamination or that remediation is required and that the development is viable as a means of delivering this.**
Without this information a grant of outline permission would be unsafe, this means that **permission should not be granted** unless the Planning Authority is satisfied that it understands the contaminated condition and the development incorporates appropriate remediation. The advice indicates that sufficient information would mean that;

- The risks have been properly assessed.
- Where unacceptable risk is identified that there has been an appraisal of the options to mitigate/remediate such risks and;
- The remediation scheme (including verification) proposed will be capable of reducing the risks to an acceptable level and the proposed development

Granting of Planning Permission

Permission should be granted only in circumstances where the planning authority is satisfied that the development proposed will be appropriate, having regard to the information available on contamination of the site and the proposed remediation measures and standards.

When are Planning Conditions Appropriate for Use?

The Planning Authority is advised that granting permission (subject to the above being met) may include any conditions requiring**;**

- **Further Investigation**
- **Remediation including verification**
- **As is reasonable and necessary**

Refusal of Planning Permission

In circumstances where the Planning Authority is not be satisfied based on the

information provided (including information from those consulted) that the development would be appropriate permission refused. Examples of grounds for refusal include:

- No information has been obtained which excludes the possibility of contamination.
- It is considered unacceptable risk exists and cannot be dealt with to deliver a development that is suitable for use.
- The steps needed to deliver a suitable development have not been taken and cannot be secured by suitable planning conditions.

Role and Responsibilities of the Developer and Other Stakeholders.

The Planning Department must consult key stakeholders during the planning/development control process.
This Section provides an overview of the the roles and responsibilities of other stakeholders along with the delivery risks associated with the safe development on land affected by contamination.

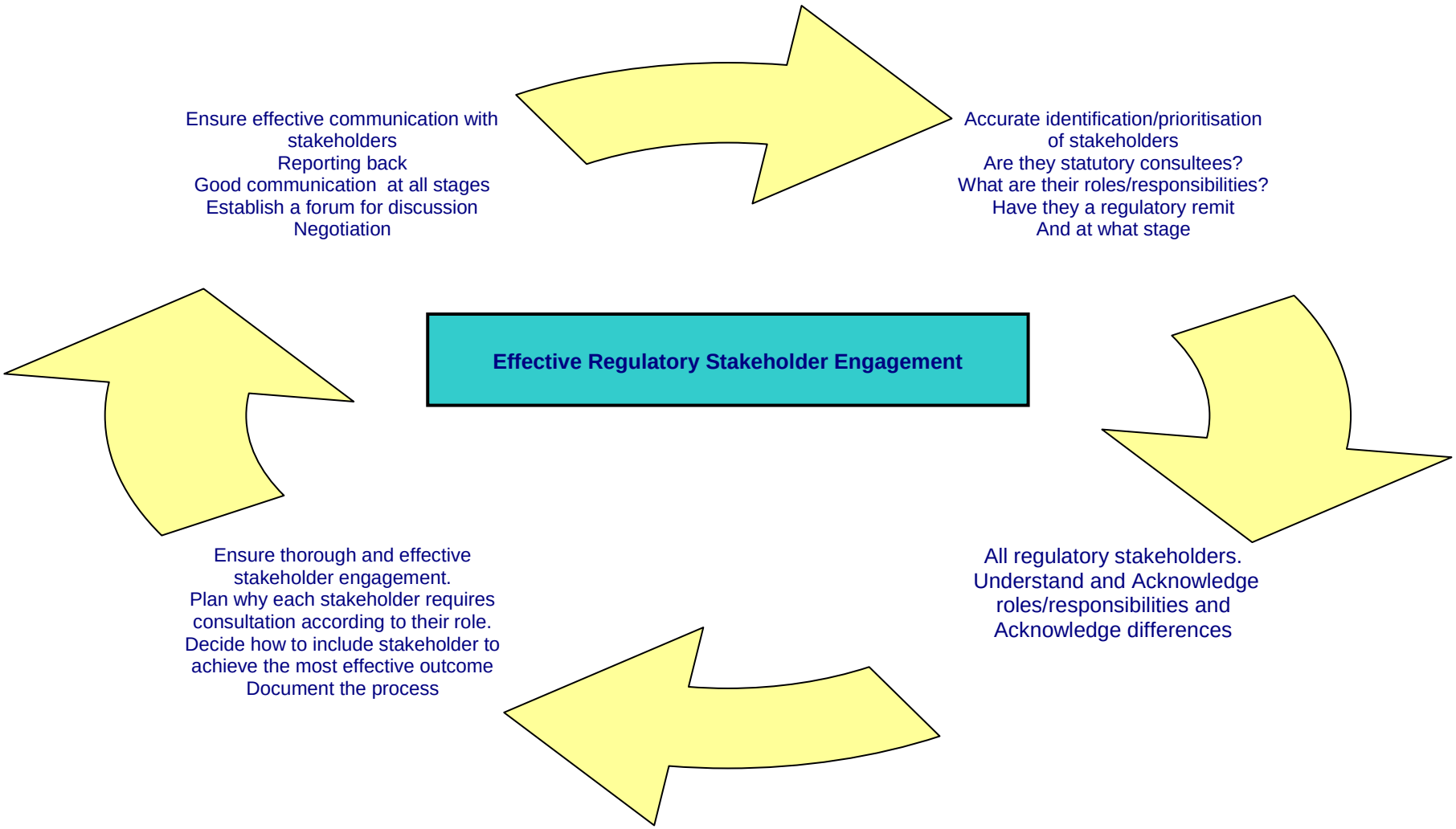
Council Environmental Health Department

The Environmental Health Department is a technical advisor to the Planning Department, Planning Officer's identify the applications which require consultation, i.e. where the development proposed might be affected by contamination.

<u>The Environmental Health Department is not the Planning Authority and does not make a determination on the planning application.</u>

Stakeholder Engagement and Interaction within the development process can be more successful when there is better understanding of the roles and responsibilities.
Section x provides further information regarding the following:

1. Effective Regulatory/Stakeholder Engagement
2. Delivering Safe Development – Developer Delivery Risks
3. Delivering Safe Development – Regulatory Inputs
4. Delivering Safe Development – Developer Stages/Requirements
5. Other Stakeholder Regulator Roles
6. The Planning Role
7. Environmental Health
8. NIEA
9. Building Control
10. Health and Safety Executive NI


Effective Regulatory Stakeholder Engagement
Accurate identification/prioritisation of stakeholders
Are they statutory consultees?
What are their roles/responsibilities?
Have they a regulatory remit
And at what stage
All regulatory stakeholders.
Understand and Acknowledge roles/responsibilities and Acknowledge differences
Ensure thorough and effective stakeholder engagement.
Plan why each stakeholder requires consultation according to their role.
Decide how to include stakeholder to achieve the most effective outcome
Document the process
Ensure effective communication with stakeholders
Reporting back
Good communication at all stages
Establish a forum for discussion
Negotiation

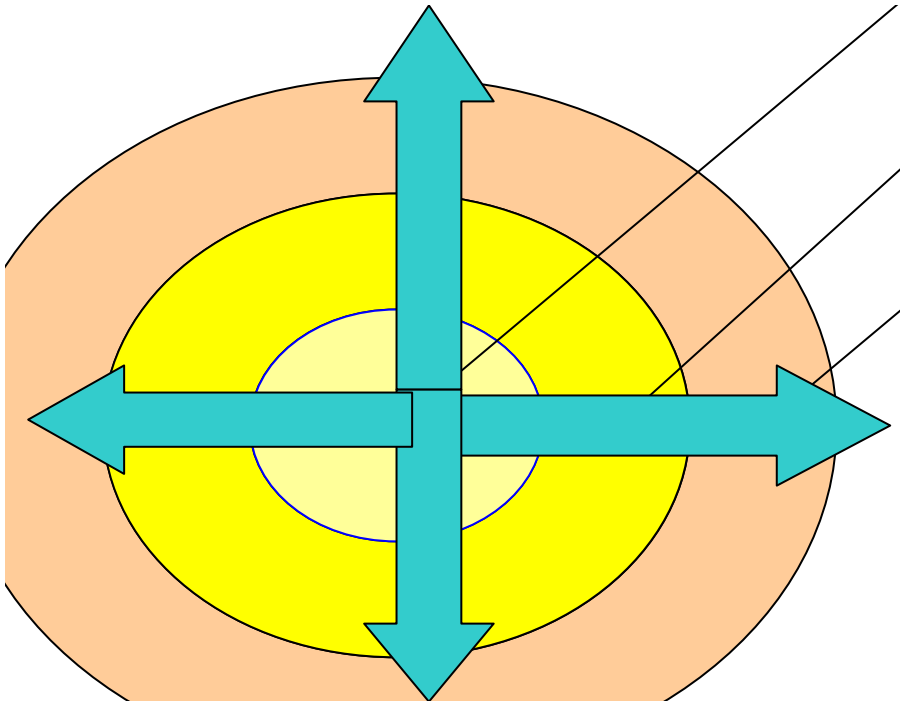
Delivering Safe Development – Developer Delivery Risks

DELIVERY RISK - LEGAL LIABILITY

Statutory liability/obligation to make site suitable for use: – Material Planning Consideration.
Future Liability for any contamination not found during course of development.

DELIVERY RISK - OTHER REGULATORY REQUIREMENTS

Potential - Future Part III (contaminated land) designation/ liability
Health and Safety legislative requirements (public/occupational safety – during site preparation/construction/remediation phases)
Building Control Regulatory Approval - Ensure safe development – dealing with dangerous/hazardous substances in the ground – Buildings and future occupants.
Waste management licensing – e.g. Surrender of Waste licence/Mobile Treatment Licence/PPC Permit



DELIVERY RISK – SITE CONSTRAINTS

Obstacles to reuse of existing buildings – such as asbestos containing materials – which require site survey/ removal in accordance with relevant Health and Safety requirements.
Site – e.g. size/location on-site infrastructure – influencing site remedial works
Listed Buildings – Demolition constraints/ Restoration – meeting current Standards/Regulations.

Developer of Site Proposes Development on Land Affected by Contamination

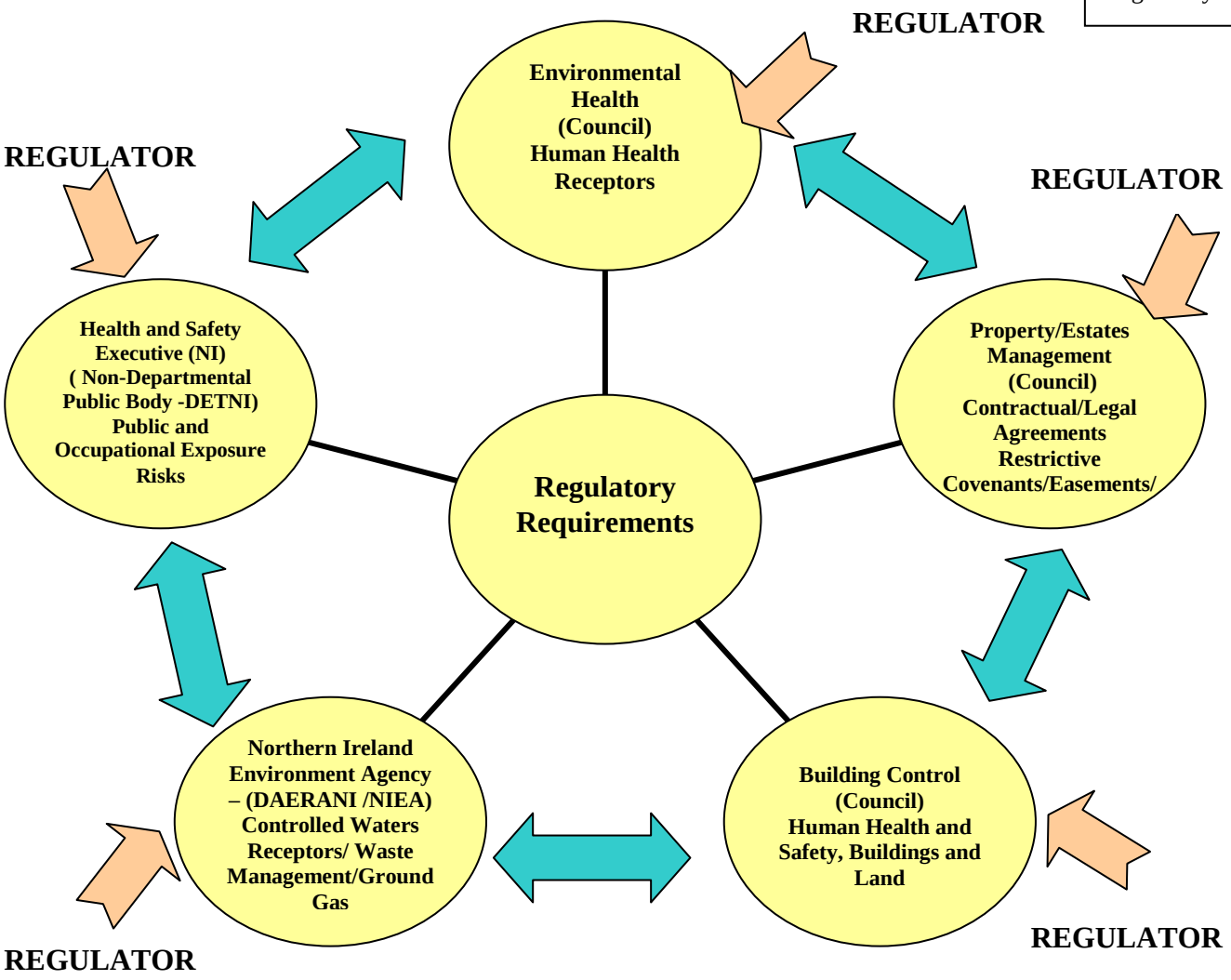
Delivery Risk of Developing Site : High?

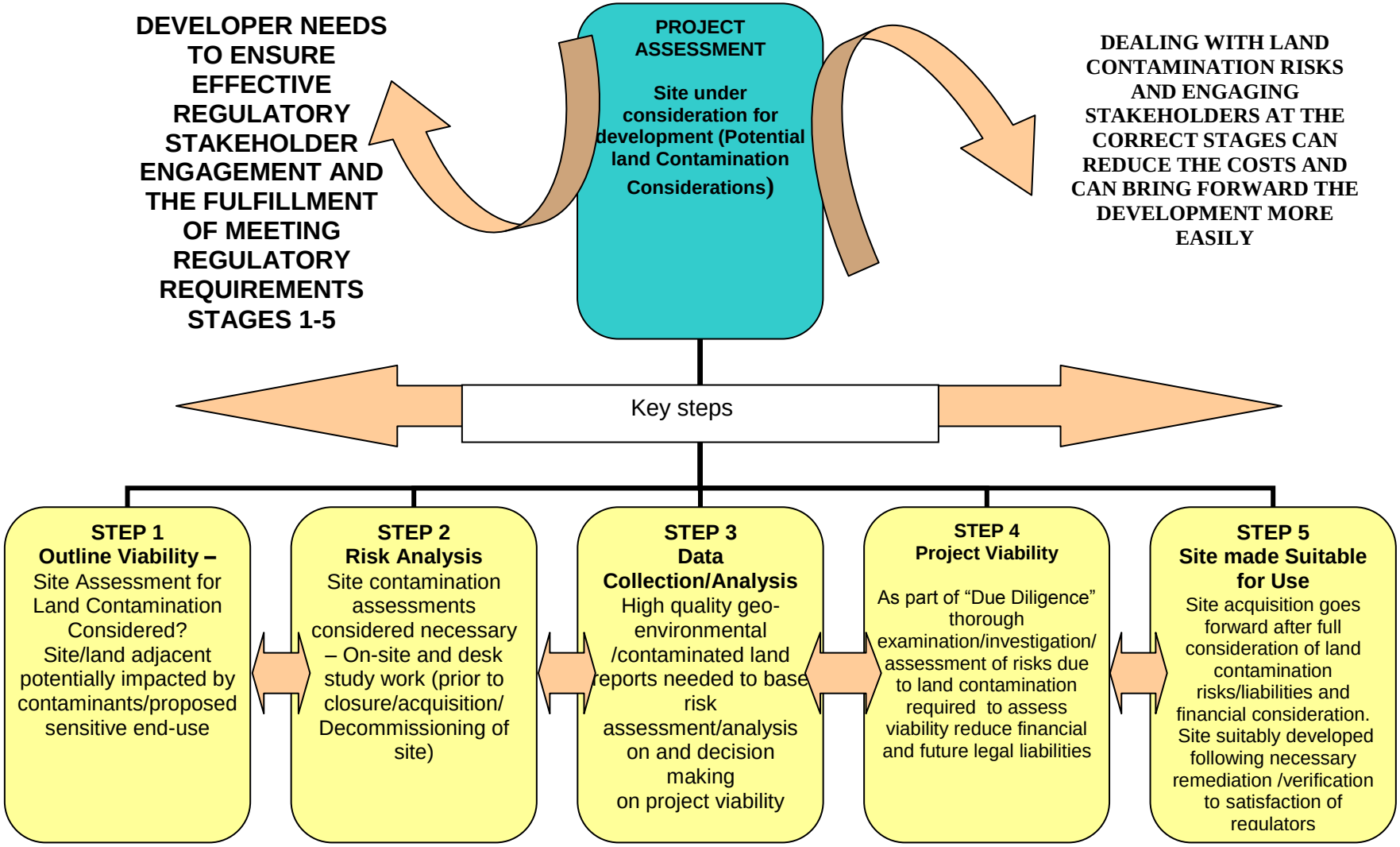
Developer aware and acknowledges risks need to be identified

DELIVERY RISK -FINANCIAL/LEGAL LIABILITY

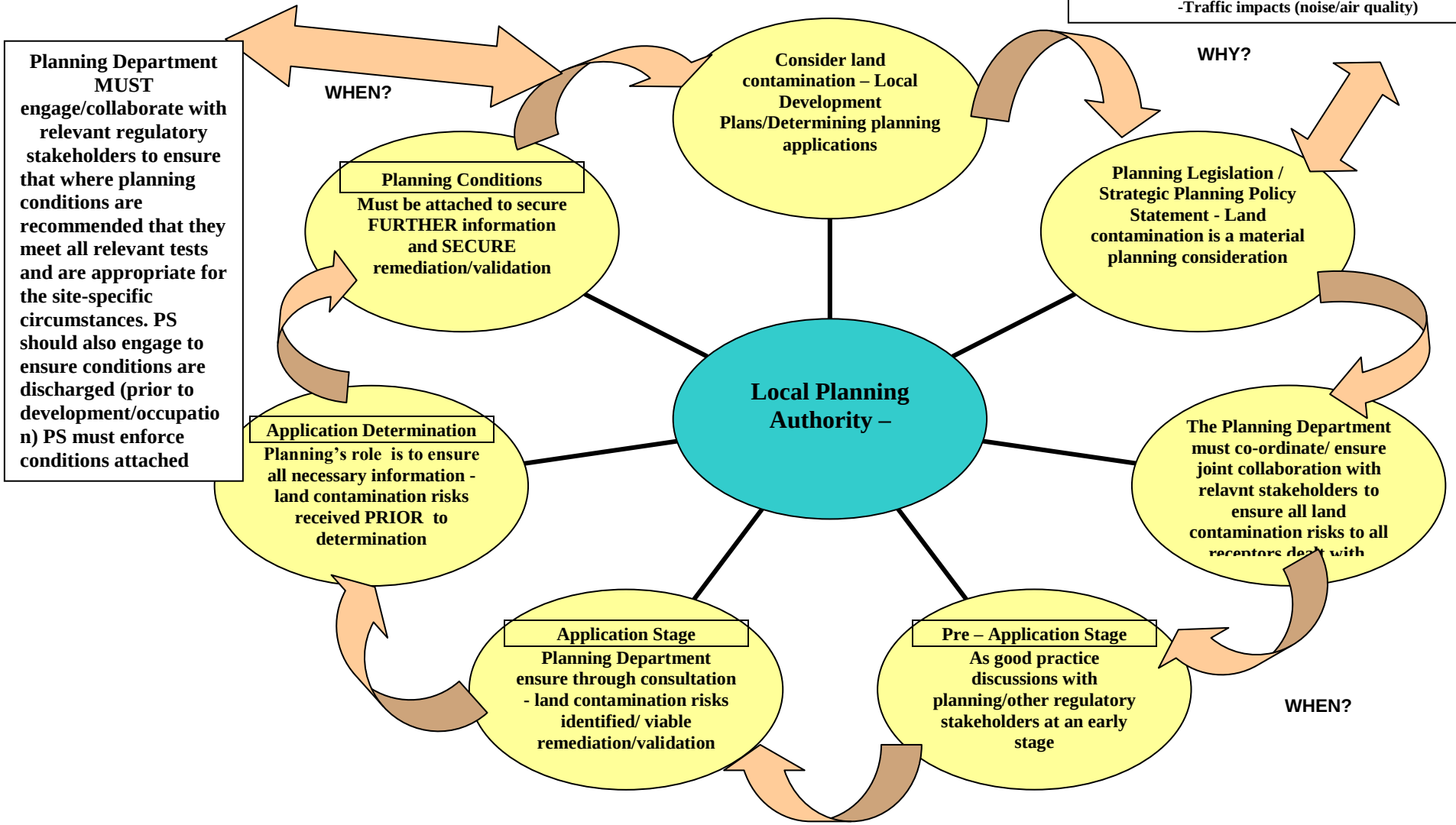
Time and cost burdens – preparatory through to construction/remediation/verification
Is there certainty that the site has been remediated, and verified to be safe and suitable for use?
Is there any potential residual risks which would mean the site could be determined as Part III land in the future?
Professional Indemnity Insurance

Delivering Safe Development – Regulatory Inputs



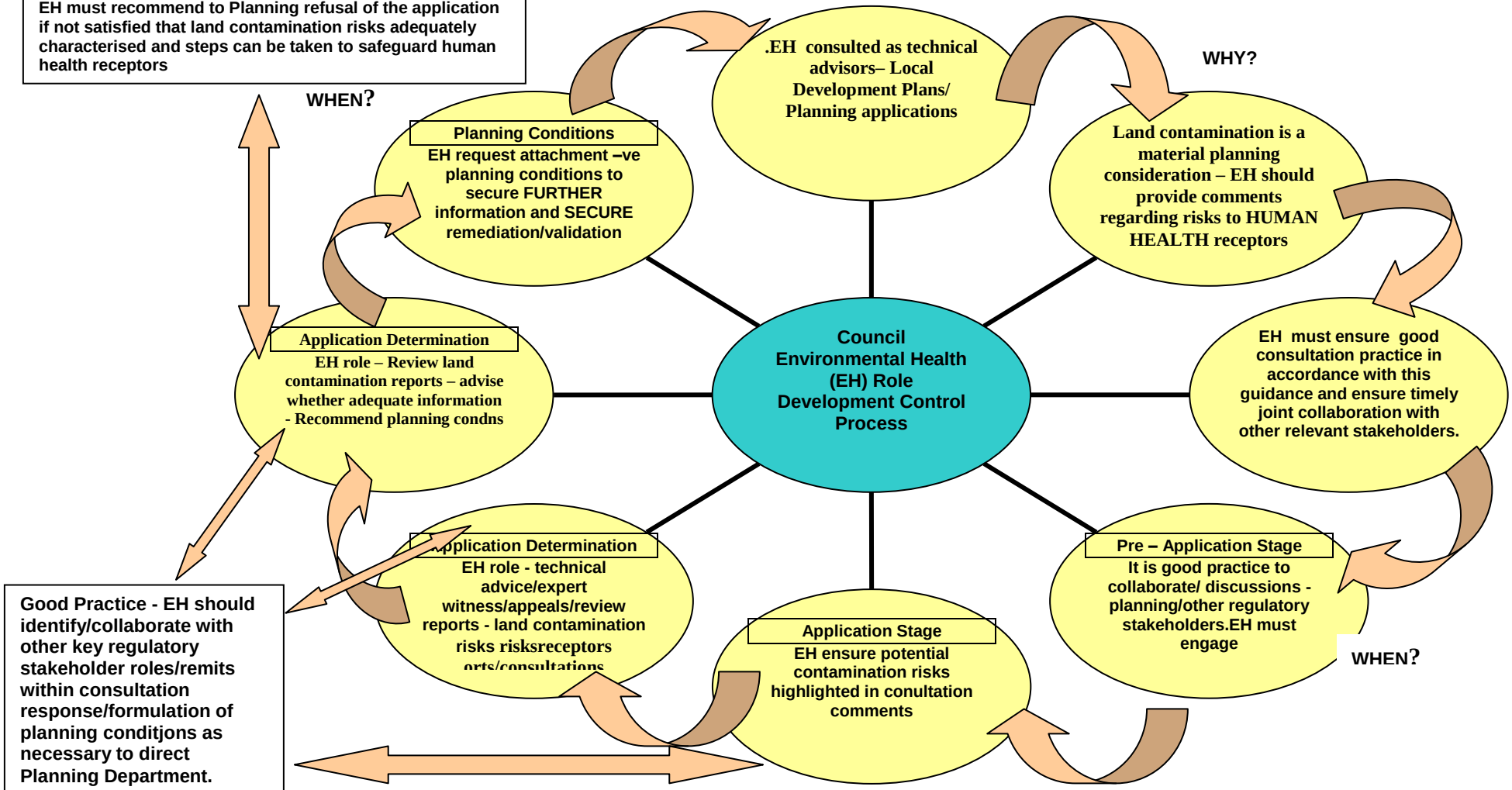

DEVELOPER NEEDS TO ENSURE EFFECTIVE REGULATORY STAKEHOLDER ENGAGEMENT AND THE FULFILLMENT OF MEETING REGULATORY REQUIREMENTS STAGES 1-5
PROJECT ASSESSMENT
Site under consideration for development (Potential land Contamination Considerations)
DEALING WITH LAND CONTAMINATION RISKS AND ENGAGING STAKEHOLDERS AT THE CORRECT STAGES CAN REDUCE THE COSTS AND CAN BRING FORWARD THE DEVELOPMENT MORE EASILY
Key steps
STEP 1
Outline Viability –
Site Assessment for Land Contamination Considered?
Site/land adjacent potentially impacted by contaminants/proposed sensitive end-use
STEP 2
Risk Analysis
Site contamination assessments considered necessary – On-site and desk study work (prior to closure/acquisition/ Decommissioning of site)
STEP 3
Data Collection/Analysis
High quality geo-environmental /contaminated land reports needed to base risk assessment/analysis on and decision making on project viability
STEP 4
Project Viability
As part of "Due Diligence" thorough examination/investigation/ assessment of risks due to land contamination required to assess viability reduce financial and future legal liabilities
STEP 5
Site made Suitable for Use
Site acquisition goes forward after full consideration of land contamination risks/liabilities and financial consideration. Site suitably developed following necessary remediation /verification to satisfaction of regulators

Other Planning Policies/material planning considerations relevant to development of sites which may be affected by contamination include
- Built Environment – Noise/Dust.
- Drainage/Flood Impacts
- Ecological Impacts/Natural Environment
-Traffic impacts (noise/air quality)



EH must engage/collaborate with Planning and other regulatory stakeholders to ensure Planning condns. attached are cohesive, meet relevant tests and do not duplicate. PS should be provided with assistance in the review/discharge of condns

EH must recommend to Planning refusal of the application if not satisfied that land contamination risks adequately characterised and steps can be taken to safeguard human health receptors



Good Practice - EH should identify/collaborate with other key regulatory stakeholder roles/remits within consultation response/formulation of planning conditjons as necessary to direct Planning Department.

Regulatory compliance Requirements-Public Health Nuisances

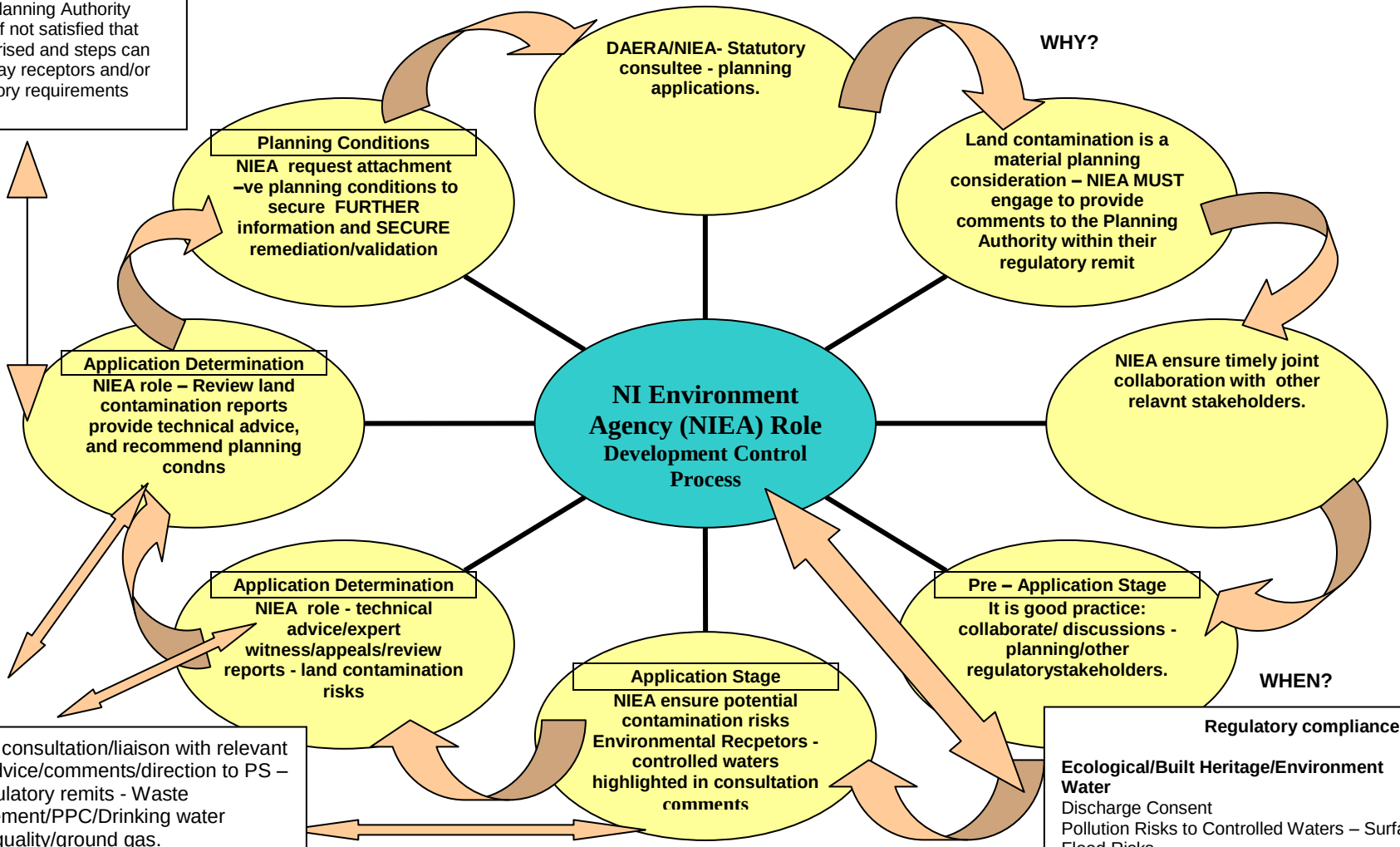
-Noise/Dust /Odour
Site clearance
Decommissioning
Site Preparation/Investigation/
Renediation

- Waste
Accumulations/deposits in ground/underground
e.g. hazardouns wastes/asbestos

Air Quality
Traffic Impacts/Remediation works

EH/NIEA must engage/collaborate with the Planning Authority and other regulatory stakeholders to ensure Planning condns. attached are cohesive, meet relevant tests and do not duplicate. PS should be provided with assistance from EH/NIEA in the review/discharge of condns.

NIEA should recommend to Planning Authority REFUSAL of the application if not satisfied that risks are adequately characterised and steps can be taken to safeguard waterway receptors and/or compliance with other regulatory requirements



NIEA - internal consultation/liaison with relevant units ensure advice/comments/direction to PS – regulatory remits - Waste management/PPC/Drinking water quality/ground gas.
Joint collaboration with other stakeholders - formulation of planning conditions

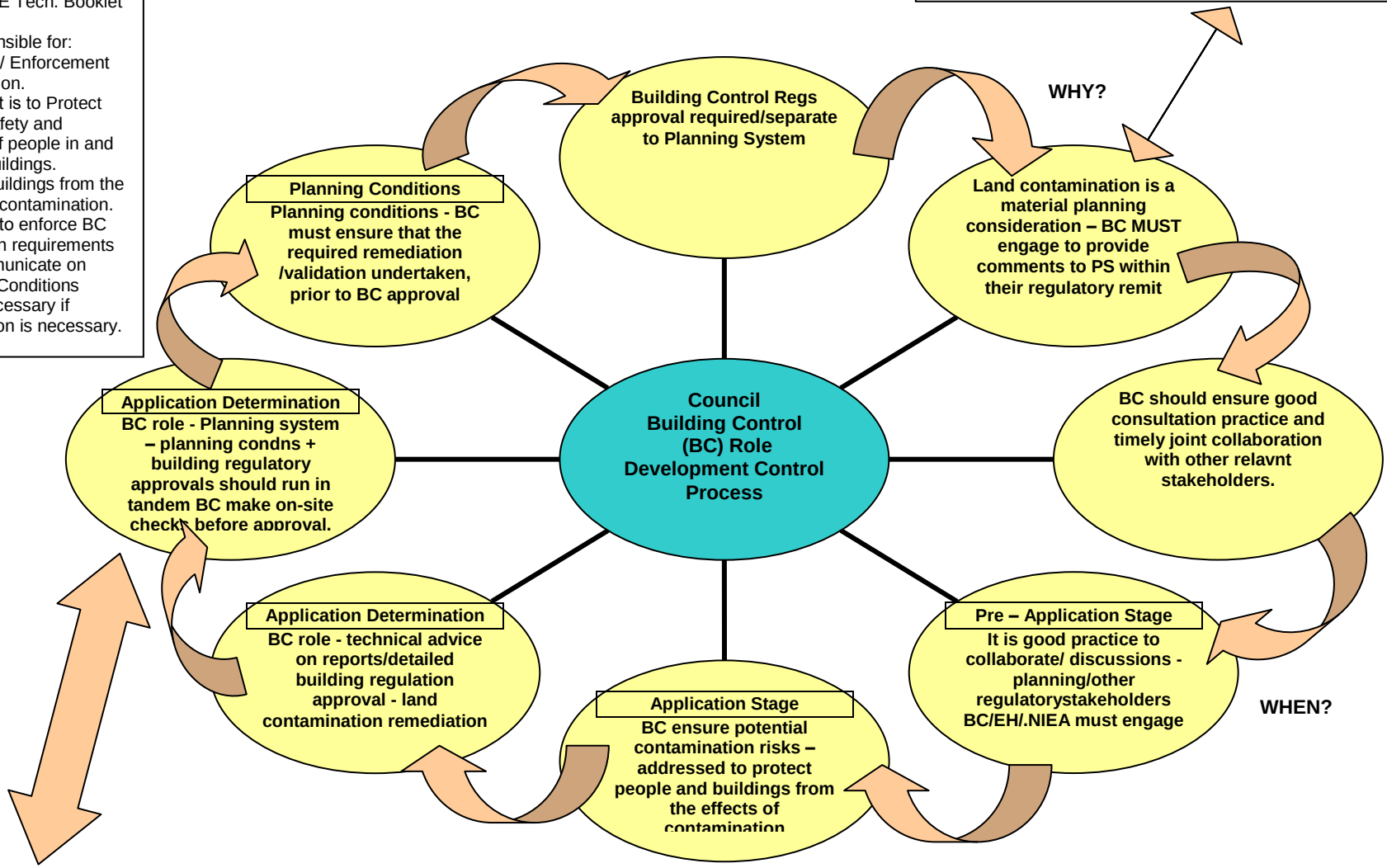
Regulatory compliance Requirements

Ecological/Built Heritage/Environment
Water
Discharge Consent
Pollution Risks to Controlled Waters – Surface/Groundwat
Flood Risks
Waste
Waste management Licences
Duty of Care
Hazardous Waste (e.g. contaminated soils/asbestos)
Mobile Treatment Licences (Remediation)
IPPC Permitting

Regulatory compliance Requirements

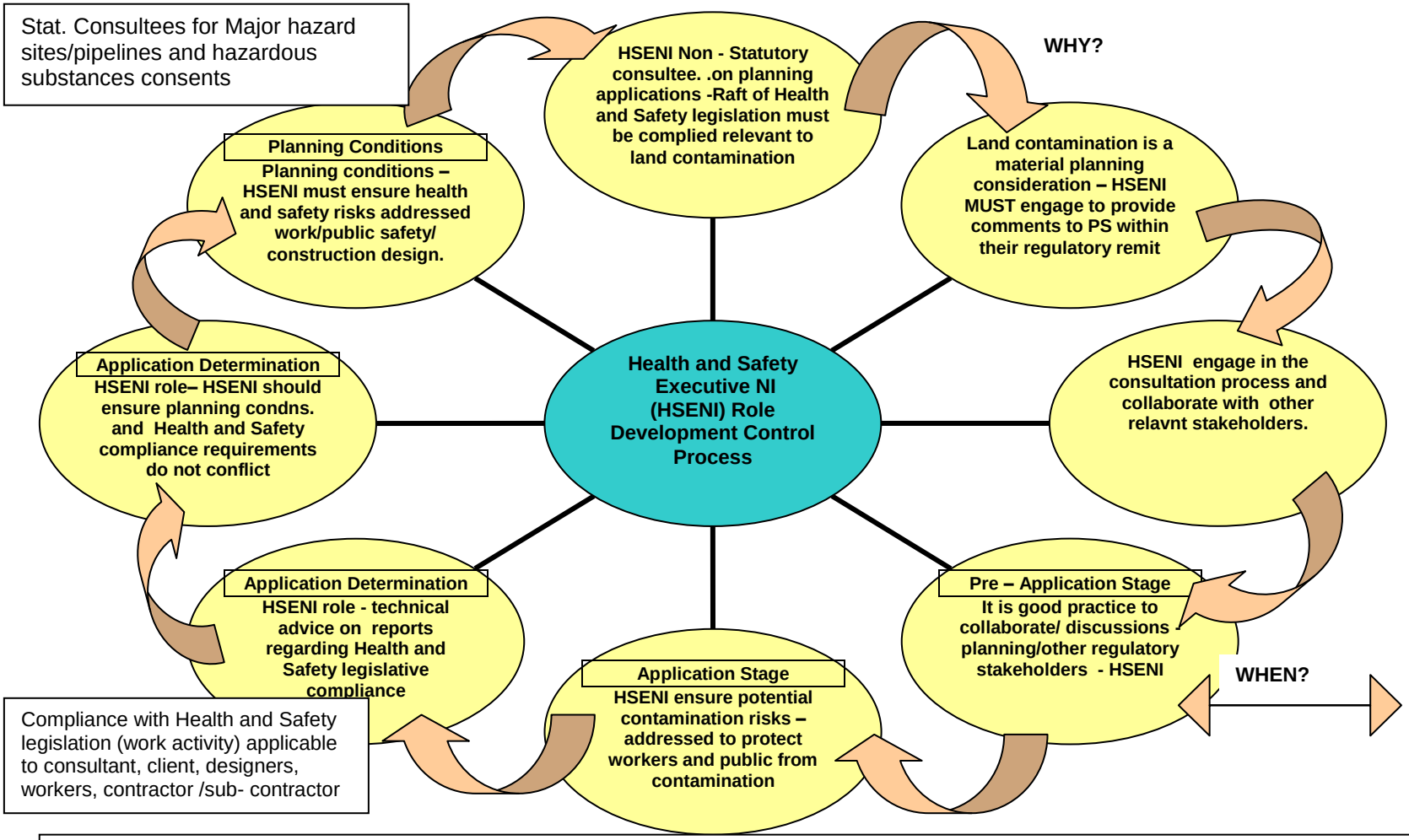
Established system - Building Regulations (NI) 2012. DOE Tech. Booklet C 2012`
BC responsible for: Operation/ Enforcement of legislation.
BC's remit is to Protect Health Safety and Welfare of people in and around buildings.
Protect Buildings from the effects of contamination.
BC's role to enforce BC Regulation requirements and communicate on Planning Conditions where necessary if remediation is necessary.

It is the role of the Planning Department to ensure that relevant regulatory stakeholders consulted where development proposals may be affected by contamination.



Internal consultation/liaison with relevant departments within the Council EH/BC to ensure advice/comments/direction to Planning – Joint collaboration with other stakeholders - formulation of planning conditions

Health and Safety Executive NI - Stakeholder Role



HSENI's role – responsible for health and safety at work – should provide advice when working on land affected by contamination.
Main Legislative Provisions –
Construction (Design and Management) Regulations NI 2007 – site clearance/demolition/site investigation/remediation.
A Health and Safety plan/Risk Assessment will be required for site walkover/investigation.
Risk mitigation measures must be detailed within the Health and Safety plan.
Other Provisions
Control of Substances Hazardous to Health Regulations
Control of Asbestos (NI) Regulations 2012 –CIRIA Technical Guidance C733 (Asbestos) and HSG 248.
Raft of Asbestos/H&S requirements.
CIRIA SP 102 Vol II Decommissioning/Decontamination and demolition, 1995
CIRIA SP 78 Building on Derelict Land Part B 23 – Safety in Site Working, 1991
HSE 47, 2001 – Avoiding Danger from Underground Services
EH 40, 2005 – Occupational Exposure Limits. No UK guidelines for acute exposure risks from soil contamination exist – occupational exposure limits for some vapours/dusts
Protection of Workers and General Public during the development of contaminated land HS G 66, 1991 (no longer current)

7.0 The Key Activity Stages – Phased Risk Based Approach to Identifying Land Contamination Risks and Land Contamination Report Checklists.

A brief description of each key activity stage (refer to the Model Procedures for further details) is provided below.

STAGE 1- RISK ASSESSMENT

Risk assessment is a process, which should be carried out within a tiered framework.

Hence it may become necessary to revise assumptions made in the early stages of the assessment, as more information becomes available about the site (see Box 1).

Box 1

STAGES OF RISK ASSESSMENT

Box 1 **RISK ASSESSMENT**
Each tier of the risk assessment process should follow these four basic steps: 1) Hazard Identification **-** Establishing contaminant sources 2) Hazard Assessment - Analysing the potential for unacceptable risks (what pathways and receptors could be present, what pollution linkages could result and what the effects could be) 3) Risk Estimation - Predicting the magnitude and probability of the possible consequences (what degree of harm or pollution might result to what receptors and how likely it is) that may arise as a result of a hazard 4) Risk Evaluation - Deciding whether a risk is unacceptable

PRELIMINARY RISK ASSESSMENT

The purpose of the preliminary risk assessment stage is to develop an **outline conceptual exposure model** and establish whether or not there are any potentially unacceptable risks arising from contamination at the site.

For the purpose of this guidance, the Environmental Health Department is concerned with ensuring that there has been adequate consideration of the identification of potential unacceptable risks to human health.

In terms of preliminary risk assessment the main activity will entail the collection of information required to identify all **plausible pollutant linkages** at the site in order that the outline conceptual exposure model can be prepared.

Preliminary risk assessment may include desk study activity and site walkover survey/s, such surveys are undertaken to verify data and obtain additional information such as anecdotal evidence from employees.

Depending on the outcome of the preliminary risk assessment stage, further action may be required, for example if there are any gaps in information or potentially unacceptable risks are identified at the site.

In some cases there may be sufficient information to be able to move straight to an appraisal of any required remediation measures.

If the applicant is able to demonstrate, through the submission of adequate information (site reports submitted through the development control process) that the site does not present any unacceptable risks to human health, it may be accepted that no further information/action is required.

CONCEPTUAL EXPOSURE MODEL

CONCEPTUAL EXPOSURE MODEL
The conceptual exposure model is a representation of the understanding of the site and the surrounding environment including the geology, groundwater, surface water bodies, potential contamination, processes (e.g. volatilisation, leaching) acting on substances present and contaminant migration pathways. It should describe all pollutant linkages at the site, taking into account the current and proposed uses of the site. The conceptual model can be expressed in a visual, written or tabular format or, preferably, a combination of all three. The use of vertical cross-sections is recommended. For the purposes of this guidance, the conceptual exposure model should concentrate on pollutant linkages that have human health features as the receptor.

QUANTITATIVE RISK ASSESSMENT (INCLUDING SITE INVESTIGATION)

The purpose of the quantitative risk assessment stage is to:

- Refine and update the conceptual exposure model
- Confirm pollutant linkages
- Evaluate potential unacceptable risks
- Provide the basis for the appraisal of remedial measures when unacceptable risks are identified at the site.

This stage should be undertaken when the preliminary risk assessment identifies potential unacceptable risks at the site.

In the context of this guidance, the Environmental Health Department is concerned with unacceptable risks to human health.

It is anticipated that quantitative risk assessment will be required in most cases where contamination is known to be present or is suspected at the site, as a Further information on the presence and extent of contaminants, pathways and receptors and other site characteristics required for the quantitative risk assessment may be gathered through intrusive site investigations.

When commissioning laboratories and reporting on the results of chemical analyses, soils testing should be undertaken in accordance with the MCERTS performance standard

MCERTS
The Monitoring Certification Scheme (MCERTS) is designed to improve the quality of monitoring data. The MCERTS Performance Standard for Laboratories Undertaking Chemical Testing of Soil provides an application of the European and international standard, BS EN ISO/IEC 17025:2000, specifically for the chemical testing of soil. Accreditation to the MCERTS performance standard for soil laboratory tests is recommended where reports are submitted on a voluntary basis or for planning purposes, including site investigation, verification of remediation and long-term monitoring activities. Further details on MCERTS are available on the Environment Agency's website and **www.mcerts.net**. The Environment Agency has launched its MCERTS scheme for chemical testing of soils with publication of Version 2 of the MCERTS performance standard.

The conceptual exposure model should be refined and pollutant linkages confirmed as a result of the site investigations.

The risks associated with those linkages should then be evaluated using either generic or site-specific assessment criteria, or a combination of both.
The recommended approach for assessing risks to human health is that a target concentration is set for an appropriate compliance point and site derived concentrations should not exceed that concentration.

REMEDIAL TARGETS METHODOLOGY

REMEDIAL TARGETS METHODOLOGY
The Council environmental health department recommends that risk assessments for human health receptors from ground contamination should be undertaken in accordance with the tiered framework set out within the Contaminated Land Exposure Assessment Model and associated current UK guidance.

SELECTION OF SUITABLE CONTAMINANT ASSESSMENT CRITERIA

SELECTION OF SUITABLE CONTAMINANT ASSESSMENT CRITERIA
When undertaking a risk assessment to determine if unacceptable risks to human health may be present, site derived values of contaminants in soil or other media, should be compared to relevant standards and contaminant assessment criteria, within the UK risk based framework. **Reference and utilisation of other risk assessment frameworks and/or standards/reports produced by authoritative organisations may be**

acceptable, however their use must be justified for use in the UK context.

Further information with regard to The Contaminated Land Exposure Assessment Model (CLEA) and the associated CLEA technical framework documentation include:

TOX guidance report (Final SC050021/SR2) and CLEA report (Final SC050021/SR3)

1.**Human health toxicological assessment of contaminants in soil (Science Report Final SC050021/SR2)** - This report describes the technical principles and framework we use to derive Health Criteria Values.

2.**Updated technical background to the CLEA model (Science Report Final SCO50021/SR3** – This report describes the technical background to the CLEA model. It also sets out the underlying assumptions used to predict exposure for three standard land use scenarios (residential, allotments and commercial).

Further information regarding the changes/errata to the CLEA model and risk assessment factsheet information may be accessed from the Environment Agency website.

►**Risk Assessment Fact sheet Information (Relevant to Other Risk Assessment Exposure Models) – SNIFFER, RBCA, RISC HUMAN, RISC, RISK* ASSISTANT, CLEA.**

may be accessed from the EA website at:

http://www.environment-agency.gov.uk/clea

STAGE 2- OPTIONS APPRAISAL

The aim of the "options appraisal" stage (i.e. for remediation) is to establish which remediation option, or combination of options, provides the best approach to remediating all pollutant linkages that present an unacceptable risk at the site.
The Environmental Health Department's main concerns at this stage will be to ensure that:

• Remediation criteria selected for the site are protective of human health

• Appropriate remediation options have been selected for each relevant pollutant linkage

• The Remediation Strategy addresses all relevant pollutant linkages

The applicant should be aware that where the proposed remediation scheme will necessitate requirements, such as waste management licences, environmental permits, discharge consents etc. that account is taken of the aforementioned at an early stage in the options appraisal.

The regulatory body responsible for requirements such as waste management licences, environmental permits and discharge consents is the NIEA Land and Resource Management Unit/Water Quality Unit.

IDENTIFICATION OF FEASIBLE REMEDIATION OPTIONS

Site-specific remediation objectives should be identified and remediation criteria for measuring compliance against these objectives should be derived at this stage.
The Environmental Health Department recommends that remediation criteria for human health should be derived in accordance with the Remedial Targets Methodology

A short-list of feasible remediation options, i.e. options that are capable of achieving the remediation criteria derived for the site given site-specific constraints, should then be identified and be taken forward for detailed evaluation.

DETAILED EVALUATION OF OPTIONS

A review of the short-listed remediation options should be undertaken to determine which are the most appropriate for addressing each relevant pollutant linkage.

Detailed information on the technical attributes of each option will be required for the review and evaluation criteria will need to be developed for assessing the relative merits of each option.

Proposals for combining options should be included where more than one option is required.

RELEVANT POLLUTANT LINKAGE

RELEVANT POLLUTANT LINKAGE
A relevant pollutant linkage is one that has been identified during the risk assessment stage as representing unacceptable risks to human health or the environment. For the purposes of this guidance, relevant pollutant linkages are taken to be only those that represent an unacceptable risk to human health receptors.

The applicant is advised to ensure that an assessment of likely regulatory requirements and feasibility of obtaining the appropriate environmental licenses, permits etc. within the required timescale form part of the evaluation. The evaluation should also take account of Best Practicable Environmental Option;cost benefit, environmental outcomes and appropriate timescales for remediation.

DEVELOPING THE REMEDIATION STRATEGY

The Remediation Strategy sets out how the remediation options selected for each

relevant pollutant linkage, or combination of options, will be put into place at the site.

It should provide a clear picture of how relevant pollutant linkages will be remediated and the remedial works verified. Practical issues such as zoning and phasing of remediation and proposals for obtaining the appropriate environmental licences, permits etc. should be addressed within the Remediation Strategy.

STAGE 3- IMPLEMENTATION OF THE REMEDIATION STRATEGY

The main aims of the implementation stage are to ensure that the remedial works deliver the site remediation criteria without causing harm to the environment and that there is an accurate and permanent record of the works.

PREPARATION OF IMPLEMENTATION PLAN

The Implementation Plan translates the Remediation Strategy into a clear set of remediation activities for the site. It should set out all aspects of the design,
preparation, implementation, verification and long-term monitoring and maintenance of the remediation. The Implementation Plan should be capable of demonstrating to that:

- Site remediation criteria derived for relevant pollutant linkages will be achieved
- Appropriate environmental permits, licences etc. have been, or will be, obtained
- The remediation activities will be protective of human health
- Measures will be taken to mitigate potential risks to human health that may arise if there are significant variations from the Remediation Strategy.

BEST PRACTICABLE ENVIRONMENTAL OPTION (BPEO)

BEST PRACTICABLE ENVIRONMENTAL OPTION (BPEO)
The BPEO principle may be adopted to ensure that the option, or mix of options, provides the most benefit or the least damage to the environment, at acceptable cost, in the long-term as well as the short-term.

DESIGN, IMPLEMENTATION AND VERIFICATION

Through the planning and development control process it must be demonstrated adequately by the developer that the site remediation is completed in accordance with the Remediation Strategy.

Once the detailed remediation design is complete, a **Verification Plan** should be prepared detailing the data gathering requirements necessary to demonstrate that the remediation meets the site remediation criteria.

A **Monitoring and Maintenance Plan** will also be required if the remediation is to include permanent structures/equipment etc that require maintenance or if there will be a need for monitoring to demonstrate the continuing effectiveness of the site remediation following substantial completion of the site works.

Once the site remediation is complete, a **Verification Report** will be required to demonstrate that the agreed site remediation criteria have been achieved. This report should provide a full record of all remediation activities carried out at the site and data collected in accordance with the requirements of the Verification Plan. In some cases reports on the verification works may require to be phased in order to demonstrate progress and enable any regulatory body to monitor such progress. This would be an additional reporting requirement and would not replace the need for a final completed version of the report. Details of monitoring, sampling and test results undertaken prior to, during and post-completion of the remediation works are required to be submitted to the Planning Service at appropriate stages within the reporting process, in order that relevant consultees to the Planning Service can be consulted on such submissions at the appropriate stage in the process.

LONG –TERM MONITORING AND MAINTENANCE

Long-term monitoring and/ or maintenance will only be necessary if a Monitoring and Maintenance Plan was required and prepared due to site specific remediation requirements.

8.0 Useful Reference Sources

Guidance

Atkins ATRISK Soil Screening Value Data – Generic Assessment Criteria

British Standards Institution (2001) Investigation of Potentially Contaminated Sites, Code of Practice, BS: 10175 * The British Standard is currently under review and the revised version is scheduled for draft publication December 2010.

British Standards Institute (BSI) BS5930, The Code of Practice for Site Investigations, 1999

British Standards Institute (BSI) BS 8485, Code of practice for the characterization and remediation of ground gas in brownfield developments, 2007a

British Standards Institute (BSI) ISO/CD 17402, Soil quality – Guidance for the selection and application of methods for the assessment of bioavailability of contaminants in soil and soil material, 2008a

CIEH/CL:AIRE, Guidance on comparing soil contamination data with a critical concentration, 2008a

CIEH/LQM, Generic Assessment Criteria for Human Health Risk Assessment, 2nd Edition, 2009

Construction Industry Research and Information Association (1995-1998) Special Publications 101-112, Remedial Treatment for Contaminated Land, Volumes I to XII.

CIRIA, SP103, Remedial Treatment for Contaminated Land: Volume III, Site Investigation and
Assessment, 1995

CIRIA, 552, Contaminated Land Risk Assessment, A Guide to Good Practice, 2001

CIRIA, C562, Geophysics in Engineering Investigations, 2002

CIRIA, C665, Assessing risks posed by hazardous ground gases to buildings, 2007

CIRIA C682 The VOC's Handbook

CL:AIRE/EIC/AGS Soil Generic Assessment Criteria For Human Health Risk Assessment

DEFRA, Assessing Risks from Land Contamination – A Proportionate Approach, Soil Guideline
Values: The Way Forward, 2006

DEFRA, Guidance Note on the Statistical Analysis of Land Contamination – A Proportionate
Approach, Soil Guideline Values: The Way Forward, 2006

DEFRA/EA The Contaminated Land Exposure Assessment Model (CLEA) Version 1.06

and the associated CLEA technical framework documentation include:

TOX guidance report (Final SC050021/SR2) and CLEA report (Final SC050021/SR3)

Human health toxicological assessment of contaminants in soil (Science Report Final SC050021/SR2)

Updated technical background to the CLEA model (Science Report Final SCO50021/SR3

Department of the Environment (1997) A Quality Approach for Contaminated Land Consultancy, Environmental Industries Commission in Association with the Laboratory of the Government Chemist (CLR 12).

Department of the Environment (1994) CLR Report No.4: Sampling Strategies for Contaminated Land.

Department of the Environment (1994) DOE Industry Profiles

Department for Regional Development Northern Ireland, Shaping Our Future, The RegionalDevelopment Strategy for Northern Ireland 2035,

Department of the Environment, Transport and the Regions (2000) Guidelines for Environmental Risk Assessment & Management, Revised Departmental Guidance.

Environment Agency (2004) Environment Agency Policy Number 307_03 on Chemical Test Data on Contaminated Soils -Qualification Requirements.

Environment Agency (2004) Model Procedures for the Management of Land Contamination (CLR 11).

Environment Agency (2000) Technical Aspects of Site Investigation (Volumes I and II) R&D Technical Report P5-065/TR.

Environment Agency (2000) Secondary Model Procedure for the Development of Appropriate Soil Sampling Strategies for Land Contamination, R&D Technical Report P5 066/TR.

Environment Agency, Risks of contaminated land to buildings, building materials and services,
P331, 2000

Environment Agency, The UK approach for evaluating the human health risks from petroleum
hydrocarbons in soils, 2005

Environment Agency and National House Building Council (2008) Guidance for the Safe Development of Housing on Land Affected by Contamination, R&D Publication 66.

National Assembly for Wales (2002) Planning Policy Wales: Chapter 13 Minimising and Managing Environmental Risks and Pollution.
Office of the Deputy Prime Minister (2004) Planning Policy Statement 23: Planning and Pollution Control. Annex 2 Safe Development on Land Affected by Contamination

WRc (1995) Soil Water and Groundwater Sampling.

The Model Procedures for the Management of Land Contamination (CLR 11) contain a comprehensive list of references on a wider range of issues than are addressed in this guidance. (Readers should be aware that key reference material may have been withdrawn and reissued since publication of CLR 11 in 2004)

Websites

• These websites contain many useful references:
• British Standards Online at www.bsi-global.com
• Construction Industry and Research and Information Association contaminated land website at www.contaminated-land.org
• DEFRA website at www.defra.gov.uk

- Environment Agency website at www.environment-agency.gov.uk

APPENDIX A
Reporting Requirements

Checklists provided in this Appendix

MODEL PROCEDURES KEY ACTIVITY STAGE	CHECKLIST	REPORTING REQUIREMENTS FOR:
1. Risk Assessment	Checklist 1	Preliminary Risk Assessment
	Checklist 2	Quantitative Risk Assessment (including Site Investigation)
2. Options Appraisal	Checklist 3	Combined Options Appraisal
3. Implementation of the Remediation Strategy	Checklist 4	Implementation Plan
	Checklist 5	Verification Plan
	Checklist 6	Monitoring & Maintenance Plan
	Checklist 7	Verification Report
	Checklist 8	Monitoring Reports

The council environmental health department recommends that the checklists are completed, signed, dated and submitted to the Planning Service (these should be forwarded by the planning authority together with the relevant reports, in order to demonstrate that the reports have been checked recently and by an appropriately qualified person. Evidence of professional qualifications and experience may be requested.

General Comments

A1 A preliminary risk assessment must be submitted as a minimum in all cases. The reporting stages that should then be completed for each site will depend on the outcome of the preliminary risk assessment and progression through the Step by Step process.
Other regulatory bodies such as the NIEA should be consulted concerning its own requirements with regard to pollution of controlled waters. Guidance with regard to management considerations that are not addressed in the checklists, is provided in the Model Procedures document CLR 11.

The reporting requirements provided in the checklists represent good practice but are not exhaustive. Depending on site-specific factors, further work and reporting may be required. Comment boxes are provided beneath the checklists for additional comments and explanation for failure to meet any of the reporting requirements, e.g. because they are not applicable in the individual circumstances at a site.
All reports should be prepared by suitably qualified professionals.

Combining Reports

A2 Repetition can be minimised if reports are combined or cross-referenced properly. In particular, the site investigation and quantitative risk assessment reports should be combined or submitted together, as the council environmental health department will that the site investigation report is always accompanied by a risk assessment to explain the significance of the investigation findings.

Both factual and interpretative reports should be supplied. Reporting requirements for all three elements of the Options Appraisal are combined into one checklist as it is anticipated that they will be included in one submission to the Planning Service (to be consulted by other interested parties/consultees) in most cases.

If the Remediation Strategy is submitted separately, it should clearly cross-reference or summarise the findings of the earlier Options Appraisal reports.

The Verification and Monitoring and Maintenance Plans may be submitted as part of, or appendices to, the Implementation Plan.

CHECKLIST 1

Preliminary risk assessment reporting requirements:	
Contents:	Yes □/No□
Report objectives	Yes □/No□
Site location map and National Grid Reference	Yes □/No□
Site layout plans*	Yes □/No□
Site area in hectares	Yes □/No□
Description of site and surroundings	Yes □/No□
Details of desk study research undertaken (including the review of previous site contamination investigation reports (desk study and/or intrusive) remediation proposals	Yes □/No□
Information on past and current activities at the site	Yes □/No□
Details of intended future use of the site	Yes □/No□
Unique references for all relevant planning applications or permissions at the site	Yes □/No□
Historical Ordnance Survey (NI) maps* and site plans* and if available, aerial photographs	Yes □/No□
Environmental setting including: • superficial deposits and solid geology • hydrology • hydrogeology (including the interaction between all relevant shallow and deep groundwaters and how they flow to potential receptors) • Information from EHS with regard to location and status of relevant surface water and groundwater receptors and vulnerability, including all abstracted uses, landfill sites and land quality database information etc. • Pollution Incidents	 Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□
Information on site drainage and other man-made potential pollutant pathways, e.g. underground services	Yes □/No□
Identification of potential contaminants of concern and source areas	Yes □/No□
Consultations with the local authority	Yes □/No□
Consultations with the Environment and Heritage Service	Yes □/No□
Consultations with other appropriate bodies	Yes □/No□
Review and summary of previous reports, with report references	Yes □/No□
Outline conceptual model with nature and location of human health and environmental receptors clearly identified	Yes □/No□
Description of possible pollutant linkages for human health	Yes □/No□
Identification of potentially unacceptable risks to human health including criteria used to identify those risks and interpretation of preliminary risk assessment	Yes □/No□
Discussion of uncertainties and gaps in information	Yes □/No□
Description and justification of next steps proposed at the site, e.g. carry out site investigation and quantitative risk assessment	Yes □/No□
Conclusions	Yes □/No□
***All plans and historical map extracts must be legible, suitably scaled and annotated, with a north point, and clearly show the site boundary.**	

Signed by: ……..

Name & position: ……..

Contact Information: ……..

Date: ……

Further Comments:

CHECKLIST 2

Quantitative risk assessment (including site investigation) reporting requirements:	
Contents:	Yes □/No□
Report objectives	Yes □/No□
Site location map and National Grid Reference	Yes □/No□
Site layout plans*	Yes □/No□
Review and summary of previous reports, with report references	Yes □/No□
Outline conceptual model with all contaminant sources, pathways and receptors identified	Yes □/No□
Results of preliminary risk assessment	Yes □/No□

Details of any preparatory enabling works e.g. moving mounds of waste, breaking out concrete and demolition works.	Yes □/No□
Site investigation:	
Investigation objectives and Justification of Exploration, Sampling and Analytical Strategies.	Yes □/No□
Summary of work done	Yes □/No□
Site investigation strategy, including: • rationale for investigation • methods used for forming exploratory holes e.g. boreholes, trial pits, window samples • details of any borehole sampling undertaken • methods used for collecting, preserving and transporting samples to the analytical laboratory	 Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□
Site sampling strategy, including: • rationale for strategy • description and explanation of monitoring, sampling and testing programmes • monitoring and sampling locations, depths (metres below ground and frequencies)	 Yes □/No□ Yes □/No□ Yes □/No□
Analytical strategy, including: • rationale for selection of analytical parameters • justification of selection of samples for testing • justification and description of chemical analyses, in accordance with the MCERTS performance standard for soils • details of quality assurance and quality control requirements for laboratory analyses	 Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□
Plan showing monitoring and sample point locations*	Yes □/No□
Details of in-situ tests and geotechnical tests required to provide data for quantitative risk assessment	Yes □/No□
Description of site works and on-site observations	Yes □/No□
Measures undertaken to prevent unacceptable risks to human health and the environment as a consequence of site investigation methods used	Yes □/No□
Presentation and interpretation of investigation results, including: • description of ground conditions encountered at the site • cross-sections showing site strata and shallow and deep groundwater levels • summary tables of chemical analyses, site monitoring and test results • description of type, nature and spatial distribution of contamination, with plans where appropriate* • evaluation of site investigation results against the outline conceptual model	 Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□
Annexes containing: • exploratory hole logs including grid co-ordinates and ground elevation (logged by suitably qualified professionals) • Monitoring boreholes or other type of installation methodology • monitoring/sampling/test results • description of samples submitted for analysis • laboratory analytical reports, completed in accordance with the	 Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□

MCERTS performance standard for soils • chain of custody records	Yes □/No□ Yes □/No□
Quantitative risk assessment: Generic and/or Site- Specific	
Risk assessment objectives	Yes □/No□
Description of proposed development	Yes □/No□
Conceptual model, revised following site investigation, with sources, pathways and receptors clearly identified	Yes □/No□
Rationale for the chosen risk assessment approach and explanation for why it is valid for the site	Yes □/No□
Discussion of relevant exposure scenarios	Yes □/No□
Assessment criteria selected for the site, with justification for all criteria used	Yes □/No□
Description of risk assessment model, if used, and: • **input parameters** • **safety factors** • **assumptions** • **any sensitivity analysis undertaken**	 Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□
Calculation worksheets/ model inputs and outputs provided	Yes □/No□
Constraints and limitations relating to data quality and risk assessment method	Yes □/No□
Identification of pollutant linkages that present an unacceptable risk to human health	Yes □/No□
Discussion of uncertainties and their impact on the outcome of the risk assessment	Yes □/No□
Results of risk estimation if detailed quantitative risk assessment is undertaken	Yes □/No□
Evaluation of unacceptable risks to human health taking into account both the current use of the site and details of the proposed development.	Yes □/No□
Description of evaluation method and criteria used	Yes □/No□
Description and justification of next steps proposed at the site, e.g. carry out Options Appraisal (remediation) for pollutant linkages that present an unacceptable risk to human health	Yes □/No□
*** All plans map extracts must be legible, suitably scaled and annotated, with a north point, and clearly show the site boundary.**	

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Contact Information:
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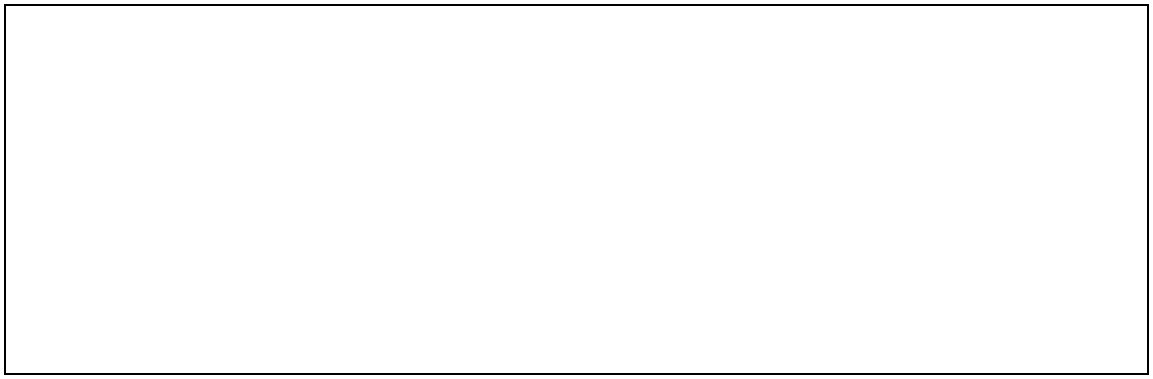
Date: ……..

Further Comments:



CHECKLIST 3

Combined options appraisal (remediation/risk management options) reporting requirements:	
Contents	Yes □/No□
Report objectives	Yes □/No□
Site location map and National Grid Reference	Yes □/No□
Site layout plans*	Yes □/No□
Review and summary of previous reports, with report references	Yes □/No□
Summary of relevant pollutant linkages that require remediation	Yes □/No□
Statement and explanation of remediation objectives, i.e. what the remediation needs to achieve, for each relevant pollutant linkage	Yes □/No□
Statement of remediation criteria against which compliance with remediation objectives for each relevant pollutant linkage	Yes □/No□
Statement of overall site remediation criteria (these should always be protective of human health) where they differ from the criteria derived for relevant pollutant linkages	Yes □/No□
Identification of feasible remediation options:	
Summary of feasible remediation options identified for each relevant pollutant linkage, including general characteristics of those options and methods used for collecting information on them	Yes □/No□
Short-list of feasible remediation options to be taken forward for more detailed consideration, including: • an assessment of their suitability for use at the site • reasons for selecting options on the short-list and rejecting others	Yes □/No□ Yes □/No□ Yes □/No□
Detailed evaluation of remediation options:	
Evaluation of short-list remediation options, including explanation of evaluation criteria used	Yes □/No□
Identification of the most appropriate option for each relevant pollutant linkage and justification for its selection	Yes □/No□
Reasons for rejecting other remediation options on the short-list	Yes □/No□
Justification for any proposals to combine remediation options	Yes □/No□
Remediation Strategy:	
Description of the Remediation Strategy, including: • technical and scientific basis of the strategy • requirement for preparatory works • effectiveness of combining remediation options, where required • proposed site zoning and phasing of remediation • verification of remediation and monitoring requirements • constraints and limitations to remediation • timescales required for environmental permits, licences etc. • expected durability of the proposed remediation • measures to prevent unacceptable risks arising from remediation activities at the site	 Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□
Justification for any changes required under the Remediation Strategy to remediation criteria derived for any relevant pollutant linkages	Yes □/No□
Summary of alternative remediation strategies considered	Yes □/No□

Justification for selection of the preferred Remediation Strategy	Yes □/No□
Description of how the Remediation Strategy will deliver remediation criteria derived for all relevant pollutant linkages	Yes □/No□
*** All plans map extracts must be legible, suitably scaled and annotated, with a north point, and clearly show the site boundary.**	

S**igned by: ……**

Name & position:……..

Contact Information: ……

Date: ……

Further Comments:

CHECKLIST 4

Implementation Plan reporting requirements:	
Contents:	Yes □/No□
Report objectives	Yes □/No□
Site location map and National Grid Reference	Yes □/No□
Site layout plans*	Yes □/No□
Review and summary of previous reports, with references	Yes □/No□
Description of ground conditions at the site, including waterways features	Yes □/No□
Remediation objectives for each relevant pollutant linkage	Yes □/No□
Remediation criteria for relevant pollutant linkages	Yes □/No□
Overall site remediation criteria	Yes □/No□
Remediation methodology, i.e. what is to be done by way of remediation	Yes □/No□
Phasing of the remediation works and approximate timescales for each phase	Yes □/No□
Site preparation and operational constraints	Yes □/No□
Site procedures for managing the remediation works in a manner that will not cause unacceptable risks to human health and/or the environment	Yes □/No□
Discussion of permitting requirements and proposals for obtaining the appropriate permits, e.g.: • PPC permit • waste management site licence • exemption from waste management licensing • mobile plant licence • abstraction licence or consent • discharge consent • Groundwater Regulations authorisation • flood defence consent • other permits	Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□
Details of how any variations from the Implementation Plan that have the potential to impact on human health receptors (including any areas of unexpected contamination encountered) will be dealt with during the site works.	Yes □/No□
Monitoring boreholes/installation methodology	Yes □/No□
Cross-reference to the Verification Plan and, if required, Monitoring and Maintenance Plan for the site.	Yes □/No□
Plans* showing: • areas to be remediated • proposed locations and phasing of remediation works • area to be used for stockpiling segregated contaminated and clean, site-derived and imported materials • location of areas to be remediated in relation to any proposed development • proposed monitoring locations	 Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□
***All plans map extracts must be legible, suitably scaled and annotated, with a north point, and clearly show the site boundary.**	

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Name & position: ……

Contact Information: ……..

Date: ……

Further Comments:

CHECKLIST 5

Verification Plan reporting requirements:	
Contents:	Yes □/No□
Report Objectives	Yes □/No□
Site location map and National Grid Reference	Yes □/No□
Site layout plans*	Yes □/No□
Review and summary of previous reports, with references	Yes □/No□
Scope of remediation works to be undertaken and any design	Yes □/No□

details required to inform the Verification Plan	
Description of what constitutes completion for the remedial works and how completion will be verified.	Yes □/No□
Data gathering requirements to demonstrate that site remediation criteria are achieved for each relevant pollutant linkage, such as: • sampling and monitoring strategy, including e.g.: 1. validation testing of excavations to remove contaminated materials 2. validation testing of materials excavated, treated and deposited at the site 3. validation testing of materials imported as 'clean fill' 4. post-completion verification testing of the remediated area 5. background water quality testing in groundwater and nearby surface waters 6. water quality testing of any treated groundwater and surface waters 7. site sampling and monitoring methods and frequency • how on and off-site observations will be recorded • explanation and schedule of chemical analyses, to be undertaken in accordance with the MCERTS performance standard for soils • laboratory quality assurance and control requirements	 Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□ Yes □/No□
Performance testing required, e.g. for contaminant barriers and capping layers	Yes □/No□
Plans showing proposed sampling and monitoring point points*	Yes □/No□
Explanation of how compliance with discharge consents, abstraction licences, etc. will be demonstrated	Yes □/No□
Proposed actions in case: • test results and monitoring data show that the remediation activities will not achieve the remediation criteria derived for relevant pollutant linkages • site works vary from those anticipated in the Implementation Plan	 Yes □/No□ Yes □/No□
Timing for preparation of the Verification Report, particularly if any remediation activities will extend beyond substantial completion of the main site works	Yes □/No□
***All plans map extracts must be legible, suitably scaled and annotated, with a north point, and clearly show the site boundary.**	

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Name & position…….

Contact Information: ……..

Date: ……..

Further Comments:

CHECKLIST 6

Monitoring and Maintenance Plan reporting requirements:	
Contents:	Yes □/No□
Report objectives	Yes □/No□
Site location map and National Grid Reference	Yes □/No□
Site layout plans*	Yes □/No□
Scope and explanation of site monitoring (this is taken to include sampling for ease of reference) and/or maintenance work required following completion of site works	Yes □/No□
Statement and justification of end-point for the site monitoring programme	Yes □/No□
Proposed monitoring assessment criteria and reasons for their selection	Yes □/No□
Measures for ensuring that the required monitoring and/or maintenance undertaken to remediate relevant pollutant linkages continue to be effective	Yes □/No□
Schedule of monitoring and maintenance required	Yes □/No□
Monitoring boreholes or other type of monitoring installation methodology	Yes □/No□
Method of collecting, preserving and transporting samples to the analytical laboratory	Yes □/No□
Type and suitability of monitoring equipment to be used	Yes □/No□
Plans showing proposed monitoring point and maintenance locations*	Yes □/No□
Description of chemical analyses required, to be undertaken in accordance with the MCERTS performance standard for soils	Yes □/No□
Laboratory quality assurance and control requirements	Yes □/No□
* **All plans map extracts must be legible, suitably scaled and annotated, with a north point, and clearly show the site boundary.**	

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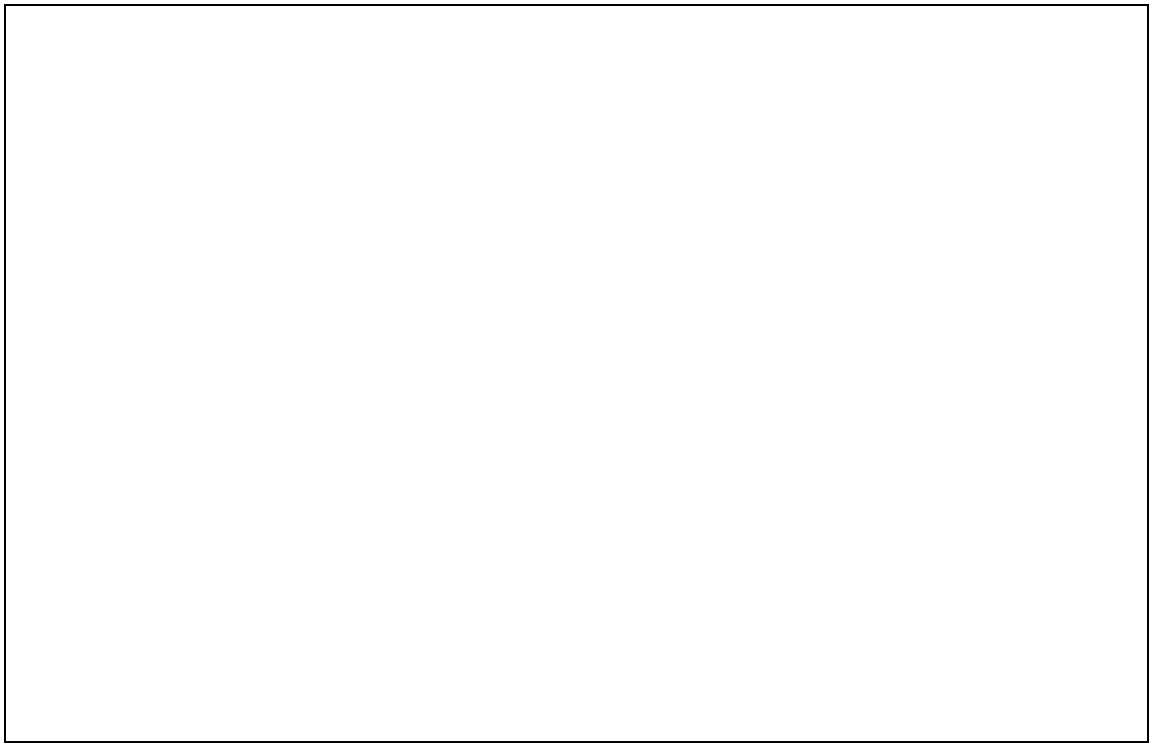
Contact Information: ……..

Date: …..……

Further Comments



CHECKLIST 7

Verification Report requirements:	
Contents:	Yes □/No□
Verification work objectives	Yes □/No□
Site location map and National Grid Reference	Yes □/No□
Site layout plans*	Yes □/No□
Review and summary of previous reports, with references	Yes □/No□
Description of relevant pollutant linkages addressed	Yes □/No□
Description of remedial works undertaken	Yes □/No□
Details of and justification for any variations from the Verification Plan	Yes □/No□
Results of verification, validation and performance testing specified in the Verification Plan and any subsequent variations	Yes □/No□
Provision of laboratory analytical reports, completed in accordance with the MCERTS performance standard for soils	Yes □/No□
Plans* showing remediated areas, indicating any variations from those shown in the Implementation Plan	Yes □/No□
Details of permits, licences, authorisations and consents obtained for the site and evidence of compliance with them	Yes □/No□
Description of reinstatement works, including methodology for decommissioning e.g. monitoring boreholes	Yes □/No□
Description of the final condition of the site at completion	Yes □/No□
Assessment of the potential impact of the site at final condition on human health when put to the proposed end-use	Yes □/No□
Details of any permanent installations required as part of the remedial works, that are to be left in place post-completion of site works	Yes □/No□
Confirmation of post-completion monitoring and/or maintenance requirements	Yes □/No□
*** All plans map extracts must be suitably scaled and annotated, with a north point, and clearly show the site boundary.**	

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Name & position: ……..

Contact Information:
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Date: …..…….

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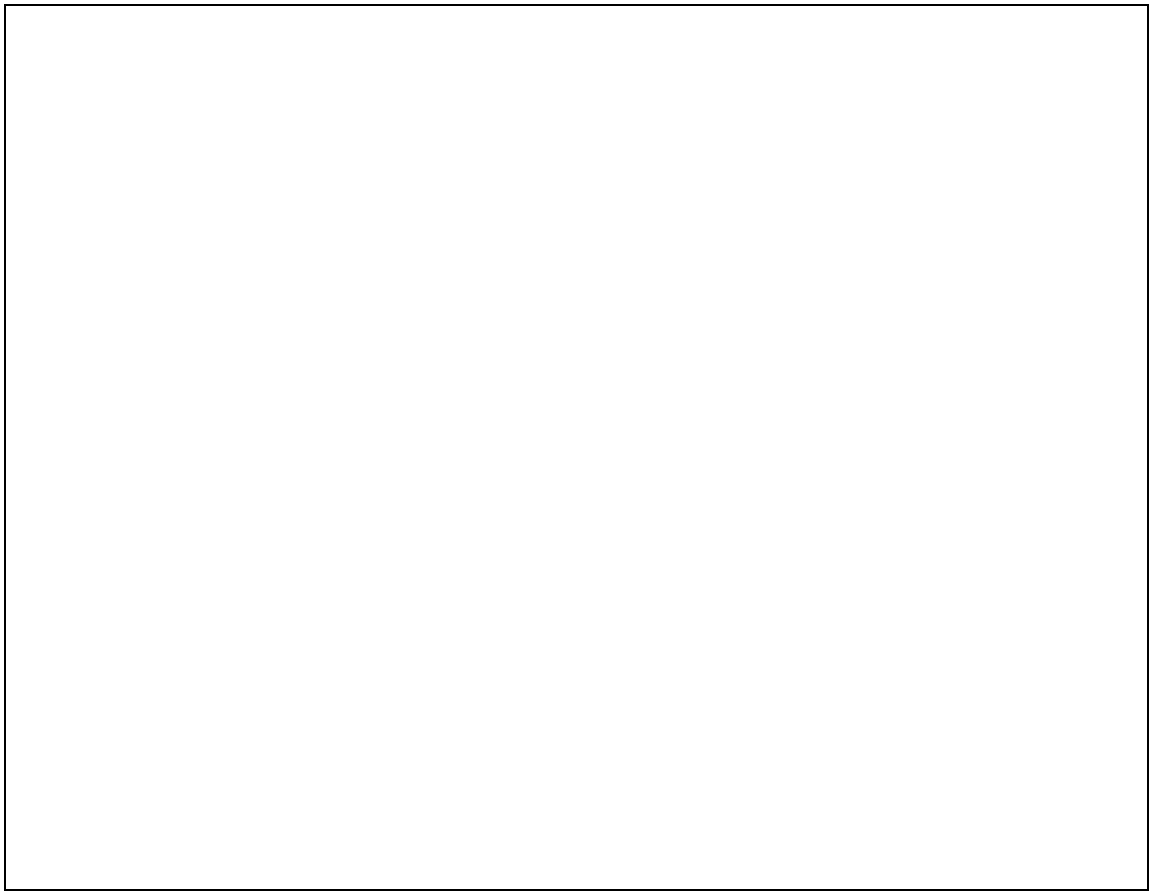

CHECKLIST 8

Monitoring Report requirements:	
Contents:	Yes □/No□
Report objectives	Yes □/No□
Site location map and National Grid Reference	Yes □/No□
Site layout plans*	Yes □/No□
Scope of site monitoring (this is taken to include sampling for ease of reference) and sampling activities required to ensure that remediation of relevant pollutant linkages continues to be effective and human health receptors continue to be protected from unacceptable risks	Yes □/No□
Plans* showing monitoring point locations	Yes □/No□
Schedule of monitoring activities undertaken since the previous report	Yes □/No□
Schedule and results of chemical analyses	Yes □/No□
Laboratory analytical reports, completed in accordance with the MCERTS performance standard for soils	Yes □/No□
Assessment of on-going compliance with remediation criteria	Yes □/No□
Report on actions taken in response to exceptional monitoring results	Yes □/No□
Recommendations for future monitoring, including any variations required from the monitoring programme provided in the Monitoring and Maintenance Plan	Yes □/No□
***All plans map extracts must be suitably scaled and annotated, with a north point, and clearly show the site boundary.**	

Signed by:……..

Name & position:……

Contact Information: ……

Date: ……

Further Comments: