

## **Chapter 2. Characteristics of the Isle of Wight**

This section of the Strategy provides the reader with some background to the island and an explanation of how this influences the Council's particular approach to inspection for contaminated land. It will also enable fair comparison with other authorities.

### **2.1 Geographical location**

The Isle of Wight is England's largest offshore island. It lies in the English Channel, about halfway along the south coast, opposite Hampshire. The island is separated from the mainland by as little as a mile. Its northern shores are bordered by the waters of the Solent and its southern shores are bound by the English Channel (see Figure 2). The island is connected to the mainland by car ferry services and faster catamarans and hovercraft for passengers only. The car ferries are connected to the mainland ports of Lymington, Southampton and Portsmouth. The main ferry terminals at Southampton and Portsmouth are connected to London by fast rail and road links. The journey time from London to the island can be as little as two hours.

**Figure 2 Location of the Isle of Wight**



The car ferries from Lymington to Yarmouth and from Portsmouth to Fishbourne take approximately 35 minutes. The crossing from Southampton to Cowes is the longest, taking 55 minutes by car ferry and 25 minutes by high speed passenger ferry. The passenger only services from Portsmouth (by catamaran) and Southsea (by hovercraft) take 15 minutes and 9 minutes respectively. All the cross Solent services run regularly during the day with intervals of between 30 and 60 minutes between sailings. The Portsmouth to Fishbourne car ferry operates a twenty-four hour service.

The London Airports of Heathrow and Gatwick are both approximately ninety minutes drive from the ferry terminals. Travellers from Europe can fly direct to Southampton airport which is about twenty minutes by road from Southampton ferry terminal (see Figure 3).

**Figure 3 Map of the Isle of Wight in its regional setting**



## **2.2 Brief description/history**

The island is roughly diamond shaped (see Figure 4) and extends thirteen miles north to south and 23 miles east to west covering an area of 381km<sup>2</sup> (38,100Ha). Whilst it is amongst the smallest counties in England, it forms one of the larger unitary authorities.

Over the centuries, the island's strategic, defensive and trading position has meant a succession of invasions and settlements since 1900 BC. The presence of settlements on the island over such a long period of time has left its mark on the towns, villages and landscape.

The island is rural in character with a resident population of 125,466 (Municipal Year Book, 2000) spread over a large area. The population resides in a number of small towns and villages. The island's only significant inland population is the capital town, Newport, which acts as the island's principle retail and administrative centre, with a population of approximately 23,000. The other urban centres, Ryde (the largest town), Cowes, Sandown/Shanklin and Ventnor, are situated on the coast and range in size from approximately 7,000 to 23,000.

The population of the island has been growing steadily since the war. The demographic structure of the population is aging, with a high proportion of elderly and retired people. Death rates constantly exceed birth rates on the island so the maintenance of the population is dependant on net in-migration. Most inward migrants are of retirement age. There are few quality jobs on the Island and the wage rate is low. The relative lack of commuting to and from

the island has led to lower wages on the island than on the mainland, which encourage young island folk to leave.

**Figure 4 Map of the Isle of Wight**



As an island, the county is disadvantaged economically and suffers from relatively high unemployment and low levels of investment. This is in part due to high cross-Solent transport costs and more difficult access, which creates a disincentive for companies to locate here.

The island's economy relies on three main sources of income: agriculture and horticulture, tourism and light industry. The manufacturing sector is in decline, having traditionally been dependant on shipbuilding and repair industries that suffered the effects of the early 1990s recession. These more traditional industries have made way for modern high technology, aerospace, electronics, plastics and marine engineering. World renowned companies such as British Aerospace Defence Systems, GKN Westland Aerospace, Siemens and Britten-Norman take advantage of the security on the Island, which allows sensitive businesses to operate with ease. There is also a flourishing maritime industry, including fast ferry builders, FBM Marine and other companies such as software producers Marex and circuit-board and wind turbine manufacturers. The Island also has an association with land-speed records. Thrust II and Bluebird were designed and built on the Island at Wootton Creek and East Cowes.

The Victorians were the first to realise the potential the island had for becoming a popular holiday destination. The island has a consistently warmer and sunnier climate than the English mainland. The average temperature in January is 5°C and 17°C in July. The average annual rainfall is approximately 760mm.

Another of the island's attractions is the varied landscape. More than half the island has been designated as an Area of Outstanding Natural Beauty (AONB). The island has over 60 miles of coastline, comprising golden beaches, spectacular cliffs and the famous chalk "needles". The island's main topographical feature is a chalk ridge that runs east to west through the centre of the island. The chalk ridge is cut by the valleys of the River Medina and the two rivers Yar. The highest point on the island is at St Boniface Down, near Ventnor, which reaches 241 metres AOD. The landscape is enhanced by picturesque villages and market towns. The Island's resident population more than doubles during the busy, but relatively short, summer holiday season from June to September.

Approximately 75% of the island's area is in agricultural use. Of this, roughly 46% is tillage, 46% pasture and 8% rough grazing (Vectis Report, 1980 & Wildlife of IOW, 2000). The north of the island is dominated by dairy farms. The heavy soils there are best suited to the growing of grass. The central chalk downs are better drained than the soils to the north. Traditionally this area has been grazed, though an increasing area is coming under the plough. The southern half of the island is of higher-grade agricultural land. The rolling hills and valleys are covered by light, friable soils that afford some of the best arable land on the island. The Arreton Valley also supports the horticulture and glasshouse industry. In addition to agriculture, a substantial proportion of the island is covered by woodland (8.5%). This is mainly situated in the northern half of the island.

### **2.3 Details of Council owned land**

The Council has substantial holdings on the Island. These holdings range in size from the smallest of plots which form flower beds and grass verges, to larger tracts of Council owned amenity open space and industrial estates, though the Council does not own any housing stock at present. The Council's land holdings form a valuable asset, both to the Council and to the Island by enhancing the environment and providing attractive premises to draw industry, commerce and tourism to the island. However, they also pose a liability risk. Some of the land, which is Council owned, has been used by industry before adequate controls were in place to prevent land contamination. The Council also owns at least one tipped area. Although the Council has undertaken remediation of contaminated land in its ownership in the past, issues of contamination have received little attention in recent years.

The Council's Property Services department will be consulted prior to the detailed investigation of any site in order to establish if the site is in the Council's ownership.

### **2.4 Protected locations**

The Isle of Wight is ecologically diverse. This is borne out by the large number of sites that are designated for nature conservation. The 275 "Sites of Importance for Nature Conservation" (SINCs) cover 10% of the island's surface. They are non-statutory wildlife sites, but are recognised by the

Planning Authority when drawing the Unitary Development Plan. Whilst this designation offers no statutory protection against harm from contamination, the large area these sites cover is a good indication of the rich natural habitats the island possesses.

The Isle of Wight also has a large number of statutory designated sites. Sites that cause “significant harm” to statutory nature conservation areas will be designated as statutory “contaminated land” and will be remediated. Appendix 2 outlines in more detail the nature of the harm to the specific receptors that are necessary before a site can be determined as “contaminated land”.

The Isle of Wight has 40 “Sites of Special Scientific Interest” (SSSIs) covering 11% of the area of the island (3825 Ha). The sites have been designated because they contain nationally important representations of the following habitats:

- Coastal lagoons
- Sand dune
- Saltmarsh
- Vegetated Shingle
- Reefs
- Grazing Marsh
- Lowland Heath
- Calcareous Grassland
  
- Unimproved/ Acid neutral grassland
- Ancient Semi-Natural Woodland
- Reedbeds
- Fens
- Mudflats
- Estuaries
- Vegetated sea cliffs

There are other sites that afford statutory protection. Such sites include seven Local Nature Reserves (LNRs) at Afton Marshes, Shide, Alverstone Mead, Dodnor Creek and Dicksons Copse, Rew Down, Sibden Hill and Newtown (much of which is also a National Nature Reserve).

In addition to the above sites, there are a number of international designations. There are four candidate Special Areas of Conservation (cSACs) and one proposed Special Protection Area (SPA) and Ramsar site. A Ramsar site is designated as containing an internationally important wetland. Any proposals that are likely to impact upon a European site will be subject to stringent assessment.

The four cSACs are The Solent Maritime, South Wight Maritime, Isle of Wight Lagoons and Isle of Wight Downs. These coastal waters and downs have been designated because they are internationally important habitats. The Solent and Southampton Water proposed SPA mainly consists of estuaries and coastal areas. These areas support internationally important bird populations. A proposed Ramsar site is similar in area to the proposed SPA mentioned above.

The Council's Ecology Officer will be consulted during desk studies that affect protected locations and prior to requiring any intrusive investigation or remediation work that may affect those locations.

## **2.5 Key property types**

If a substance on a site, is more likely than not to cause significant harm to property in the form of buildings or structures, then it may be designated as contaminated land under the Part IIA regulations (see appendix 2). It is therefore prudent to compile a database of the Ancient Monuments and Listed Buildings on the Island, as these are the structures of highest conservation value. Not only can historic sites like these be fundamental to the designation of a site, but the remedial works could adversely affect them. In some situations, the source of contamination may be an industrial or military relic that has been scheduled. English Heritage and the Council's Conservation Officer will be consulted during any desk-top studies that affect Scheduled Ancient Monuments or listed buildings before designating a site or designing the required remediation actions.

The Council's Archaeology Centre will be contacted prior to requiring any intrusive site investigation works resulting from the inspection of the island. This is in order to identify if there are any known archaeological remains that could be damaged by the investigation or subsequent remediation.

There are 47 Scheduled Ancient Monuments on the Isle of Wight. These are mainly Burial Mounds, though there are also Roman remains, camps, settlements, ecclesiastical buildings, castles and fortifications. The island also has a large number of Listed Buildings.

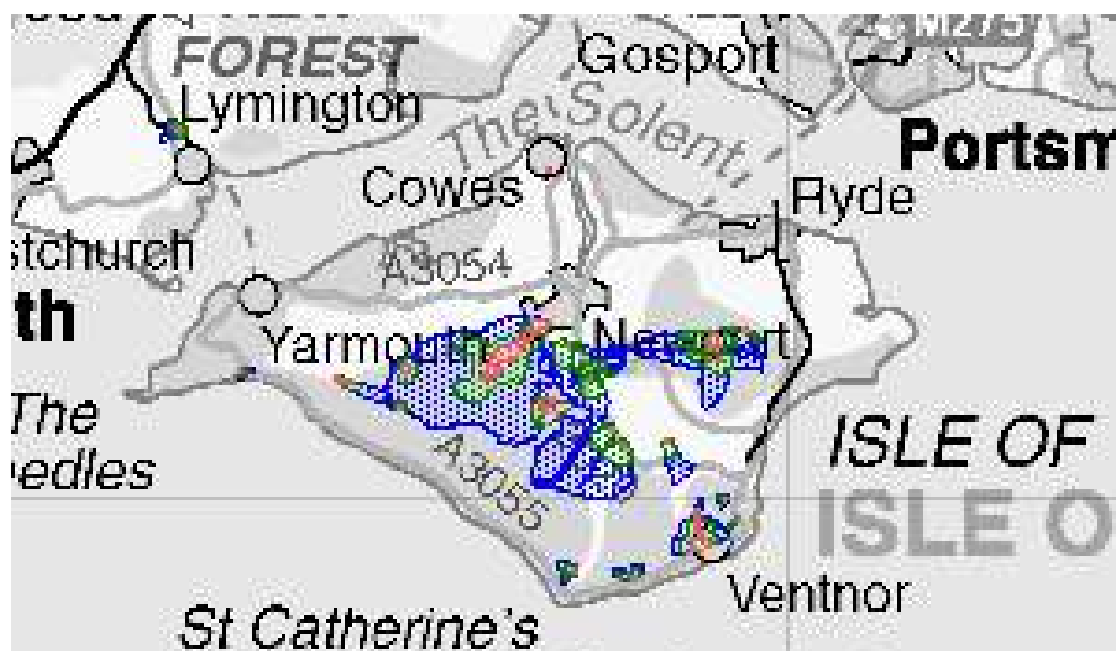
## **2.6 Key water resources**

Almost the whole of the southern half of the Island is situated over a major aquifer. This aquifer consists of the Upper, Middle and Lower Cretaceous Chalk and Cretaceous Sandstones (Upper and Lower Greensands, see Figure 6). Three quarters of the public water supply is from groundwater, accounting for 86% of all groundwater abstractions. This is mainly abstracted from several deep boreholes into the Upper Chalk. There are a larger number of groundwater abstractions for irrigation of arable land, especially in the south of the island (see Figure 5). However, groundwater abstractions only supply 27% of water used for irrigation. The remaining 73% is abstracted from surface waters which are in short supply during the summer months. This is especially evident in the Eastern Yar catchment where the surface waters are supplemented by augmentation boreholes during the summer months.

The major aquifers tend to have very porous soils that would do little to protect the aquifer from contaminants. The Environment Agency provide maps of groundwater vulnerability and source protection zones around licensed groundwater abstractions based on the geology and the level of protection that the soils afford. If there is a source of contamination, the presence of an aquifer that is in use could cause a site to be determined as being statutory contaminated land on that basis.

Groundwater in the Chalk and Greensand aquifers are measured by the Environment Agency at 45 locations. From their studies, it appears that the groundwater levels are stable across most of the Island and therefore the current levels of groundwater abstraction are considered sustainable. The exception to this is the Eastern Yar catchment where most of the Island's horticultural industry is located. Current levels of groundwater abstraction on the Island are supplemented by the import of up to 36,000 cubic metres per day of drinking water from the mainland.

### **Figure 5 Map of Licensed Groundwater Abstractions and Source Protection Zones**



Much of the northern half of the island consists of minor aquifers with a much lower porosity. Such geological strata consist of Hamstead (Hempstead Beds) and Osbourne and Wealden Beds. These minor aquifers support only a handful of licensed groundwater abstractions. The soils here are less porous than over the major aquifers and are therefore less sensitive to contaminants at the surface than are major aquifers.

### **2.7 Known information on contamination**

The Council already holds some information on contaminated land. Most of the information regarding contamination relates to the known landfill sites. Much of this information has been gathered from ground investigations carried out by developers as a requirement of planning consent. Often the results of the ground investigations would lead to remedial works being required of the developers, in order for building to commence. These ground investigation reports will provide valuable information of use in investigating the Island for contaminated land.

### **2.8 Industrial, Military and Redevelopment history**

Although the Island's character is predominantly rural, a number of trades have been present on the island since medieval times. The Domesday book recorded 35 mills in use at the time as well as three salterns (salt-making facilities). The saltern at Newtown was in use until the 1890s. Medieval stone quarries were also recorded at Binstead. The material from these quarries has been used in a number of prominent buildings including Carisbrooke Castle.

In post medieval times, the island was largely self-sufficient. There are records of a significant brick and cement industry, several breweries, railway workshops, a lace factory, an integrated workhouse, warehouses and shipyards on the island. Most of these industries have not survived and the land they once occupied are now in different uses.



Cowes is home to the majority of the Island's shipbuilding industry. Shipbuilding has been the most significant industry on the island and continues to play an important part in the Island's economy. The development of West Cowes did not commence until the early 17<sup>th</sup> century despite the existence of small medieval settlements in the vicinity. In the eighteenth century the town became a thriving port. The shipbuilding industry became established in the 17<sup>th</sup> century, initially only in East Cowes, but later on both sides of the river Medina. Remains of the shipbuilding industry are not extensive. The early shipyards, warehouses and associated trades were extensively bombed by the Luftwaffe in the second world war and the process of continuous redevelopment has removed much of the evidence. However, much of this redevelopment has been for uses that have the potential to introduce new pathways and receptors. Some of this redevelopment was undertaken at a time when the issues of contamination were not properly addressed.

The redevelopment of sites prior to circa 1987 were usually carried out without full consideration of any likely contamination. These sites will be investigated as part of the inspection of the Island. The Council encourages the reuse of sites, though the Council must be satisfied that the ground conditions are suitable for the proposed redevelopment.

In addition to an industrial legacy of potentially contaminated sites, there are a number of military sites on the island that have the potential to be contaminated. There are a number of 19<sup>th</sup> century "Palmerston" forts to guard the Needles passage, Spithead and Sandown Bay against possible French invasion. There are also various military remains relating to the first and second world wars, particularly around the coast. Many of these forts have been redeveloped as holiday camps, though the others are of conservation interest, as are many of the industrial remains on the island.

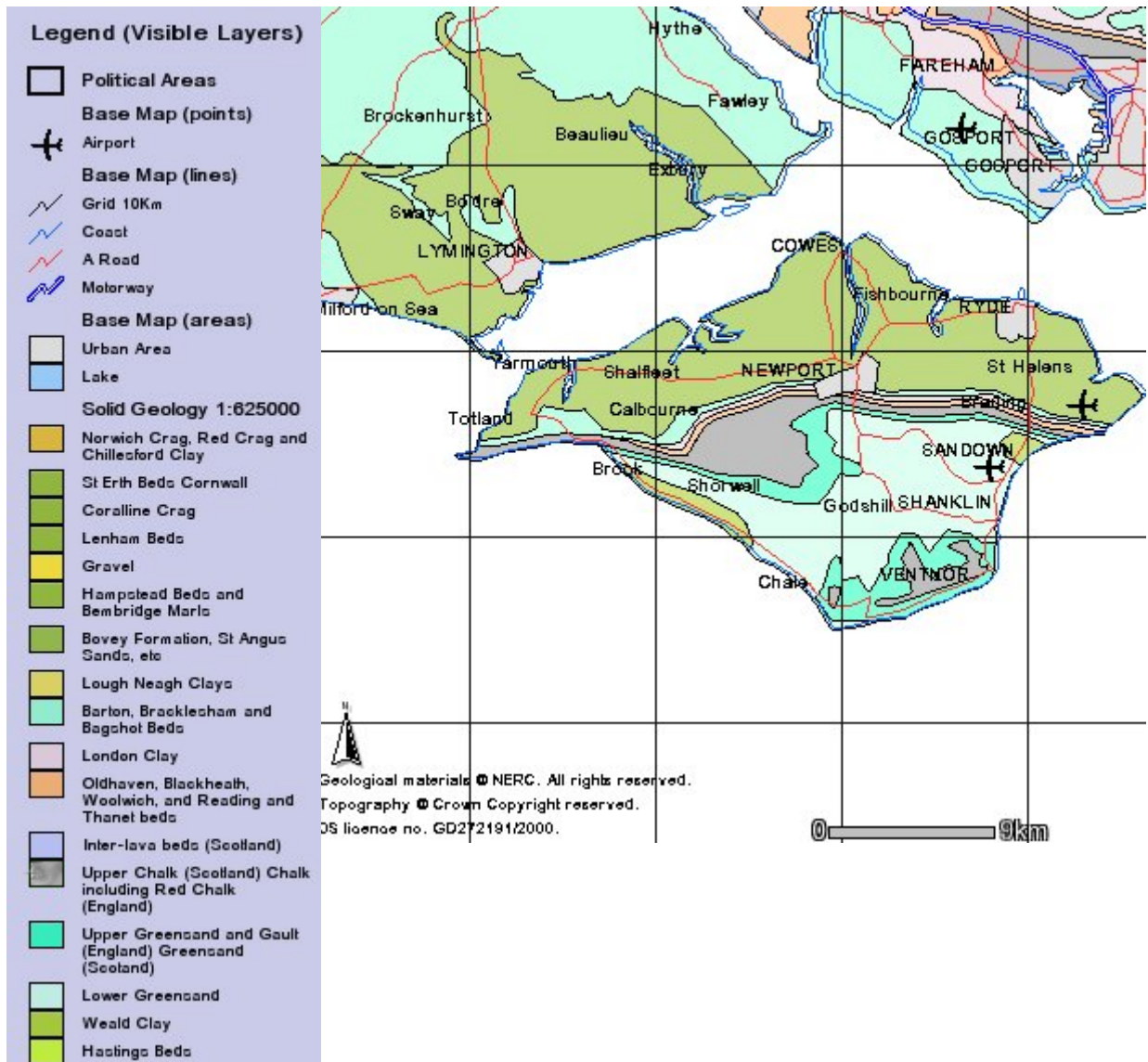
There are numerous small sites that extracted materials for use in the construction industry. Many of these pits have been in-filled over the last century, many before COPA (Control of Pollution Act 1974) licensing came into effect. The unknown content, and sometimes location, of these small landfill sites means they should be located and monitored for the production of landfill gases and leachate.

## **2.9 Broad geological/ hydrogeological characteristics**

The Island's varied landscapes owe much to the large variations in geology in such a small area. The island reaches almost 240m AOD just a kilometre from the coast at St Catherine's Down at the south of the island. In contrast, much of the northern half of the island is relatively low-lying and gently undulating. A chalk ridge runs from east to west through the centre of the island. At the west of the island, these relatively hard rocks have been slowly eroded by the sea and have formed the famous "Needles". There are three main rivers on the island, the river Medina and the two rivers Yar. The principle river is the Medina, which rises at the foot of St Catherine's Down and flows northward to

Cowes, traversing almost the entire width of the island. The Western Yar has its origin in Freshwater Bay, just a few yards from the English Channel. In its short journey to the Solent it attains a fair width. The Eastern Yar rises near Niton and emerges at Bembridge on the eastern coast, where its course has been straightened through an area of made ground behind the course of a disused railway. This area was an estuarine environment until the late 1800s.

**Figure 6. Solid Geology of the Isle of Wight**



The Island is self-sufficient in most minerals, though some crushed rock is imported from the mainland. There are ten current mineral extraction sites on the Island, all of which lie within an AONB. These sites extract limestone, sand and gravel. Despite large sand and gravel extraction on the island, half of sand and gravel aggregates used on the island are obtained from marine dredging. Oil and gas exploration is ongoing both on land and offshore though there is not, as yet, any extraction of these fuels.

Historically, there have been much smaller extractions of a wider range of minerals. There has been a small amount of fuel extraction on the Island. There was extraction of coal from one seam, part of the Bracklesham Beds at Alum and Whitecliff Bays. The coal is, however of little value as it is high in sulphur and does not burn well. There was also a small amount of peat extraction on the Island, at Wroxall Down. The alluvial peat deposits have seen very little extraction.

There have been a number of sources and types of building stone on the Island. Evidence for this can be found in some of the older buildings such as the castles, churches and farmhouses. Freestone, Chalk, Flint, Limestone and Chert have all been used in various constructions that are still in existence on the island.

The clays and loams of the Hamstead Beds which occur at or near the surface of most of the the northern half of the island, have long provided the principle raw material for the Island's brick and tile industry. Weathered Wealden Shales and Gault have also been used to produce bricks. There were at least two brick-manufacturers in operation near Gurnard and Newport well into the twentieth century on the Island. The Reading beds have made good tiles and once provided material for a pottery at Newport. Pipe clay in the Bagshot Sands has been extracted at Alum Bay and south of East Afton.

In addition to building stone, there are a number of other mineral extractions that were operated on the island. These include the use of clays extracted from Alum Bay for use in the production of Alum at Parkhurst Forest. White-lime was produced in lime-kilns in a number of chalk quarries for use in limewash and plaster. Chalk was also excavated at Shide and used in the manufacture of cement at Medina Cement Works. At Brading, cement has been manufactured from limestone excavated on the same site.

The annual rainfall on the Island is between 770-860mm per annum, a little below the national average. The large exposure of permeable strata combines with the average annual rainfall to provide a substantial groundwater resource. By remediating contaminated land, it will help protect the aquifer from pollution, which will help preserve the long-term quality of the water resource and therefore, its sustainability.

The following is a quick guide to the water bearing qualities of the Island's geological units:

**Major Aquifers:**

Upper Cretaceous Chalk

Middle and Lower Cretaceous Chalk

Lower Cretaceous Sandstones including Lower Greensands (Carstone, Ferruginous Sands, Sandrock)

Chert

Upper Greensands

**Minor Aquifer:**

Hamstead (Hempstead Beds)

Osbourne and Wealden Beds

Reading Beds

Bembridge Marls

**Non-Aquifers:**

Gault

Wealden Beds

Atherfield Clays

London Clay

**2.10 Action already taken to deal with land contamination**

Contaminated land on the Island has predominantly been remediated by developers when they come to redevelop a site which contains contamination. Remediation of this type is usually required as a condition of planning consent, though on occasions, the remediation may need to be undertaken before planning consent is given, in order to monitor its effectiveness. It is often the case that site investigations will need to be undertaken before planning consent can be given. This is the case where the nature and extent of the contamination could jeopardise the viability of a proposed development.