



**Supplemental Phase I Site & limited Phase 2 Investigation: J.M.  
Strang's Filling Station, North Deeside Rd, Kincardine O'Neil,  
Aberdeenshire**

**Project no:** ESL1834  
**Version no:** 1  
**Status:** Draft  
**Date of Release:** 06/06/18  
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# 1. Introduction

## 1.1 Background

EnviroSurveying Ltd (ESL) was commissioned by Mr Alan Riach of Deeside Log Cabins (the clients) to undertake a Supplemental Phase I site investigation and limited Phase 2 investigation at the J.M. Strang's Filling Station on North Deeside Rd, Kincardine O'Neil, Aberdeenshire, in order to determine whether the land beneath the site has the potential to be contaminated.

We understand that the client is interested in potentially purchasing the site to re-develop it, and this investigation would be to provide reassurance that there is unlikely to be any major contamination issues caused by fuel leakage from the underground tanks, whilst not actually going to the expense of removing the tanks at this due diligence stage. We aim to provide an approach that can provide data which will be useful at a later stage for assessment by the Council during appraisal of a planning application for the site.

We are very familiar with the site, having included it in risk assessment of the adjacent housing development for Snowdrop developments in Ltd. However, while this involved gathering some information on the site it did not include a specific site visit around the structures on this filling station. The key aim is to determine whether contamination of the land has occurred from historic use as a garage and fuel station. We understand that there are two twin-compartment underground tanks on the site. One pair was installed in 1972 and one pair in 1989. There are 3 dispensing pumps. It is believed the tanks remain in place but may be empty or near empty.

In 2015 we installed 3 water monitoring boreholes along the grass verge to the rear of the filling station site, just over their fence and into the field south of the filling station. These were for the housing development and were to see if any migration of fuel from the tanks was picked up. These holes were to over 10m deep each and were into the natural groundwater. We did not encounter any indication of fuel migration/leakage. The Council accepted this as enough proof for the housing development that the tanks were not a risk. These boreholes might still be in existence and therefore could be used to get water samples now to assist a future development.

We therefore recommended the following approach:

- Carry out a limited Phase 1 desktop study to visit the site, take photographs and gain some more specific information from the owners. This would be used to supplement the existing Phase 1 study undertaken by Snowdrop Developments- the hope would be that permission could be gained to use that report as a supplemental to this site in the future.
- At the same time, install 2 boreholes to approx. 5mbgl south of the current fuel tank locations. These tanks lie east of the building on site, and boreholes would be placed in the nearest grass (believed to be around 5m south of the tanks). These would be drilled by a geotechnical rig operated by Northern Soil Surveys and used to both recover soil samples and be installed to allow later collection of water and gas sample, should these be needed. These will remain on the site at present.

- Submit selected soil samples to the labs for testing for common fuel related chemicals and assess these results against acceptable threshold concentrations for a commercial use for the site.
- Submit a Phase 2 contamination report to the client which could be later adapted slightly and submitted to the Council as part of the risk assessment for planning purposes.

ESL therefore recommend this process and believe it will also be requested by the Environmental Health Department, Aberdeenshire Council (the Council) due to their obligations under Part IIA of the Environment Protection Act 1990. Due to the fuel storage use the site may also require to be investigated under the Town and Country Planning Act (Scotland) 1997 in order to determine "material considerations" such as that defined by PAN33 (Development of Contaminated Land) and PAN51 (Planning and Environmental Protection). PAN33 places a duty upon the Local Authority to consider the potential for contamination during review of a planning application. The proposed investigation will also focus on determining whether there is a significant risk that the land at the site represents a risk to sensitive site receptors. This will ensure that the site is suitable for the intended purpose and that there is no "significant harm being caused or significant possibility of significant harm being caused" (SPOSH) as defined by Part II of the Environmental Protection Act after revision in 1995. This is not necessarily defined by an exceedance of guideline values which define the level of minimum risk rather than the unacceptable intake level.

Normally a site investigation plan (Phase II) will submitted to the Council for comment and agreement prior to being issued. This document sets out the objectives, scope, timescale and costs and of the proposed site investigation. In this case we are interpreting the most likely needs in advance for due diligence purposes. The Council will likely require a full Phase 1 desktop report, or the site-specific assessment in conjunction with the Phase 1 undertaken by Snowdrop Developments. This would go in hand with the results of this investigation.

The report would assess the site risk based on all information that can be gained without tank This report is to investigate whether potential contamination remains on the site from the previous use and whether this could pose a risk to the future residents.

## 1.2 Objectives

The specific objectives of the site investigation are as follows:

- to carry out a limited Phase 1 desktop study
- to specify investigative works for due diligence purposes;
- to carry out said intrusive works on site including borehole installation, sample collection, laboratory analysis and risk assessment;
- to present all the findings of the site investigation in a report for the client to advise on purchase

## 1.3 Scope

The following limited Phase 1 scope is proposed:

a site reconnaissance will be carried out to make visual observations of all potentially significant sources and pathways at the site, and to set the site in context with the surrounding area. Details of other features, such as structures, building fabric, electrical substations, drainage systems, chemical substances used, fuels, storage vessels and storage areas; condition of the floor slab, permeable and impermeable areas, waste generation and storage tanks, watercourses, etc, will also be recorded;

anecdotal evidence will be collected by undertaking interviews with former staff/site owners, where possible.

Once both the site reconnaissance and desk study review are complete, it will be possible to identify all likely sources, pathways and receptors at the site and any potential pollutant linkages. The significance of these pollutant linkages will be assessed by carrying out a preliminary risk assessment, and thereafter the overall risk to site receptors will be evaluated.

Phase 2 proposed scope of works will be as follows:

- Two boreholes installed on the grass around 5m from the tanks (to the south). Locations to be agreed on site. These will be installed with standpipe and gas taps to allow them to be used later for gas and groundwater testing should any indication of fuel leakage be confirmed.

- The pits will aim to go at least 5m deep (or into groundwater if earlier), depending on soil conditions, representative soils samples will be collected from at least five depths (, 0.5, 1.0, 2.0, 3.0,4.0, 5.0 and deepest achieved) within each pit. If visual or olfactory evidence of contamination is observed during the investigation additional samples may be collected;
- Two soil samples will be submitted from each pit for contamination testing. These are most likely to be from the deepest horizons and capillary fringe (if encountered) in order to test for fuel migration. These will be tested for heavy metals including organo-lead, TPH & BTEX, plus speciated PAH. This will allow for detection of both petrol and diesel. In addition, each sample tested will be submitted for pH and OM content to aid in risk assessment.
- In all cases the selection of samples and choice of testing will depend on ground conditions encountered.
- values will be compared to LQM CIEH S4UL values for commercial developments, or to SSAC generated using CLEA 1.071, if required
- appropriate limits of detection (where possible) will be used to allow comparison with screening criteria;
- all information collected from the intrusive site works, including photographs and trial pit logs, will be incorporated into a factual site investigation report. The report will also contain the updated desktop information from the site visit, qualitative risk assessment for human health impacts and an updated site conceptual risk assessment model.

## 1.4 Report Structure

The Original Phase I site investigation and this supplemental report were was carried out in accordance with BSi 10175, 2011, through a walkover visit and desk study. This document should be read in accordance with the Phase 1 desktop study for the adjacent land which wraps around 2 sides of this development, known as ESL 1474, assuming copyright permission is given by the owner, Snowdrop Developments Ltd.

## 2. Site location & description

Full details of the site situation, surrounds, history, geology etc are all given in ESL1474. The information below is a summary of that specific to this site.

The site is located in Kincardine O'Neil, on the S side of the main road through the village. Kincardine O'Neil is situated approximately 8½ miles W of Banchory on the A93. The site entrance is from North Deeside Rd on the edge of the village travelling W. The site consists of two rectangular shapes – 1 large and 1 small. The smaller part is the current filling station forecourt and building. This sits by the roadside. To the rear of this is a large grass covered area, which is planted with mature conifers on 3 sides. This rear area is hidden from view on all sides and is very private.

The garage forecourt area opened in 1973, with the current owners John & Margaret Strang moving their business there from premises further along the Main Street which they opened in 1956. They are currently in their 80's and recently took the decision to stop operating the filling station and close that business (March 2018). They still operate a small haulage and tipper lorry business with their son and daughter-in-law and use the fuel tanks for their vehicles only at this time.

The filling station has four underground fuel tanks. These comprise two pairs of twin-tanks. One pair was installed in 1972 and a second pair was installed in 1989. As the life-span of an underground tank is usually assumed to safely be 25 years these tanks are both beyond that, although those installed in 1989 are close to this precautionary age limit. This does not mean that they are however definitely leaking.

The tanks were examined on site and were labelled as follows:

- Tank 1 – closest to Eastern boundary with bowling club. Tank top set 0.5m below yard surface. Labelled as 9000L of diesel.
- Tank 2 – the other half of the pair with Tank 1. Labelled as 13,600L of Unleaded Petrol.
- Tank 3 – This is the first half of the second twin tank. It is also labelled as holding 13,600L of Diesel but originally held Unleaded petrol when first licenced.
- Tank 4 – this is the second half of the pair with Tank 3 and is labelled as being for 9000L of diesel.

At this time, it is believed that the tanks are largely empty but that some diesel remains for the use by their haulage vehicles. It is not known which tank this remains in. It should be assumed that all tanks have the potential to contain some fuel at this time, as a tank is rarely fully empty unless professionally cleaned.

With the known volumes, length, and the fact the tanks are set 0.5m below the current finished site level a calculation of their likely depth was made. Based on a total volume per twin tank of 22,600litres, and the measured tank length of 4m, this allows for a surface area of 5.65m<sup>2</sup> on

the tank end (allowing for a circular tank). The tank radius of 1.34m, and therefore a diameter of 2.7m. This would mean the base of the tank was at 3.2m below the current finished site level.

In our experience these twin tanks are usually a long cylindrical shape, with an internal dividing wall to split them into two compartments. Each compartment has an access hatch on the surface for filling. Escape of fuels from these tanks can occur from tank failure, where the metal becomes perforated and fuels seep slowly into the soils around and below the tank, however fuel release can also occur during filling, if supervision is not strict an occasional over-fill can occur which leads to fuel running around the outside of the tank and collecting below the tank.

As well as the tank inspection the remainder of the site was inspected for potential contamination risks. There is a single storey rectangular building on site. This is made from concrete block and render, with a concrete tile roof. This is mainly used for the shop area but there is a very small single car workshop at the west end, with an inspection pit. A doorway here leads through to a storage room. In the workshop area there was no sign of staining on the concrete floor and no noted storage of new or waste oil. The inspection pit was boarded over so the base could not be seen.

Outside the building the whole forecourt area was covered in tarmac or concrete and was very tidy. It has clearly been well maintained and is notable for the attention to the landscaping, which indicates careful owners. There are 3 fuel dispensing pumps. These are centrally located. The owner's son confirmed there is no interceptor on site to collect any fuel in surface water run-off, as the filling station was too small to require one in accordance with the petroleum station regulations. Surface water collects through normal drains and enters the public drain on the adjacent road.

There is a line of mature trees marking the boundary between the forecourt and the grassy area behind. A tall double wooden gate allows access through to this rear area. These extend as a wooden fence to the boundary with the bowling green and the owners confirmed the tanks do not extend beyond this fence line. The owners asked the landowner to sell them some land to allow driveable access behind the garage building. The surveyor for the landowner came and offered to sell them this much larger area so that the boundaries aligned neatly with the adjacent bowling club. This large area is all grass and is surrounded by mature Leylandii which Mr & Mrs Strang planted themselves. They confirmed they had never farmed this area, never used is for business purposes or even grazing, they just cut the grass annually and sold it to a local horse owner.

The land to the east side of the village bowling club. The surrounding land to the south and west was farmland until very recently when new housing commenced, built by Snowdrop developments. The village of Kincardine O'Neil is a very picturesque village and is mainly older traditional properties.

There are no concerns regarding contamination sources from the surrounding land.



## 2.1 Summary of relevant information from the 2015 Phase 1 for the adjacent site

- There are not known to be any underground structures at the site other than the 4 fuel tanks and the inspection pit in the small workshop
- The site is believed to be connected to the foul and surface water public drains, and to have an existing water and electricity connection. To be confirmed with all service providers.
- It is not thought that any waste was stored on site.
- The site will hold current fuel storage licences with Trading Standards at Aberdeen City Council. These are required for petroleum storage but not diesel storage. These may have been surrendered already or be in the process of surrender. Below is an extract from the licence database:

### 1) Petroleum Storage Details:

#### J & M STRANGS FILLING STATION

\*\* DATA EXTRACTED FROM GRC DBASE SYSTEM (PETLIC)

NUMBER OF LITRES LICENCED TO STORE: 36370

FIRE EXTINGUISHERS: 2 DRY SAND: 2

TANK CAPACITY DATE TYPE

1	9100	19721116	US
2	13640	19721116	US
3	13640	19891116	US
4	9100	19891116	DER

SUBSTANCE MAXIMUM QTY

D 9100

STORAGE METHOD LITRES

UNDERGROUND TANKS 36370

METHOD: UNDERGROUND TANKS

16/ 8/2007 15:10 EF Tank No 3 changed from petrol to diesel.

As the premises is still operational details of installation are held by Consumer Protection.

Kincardine O'Neil Filling Station (no longer in use)

Copy of Petroleum Record attached.

<https://mail.google.com/mail/u/0/?ui=2&ik=f11b87ba6f8&view=pt&search=inbox&th=14de7e8e1a3c0bc&siml=14de7e8e1a3c0bc>

1/3

- The superficial geology below the site is thought to be largely undifferentiated river Terrace Deposits of Clay, Silt, Sand and Gravel which has very variable permeability from very low to very high due to the granular nature of the material. The bedrock underlying the site is of Queen's Hill Formation of Semipelite, Psammite and Pelite Rock Type. This solid geology is thought to contain concealed aquifers of limited potential, regions without significant groundwater, from regions underlain by impermeable rocks, generally without groundwater except at shallow depth. The permeability of this solid layer is low and is of the fracture type. There are no records of landslips,
- The nearest main moving bodies of water are the River Dee, which flows W to E around 320m S of the site and the Neil Burn, which passes the site about 300m E, flowing S into the Dee.
- The underlying superficial geology of the site is thought to contain concealed aquifers of limited potential without groundwater except at shallow depth. There are no BGS boreholes within 250m of the site.
- The site is believed to be within a radon gas area where the estimated probability of a property being above the Radon action level is between 5% and 10%
- The 2015 searches showed a low risk of running sand and a moderate-high risk of compressible deposits. The Geology report stated:

“Significant potential for compressibility problems. Do not drain, load or de-water ground near the property without technical advice. For new build, consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property, possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.”

### 3. Site History

A full historical map review was carried out for the 2015 Phase 1 desktop area and included this site as an immediate neighbour. The earliest site map available was 1867. The JM Strang's site was shown as open farmland until 1972 when the filling station was built. The initial layout is the same as it is today. There were no other significant changes to the surrounding land which remained farmland until the new housing development began, with old established housing and the bowling green as the only other neighbours.

Additional web searches have been carried out to gain a fuller picture of the site history. The search terms used were "Kincardine O'Neil", "JM Strang, The Garage, Kincardine O'Neil", as well as geographic location searches.

Searches were made of the following locations:

**Google** – Brought up the Kincardine O'Neil Community Action Plan, containing, among other things, a brief history of the village ([www.kincardineoneil.co.uk](http://www.kincardineoneil.co.uk)). There are several pages of references to Kincardine O'Neil, ranging from Wikipedia to the Tourist Board, but nothing specifically relevant to this report.

**Royal Commission on Ancient & Historical Monuments (RCAHMS)** – site known as St Erchard's Well, Canmore ID 35252, as well as 51 others in and around the village but none on the site.

**Scotland's Places** – There are 5 records relating to Kincardine O'Neil, but none to the actual site. They include aerial photos and information and photos of the toll houses.

**PastMap.org** – nothing relevant

**Scottish Places** - no further information about the site; plenty about Kincardine O'Neil the village and the parish.

**NRS** – has 'Banchory-Ternan Kirk Session: Scroll minutes of the presbytery of **Kincardine O'Neil**, 1821 – 1825, Ref CH2/28/15'; also, various church and/or presbytery records going back to 1700; distillery discharge Records dating to the 1820s; and other records too many to mention, including Depositions, Estate Plans, Architects Plans, Railway Plans, Evidence in Trials, Charters, to name but a few, dating back as far as 1325.

**Geolocation** – no further information

**SCRAN** – has 28 aerial photos of Kincardine O'Neil, as well as photos and maps

**Derelict Places** - no further information

**Old-maps** - no further maps not already obtained

**Geograph** – there are well over a hundred photos of Kincardine O'Neil but are mostly quite recent.

## 4. Conceptual site model

### 4.1 Sources

There are currently 4 underground fuel tanks, installed in 1972 and 1989. The owner reports no issues known with regards to leakage or spillage. There always remains a potential risk of underground fuel seepage from the older tanks. It can be hypothesised that any underground flow would be south east due to the topography and the flow direction of the River Dee. If fuel was leaking to the ground then this would contribute hydrocarbons and metals primarily to the soil. The site also has a small garage workshop with an inspection pit. These are often used for jobs such as oil changes and there is a potential risk for seepage from the base of the inspection pit, depending on the nature of the pit and whether it has a porous floor or a drain

Radon gas has been deemed a potential risk in this area and the design of all new buildings will need to take protection measures into account.

There are no other likely sources known to exist on or near the site.

### 4.2 Pathways

Given the objectives of the site assessment, pathways that impacted upon human and ecological receptors (e.g. groundwater) are considered. Therefore, the main pathways hypothesised were:

- migration of contaminants within the soil at the site to sensitive site receptors via inhalation of dust
- migration of contaminants within the soil at the site to sensitive site receptors via inhalation of vapour
- migration of contaminants within the soil at the site to sensitive site receptors via ingestion of soil
- migration of contaminants within the soil at the site to sensitive site receptors via dermal contact with soil;
- migration of contaminants from the site to the groundwater via the soil; and
- migration of contaminated groundwater to and/or from receptors outside the site boundary
- Migration of contaminated groundwater into private water supplies or affecting water supply pipes
- Direct contact with buildings

### 4.3 Receptors

For the site assessment, the receptors being considered are:

- sensitive site receptors (human residents, visitors and site workers);
- Water bodies (groundwater, drinking water, surface water indirectly).
- Future buildings

### 4.4 Initial qualitative risk assessment

The sources, pathways and receptors identified above can now be qualitatively risk assessed: the assessment is presented in Table 1.

**Potential risk severity:** 1 = Minor; 2 = Mild; 3 = Medium; 4 = Severe

**Probability:** 1 = unlikely; 2 = low likelihood; 3 = likely; 4 = High likelihood

**Table 1** - Initial qualitative risk assessment for J.M. Strang's Filling Station, North Deeside Rd, Kincardine O'Neil

Area	Source: contaminants	Pathway(s)	Receptor(s)	Potential Consequence	Potential Probability	Potential Risk severity	Assessment
<b>Most recent &amp; only known site use</b>							
Fuel storage & garage activities	TPH, PAH, heavy metals	Through soil (Inhalation, ingestion,)	Human	ill health	Low likelihood/unlikely	medium	The tanks are/were recently actively licensed via Consumer Protection and therefore it has to be assumed any concerns via fuel leakage would be addressed via their system of monitoring. However, two of these tanks were installed in 1973 and are therefore 42 years old, which is longer than an advisory usable lifetime. It is possible they could be leaking small quantities of fuel into the ground. This cannot be confirmed absolutely until the tanks are decommissioned and removed, however investigations of adjacent ground could indicate leakage. In addition, boreholes installed on the site boundary in 2015 may provide addition information.
		groundwater migration	Groundwater	contamination of groundwater	Low likelihood/unlikely	low	
		Soil or GW migration	Human	Contamination of soil	Low likelihood	medium	
Radon gas	radon	inhalation	Human	Ill health	5-10%	Medium-severe	This area has been assessed by HPA as having a 5-10% risk of potential impact by radon gas and therefore protection measures will need to be considered.

## 5. Summary of Phase 1 investigations

A Supplementary Phase I site investigation was carried out on the J.M. Strang's Filling Station site in order to aid the client in the decision-making process for purchase and re-development of the site. A full detailed Phase 1 desktop study and Phase 2 site investigation were carried out in 2014/15 for the adjacent Snowdrop Developments Ltd housing which wraps around this site. These reports should be read in conjunction with this report, and if permission is granted, this 2015 report should be used alongside this 2018 report for full risk assessment by the Council for planning appraisal. The relevant parts of the intrusive investigation for Snowdrop Developments Ltd included the installation of 2 deep (10m) boreholes along the boundary fence with JM Strang's in order to assess the potential for fuel migration from underground fuel tanks to affect the planned housing development for this field. Soil samples were collected from these boreholes and analysed for common chemicals associated with diesel and petrol, but none were found. There was no odour or staining at any depth in these soil columns. These boreholes were installed with standpipe in order that they could be potentially used later for gas and groundwater monitoring should any doubt on ground condition remain. Each borehole was installed into the groundwater, as this would be the most likely pathway for fuel to migrate a distance. No sheen or odour was noted from the groundwater. Aberdeenshire Council were content that all reasonable efforts had been made to assess the potential risk of fuel leakage to that development, and that the information provided did not show any evidence of this having occurred.

The JM Strang's site has 4 underground fuel tanks dating from 29 to 45 years old. The site appears to have been very well maintained by the same owners since the time of opening 45 years ago. There is always however a possibility that fuel has seeped from the tanks into the ground below. In this case, the geology of the site was known, both from British Geological Society records and also from the experience of borehole drilling at the boundary of the site in 2015. The ground was known to be sands and gravels, with groundwater around 9-10m deep. In discussion with the client, the key focus at this stage was to achieve a reasonable certainty that the tanks were in good condition, without actually going to the expense of removing them. This was for Due Diligence in deciding whether to purchase the site. Discussions were had regarding the merits of digging trial pits behind the tanks versus using a Cable percussion drilling rig to gain deeper soil samples. The original boreholes were installed by rotary rig but this can be prohibitively expensive at this stage, and the client needed to act quickly to gain reassurance on site condition. The aim was to gain soil samples from below the tank base depth. The concern with trial pitting to this depth is that the ground can be loose and not stand open to that depth and can leave a larger disruption to the site. The decision was made use a drilling rig at 2 locations to the down-stream side of the underground tanks to attempt to gain soil samples for examination and potentially lab testing.

Our recommendation was also that in the long-term a further investigation would be needed at the time of tank removal to fully confirm whether any impact on the ground below the tanks had occurred. However, at this stage an investigation near the tanks would provide some reassurance/information.

## 6. Intrusive site works

On Tue 21<sup>st</sup> May 2018 an engineer from ESL and a geotechnical engineer from Northern Soil Surveys (NSS) attended the site. Following a site walkover and information gathering phase, two locations were chosen to drill boreholes for the purposes of collecting soils to assess potential tank leakage. The south boundary of the underground tanks is marked by a 5ft wooden fence. Immediately to the rear of this is a line of tall and wide Leylandii trees. Therefore, the closest we could drill was 5m from the fence line/tank edge. This was also a suitable safety distance to avoid disturbance of the tanks. The breather pipes for the tanks are attached to this fence.

NSS used a tracked Cable percussion rig to drill boreholes in the ground. Service clearance was first undertaken and the locations were not hand dug as there were no services in the area and the ground was thought to be topsoil over natural sands and gravels. No previous disturbance was known. The first location was to the rear of Tank 1 and Tank 2. This was 3m from the E boundary fence and 5m from the wooden fence by the tanks. The initial 0-1m core was brought to the surface easily and contained 0.4m cover of topsoil, with gravelly sand below this. The second section from 1-2m however produced a notable change. The 1-1.3m section proceeded quickly and then the drilling rig slowed progress. After quite some time it was decided that there was likely to be a boulder here and it was large enough to prevent the rig breaking through it. The drill was abandoned and the rig then re-positioned 1m W of this. The same process occurred – good progress to 1.3m and then failure to progress thereafter. Recovery of the cutting length to the surface showed that there was pink granite in the cutting shoe of the drill core, and this had actually cracked the substantial steel cutting shoe on the drill core.

This location was therefore also abandoned and the drilling rig moved to the rear of Tank 3 /Tank 4. Again, it was 5m from the fence line and mid-way between tank 3 and tank 4. The same response from the drilling rig occurred. The rig was again moved over to try a re-drill and the same occurred. It was now 6.30pm and it was concluded that the presence of pink granite cobbles or boulders in the sands and gravels was preventing drilling progress and we reluctantly abandoned this operation.

The following day we discussed the situation with the client and agreed to return to the original trial pitting approach. The client arranged a suitable tracked excavator which had the reach to obtain 4.5m below the current ground level. The excavator dug a long narrow trench parallel to the treeline, and in the same 5m line as the attempted boreholes. Please see the photos in the Appendices. This trench stood open and 4.5m depth was obtained and recorded. The arisings were brought to the surface and carefully checked for odour or staining. There was no indication of any impact on these materials. There was no water ingress into the hole either. As a result no samples were sent for lab analysis.

This trench gives a good indication that the likelihood of fuel migration from the tanks is low. There are no guarantees in such a situation, and the client is aware that only at the stage of tank



removal will this be clear, but for Due Diligence purposes this strongly indicates that the surrounding soils may not be impacted.

During the drilling works we also attempted to examine the 2 deep boreholes placed on the boundary line of the JM Strang's site in 2015. The intention was to bring up a groundwater sample from the base of each borehole for examination for odour and sheen, and potentially lab testing if there was any suspicion of fuel. However, on visiting the site it was found that this boundary is now covered by the portacabins, storage unit and welfare facilities for the construction staff working on this housing. This includes temporary installation of services for the welfare units. The boreholes could not be located and are assumed to either be under a cabin or potentially damaged.

## 7. Conclusions & Recommendations

A detailed Phase 1 desktop investigation from this site and the adjacent site concludes the main risks of contamination at this site are:

- Fuel leakage/seepage from the belowground fuel tanks
- Potential oil/fuel escape from the base of the inspection pit in the small workshop

The results of physical investigations are:

- An investigation in the adjacent site in 2015 found no traceable impact from fuels on the groundwater which is anticipated to migrate from the fuel station towards the River Dee.
- A deep trench dug along the full length of the tanks, to 4.5m depth and therefore 1.3m deeper than the expected tank bases, showed no indication of fuel impact.

Recommendations for the client are as follows, should they decide to purchase this site and proceed with a re-development:

- Arrange for a reputable company (such as Taylors Industrial Services or Adler & Allan) to decommission each of the tanks by removing any fuel in them, blowing all fuel supply lines clear, cleaning the tanks and providing a gas certificate to confirm they are safe to remove. This should be arranged in tandem with an excavator to extract the tanks from the ground, a disposal method for the tanks, and an environmental consultant on site to photograph the tanks, inspect them and inspect the void in the ground. Soil sampling from the void may be required if there is an indication of fuel leakage and this should be immediate rather than from holes left open for a period of time. This will provide independent verification of the tank condition. This can then be reported to add to the existing body of information.
- Provision of this report to the Council and secure permission if possible to use the existing 2015 Phase 1 from the adjacent Snowdrop Development site.
- Following demolition of the building a visual inspection of the ground below the inspection pit should be made. If there are any signs of impact by fuels and oils here then advice should be sought from an environmental consultant.
- Similarly, during groundworks should any leakage of oils/fuels be noted from the drains or in any ground exposed then advice should be sought on the appropriate way to deal with this.

- As the site is brownfield land, a soil investigation will be required as part of any application made to Scottish Water for a potable water connection. This has to be done to UKWIR standard. ESL are able to undertake these and can advise here. A provisional site layout is needed to ensure appropriate testing on the planned pipe routes takes place.
- It is always advised that early contact with the contaminated land officers at Aberdeenshire Council is made, when development proposals are being formed, to confirm that their requirements are. This ensures no bottle neck in the planning assessment costs.

## 8. References

**BGS/SEPA, 2004b**, Bedrock Aquifer map, [http://www.sepa.org.uk/pdf/groundwater/tools/bedrock\\_aquifers.pdf](http://www.sepa.org.uk/pdf/groundwater/tools/bedrock_aquifers.pdf).

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**BSi, 2011**, BS10175:2011, Investigation of potentially contaminated sites: Code of practice, British Standards Institute (BSI).

**CIRIA, 2001**, Contaminated Land Risk Assessment, A guide to good practice. Publication C552, 2001.

**BGS** 1:50,000 classification sheets.

**Radon search by postcode**, 2013, Public Health England

## 9. Disclaimer

EnviroSurveying Ltd has prepared this report for the sole use of the Clients, in accordance with generally accepted consulting practice and for the intended purpose as stated in the related contract agreement. No other warranty, expressed or implied, is made as to the professional advice included in this report.

To the best of our knowledge, information contained in this report is accurate at the date of issue; however subsurface conditions including contamination concentrations may vary spatially and with time. It should be noted, however, that this report is based on information obtained from the site investigation works. There may be conditions pertaining at the site not disclosed by these investigations, which might have a bearing on the recommendations provided if such conditions were known.

It is important that these implications be clearly recognized when the findings of this study are being interpreted.

# APPENDICES

**APPENDIX A – Site photos from 2018 Phase 1 walkover**

Filling Station site by the roadside and is very well maintained.



View from E boundary looking towards W, tanks out of sight to L

The grounds are all landscaped with no signs of plants being stunted



Three fuel dispensing pumps on the forecourt with no sign of staining



In the only building there is a shop with a storeroom to the rear



Wooden gates attach to side of shop, rear of shop seen here



There is a small single car workshop by the shop with an inspection pit in the floor



Behind the shop/workshop is a greenhouse but otherwise open space





View from NW corner of green space behind the forecourt, looking W



Small parking area just inside the wooden gates where owners leaves their cars



The bulk of the site is a large green space. The boreholes installed in 2015 are just beyond this hedge.



UG tanks are located on E side of Forecourt – 4 covers



Breather pipe attached to rear of fence

Tanks in relation to wooden gate to rear of the site



Drilling rig on first location



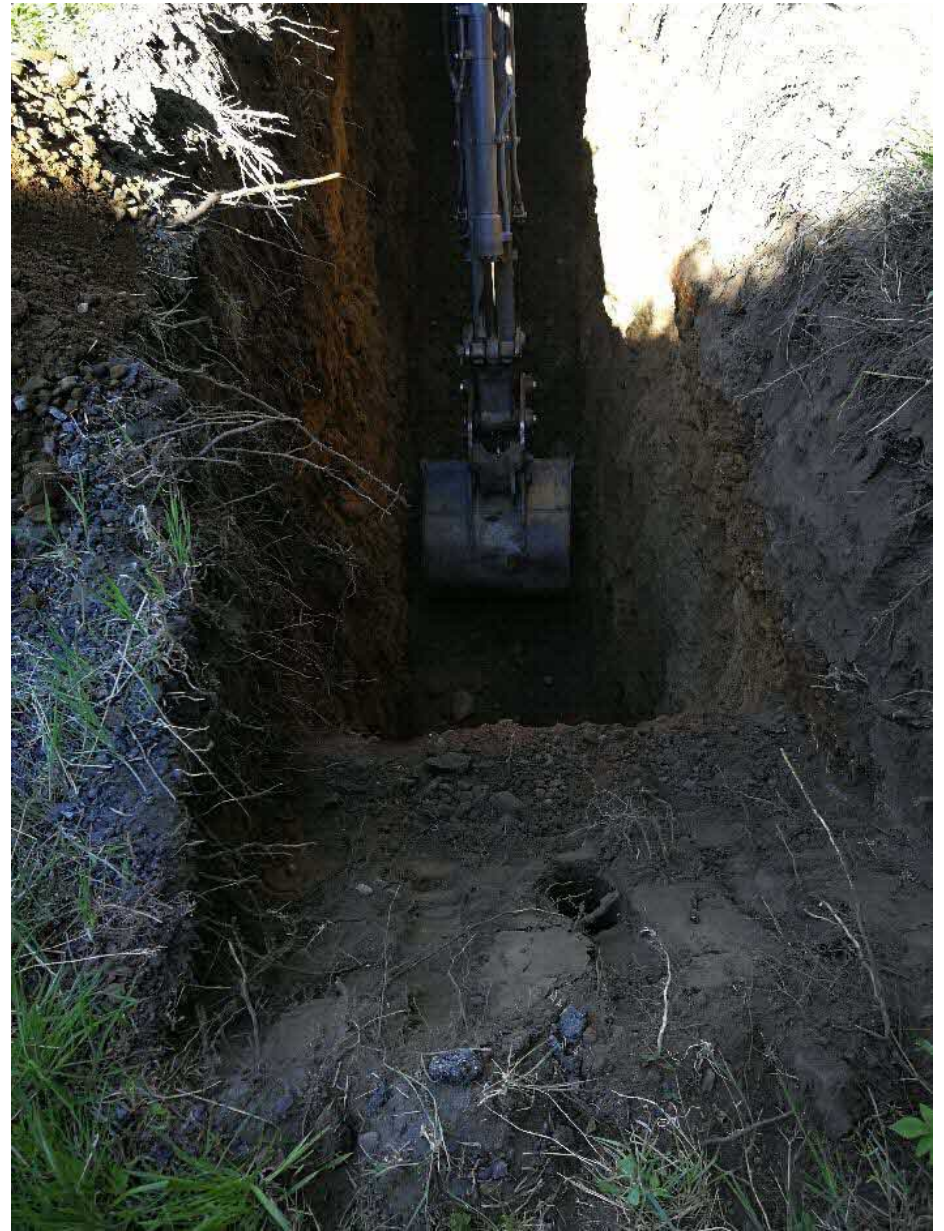
Drill cutting shoes cracked on pink granite – seen in drill casing and after extraction.



Drill arisings – 2 attempts for Borehole one laid out on ground – from L to R : 1 to 1.4m, 0-1.0m, repeat for second attempt. Plus close up of coarse sand with rock fragments frequent



Trench dug along same line as boreholes. Dug to 4.5mbgl- which should be 1.3m below tank base. All arisings clean



Confirmation of location and sandy gravelly nature of arisings, several cobbles seen. In 2015 the borehole records also indicate large rocks present.



Location of 2015 boreholes on the other side of the hedge



Western boundary of site seen from other side of the hedge in new housing area



**APPENDIX B** – Site location plan. Extracted from Roundhouse Architecture planning drawing for the Snowdrop Development Ltd planning application in 2014. The red boundary shows their site and the green boundary line shows the JM Strang’s site under consideration here.

