WISBECH CANAL ENVIRONMENTAL INVESTIGATION

DESKTOP STUDY SUMMARY

APRIL 2010

This report is a summary of the desk-top study that was carried out in relation to the environmental investigation of Wisbech Canal. A desk top summary is research of map, documents and previous reports relating to a site. This report outlines the site history, previous monitoring and site investigation, contamination and the scope of the investigation.

This report is a non-technical summary to provide an introduction into the research behind the environmental investigation.

Wisbech Canal Study Summary

CHAPTER 1. SITE HISTORY

The site which will be investigated is the former Wisbech canal. The canal was 5.25 miles long and extended from The River Nene at Wisbech to Outwell where it joined Well Creek and connected with the River Ouse at Salter's Load Sluice.

Because of the low level of the Fens, the canal was built on embankments for some of its length. The canal did not have its own water supply, but was refilled with water at each high tide. Figure 1 shows a diagram of the canal and its bridges and locks.

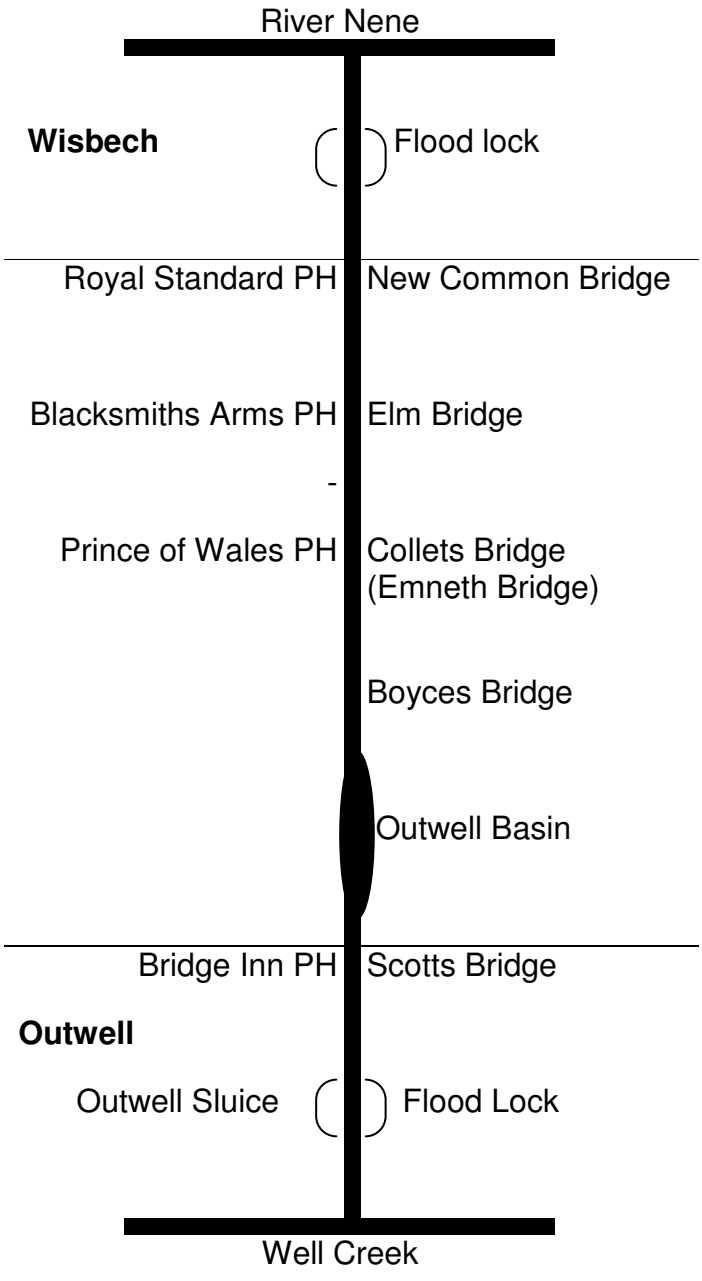


Figure 1: Diagram of the Wisbech Canal

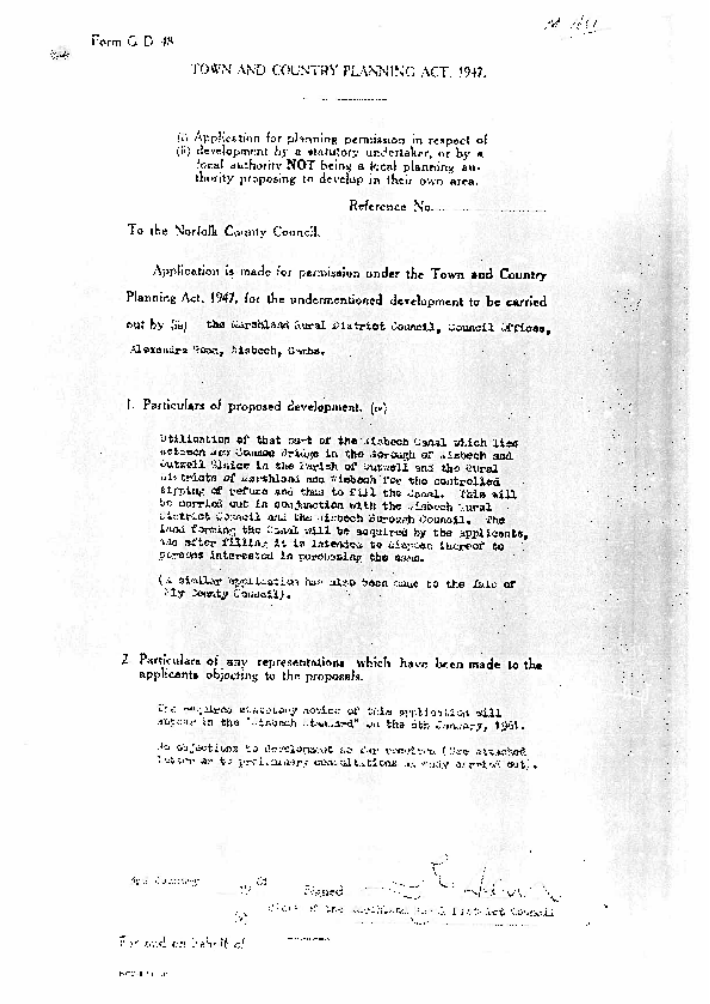
Figure 2: Outwell - Canal, Sluice, Well Creek and tramway in 1800s (Source William Smith)

The canal was authorised by an Act of Parliament in 1794 and opened in 1797. A tram line opened to Outwell on 20th August 1883. For a time the tramway helped the canal. The line followed the canal to Outwell Basin, where the first stopping point was. The canal widened at the basin so that barges could turn and moor. The canal carried coal for onward transport to the Fens on barges. The canal and tram also carried fruit back from the Fens.

The trams competed with the canal and traffic on the canal stopped in 1922. The canal was abandoned in 1926.

A letter on Marshland Rural District Council files dated 4 January 1961 provides reasons why the council wished to fill in the canal. The Clerk of the Council states that since the canal was abandoned it became unused by traffic, derelict and a nuisance.' The letter goes on to state that in 1944 the Wisbech Canal Corporation were granted powers to pipe and fill in a portion of the canal from the River Nene to New Common Bridge and a large section of this work has been carried out.'

Marshland Rural District Council reached agreement that the land from New Common Bridge to Outwell Sluice should be bought for filling with refuse.



Form G.D. 4B

TOWN AND COUNTRY PLANNING ACT, 1947.

(i) Application for planning permission in respect of (ii) development by a statutory undertaker, or by a local authority NOT being a local planning authority proposing to develop in their own area.

Reference No. ...

To the Norfolk County Council.

Application is made for permission under the Town and Country Planning Act, 1947, for the undermentioned development to be carried out by (a) the Marshland Rural District Council, Council Offices, Alexandra Road, Wisbech, Cambs.

1. Particulars of proposed development. (c)

Utilisation of that part of the Wisbech Canal which lies between Bevis Bridge in the Borough of Wisbech and Outwell Sluice in the Parish of Outwell and the Rural Districts of Marshland and Wisbech for the controlled tipping of refuse and thus to fill the Canal. This will be carried out in conjunction with the Wisbech Rural District Council and the Wisbech Borough Council. The land forming the Canal will be acquired by the applicants, and after filling it is intended to dispose thereof to persons interested in purchasing the same.

(A similar application has also been made to the Isle of Ely County Council).

2. Particulars of any representations which have been made to the applicants objecting to the proposals.

The required statutory notice of this application will appear in the "Wisbech Standard" on the 5th January, 1961.

No objections to development as per mention (See attached letter as to preliminary consultations already carried out).

Signed ...

(a) Insert name of the applicant Council

For and on behalf of ...

Norfolk County Council granted planning permission on 10th April 1961 for controlled tipping of refuse into the Wisbech Canal 'In the interests of visual and social amenities of the locality.'

Conditions were placed on planning permission including requirements to
tip in layers;
cover waste;
control fires and vermin;
tip from one side at a time;
not to raise the surface above adjoining land and
avoid pollution of watercourses.

A copy of the planning permission (M1661, 1961) and conditions is shown to the left.

Figure 3: Planning Permission

The landfill area is approximately four and a half miles long. Discussions with people who live locally suggest that the northernmost sections of the canal were filled with generally inert material such as soil. It is thought that domestic waste tipping may have been restricted to the sections of the canal to the south of Elm.

Wisbech and Fenland Museum report that the tipping was complete and the Wisbech Canal was finally blocked in the 1970's allowing parts of the A1101, Churchill Road into Wisbech to be built on the route of the canal.

A review of the old maps dated 1872 to 1999 was carried out as part of this research. These maps show previous land use and changes over time. Information on residential or commercial land use, natural water features and the many man-made water features can be seen on maps.

Figure 4: 1800 OS Map of Outwell Sluice

Remains of the old sluice are still visible at Outwell as this picture shows. A map extract is above showing the canal and tramway at Outwell in the 1800s.

Figure 5: Photo of remains of Outwell Sluice

CHAPTER 2. MONITORING AND SITE INVESTIGATION

Cambridge County Council and Norfolk County Council (NCC) took responsibility for the closed landfill as the Cambridgeshire and Norfolk border runs along the centre of the site. Norfolk County Council manages the land on behalf of both County Councils. As the waste can create ground gas such as methane and carbon dioxide (CO_2), NCC carries out monthly gas monitoring from 69 monitoring wells. The land falls in both West Norfolk and Fenland administrative areas.

Figure 6: photo of gas monitoring well

Monthly gas monitoring by NCC to the south of the A47 has shown carbon dioxide in several monitoring wells within the waste. Recently methane has been detected in two locations.

Norfolk County Council reports that the old canal immediately north of the A47, Wisbech bypass, was believed to be filled with soil and rubble.

In 1991 some holes were dug approximately three metres deep in this area. These showed soils, rubble and some timber. Gas wells were installed in the holes and the gas in the wells was measured four separate times. Monitoring was stopped when no methane was detected and only slightly elevated levels of carbon dioxide.

Where new buildings are proposed within 250m of the infilled canal both West Norfolk and Fenland Councils planning permission asks for a gas risk assessment. The presence of some gas has been reported and gas protection has been included in new buildings. However, the source of the gas has not been proved.

NCC have researched some areas of the infilled canal where it is proposed to sell the land to local residents. In these areas the land is used as amenity land, residential gardens or vegetable patches. Copies of the research were supplied to potential buyers.

Hand dug samples

As part of this investigation, soil samples were taken from four locations and submitted for laboratory analysis on 14th January 2010. This part of the investigation aimed to show what contaminants might be present in soil near the surface. Samples were collected at 0.2m and 0.5m below ground level. Where waste was present at the surface a sample was collected of the waste material.

Figure 7: Photo of disturbed waste

Table 1: Hand dug samples soil descriptions	
Location	Depth below ground and description
HA1 Elm open space	0.0-0.2m Brown clayey topsoil 0.2-0.5m Light brown soil with some brick, stone and ash fragments
HA2 Embankment south of Collets Bridge	0.0-0.2m Brown sandy clay with brick and flint fragments and some black plastic sacks 0.2-0.5m Becoming more sandy, orange brown with brick and numerous flint fragments
HA3 East of Outwell Basin	Land recently disturbed for underground service excavation 0.0m Waste on surface, fabric, clothing, shoes, bottles, plastic, detergent bottles, organic material and vegetation 0.2m Brown soil some glass and organic material 0.2-0.5m Buff sandy fill, some stones, obstruction at base
HA4 Adjacent to gas well 68 and former sluice	0.0-0.2m Very stony brown soil 0.2-0.5m Very stony brown soil with flints

Laboratory analysis suggested there were contaminants in the waste such as lead, oil or ash higher than would be expected in local soils.

CHAPTER 3. CONTAMINANTS, PATHWAYS AND RECEPTORS

The purpose of site inspection is to find if humans or other subjects such as buildings, crops or water could be harmed by contamination. Subjects that could be harmed are called 'receptors'. 'Pathways' is the word used to describe how contamination could travel to the receptor. Examples of pathways are people touching soil or movement of gas from the soil into a house.

To decide if there may be a risk to human health or other receptors it is necessary to find out:

1. What contaminants may be present;
2. Who or what (receptors) are present on the site or close by (humans, water, property);
3. What pathway the contaminant could travel along to reach the receptors

Contaminants

Information from the library and local archives, reports like the Department of the Environment Industry Profiles and research documents published by the Environment Agency were used to find out what contaminants might be found in the waste material and surrounding soil. A site walkover survey was carried out to look for evidence of the canal and fill materials.

Table 2 indicates some of the contaminants that research showed could be found in waste materials. As the waste rots it can produce methane gas or carbon dioxide gas.

Table 2: Sources of Contaminants

Source	Contaminants
Landfilled wastes	Oil/fuel hydrocarbons, Polyaromatic hydrocarbons, Chlorinated hydrocarbons, PCBs, Metals, Sulphate, Asbestos, Carbon Dioxide gas, Methane gas, Dioxins and Furans

The line of the canal could be seen clearly from the site walkover. Some areas of uneven ground indicate where the waste material has settled or where different soils were used to cap the waste. Uneven ground can also be a sign that some organic waste has rotted away underground.

Pathways

Local geology was studied to see if contaminants from the waste could travel in water or vapours from the landfill towards nearby receptors. The local geology consists of clay, which doesn't easily allow water or vapours to pass through. However, there are some Fen soils lying over the clay which could allow water or vapours to travel through the ground.

Receptors

Human Beings
People have cultivated gardens and vegetable areas on the site of the old canal and use the land for informal recreation such as dog walking. Construction, roadworks and grounds maintenance staff also have contact with the ground. So do workers who install or repair the water and sewage pipes. Some people also work in small businesses in the area.

Water
The water in the ground is not generally used as a source of drinking water. Water in drainage ditches may however be affected by the waste in the infilled canal

Property - Buildings
Although there are no buildings directly on the waste material, there are buildings surrounding the site and these are mostly houses with a few agricultural or trade buildings and outbuildings.

Property – Crops and Livestock
There are vegetable plots and gardens on parts of the infilled canal. Part of the site is rented for horse grazing. Close by the site there are domestic gardens, orchards, grazing and arable fields.

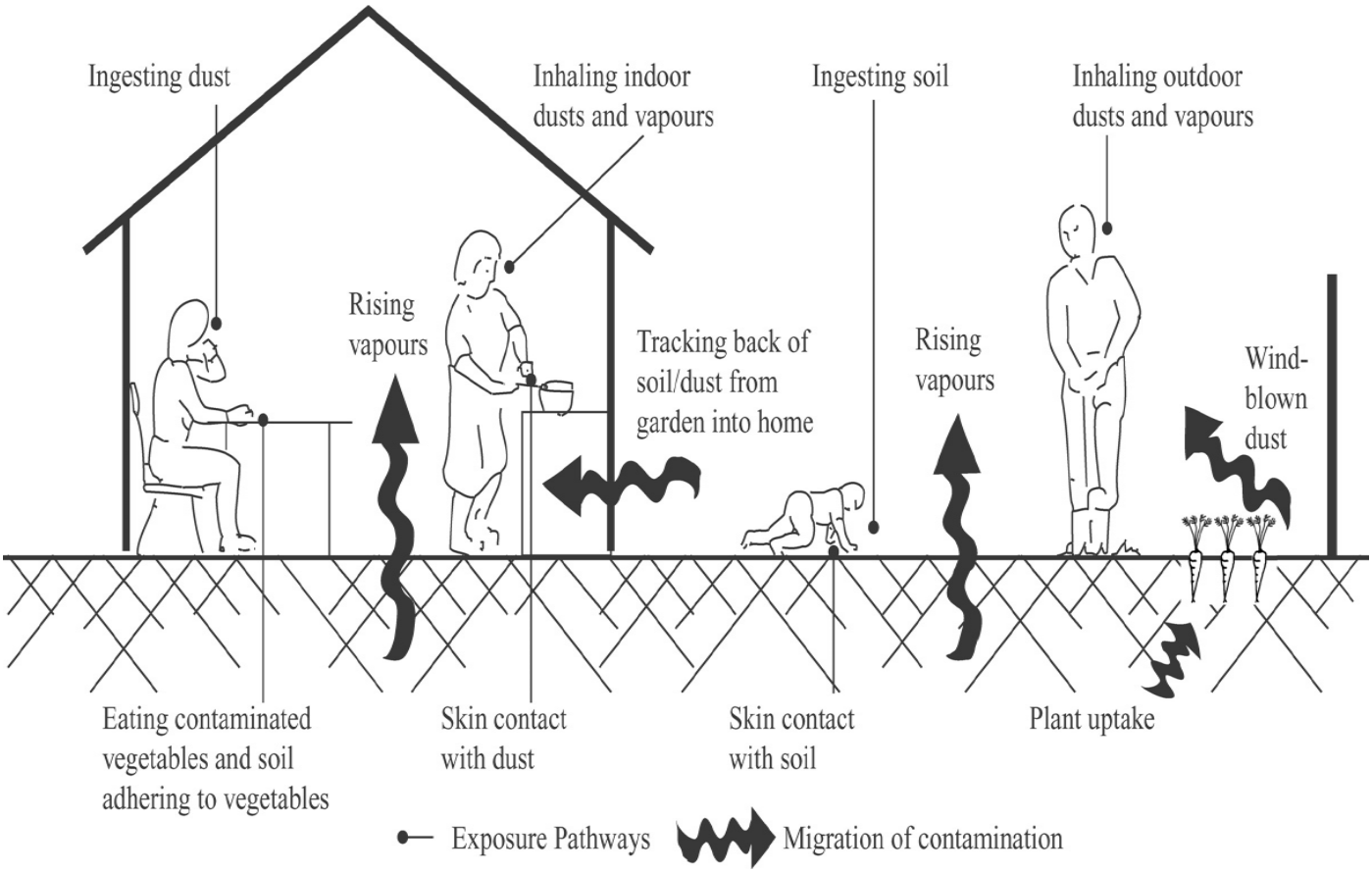


Figure 8. Illustration of contamination pathways

The picture above shows how people could be exposed to contamination from the infilled canal in their homes and gardens (the exposure pathways).

We know that some of the local ground is made of Fen soils and these allow water to move beneath the surface. This is a way that contamination could move out of the landfill and into water features such as ditches and ponds.

Buildings close to the landfill could be exposed to contaminants which have dissolved in water and moved away from the infilled canal.

The roots of arable crops and orchard fruit could also pick up contaminants which have travelled in water in the soil. Grazing animals could be exposed by contact with soil, by eating affected vegetation, or breathing in gas from the ground.

Because there could be a way for contamination to reach people, property or water more research is needed to find out what is in the waste and whether anything is moving out of the waste to receptors nearby.

CHAPTER 4. OUTLINE SCOPE OF WORKS

The desk top study has shown that historic uses of the site may have caused pollution. Knowledge learnt from monitoring and previous investigations has shown that some pollution is present and certain locations along the canal. The pollution may not be of any concern to many of the residents as there may be no pathway for the pollution to travel to them. At present monitoring has provided information regarding specific locations, although not about the canal as a whole.

The need for further investigation is to identify if pollution does exist and if there are any linkages of that pollution to any possible receptor.

To learn more about the site an environmental investigation will be undertaken. The investigation will be undertaken by an Environmental Consultant.

The investigation will include;

- Data Review;
    - the consultant will review all the information that both local authorities have identified and all previous monitoring.
- Site Investigation;
    - this will include a walkover of the site,
    - taking hand dug soil samples, taking samples of gases,
    - identifying any water course and considering water samples
- Climate Change Assessment
    - Work on old waste sites will look to see if decomposing materials can affect climate change.
- Risk Assessment
    - To see if there are any links between any pollution and people or land users
    - Identify if any links cause risks and the significance of those risks
    - To make recommendations for the future of the site.
    - To describe any work that could be undertaken to reduce or remove any risks.