# NON-TECHNICAL SUMMARY

OF

THE FURTHER SITE INVESTIGATION AND HUMAN HEALTH RISK ASSESSMENT

AT

FLORENCE ROAD ALLOTMENT SITE,
FLORENCE ROAD, CHICHESTER

A Report For:

## Chichester City Council

LSOX0234/AJC/R1/Rev0

November 2006

## DOCUMENT INFORMATION AND CONTROL SHEET


Client:

Chichester City Council
The Council House
North Street
CHICHESTER
West Sussex
PO19 1LQ

Tel: 0845 450 7716
Fax: 0845 450 7742

Project Manager:

Mr Guy Clifford

Environmental Consultant:

Bureau Veritas HS&E Ltd
91 – 95 Winchester Road
Chandler's Ford
Eastleigh
Hampshire
SO53 2GG

Tel: 023 8024 2300
Fax: 023 8024 2399

Project Manager:

Sam Carson

Project Team:

Sam Carson
Adam Collier

Principal Authors:

Sam Carson
Adam Collier


Document Status and Approval Schedule

| Issue | Status | Date | Prepared By: Mr. A.J. Collier Signature / Date | Technical Review By: Mr. S.J.R. Carson Signature / Date | Checked By: Mr. S.J.R. Carson Signature / Date |
|---|---|---|---|---|---|
| Rev0 | Draft | 24/11/2006 | | | |

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## NON-TECHNICAL SUMMARY

## CHICHESTER CITY COUNCIL FLORENCE ROAD ALLOTMENTS

### Background

Bureau Veritas was instructed by Chichester City Council on 27th June 2006 to undertake a further site investigation and human health risk assessment of the allotment garden sites on Florence Road, Chichester. The purpose of this work was to obtain further information on the condition of the soil cover in specific areas within the allotments, where previous investigations had showed elevated concentrations of certain contaminants to be present.

Historically, large parts of the allotment land were used for gravel extraction and were subsequently infilled with waste materials. This infilling took place between the 1930s and 1950s and the wastes tipped are believed to have comprised mainly ash, clinker, glass, rubble and other municipal refuse. After infilling, the site was capped with soil and given over to public allotments, which have been in use for many years.

### How was the Investigation Targeted ?

Previous investigations on the allotment land, in 1997 and 2005, had showed that while waste materials were present beneath much of the land, all previous samples taken in superficial soils in the western sector of the site (see attached plan), appeared to be free from elevated concentrations of the contaminants tested for. Across the remainder of the site, elevated concentrations of certain contaminants were present in some, though by no means all, samples from superficial soil. These areas of the site were therefore targeted for further investigation by Chichester City Council.

Clearly, any investigation of a site relies on the testing of discrete samples at localised points and depths. The area of soil to which individual allotment holders would be expected to have exposure would correspond to that of their own plot(s), rather than the site as a whole. Therefore, the most appropriate sampling strategy was felt to be one based on the sampling of individual plots, with samples taken from within the upper 600mm of soil, as this layer is the one to which the majority of exposure occurs, and in which the majority of produce could be expected to take root. This was therefore the approach that was taken at Florence Road. On smaller plots, a single sample hole was formed, subject to access, while on the larger plots, two or even three holes were formed, in order to achieve coverage.

### What Contaminants were Found ?

All samples were tested for a schedule of relevant contaminants deemed possible on the site, as a result of the nature of the infill material, and based on the findings of previous investigation work.

Contaminants that were found at elevated concentrations included:

1. *Certain metals*, including lead, arsenic and nickel. Generally these contaminants are present in many soils, at varying concentrations depending on the underlying geology and site setting; soils in urban areas often show slightly elevated concentrations as a result of historical air pollution and atmospheric deposition. They also tend to become concentrated in ash, particularly from coal burning, which is likely to explain their presence at elevated concentrations on the site at Florence Road.

2. *Polyaromatic Hydrocarbons (PAHs)*. PAHs are a group of commonly-occurring tar-like compounds, usually formed during combustion. They are found in diesel exhaust, waste oil and are also commonly associated with ash and combustion residues, such as were known to be present from infilling on the site. There are many hundreds of PAH compounds, some of which are of limited health concern; others

however, are suspected carcinogens, in particular benzo(a)pyrene (BaP), to which much attention has been given by toxicologists and risk assessors.

How Significant were the Concentrations Measured ?

In the UK, the government has produced a limited set of Soil Guideline Values (SGVs) for the assessment of human health risks, from exposure to contaminants in soil. SGVs are designed to be protective of human health over the long-term, with regular exposure to soil over many years assumed. SGVs are currently available for several substances, while toxicological reports for several others (including BaP) have been issued, which allowed screening concentrations for soil to be derived for each substance, using the related CLEA computer model.

It should be noted that for a number of reasons (discussed in the full report), these values represent a very conservative threshold of risk. In practical terms, the SGVs represent a "safe" threshold, below which soils can be regarded as uncontaminated, and a marginal exceedance of the SGV for a particular substance in soil is unlikely to give rise to any measurable increase in risk to human health.

For these reasons and given the assumptions used in the CLEA model; where only slightly elevated concentrations of the identified contaminants were found in samples from the Florence Road allotments, it is considered unlikely that any measurable increase in risk to human health will result. By following the simple, common-sense precautions, detailed below, individual plot holders can reduce their exposure to contaminants in soil, to a significant extent, sufficient to control the possible increase in risk.

In certain samples however, substantially elevated concentrations of BaP, in particular, were found. If these concentrations are taken to be representative of the plot, then it is possible that an increase in risk to human health could exist, even with the use of the precautions below. That is not to say that ill-health is likely to result, merely that it cannot be discounted. For this reason, where substantially elevated concentrations of BaP, in particular, were found, it has been recommended that the affected plots be taken out of service.

Which Plots are Affected ?

Northern Allotment Area: Plot 6a, Plot 7b, Plot 9a

Western Allotment Area: Plot 26, Plot 28, Plot 29, Plot 30b, Plot 31a

Southern Allotment Area: Plot 35b, Plot 36, Plot 37b, Plot 39, Plot 40

Is there a Pattern to the Plots Affected ?

There does not appear to be a clear pattern to the distribution of samples with substantially elevated, as opposed to slightly elevated, concentrations. Given the inherently variable nature of the infill material, this is not unexpected.

Generally speaking, concentrations of the identified contaminants increase with depth (into the underlying waste material). It may therefore be the case that plots which have been "double-dug", show higher contaminant concentrations in the superficial soil, due to the greater soil mixing. It would therefore be prudent to avoid deep tillage of the soil if possible. Where clean soil/ compost has been imported to individual plots, it is likely that this will have improved the situation in the superficial soil.

Control Measures

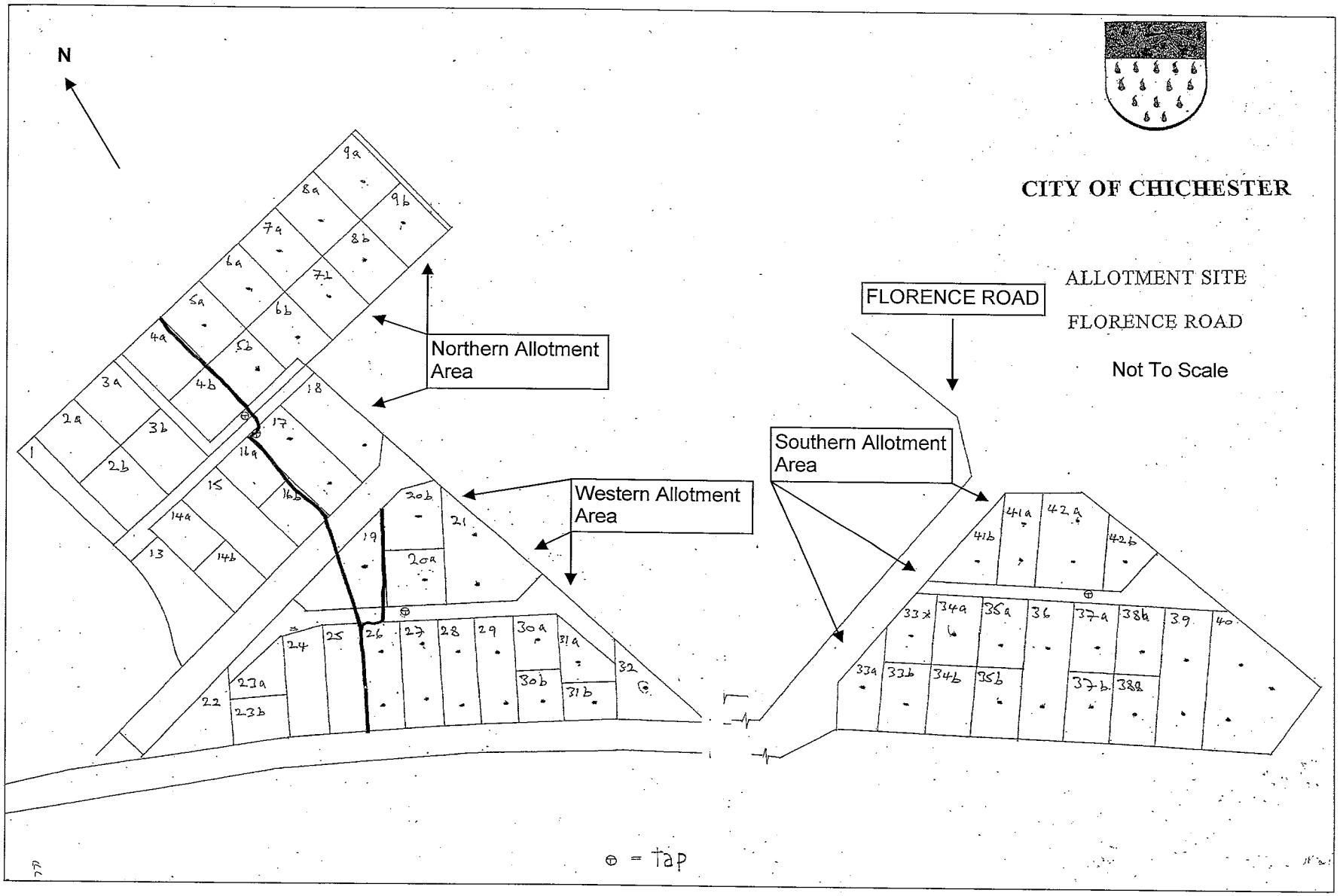
For the remainder of the site, good practices that are recommended to minimise potential risks from contamination include:-

- Keep separate boots / Wellingtons for work on the allotment and do not wear these around the home.
- Keep muddy tools on the allotment, or wash them before bringing them into the home.
- Before working on the allotment, cover any open cuts/ wounds thoroughly with a plaster.
- During work, wear gardening / work gloves, if possible.
- After work, and before eating, wash hands thoroughly to remove any mud, dirt or dust.
- Wash vegetable produce thoroughly to remove soil before preparation.
- If possible, peel vegetables during preparation.
- If young children are taken to the allotments, they should be discouraged from putting soil, or their hands, into their mouths. They should wash hands thoroughly after the visit, and before eating.

Plans

See attached.

## Allotment Site Plan denoting Indicative Sampling Locations



## Allotment Site Plan denoting Plots Recommended to be Taken out of Service