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ARCHAEOLOGICAL INVESTIGATIONS IN WEST SUSSEX UNDERTAKEN DURING THE INSTALLATION OF THE HORNDEAN (HAMPSHIRE) TO NEWELLS LANE (WEST SUSSEX) GAS PIPELINE (SU 7093 1235- SU 8004 0694)

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with contributions by Kate Brayne, Jane Bircher, Moira Laidlaw, Malcolm Lyne and John Valentin

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ABSTRACT

This report presents the results of archaeological investigations undertaken in West Sussex during the installation of the Horndean (Hampshire) to Newells Lane (West Sussex) gas pipeline (SU 7093 1235 to SU 8004 0694) during the summer of 2001. The two principal areas of interest, which had previously been identified as being of archaeological potential comprised the cropmark remains of two enclosures located on land to the north of Lordington House and a small round barrow cemetery at Walderton Down. Both lie in the parish of Stoughton.

Subsequent excavations at Lordington House revealed the presence of a complex of linear and discrete features, which are likely to represent the remains of former field systems of late Bronze Age/early Iron Age, Romano-British and Medieval date. Investigations at Walderton Down revealed a series of linear features, probably representing elements of former late Bronze Age/early Iron Age field systems and land divisions. Two graves containing two inhumations determined by radiocarbon dating to be of a middle/late Saxon date were also identified.

INTRODUCTION

Project background

Archaeological investigations were undertaken in West Sussex during the installation a 450mm diameter buried steel pipeline during summer 2001. The pipeline which was required to reinforce the natural gas supplies in the Hampshire/West Sussex border region, was some 15km long running between an existing installation at Horndean, Hampshire (SU 7093 1235) and a block valve site at Newells Lane, West Sussex (SU 8004 0694). The section of the pipeline route within West Sussex ran for some 11km between Finch Dean Road, Rowlands Castle and Newells Lane, West Ashling (SU 7386 1198 to SU 8004 0694). See Fig.1 for location of pipeline route. The fieldwork was commissioned by RSK ENSR Environment Ltd on behalf of Amec/Transco and undertaken by AC archaeology.

While the land use generally comprised both arable and pasture, areas of set-aside and small paddocks were also crossed. The topography varied from gently sloping ground, sometimes undulating, to moderately narrow river valleys. The underlying geology of the route was predominantly clay-with-flints and upper chalk. An area of localised raised beach material at the eastern end of the route between Common Lane, Funtington and Newells Lane, West Ashling forms the westerly extent of the Slindon and Eartham Formations, which were occupied by the early Boxgrove site. Exposures of these deposits within the working width were examined and recorded by the Boxgrove Research Project. Further analysis of these results has not been included in this report. The approximate location of that section of the pipeline which crosses the raised beach is shown on Fig. 1.

Archaeological Background

Prior to the commencement of the construction phase, an archaeological desk-based assessment of the proposed pipeline route was undertaken by RSK ENSR Environment Ltd (RSK 2000). This identified several areas of archaeological potential, including evidence for Neolithic and Bronze

Age activity. Subsequent analysis of the route by means of an extensive programme of surface artefact collection (RSK 2001) a review of aerial photographic evidence and geophysical survey (GSB Prospection 2001) resulted in the confirmation of two areas of archaeological potential at Lordington House and Walderton Down (Sites A and B; Fig. 1).

Lordington House, Stoughton (SU 7820 1010)

Cropmarks to the north of Lordington House (see Fig. 2a) were subject to archaeological investigations in the 1980s. This determined that one of the enclosures is likely to represent the remains of a stock enclosure; the other proved to be a positive lynchet of a post Romano-British date, which like other remnants of positive lynchets to the south of the pipeline route may be associated with the Lordington Deserted Medieval Village. Geophysical survey of the proposed pipeline route produced evidence for several linear features of possible archaeological origin.

Walderton Down, Stoughton (SU 7860 0950)

Three cropmarks identified as ring ditches and representing probable former Bronze Age funerary monuments have been identified on the west-facing slope of a southern spur of Walderton Down, immediately to the east of Lordington (see Fig. 3a). While previous surveys had identified the presence of elements of former field systems dating from the Iron Age to the Medieval periods in the vicinity, only limited evidence for linear and pit-like anomalies was identified as a result of the geophysical survey undertaken for the pipeline project.

Methodology

The scope and extent of archaeological excavation and monitoring was implemented in accordance with procedures agreed with Chichester District Council and West Sussex County Council. The site at Lordington House comprised an excavation area of c.117m x 32m (c. 3744m^2), while the site on Walderton Down comprised an excavation area of c.75m x 32m (c.2400m^2).

Monitoring of all topsoil stripping and where appropriate, trench excavation was carried out under constant archaeological supervision. The archaeological investigations were undertaken in accordance with the standard *AC archaeology* pro-forma recording system, comprising written, graphic and photographic records, and in accordance with AC archaeology's *General Site Recording Manual, Version 1*. All excavations involved the machine removal of topsoil on to the top of the sub-surface archaeological deposits. Further excavation was carried out by hand. All features and deposits within the excavation areas were planned and those which lay within the alignment of the pipe trench were investigated as a priority. Additional features within the pipeline working width were only excavated where appropriate.

RESULTS

Lordington House

The excavation area was located 200m to the north of Lordington House above the River Ems on the steep east-facing slope of a valley at 50mOD (see Figs. 1 and 2a). The underlying geology comprised chalk with localised clay-with-flints. The clarity of archaeological features was very variable.

Linear features (Fig. 2b)

Three north-south aligned linear features were clearly visible in plan at 30m (F318), 90m (F312) and 115m (F300) from the western end of the excavation area. These features ranged in width from 2.50m to 8.00m and were up to 0.15m deep, each containing a similar fill composed of mid-brown clay silt with common flint and chalk pieces. In addition to these features a further five ditches/gullies were also recorded (F304, F320, F330, F372, F374), two of which F372 and F374, were inter-cutting. Each of these features varied in dimension. The most substantial appeared to be the east to west aligned ditch F304. A single slot excavated on its northern edge revealed a steep sloping profile and an uneven base at a depth of 1.40m. Five fills comprising clay-silts or silty chalk and containing moderate or common coarse components of chalk or flint pieces were

recorded. With the exception of a single piece of Romano-British flue tile, recovered from the uppermost fill of this feature, no dating evidence was present. Ditch F304 had been partially truncated by linear feature F312, with its western extent being apparently obscured by an ill-defined area of clay with flints (layer 370).

The two shallow inter-cutting ditches F372 and F374 were both aligned approximately east to west. Ditch F374 appeared to be the later and more substantial of the two. It had a maximum width of 4.00m and a gentle sloping profile to a depth of 0.30m. The fill comprised a mid-brown clay silt with moderate amounts of chalk and flint pieces, which contained a small quantity of late Iron Age pottery. Ditch F372 had a maximum width of 1.00m and gentle sloping profile to a depth of 0.18m. The single fill comprised an orange-brown silty clay with moderate chalk and flint pieces. Although no dateable artefacts were recovered from this feature, its apparent relationship with ditch F374 suggests that it is likely to be prehistoric in origin.

Two ill-defined short lengths of gully or slot-like features, F330 and F320 of an uncertain function were also partially investigated. Each measured approximately 5.00m in length with depths of 0.10m and 0.50m respectively. Both contained similar fills composed of orange-brown silty clay with moderate flint and chalk pieces. No dating evidence was recovered from either of these features.

Discrete features (Fig. 2b)

Fourteen discrete features were also investigated the most substantial of which was F337. It was a sub-circular feature in plan, measuring approximately 6.00m in diameter. Excavation revealed a steep to gentle sloping profile and uneven base at a maximum depth of 0.95m. It contained six fills generally composed of dark brown silty clay or light brown chalky clay, with moderate coarse components of flint or chalk pieces, none of which produced any dating evidence despite the

recovery of a small quantity of animal bone. The feature is considered to comprise the remains of a former dew pond.

Only two of the remaining discrete features were considered to be archaeological in origin. These comprised pits F333 and F343 which lay adjacent to the eastern edge of linear feature F318. Both varied in dimensions with the most substantial, F333, having a diameter of some 2.00m, a steep sloping profile and flat base at a maximum depth of 0.70m. It contained two fills which were largely composed of a silty clay and chalk silt with few coarse components. The upper fill produced a single sherd of prehistoric pottery and a small quantity of animal bone and worked flint. Pit F343 measured 0.90m in diameter with a steep sloping profile and flat base at a maximum depth of 0.50m. It contained two fills generally composed of a mid-brown silty clay with moderate coarse components. A small quantity of animal bone and a single piece of worked animal bone, which may be Roman in date was recovered from this feature. All of the remaining discrete features (F324, F325, F328, F338, F339, F352 F357, F360, F363, F364, F366 and F368) when investigated proved to be natural in origin and probably represent tree boles.

Walderton Down

The site at Walderton Down was located to the east of the River Ems valley at 65mOD, on an area of chalk down land (see Figs. 1 and 3a). The topography comprised a moderately south-west sloping spur of land, with the underlying geology composed of clay with flints overlying chalk bedrock.

Phase I: late Bronze Age/early Iron Age (Fig. 3b)

The earliest phase of activity was represented by a substantial north-east to south-west aligned ditch F234 and a pit F240. Ditch F234 had a maximum width of 7.00m, with a gentle to steep sloping profile and flat base at a depth of 0.50m. This feature contained two fills, both comprising a mid-brown silty clay with flint and chalk pieces. The upper fill produced a quantity of burnt and

worked flint, five sherds of late Bronze Age pottery and a single sherd of early Saxon pottery, which may have been intrusive. Pit F240, measured 0.90m x 2.00m in plan, with a steep sloping profile and an uneven base at a depth of 0.25m. It contained a single fill composed of orange-brown silty clay with flint and chalk pieces. A small quantity of late Bronze Age to early Iron Age pottery sherds was recovered.

Other evidence for activity during this phase includes a spread of material (layer 232) which was located some 5.00m to the south of ditch F234. It comprised a mid-brown silty clay and produced a small quantity of worked and burnt flint, together with a number of late Bronze Age pottery sherds.

Phase II: middle-late Saxon (Figs. 3b-3c)

Phase II comprised two closely spaced graves (F237 and F242) which had been cut into ditch F234. Both graves contained inhumations which were orientated approximately north-west to south-east and laid out in an extended supine position (INH 239 and INH 244). See Plates 1 & 2. The inhumations were exposed at a depth of approximately 0.40m below the ditch surface. It was not possible to define the upper edge of the grave cuts as the fills were similar to those of ditch F234.

Grave F237, which contained inhumation INH239 and was exposed in plan at the base of ditch F234 (Plate 1). It had been cut into the natural bedrock and measured 1.80m x 0.60m in plan, with a maximum depth of 0.15m. It contained the remains of a moderately well-preserved adult male skeleton. A single artefact, an iron knife (SF 2), was present alongside the left humerus. This object is considered to be of a middle Saxon date (see below).

Grave F242 contained inhumation INH244 and was situated immediately adjacent to INH239. It was similarly exposed in plan at the base of ditch F234, being cut into the natural bedrock (see

Plate 2). Grave F242 measured 2.25m x 0.60m in plan and had a maximum depth of 0.15m. It contained the remains of a moderately well-preserved adult male skeleton. No dating evidence was recovered from this burial. Radiocarbon dates obtained from bone collagen samples from each skeleton has established a middle Saxon to late Saxon date for both inhumations (CAL AD 660 to 790 for INH239 and CAL AD 760 to 870 for INH244).

Undated features (Fig. 3b)

The group of undated features comprised three ditches (F226, F228 and F231) and a single pit (F249). Ditch F228 was aligned north-west to south-east. It had a maximum width of 1.20m, with a gentle sloping profile and uneven base at a maximum depth of 0.15m. Ditch F228 contained a single fill comprising a mid-brown silty clay with moderate flint and chalk pieces. Ditches F226 and F231 were both heavily truncated. Ditch F226 had a maximum width of 0.90m and a depth of 60mm. Ditch F231 had a width of 1.25m and a maximum depth of 0.25m. Pit F249 comprised a shallow sub-circular feature (c. 2.25 x 2.00m) with an irregular profile and base and a maximum depth of 0.27m. It was considered to be of natural origin, possibly representing a tree hole. Ditches F226, F228, F231 and pit 249 did not contain any dating evidence.

Other observations

A number of additional, isolated features were also recorded during the archaeological monitoring of the topsoil stripping. The details of these sites and their approximate location has been summarised in a gazetteer of observations (see Table 1).

FINDS

***Ironwork** by Jane Bircher BA AMA*

A single grave good was found in association with the supine male inhumation, INH239 (F237). This comprised an iron knife (SF2) which was found between the chest and the left humerus, suggesting that it had been deliberately positioned, perhaps over the heart of the corpse.

The knife has been x-radiographed but the metal is so heavily mineralised that little of its original form can be deduced from the x-ray plate. It has been partially cleaned to reveal diagnostic areas at the tip, halfway along the blade, the junction of blade and tang as well as the end of the tang.

The knife has a more or less straight back and a down curved tip. The blade is now straight - possibly even slightly convex, although this may be the result of wear and whetting rather than indicative of its original form. There appears to be a groove along the back edge on one side. It measures 160 mm in length with a maximum blade width of 20 mm.

The knife has similarities to Continental early Saxon types - in particular Böhner's type C class, a form current during the seventh century (Böhner 1958, Taf. 60.5, 6) and lies somewhere between Evison's Types 3 and 5 (Evison 1987, 113-116). At the Buckland cemetery, Dover, Types 3 and 5 occur in phases from the first half of the 6th century to 750 A.D. However, the high degree of regional variation throughout this period may make such comparisons misleading.

A knife very similar to this example both in size and form is published from the relatively nearby Saxon barrow cemetery at Merrow Down, West Sussex (Saunders 1980, 70-4, fig. 3) where the type is attributed a middle Saxon date. The groove along the back is not found earlier than the 7th century but the type continues into the 9th century, if not later. This dating concurs with the radio carbon date of CAL AD 660 to 790 given for INH239 and the Walderton Down knife makes a useful addition to dateable examples of this type.

***Pottery** by Malcolm Lyne*

Introduction

The Lordington House and Walderton Down sites yielded a total of 63 sherds (254g) of Bronze Age and late Iron Age pottery from 12 contexts. A single sherd of possible early Saxon fabric was also present.

Methodology

All of the assemblages were quantified by numbers of sherds and their weights per fabric. The fabrics were identified using a x8 magnification lens with in-built metric scale in order to identify the nature, form, size and frequency of added inclusions: finer fabrics were further examined using a x30 magnification pocket microscope with artificial illumination source. Although a project specific fabric series was created for the purposes of this assessment, where applicable, fabrics have been correlated with existing published fabric type series. None of the assemblages were large enough for quantification by Estimated Vessel Equivalents (EVEs) based on rim sherds (Orton 1975).

Fabrics

Prehistoric

P1. Handmade with profuse ill-sorted up-to 2.00 mm calcined-flint filler

P2. Handmade polished black with profuse 0.10 to 1.00 mm calcined-flint filler.

P3. Handmade grog-tempered ware with up-to 2.00 mm. grey and brown grog filler. Early to middle Bronze Age

P4. Handmade soot-soaked fabric fired lumpy brown with profuse silt-sized to 0.10 mm. quartz and occasional coarser quartz and grog filler.

P5. Handmade soot-soaked fabric with silt-sized quartz filler.

P6. Very-fine-sanded grey-black fabric with occasional up-to 2.00 mm. flint

P7. Handmade fabric with very-fine grog filler.

P8. Handmade black fabric with profuse up-to 1.00 mm. calcined-flint and sparse shell filler.

P9. Handmade fabric with profuse up-to 2.00 mm. calcareous inclusions, some of which are hollow. Bronze Age.

P10. Handmade black fabric with up-to 2.00 mm. chalk and flint filler. Bronze Age.

P11. Lumpy handmade brown-black fabric with sparse to moderate 0.10 to 2.00 mm. calcined-flint and grog filler. Bronze Age

P12. Coarse 'Belgic' grog-tempered ware. Late Iron Age

P13. Very-fine-sanded, soot-soaked 'Atrebatic Overlap' fabric

Early Saxon

ES1. Handmade polished black fabric with profuse up-to 0.20 mm. quartz filler.

The Assemblages

Lordington House

Pit F325 This feature produced just one basal sherd from a small handmade jar in calcined-flint tempered Fabric P1 fired patchy orange-brown/black. This fragment is fairly fresh and suggests a late Bronze Age or early Iron Age date for the feature.

Ditch F374 The five sherds (42g) from the ditch fill include a further late Bronze Age sherd; this time in flint and shell tempered Fabric P8. It is, however, abraded and clearly residual in an otherwise late Iron Age assemblage made up of one sherd each in soot-soaked sandy Atrebatic Overlap Fabrics P6 and P13 and Belgic grog-tempered ware Fabrics P7 and P12.

Walderton Down

Ditch F234 The six sherds (30g) of pottery from this feature can be dated, with one exception, to the late Bronze Age: three fresh sherds in calcareous brown-black Fabric P9 include a tiny rim fragment from a ?bucket urn and there are two sherds in calcined-flint tempered Fabric P1. A polished sherd in soot-soaked sand-tempered Fabric ES1 could either be from a post-Deverel Rimbury late Bronze Age fineware vessel or be early Saxon in date and intrusive from one of the burials cut into the ditch fill.

Layer 232 The 39 sherds (90g) of pottery associated with this occupation spread all come from two vessels. Thirteen fragments are from an urn in calcined-flint and grog tempered late Bronze

Age Fabric P11 fired brown-black. The rest come from a ?Biconical bowl in polished black Fabric P2 with profuse up-to 1.00 mm calcined-flint filler (c.1500-800 BC).

Grave F237

The main fill of the grave (Context 238) was totally lacking in pottery but laid amongst the bones of the skeleton was a small flake of chalk and flint tempered pottery from middle to late Bronze Age Fabric P10. This fragment is residual and is probably derived from the fill of ditch F234.

Grave F242

The fill of this grave (Context 243) produced just one sherd in Fabric P2 of probable post-Deverel-Rimbury late Bronze Age date which, like the sherd from grave F237, is considered to be residual in context.

Unstratified

An unstratified sherd of a rim fragment from collared urn of Longworth's primary series (1984) in grog-tempered Fabric P3 with whipped-cord decoration. c.2000-1500 BC was recovered from the Walderton Down excavation area.

***Worked Flint** by John Valentin*

The assemblage consists of three pieces of worked flint from Lordington House (weighing 27g) and 48 pieces (weighing 490g) from Walderton Down. The flint is derived from chalk and clay-with-flints deposits and consequently the condition and quality is variable. Much of the material from the chalk land areas is either fresh and blue-grey in colour or shows a thick white patina, whereas those pieces which seemingly derive from the clay-with-flints are more mottled and generally of a poorer quality. Hinge fractures are relatively scarce, as is evidence for post-depositional damage. Despite the flints being recovered from a large area, the assemblage derives entirely from the later prehistoric flake industry, consisting of waste material (generally broad,

squat flakes). There is a complete absence of blades, which indicates that earlier activity (Mesolithic or early Neolithic) was not present with the assemblage. The largest quantity of worked flint was recovered from ditch F234 (ten pieces) at Walderton Down.

Burnt flint *by M. Laidlaw*

A total of 164 fragments of burnt, unworked flint (weighing 6034g) was recovered. While this material is intrinsically undatable, the majority of the burnt flint was found in association with prehistoric artefacts. This is demonstrated by the majority of the burnt flint (74% by weight) which was recovered from ditch F234 at Walderton Down. The remaining burnt flint fragments, were mainly recovered in small quantities from a number of undated pits and ditches at both sites.

Ceramic building material *by M. Laidlaw*

A total of 12 fragments (weighing 415g) of ceramic building material was recovered, 11 of which (weighing 409g) were recovered from two features at the Lordington House site (ditch F304 and pit F343). Using the fabric and surviving dimensions as a basis, the assemblage contained a small number of Romano-British fragments including one flue tile, three tile fragments, and three brick fragments. A further five post-medieval tile fragments were also recovered.

The skeletal assemblage *by Kate Brayne*

Preservation. Skeleton 239 (F237) was approximately 75% complete. The skull and long bones were present, although in extremely fragmentary condition. Much of the axial skeleton (vertebrae, ribs and pelvis) was absent, owing to poor preservation of the spongey trabecular bone. All the surviving bones showed post-depositional damage and there was evidence of considerable periosteal exfoliation. In addition, the trabecular (spongy) bone at the epiphyses (ends) of the long bones was very poorly preserved Although Skeleton 244 (F242) was approximately 85% complete, it was in a fairly poor condition. The axial skeleton and skull were fragmentary. None

of the long bones were complete, and most displayed severe exfoliation of the periosteal surface, and degradation of the trabecular (spongy) bone at the epiphyses (ends) of the long bones.

Osteology

Methodology

Each skeleton was laid out individually with the bones in anatomical position in order to be studied. Each individual was assessed for sex, age, stature, pathology and morphological anomalies.

Determination of Sex The sex of the two skeletons was assigned according to morphological criteria; in particular by assessing features of the pelvis and skull, which display the most sexual dimorphism in humans. In addition, wherever possible, measurements were taken of the vertical diameter of both femoral and humeral heads, as these dimensions have been demonstrated to provide a reliable method of sex estimation (Pearson, 1917-1919:56).

The sex of Skeleton 239 (F237) was determined to be ?male. The sexually diamorphic features of the skull and mandible were not pronounced. The sciatic notch on the pelvis was also indeterminate. The general gracile dimensions of the skeleton, including the head of the femur might suggest a female, but in general it was considered that this was probably an elderly male, because on balance there were more male characteristics than female. Because the morphological characteristics of the skeleton which are considered masculine are largely associated with muscle attachments, which are strongly influenced by the presence of testosterone, elderly male skeletons can sometimes appear to have female characteristics, because a decrease in testosterone levels in old age affects muscle bulk. Skeleton 244(F242) was also determined to be a male on the basis of the sexually diamorphic features.

Estimation of Age at Death The age at death of Skeleton 239 (F237) was estimated to be 60+. The teeth demonstrated considerable attrition, and the cranial sutures were almost completely obliterated. No other morphological features from which age can be estimated were recovered. However, the lack of clear sexually diamorphic characteristics (see above) suggests that this individual may have been considerably older that his fifth decade. The age at death of Skeleton 244 (F242) was estimated to be 46+. The teeth demonstrated considerable attrition, and the cranial sutures were partially fused. No other morphological features from which age can be estimated were recovered.

Stature The living stature of individuals can be estimated by taking measurements of the maximum length of the long bones, then applying these to the formulae calculated by Trotter and Gleeser (1952). There are some limitations to this technique. The epiphyses of the long bones must be fused, eliminating the possibility of estimating the stature of sub-adults. Long bone epiphyses begin to fuse at around 16 years (Brothwell, 1981), and after this age stature estimates are feasible. In order to make an accurate estimate of stature as many long bones must be measured as possible. Incomplete bones cannot be used.

It was not possible to estimate the stature of Skeleton 239 (F237) as no intact long bones were recovered. However, the general appearance of the bones suggested a slightly built individual. It was not possible to estimate the stature of Skeleton 244 (F242) as no intact long bones were recovered.

Pathology

Degenerative Disc Disease. Degenerative disc disease has an almost universal prevalence among aging individuals: it is a consequence of the recurrent stresses put on the spine during everyday activity. Bony changes occur when the gelatinous internal nucleus pulposus of the intervertebral disc bulges out of its fibrous capsule, the annulus fibrosus (Roberts and Manchester, 1995).

Colloquially this condition is called a "slipped disc". It is known to cause the growth of bone around the anterior margins of the vertebrae (osteophytes), roughening and porosity of the end plates of the vertebral body, and indentations known as Schmorl's Nodes on the vertebral end plates (Rogers and Waldron, 1995). Individuals which display these bone changes may have experienced stiffness, lack of flexibility, and possibly pain.

Skeleton 239 (F237) presents with osteophytes around the vertebral body margins of all the lumbar vertebrae. Skeleton 244 (F242) presents with schmorl's nodes and osteophytes around the vertebral body margins of lumbar vertebrae 3 and 4. As this individual had a sacralized 5th lumbar vertebra, these lesions may be indicative of degenerative disc disease associated with this anomaly.

Osteoarthritis Osteoarthritis is the most common form of joint disease in both ancient and modern populations. Its prevalence increases with age, and it appears to affect women more than men (Rogers and Waldron, 1995). The cartilage which separates the bones in a synovial joint becomes degraded, so that the bones rub together ultimately creating an ivory-like surface. This process is known as eburnation. Prior to a joint surface becoming eburnated it may be porous. There may also be bone growth around the margins of the joint. Pain, restricted movement and joint deformity are clinical symptoms associated with osteoarthritis, but some studies indicate that there is not a clear-cut association between the severity of bony changes and physical symptoms (Roberts and Manchester, 1995).

Skeleton 239 (F237) presented with degenerative joint disease, which was probably osteoarthritis in the tuberosity of the right radius (the point at which the proximal shaft of the radius touches the shaft of the ulna). The tuberosity was enlarged, with pronounced marginal osteophytes and lytic (porous) lesions on the surface. Unfortunately, the distal ulna and radius were not recovered, so it

was not possible to establish if this lesion was associated with other degenerative changes at the wrist joint which would provide further evidence for age.

Dental Pathology

Calculus Calculus is an accumulation of mineralized bacterial plaque on the teeth when oral hygiene is inadequate. It occurs with two distinct forms of distribution. *Supragingival* calculus is located around the gingival margin on the necks of the teeth, and is preferentially deposited in relation to the openings into the mouth of certain major salivary gland ducts (the parotid glands on the maxilla and the submandibular and sublingual glands on the mandible). On the other hand, *subgingival* calculus is located below the level of the gingival margin, and its distribution and extent correlates well with the presence and severity of inflammatory periodontal disease, which is a condition which ultimately leads to tooth loss (Craig, *pers comm*).

Skeleton 239 (F237) presented with pronounced subgingival calculus on the lingual and buccal aspects of all the teeth. Although all the tooth roots were exposed, there was no antemortem tooth loss. Therefore, it is considered that this was evidence of continued tooth eruption, and reflected the age of this individual, rather than evidence of inflammatory periodontal disease. Skeleton 244 (F242) presented with limited subgingival calculus on the lingual aspect of the lower right 2nd premolar and 1st molar. This is most likely to be associated with salivary duct glands rather than periodontal disease.

Developmental Anomalies and Other Observation Skeleton 244 (F242) presents with congenitally absent 3rd molars and a sacralized 5th lumbar vertebra. Skeleton 244 (F242) also has extremely pronounced muscle attachments on the left and right frontal humeri for Teres major and Latissimus dorsi. Although this is a robust individual, these attachments are particularly well developed. This may indicate some form of activity during this individual's life time.

Radiocarbon dating *by Beta Analytic Inc.*

Two radiocarbon dates were obtained from bone collagen samples taken from both skeletons. Skeleton 239 gave a conventional radiocarbon age of 1290 ± 40 BP calibrated to AD 680 to 770 at one sigma and AD 660 to 790 at two sigma levels of confidence (Ref. 178259). Skeleton 244 gave a conventional radiocarbon age of 1230 ± 40 BP calibrated to AD 720 to 740 at one sigma and AD 760 to 870 at two sigma levels of confidence (Ref. 178260).

Environmental Samples by *M. Laidlaw*

Two 15 litre samples were taken from the torso area of both inhumations. On processing, the samples were found to contain small undiagnostic fragments of human bone and small quantities of land snails. No charred plant remains were recovered. Two small fragments of charcoal (<4mm) were found in the flot sample from INH244.

Worked bone *by M. Laidlaw*

The single piece of worked bone recovered comprises a rectangular shaped fragment with flat faces and squared edges. This object was recovered from the fill of pit F343 at the Lordington House site and is possibly unfinished. The object is not closely datable but on the basis of associated finds is possibly Romano-British.

Animal bone *by M. Laidlaw*

A total of 38 fragments of animal bone was recovered from the site at Lordington House, particularly from pit F343 and dew-pond F337. The animal bone is poorly preserved and very fragmentary with no measurable bones. The only identifiable fragments were cattle teeth.

DISCUSSION

Lordington House

Although the function of the features at the Lordington House site could not readily be determined, it is likely that they represent at least two phases of boundaries and/or drainage ditches possibly associated with late Bronze Age/early Iron Age and Romano-British field systems. It has not been possible to provide an accurate spatial distribution of the principal phases of activity due to the limited dating evidence from pits F325 and F343, ditches F374 and F304. The alignment and location of the three linear features F300, F312 and F318 (which are likely to represent the former remains of ridge and furrow) with the existing boundaries to the south suggests that they represent the remains of the former openfield system associated with Lordington Deserted Medieval Village.

Walderton Down

The earliest phase of activity at the Walderton Down site is represented by ditch F234, pit F240 and layer 232. Both the orientation and dimensions of ditch F234 are such that it would seem to represent the heavily truncated remains of a former significant land division. Sussex has at least 80 linear earthworks or cross ridge dykes, which vary in both siting and morphology. Their course is frequently not governed by topography with the majority traversing the chalk downland ridges often in close proximity to settlements or hillforts (Hamilton 2003). The appearance of these major land divisions was related to the reorganisation of the landscape at the start of the 1st millennium BC being stimulated by the need for territorial control as well as the growth of animal husbandry (Bradley 1971).

Although the majority of the Sussex land divisions remain undated, limited excavation such as that at Erringham Farm, Upper Beeding (Bedwin 1979) has indicated a probable late Bronze Age/early Iron Age date. The finds recovered from ditch F234 and its immediate vicinity are therefore noteworthy. The proximity of this boundary earthwork to the nearby barrow group is

significant. Similar relationships between linear boundaries of a later Bronze Age/early Iron Age and groups of earlier Bronze Age barrows are a common feature of the chalk downlands during this period e.g. Salisbury Plain and the Yorkshire Wolds (Stoertz 1997).

Linear features F226, F228 and F231 probably represent former elements of boundaries or field systems which in the absence of dateable artefacts or coherent relationships with other features remain undated.

The second phase of activity at the Walderton Down site is represented by the two middle/late Saxon inhumations (INH239 and INH 244) which had been inserted into ditch F234. INH239 comprised the remains of a 60+ year old male who appears to have had a slipped disc and evidence for osteoarthritis in his left wrist. INH244 represents the remains of a tall male individual who presents evidence for degenerative disc disease; neither appear to be related.

The extended supine burial position of the two inhumations is one of the most common burial positions in both early and late cemeteries (Lucy 2000, 80). The South Saxons converted to Christianity during the 670s-680s AD and the orientation of these inhumations does therefore imply the continuation of pagan practices in the more rural areas. However, such broad generalisations may be inappropriate given that only two graves have been identified.

The only grave good comprised a single knife (SF2) which was recovered from INH239. While knifes are ubiquitous items commonly found in Saxon furnished graves of all periods, the position of this knife is of note. As a rule knives were generally suspended from, or tucked into, a belt or girdle, and as such they are commonly found near the waist or on the upper thigh in graves (ibid, 60). The apparently deliberate placing of this knife adjacent to the left arm and possibly near /over the heart is likely to be symbolic and has parallels elsewhere (Brush 1993, 105). It may also be of significance that the knife was found in the grave of an elderly male as it has been suggested that

there may be a connection between the knife length and the age and sex of the person with which it had been interred (Härke 1989). In the absence of the survival of organic residues, it has not been possible to confirm whether the knife had originally been placed within a sheath.

A quarter of all known Saxon burial sites have relationships with ancient monuments, the majority of which comprise Bronze Age round barrows (Williams 1998). Sussex in particular has been recognised as one of the principal geographical areas where barrows frequently form the focus for later 6th to 8th century cemeteries (Lucy, 2000, 128). Other comparable Saxon cemeteries in this part of the Sussex Coastal Plain include the 5th-7th cemetery at Westhampnett, which is located on a small but locally prominent hill in close proximity to a Bronze Age barrow, an Iron Age religious site and a Romano-British cemetery (Powell & Fitzpatrick 1997, 294-295). Both the location of the Walderton Down and Westhampnett cemeteries mirror the location of the Saxon South Downs cemeteries, which were generally sited on low ridges and spurs (Welch 1983, 17-19). Perhaps as in the case of Westhampnett, the extant Bronze Age barrows on Walderton Down provided a focus for the burials. Another factor may simply be the desire by the local population to find a link and/or form a connection with past communities (Lucy 2000, 130).

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Table 1: Gazetteer of sites identified in West Sussex during the installation of the Horndean (Hampshire) to Newells Lane (West Sussex) gas pipeline

NGR	Parish	Description	Date
SU 7410 1190	Stoughton	F34: east – west aligned shallow linear feature c. 0.50mk long x 0.38m wide x 0.07m deep filled with a light creamy brown clay silt.	Unknown
SU 7440 1196	Stoughton	F41: north-south aligned linear feature c. 7.50m long x 0.70m wide x 0.30m deep filled with a light creamy brown friable clayey silt.	Unknown
SU 7584 1263	Stoughton	F80: shallow pit c. 0.70m in length x 0.60m width x 0.15m depth filled with a light mid brownish-grey clayey silt. Steep edges and a flat base. 1 piece of modern glass recovered.	Modern
SU 7724 1196	Stoughton	F66: shallow feature c. 1.60m in diameter x 0.25m in depth filled with a grey-black clay silt. Small quantity of waste flint flakes recovered.	Unknown
SU 7742 1162	Stoughton	F72: probable post-hole c. 0.70m in diameter x 0.30m in depth. Steep sided conical shape filled with a dark grey-brown clay silt.	Undated
SU 7754 1054	Stoughton	F89: pit c. 1.00m in diameter, with smooth vertical edges and a curving base at a depth of 0.45m. It contained three fills all of which largely comprised either grey-black clay silts or mottled pinky-red clays displayed signs of being burnt. A small assemblage (17 sherds) of late Bronze Age –early Iron Age pottery, a fragment of quernstone and a small quantity of burnt flint and fired clay were also recovered from this feature. The quernstone is in a moderately coarse greensand with a central spindle recess and a worn surface with concentric grooves. Comparable Iron Age rotary querns are recorded at Danebury (Brown 1984, fig. 7.53). Greensand is a commonly exploited stone type for the area and one of the many possible quarries known to have been exploiting this resource during the Iron Age period was the Lodsworth quarry in West Sussex (Peacock 1987).	Late Bronze Age/early Iron Age
SU 7797 1016	Stoughton	F97: part of a north-south aligned lynchet which followed the natural contours of the slope. Formed from a friable light creamy-brown silty clay with frequent chalk fragments and flint inclusions.	Unknown
SU 7798 1016	Stoughton	F113: shallow undated pit c. 1.00m in diameter x 0.20m depth and filled with a mid grey-brown clay silt.	Unknown
SU7820 1010	Stoughton	Lordington House site – see main text	?Romano-British
SU 7858 0978	Stoughton	F127: a linear feature noted in pipe trench section c. 6.00m wide x 1.0m m deep and filled with a mid grey-brown clay silt	Undated
SU 7860 0950	Stoughton	Walderton Down site – see main text	Late Bronze Age – middle/late Anglo Saxon
SU 7890 0905	Stoughton	A concentration of small poorly defined features, which were burnt or charred in appearance which lay to the north of Hares Lane (F201, F205, F207, F208, F210, F218, F222, F224). Features are thought to represent burnt-out tree or shrub stumps. 17 sherds of late Bronze Age/early Iron Age pottery were recovered.	Unknown

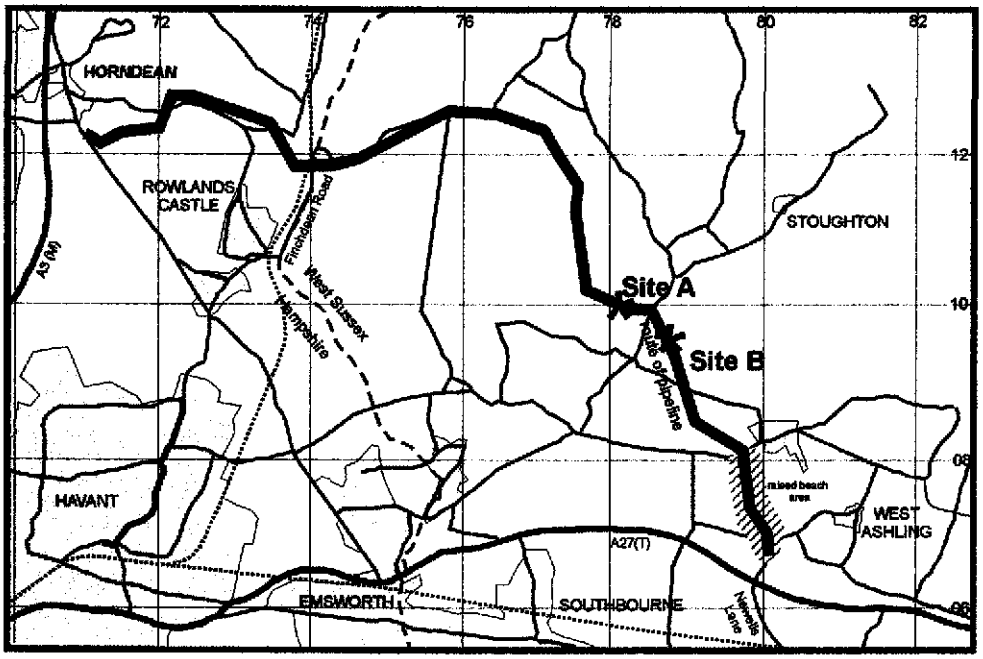

Fig. 1: Location of the pipeline route between Horndean (Hampshire) and Newells Lane, (West Sussex)

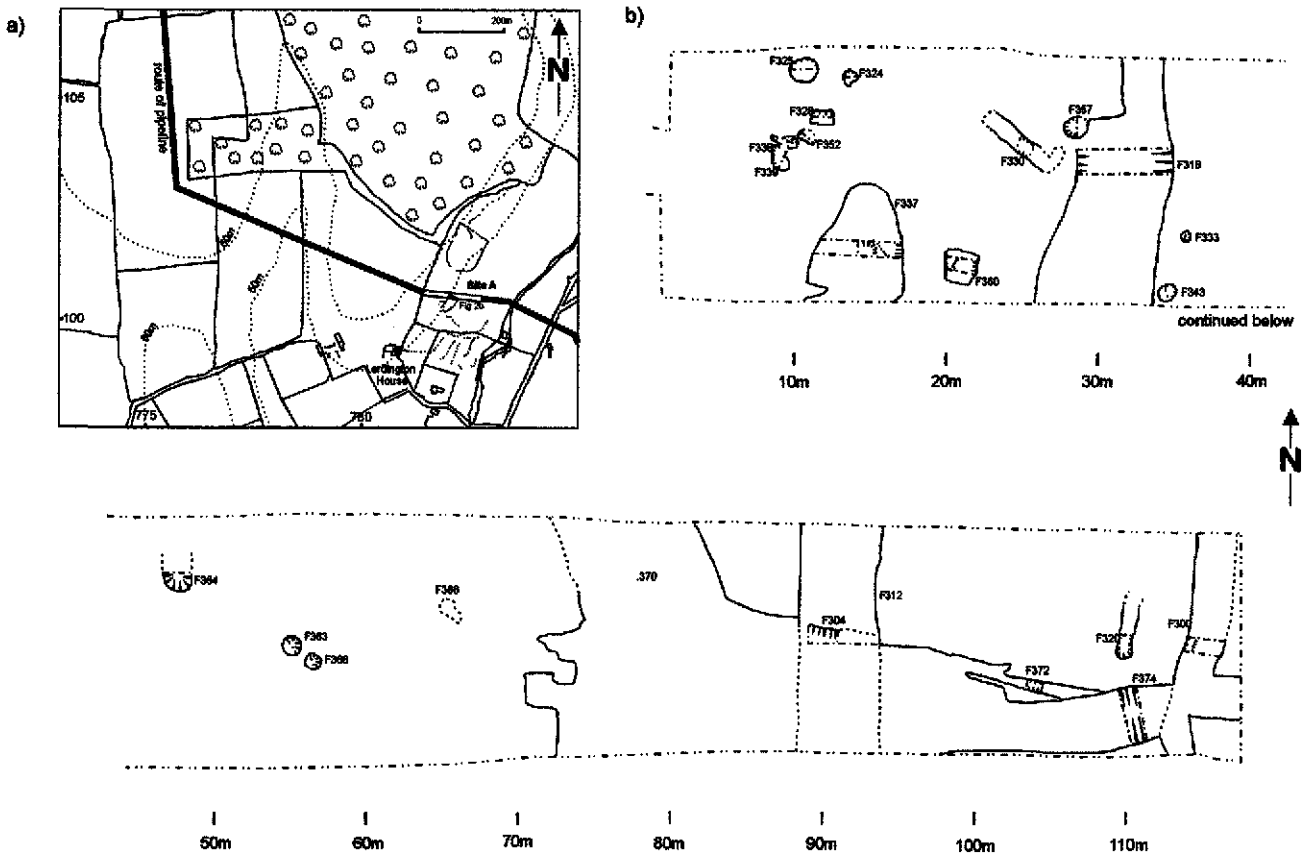

Fig. 2: Lordington House: Site location and plan of excavation area

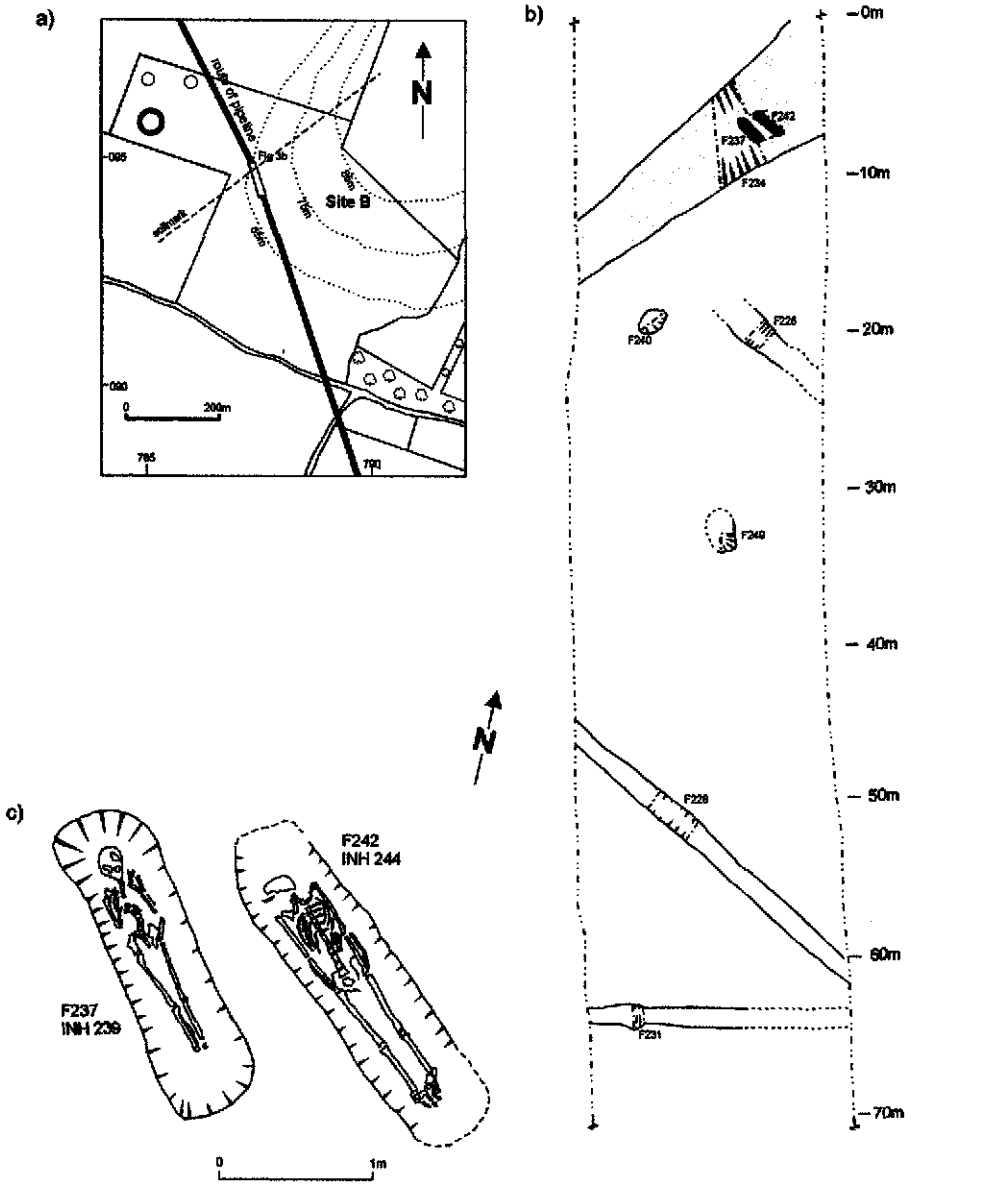

Fig. 3: Walderton Down:
Site location and plan of principal features

Plate 1: Inhumation INH 239

Plate 2: Inhumation INH 244

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GEOPHYSICAL SURVEY
REPORT 2000/124

Horndean to Newells Lane Gas Pipeline

Hampshire

Client:

RSK
ENVIRONMENT

SITE SUMMARY SHEET

2000 / 124 Horndean to Newells Lane Gas Pipeline
Hampshire

NGR: SU 710 123 to SU 801 067

Location, topography and geology

The proposed pipeline route extends from just east of Horndean, Hampshire, and continues southeast approximately 16km to Newells Lane, which lies 1km southwest of the village of West Ashling, West Sussex. The topography is undulating and the ground cover was a mixture of pasture, plough, recently seeded crop and stubble. In general, the soils traversed are brown earths, although there is a marked difference in parent geology and texture between the eastern and western ends of the pipeline corridor. The western half comprises palaeo-argillic brown earths formed from plateau drift, and brown calcareous earths formed from chalky drift. These soils consist of well drained fine silts and clays. The eastern half of the study corridor encompasses shallow brown rendzinas over chalk, and well drained, coarse argillic brown earths formed from Jurassic sands; these may tend towards podsolization locally (SSEW, 1983).

Archaeology

A number of archaeological sites are known to exist along the proposed gas pipe route. While these include ring ditches and cropmark enclosures of differing periods, there is little evidence for the route directly crossing any of these features.

Aims of Survey

The objectives of survey are to investigate the whole of the corridor using fluxgate gradiometer scanning and to assess potentially archaeologically significant anomalies using detailed gradiometer survey. This survey forms part of a wider investigation by **RSK Environment Limited**, on behalf of **Transco**, in advance of construction of a proposed gas pipeline.

Summary of Results *

Scanning with the fluxgate gradiometer found that the background magnetic response was very low and few anomalies of archaeological potential were noted. On the basis of the scan and information from the local Sites and Monuments Record, six areas were identified for detailed survey.

In general, detailed survey supported the results of the scanning. The magnetic background was low and few anomalies of definitive archaeological interest were found. Some linear responses were detected which may reflect a field system of unknown date. No concentrations of anomalies indicative of settlement were noted.

*** It is essential that this summary is read in conjunction with the detailed results of the survey.**

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SURVEY RESULTS

2000 / 124 Horndean to Newells Lane Gas Pipeline Hampshire

1. Survey Area

1.1 The whole of the available route was scanned using fluxgate gradiometers along traverses *c.*10m apart within a 20m wide corridor, totalling 32ha. Six areas were chosen for detailed survey based on the result of the scan and recorded archaeology which totalled 3.2ha.

1.2 The survey grids were set out by **GSB Prospection** between white pipeline marker stakes where available and tied in to existing field boundaries using tapes. It must be noted that the position of some of the stakes in the field differed from the route shown on the available maps. Where a difference was found the position of the stakes was used. Detailed tie-in information has been lodged with the client.

2. Display

2.1 The entire length of the proposed pipeline route and the six areas of detailed survey are shown in Figure 1 at a scale of 1:25000.

2.2 Summary greyscale images and interpretation diagrams have been produced for each of the detailed survey areas (Figures 2-13).

2.3 The results are also displayed as XY traces and dot density plots, with individual interpretation diagrams at a scale of 1:625. Area 6 has been subdivided for ease of display (Areas 6A-6D). These display formats are discussed in the *Technical Information* section at the end of the text.

3. General Considerations - Complicating factors

3.1 The survey areas were either pasture, plough, seeded or stubble. As a result, the conditions were good for survey, although heavy rain around the time of the work produced difficult walking conditions.

3.2 The variation between parent geologies encountered along the survey corridor may be expected to produce differences between geophysical data sets, principally in terms of the background level of magnetic response but also in terms of the quality of the gradiometry results. Whilst good results would be expected over the chalks, results over the coarser soils would tend to be poorer, with the soils of the western half being 'intermediate'.

3.3 A number of isolated ferrous responses are noted in the data which may be objects of archaeological interest, although a modern origin is more credible. The most prominent of these are noted on the interpretation diagrams.

3.4 Some fields along the pipeline route were not surveyed due to livestock or flooding. These are indicated on Figure 1.

4. Results of Scanning

4.1 With gradiometers in scanning mode, the evaluation area was examined along traverses spaced at intervals of approximately 10m. During this operation, fluctuations in magnetic signal were observed on the instruments' display panel. Any significant variations were investigated more closely to determine their likely origin.

4.2 In general the fields were found to be magnetically very quiet, with the background being in the order of +/- 0.5 nT. Six areas along the length of the pipe were chosen for detailed survey. These areas will be discussed starting from the northern (Horndean) end of the proposed pipeline.

5. Results of Detailed Survey

Area 1

An isolated Roman glass bead was found in this field.

5.1 The data collected in this detailed survey are dominated by a zone of disturbance at the eastern end. It was noted at the time of the survey that this coincided with a significant quantity of brick and tile on the surface of the ploughed field. The responses are typical of such fired material.

5.2 Elsewhere in the field the background is noticeably low, with occasional ferrous type responses, the most significant of which are due to a metal fence at the eastern end of the survey. A number of trends, both positive and negative, can be identified in the data. It is likely that they are the result of recent ploughing.

Area 2

5.3 The northern end of the survey contains a strong linear response that crosses the proposed pipeline. However, a modern track can be found on the Ordnance Survey (OS) map at this point and it is assumed that this anomaly is the result of this feature.

5.4 A few other weak anomalies have been found. They are largely the result of ploughing or other agricultural agencies. Four anomalies of possible archaeological interest have been suggested on the interpretation, but they lack any context and their origin is therefore uncertain.

Area 3

5.5 At the western end of this area is a series of ferrous responses, some of which are the result of barbed wire in the adjacent hedge.

5.6 Within the central portion of the area are a few weak archaeological type anomalies, although they have no clear form and could equally be natural in origin. Toward the eastern edge is a broad low level response that coincides with a pronounced topographic hollow.

5.7 Several weak linear responses have been identified and are most likely to be the result of recent agricultural activity.

Area 4

5.8 The clearest anomaly in the data from Area 4 is a ditch type anomaly within the central portion of the survey. There are few other anomalies of potential archaeological interest within the data set and it is believed that the linear anomaly may reflect a former field boundary.

5.9 A number of weak trends can be seen in the greyscale image but it is likely that they are a result of ploughing.

Area 5

Cropmark enclosures have been noted to the north of the pipeline route at this point.

5.10 The data in Area 5 contain a number of responses indicating the presence of ferrous material. However, at the western end of the area are a few weak linear anomalies that may be of archaeological interest. These anomalies may indicate the presence of ditch features, although their magnetically weak nature makes this interpretation tentative.

5.11 The various trends could be the result of ploughing or natural variation in the subsurface.

Area 6

Prehistoric pottery and burnt flint have been located along this stretch of the proposed pipeline route. Aerial photographs show ring ditch cropmarks approximately 100m to the west of Area 6D.

5.12 This data set is dominated by a classic positive-negative response of a ferrous pipe. Directly to the south of the pipe are two putative ditch anomalies which may form a right-angled corner outside of the survey area. However, the fact that the anomalies appear to terminate at the pipe must make the interpretation more cautious; it is more likely that the linear responses result from former field boundaries or drains. An area of magnetic disturbance immediately to the north of the pipe may be linked to the excavation of the pipe trench or debris associated with a former field boundary.

5.13 A parallel linear response to the south appears to be more broad and weak, which may reflect a ploughed out ditch or a natural feature. However, the anomaly is parallel to one of the other linear responses and most probably forms part of a field system of unknown date.

5.14 A number of weak trends can be seen throughout the data for this area. Most of the responses appear to be parallel with the proposed field system / boundaries identified above, and are likely to represent ploughing.

5.15 Numerous pit type responses have been detected that may be of interest. However, they are not within a clear archaeological context and could equally represent natural variations in the subsoil. A concentration pit type anomalies and ferrous responses can be seen in Area 6B near the centre of this field. Therefore, some of the pit type anomalies could represent more deeply buried ferrous debris.

6. Conclusions

6.1 Scanning using fluxgate gradiometers found few areas of potential archaeological anomalies. On the basis of the scan and information from the local SMR, six areas were identified for detailed survey.

6.2 Detailed survey largely substantiated the findings of the scanning, that is, a low magnetic background and no concentrations of archaeological type anomalies. A few of the areas provided evidence for ditch and pit features. Those noted in Areas 4 and 6 are thought to relate to previous field systems. Survey did not locate any concentrations of anomalies indicative of settlement within the pipeline corridor.

Project Co-ordinator: L Harvey
Project Assistants: Dr C Gaffney, C Martinez, F Robertson and A Shields

Date of Survey: 4th December 2000
Date of Report: 12th January 2001

References:

SSEW, 1983. *Soils of England and Wales, Sheet 6, South East England.* Soil Survey of England and Wales.

TECHNICAL INFORMATION

The following is a description of the equipment and display formats used in **GSB Prospection (GSB)** reports. It should be emphasised that whilst all of the display options are regularly used, the diagrams produced in the final reports are the most suitable to illustrate the data from each site. The choice of diagrams results from the experience and knowledge of the staff of **GSB.**

All survey reports are prepared and submitted on the basis that whilst they are based on a thorough survey of the site, no responsibility is accepted for any errors or omissions.

Instrumentation

(a) Fluxgate Gradiometer - Geoscan FM36

This instrument comprises of two fluxgates mounted vertically apart, at a distance of 500mm. The gradiometer is carried by hand, with the bottom sensor approximately 100-300mm from the ground surface. At each survey station, the difference in the magnetic field between the two fluxgates is conventionally measured in nanoTesla (nT), or gamma. The fluxgate gradiometer suppresses any diurnal or regional effects. Generally features up to one metre deep may be detected by this method. Readings are normally logged at 0.5m intervals along traverses 1.0m apart.

(b) Resistance Meter - Geoscan RM15

This measures the electrical resistance of the earth, using a system of four electrodes (two current and two potential.) Depending on the arrangement of these electrodes an exact measurement of a specific volume of earth may be acquired. This resistance value may then be used to calculate the earth resistivity. The "Twin Probe" arrangement involves the paring of electrodes (one current and one potential) with one pair remaining in a fixed position, whilst the other measures the resistance variations across a fixed grid. The resistance is measured in Ohms and the calculated resistivity is in Ohm-metres. The resistance method as used for area survey has a depth resolution of approximately 0.75m, although the nature of the overburden and underlying geology will cause variations in this generality. The technique can be adapted to sample greater depths of earth and can therefore be used to produce vertical "pseudo sections". In area survey readings are typically logged at 1.0m x 1.0m intervals.

(c) Magnetic Susceptibility

Variations in the magnetic susceptibility of subsoils and topsoils occur naturally, but greater enhanced susceptibility can also be a product of increased human/anthropogenic activity. This phenomenon of susceptibility enhancement can therefore be used to provide information about the "level of archaeological activity" associated with a site. It can also be used in a predictive manner to ascertain the suitability of a site for a magnetic survey. Sampling intervals vary widely but are often at the 10m or 20m level. The instrument employed for measuring this phenomenon is either a field coil or a laboratory based susceptibility bridge. The field coil measures the susceptibility of a volume of soil. The laboratory procedure determines the susceptibility of a specific mass of soil. For the latter 50g soil samples are collected in the field. These are then air-dried, ground down and sieved to exclude the coarse earth (>2mm) fraction. Readings are made using an AC-coil and susceptibility bridge, with results being expressed either as SI/kg x 10^{-8} or m^3/kg.

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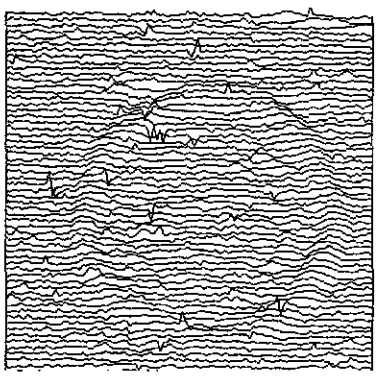
Display Options

The following is a description of the display options used. Unless specifically mentioned in the text, it may be assumed that no filtering or smoothing has been used to enhance the data. For any particular report a limited number of display modes may be used.

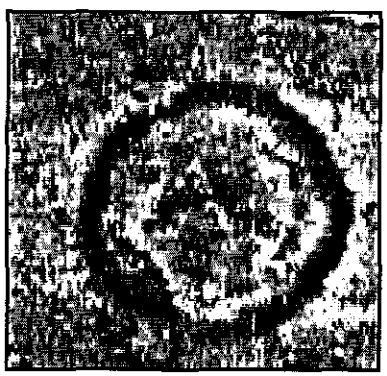
(a) Dot Density

In this display minimum and maximum cut-off levels are chosen. Any value that is below the minimum will appear white, whilst any value above the maximum will be black. Values that lie between these two cut-off levels are depicted with a specified number of dots depending on their relative position between the two levels. Assessing a lower than normal reading involves the use of an inverse plot that reverses the minimum and maximum values, resulting in the lower values being presented by more dots. In either representation, each reading is allocated a unique area dependent on its position on the survey grid, within which numbers of dots are randomly placed. The main limitation of this display method is that multiple plots have to be produced in order to view the whole range of the data. It is also difficult to gauge the true strength of any anomaly without looking at the raw data values. However, this display is favoured for producing plans of sites, where positioning of the anomalies and features is important.



(b) XY Plot

This involves a line representation of the data. Each successive row of data is equally incremented in the Y axis, to produce a stacked profile effect. This display may incorporate a hidden-line removal algorithm, which blocks out lines behind the major peaks and can aid interpretation. The advantages of this type of display are that it allows the full range of the data to be viewed and shows the shape of the individual anomalies. The display may also be changed by altering the horizontal viewing angle and the angle above the plane. The output may be either colour or black and white.



(c) Greyscale

This format divides a given range of readings into a set number of classes. These classes have a predefined arrangement of dots or shade of grey, the intensity increasing with value. This gives an appearance of a toned or grey-scale. Similar plots can be produced in colour, either using a wide range of colours or by selecting two or three colours to represent positive and negative values. While colour plots can look impressive and can be used to highlight certain anomalies, greyscales tend to be more informative.

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Terms commonly used in the graphical interpretation of gradiometer data

Ditch / Pit
This category is used only when other evidence is available that supports a clear archaeological interpretation e.g. cropmarks or excavation.

Archaeology
This term is used when the form, nature and pattern of the response is clearly archaeological but where no supporting evidence exists. These anomalies, whilst considered anthropogenic, could be of any age. If a more precise archaeological interpretation is possible then it will be indicated in the accompanying text.

? Archaeology
The interpretation of such anomalies is often tentative, with the anomalies exhibiting either weak signal strength or forming incomplete archaeological patterns. They may be the result of variable soil depth, plough damage or even aliasing as a result of data collection orientation.

Areas of Increased Magnetic Response
These responses show no visual indications on the ground surface and are considered to have some archaeological potential.

Industrial
Strong magnetic anomalies, that due to their shape and form or the context in which they are found, suggest the presence of kilns, ovens, corn dryers, metal-working areas or hearths. It should be noted that in many instances modern ferrous material can produce similar magnetic anomalies.

Natural
These responses form clear patterns in geographical zones where natural variations are known to produce significant magnetic distortions e.g. palaeochannels or magnetic gravels.

? Natural
These are anomalies that are likely to be natural in origin i.e geological or pedological.

Ridge and Furrow
These are regular and broad linear anomalies that are presumed to be the result of ancient cultivation. In some cases the response may be the result of modern activity.

Ploughing Trend
These are isolated or grouped linear responses. They are normally narrow and are presumed modern when aligned to current field boundaries or following present ploughing.

Trend
This is usually an ill-defined, weak or isolated linear anomaly of unknown cause or date.

Areas of Magnetic Disturbance
These responses are commonly found in places where modern ferrous or fired materials are present e.g. brick rubble. They are presumed to be modern.

Ferrous Response
This type of response is associated with ferrous material and may result from small items in the topsoil, larger buried objects such as pipes or above ground features such as fencelines or pylons. Ferrous responses are usually regarded as modern. Individual burnt stones, fired bricks or igneous rocks can produce responses similar to ferrous material.

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List of Figures

GSB PROSPECTION

PROJECT: 2000/124 Horndean to Newells Lane Gas Pipeline

TITLE: Location Diagram

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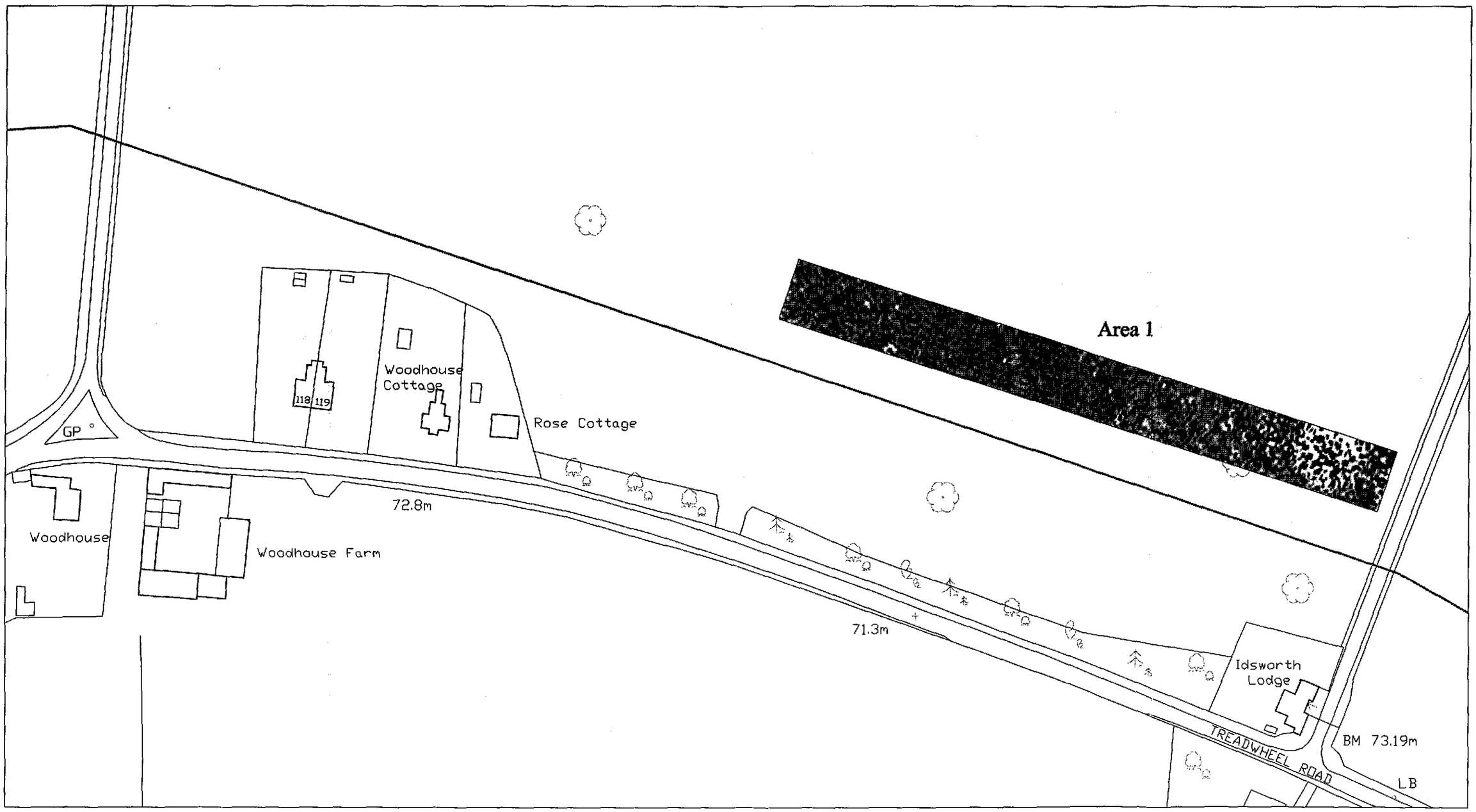
Figure 1

GSB PROSPECTION	PROJECT: 2000/124 Horndean to Newells Lane Gas Pipeline	TITLE: Greyscale - Area 1	Reproduced from Ordnance Survey 1:10,000 Digital Mapping with permission of Her Majesty's Stationery Office, © Crown copyright Licence No. 27304X



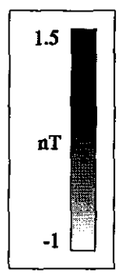
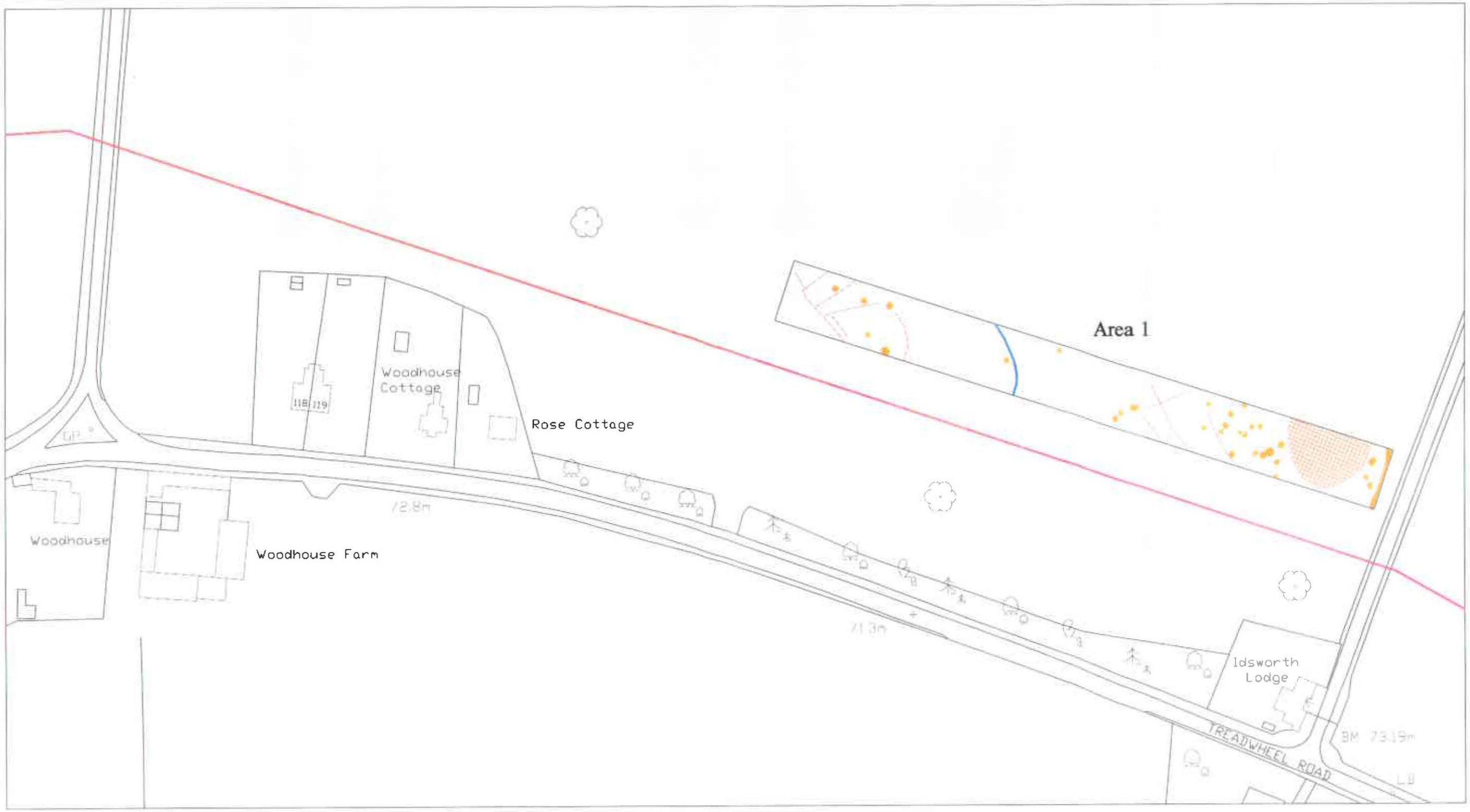


Figure 2

GSB PROSPECTION	PROJECT: 2000/124 Horndean to Newells Lane Gas Pipeline	TITLE: Summary Interpretation - Area 1	Reproduced from Ordnance Survey 1:10,000 Digital Mapping with permission of Her Majesty's Stationery Office, © Crown copyright Licence No. 27304X



Trend

Negative Trend

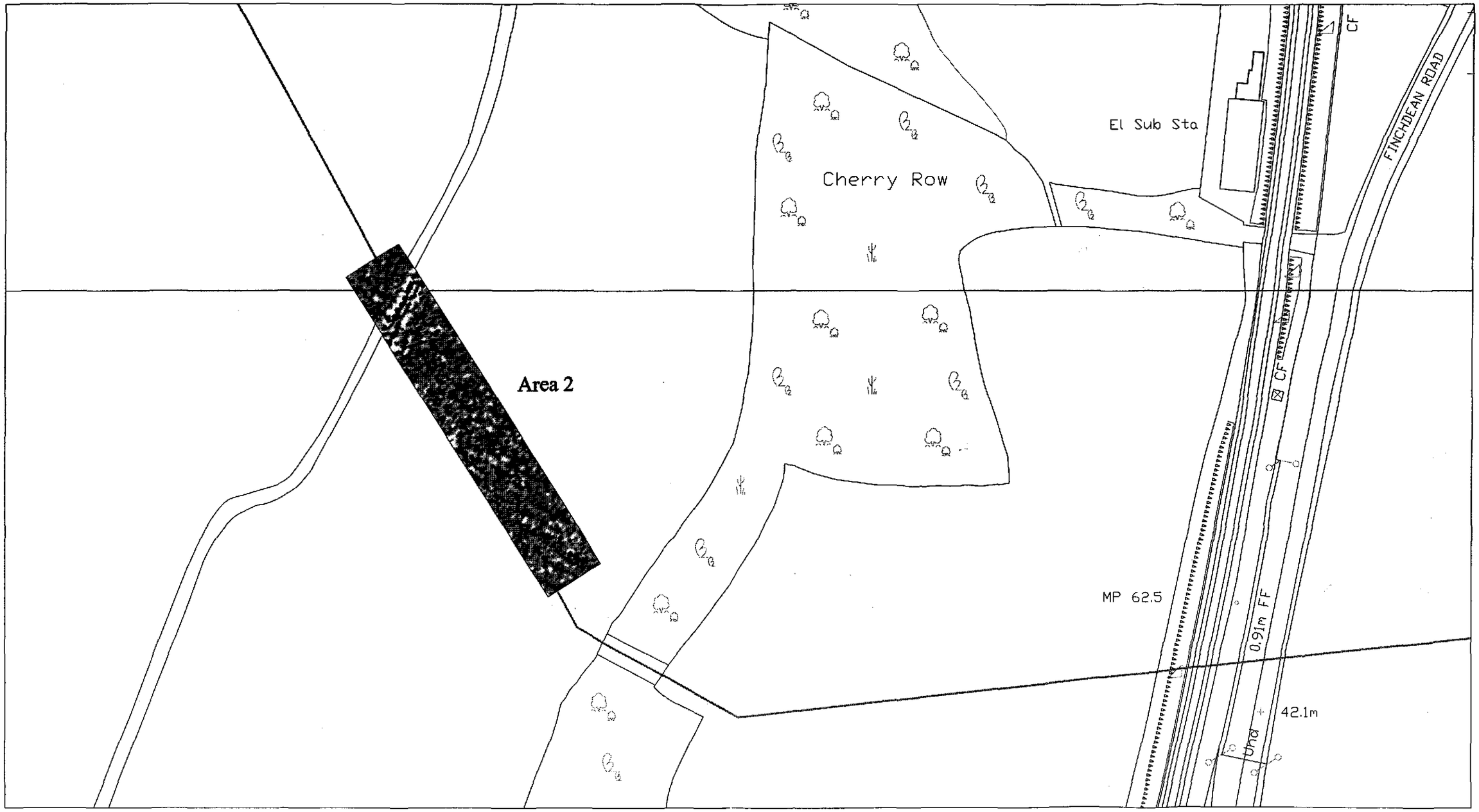
Area of Magnetic Disturbance

Ferrous Response

0 metres 50

Figure 3

GSB PROSPECTION	PROJECT: 2000/124 Horndean to Newells Lane Gas Pipeline	TITLE: Greyscale - Area 2	Reproduced from Ordnance Survey 1:10,000 Digital Mapping with permission of Her Majesty's Stationery Office, © Crown copyright Licence No. 27304X



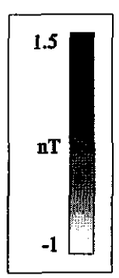


Figure 4

GSB PROSPECTION	PROJECT: 2000/124 Horndean to Newells Lane Gas Pipeline	TITLE: Summary Interpretation - Area 2	Reproduced from Ordnance Survey 1:10,000 Digital Mapping with permission of Her Majesty's Stationery Office, © Crown copyright Licence No. 27304X

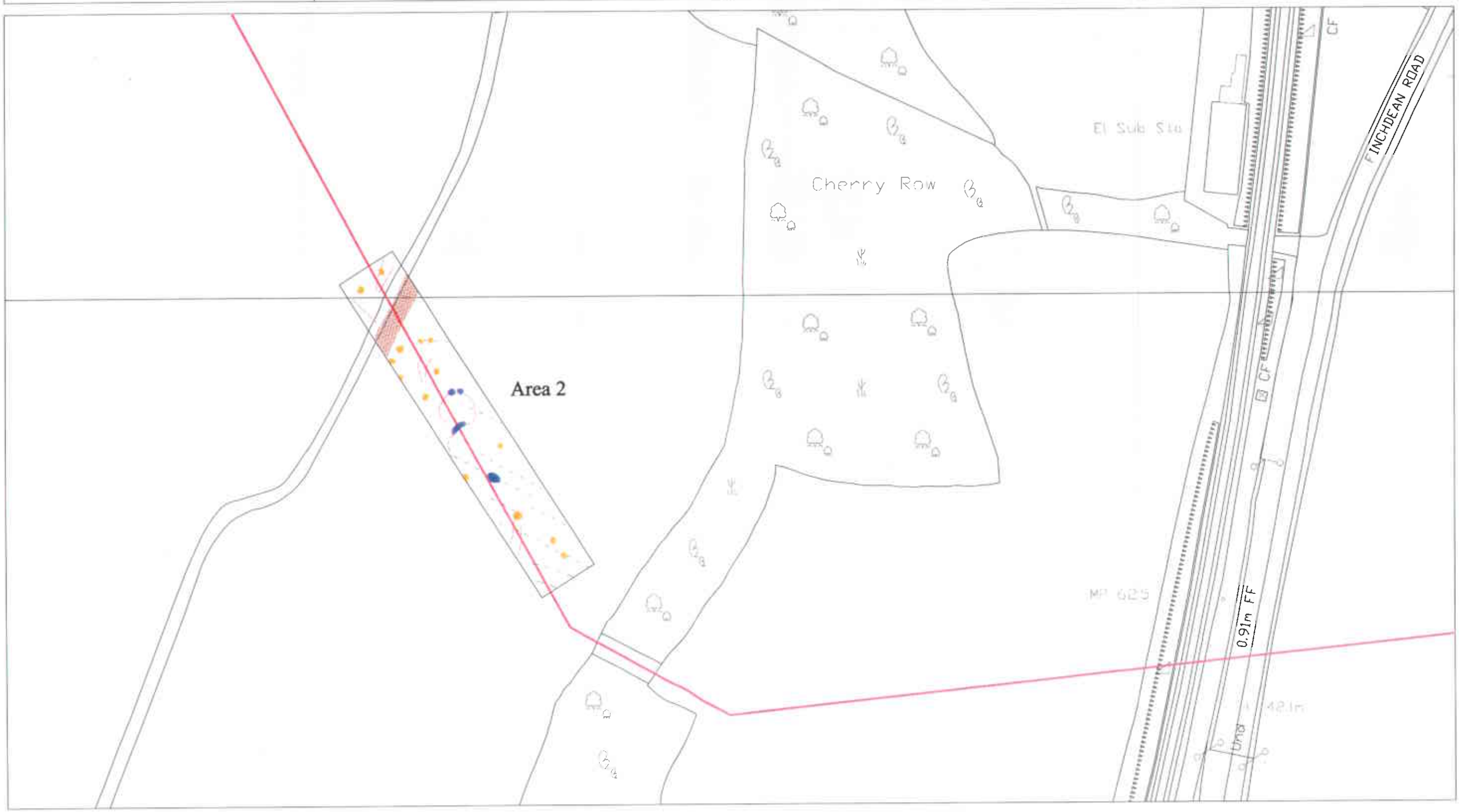


Figure 5

GSB PROSPECTION	PROJECT: 2000/124 Horndean to Newells Lane Gas Pipeline	TITLE: Greyscale - Area 3	Reproduced from Ordnance Survey 1:10,000 Digital Mapping with permission of Her Majesty's Stationery Office, © Crown copyright Licence No. 27304X

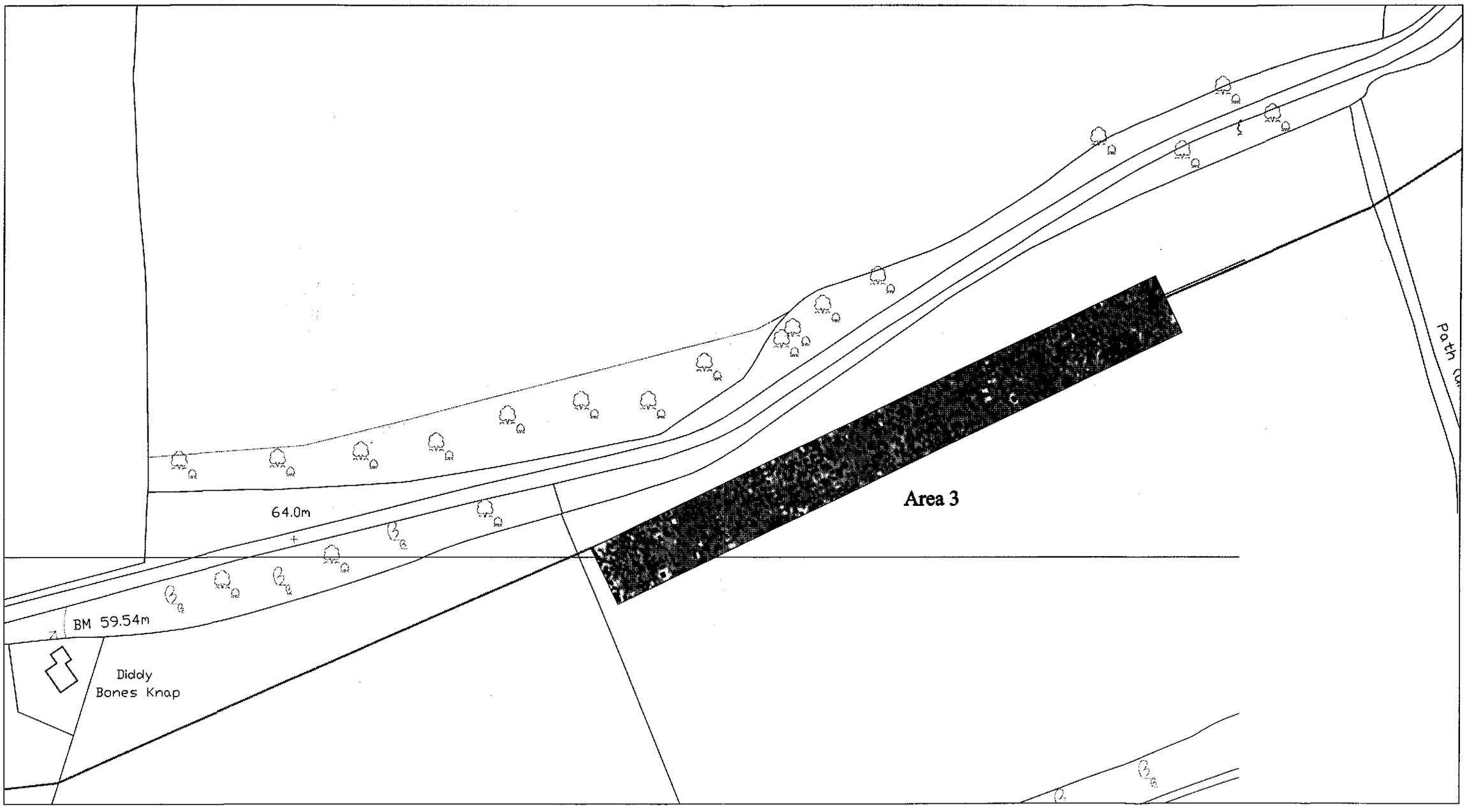
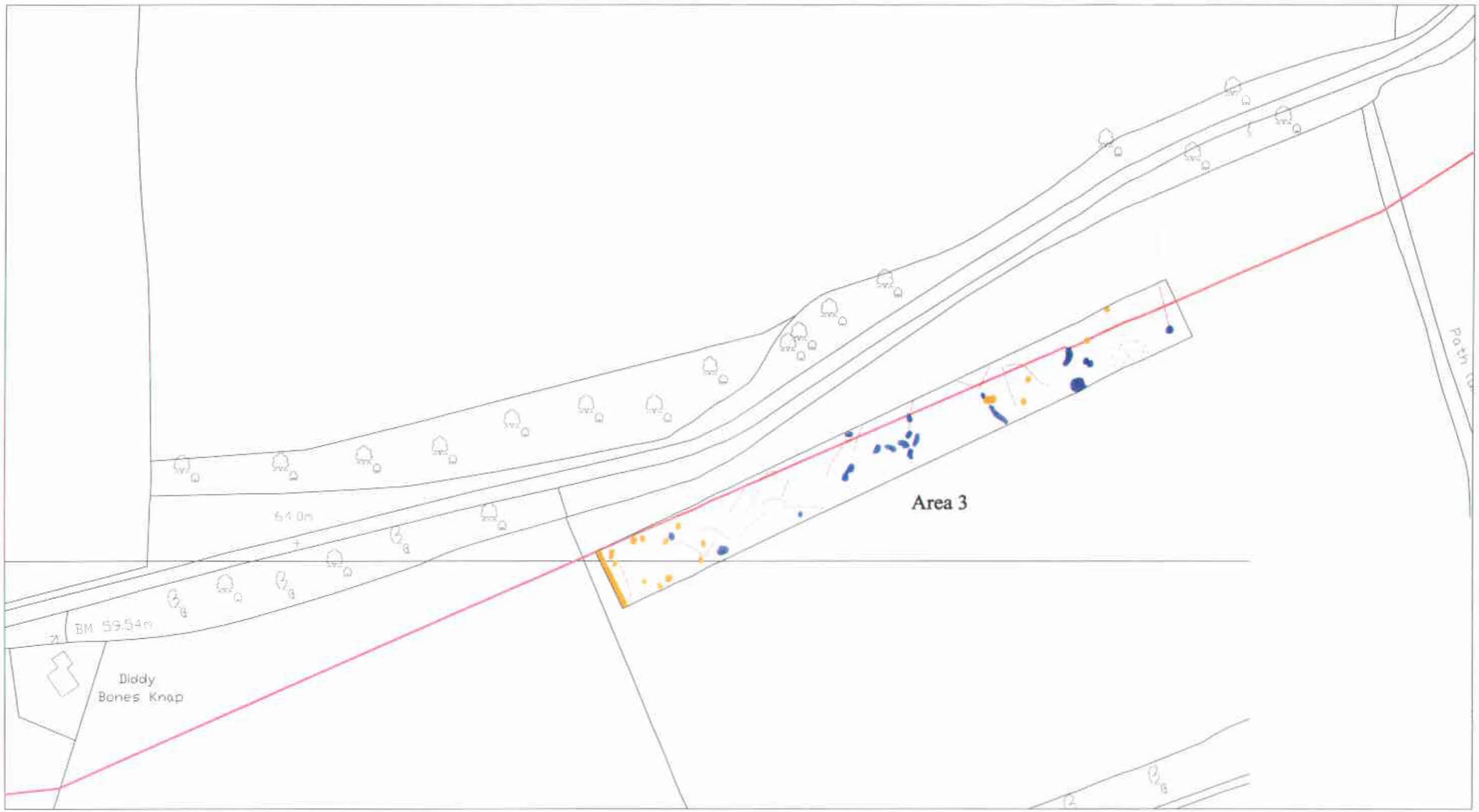


Figure 6

GSB PROSPECTION	PROJECT: 2000/124 Horndean to Newells Lane Gas Pipeline	TITLE: Summary Interpretation - Area 3	Reproduced from Ordnance Survey 1:10,000 Digital Mapping with permission of Her Majesty's Stationery Office, © Crown copyright Licence No. 2730MX



?Archaeology

Trend

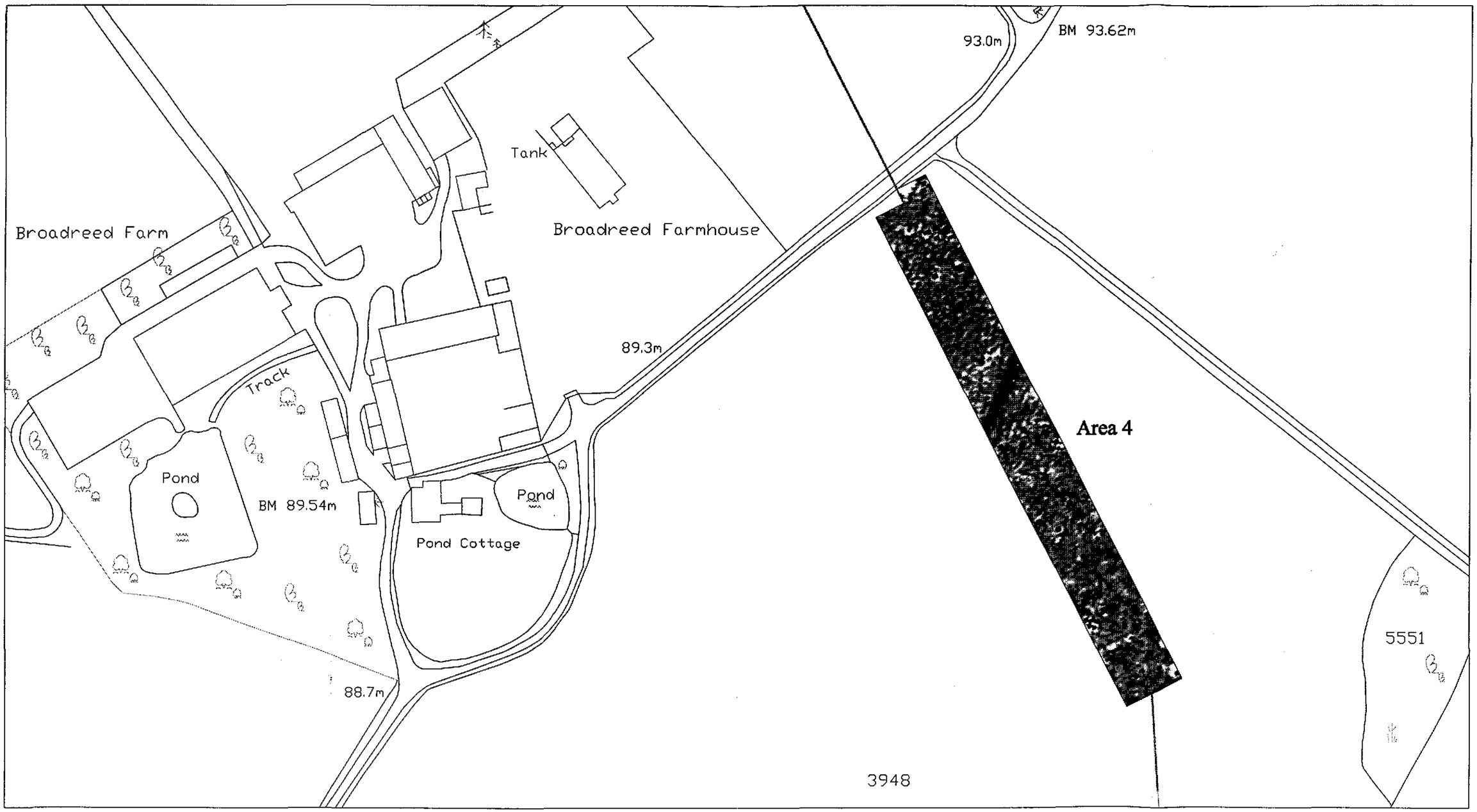
Topographic Effect

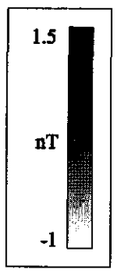
Ferrous Response

0 metres 50

Figure 7

GSB PROSPECTION	PROJECT: 2000/124 Horndean to Newells Lane Gas Pipeline	TITLE: Greyscale - Area 4	Reproduced from Ordnance Survey 1:10,000 Digital Mapping with permission of Her Majesty's Stationery Office, © Crown copyright Licence No. 27304X





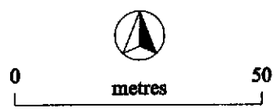
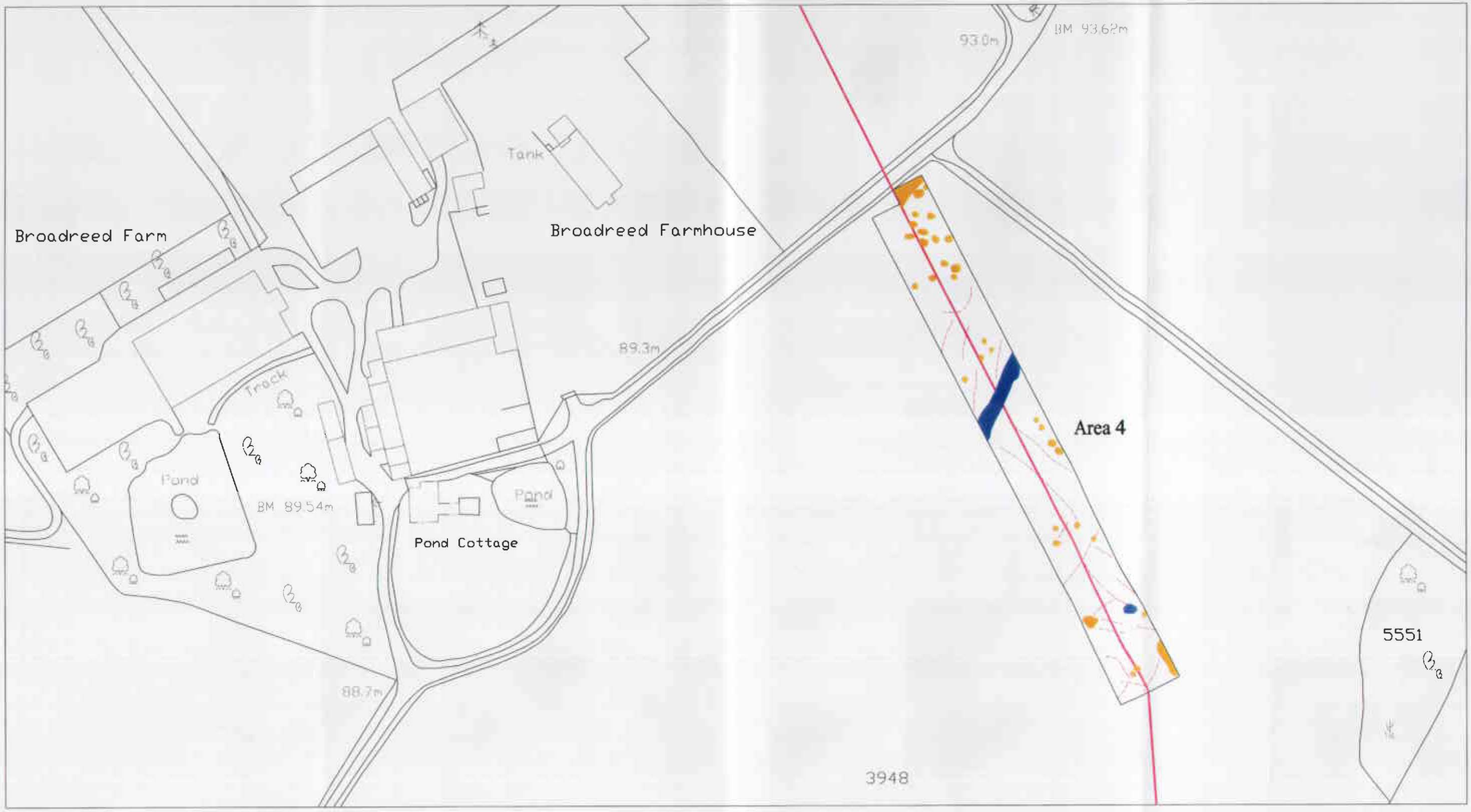


Figure 8

GSB PROSPECTION	PROJECT: 2000/124 Horndean to Newells Lane Gas Pipeline	TITLE: Summary Interpretation - Area 4	Reproduced from Ordnance Survey 1:10,000 Digital Mapping with permission of Her Majesty's Stationery Office, © Crown copyright Licence No. 27304X



?Archaeology

Trend

Ferrous Response

0 metres 50

Figure 9

GSB PROSPECTION	PROJECT: 2000/124 Horndean to Newells Lane Gas Pipeline	TITLE: Greyscale - Area 5	Reproduced from Ordnance Survey 1:10,000 Digital Mapping with permission of Her Majesty's Stationery Office, © Crown copyright Licence No. 27304X

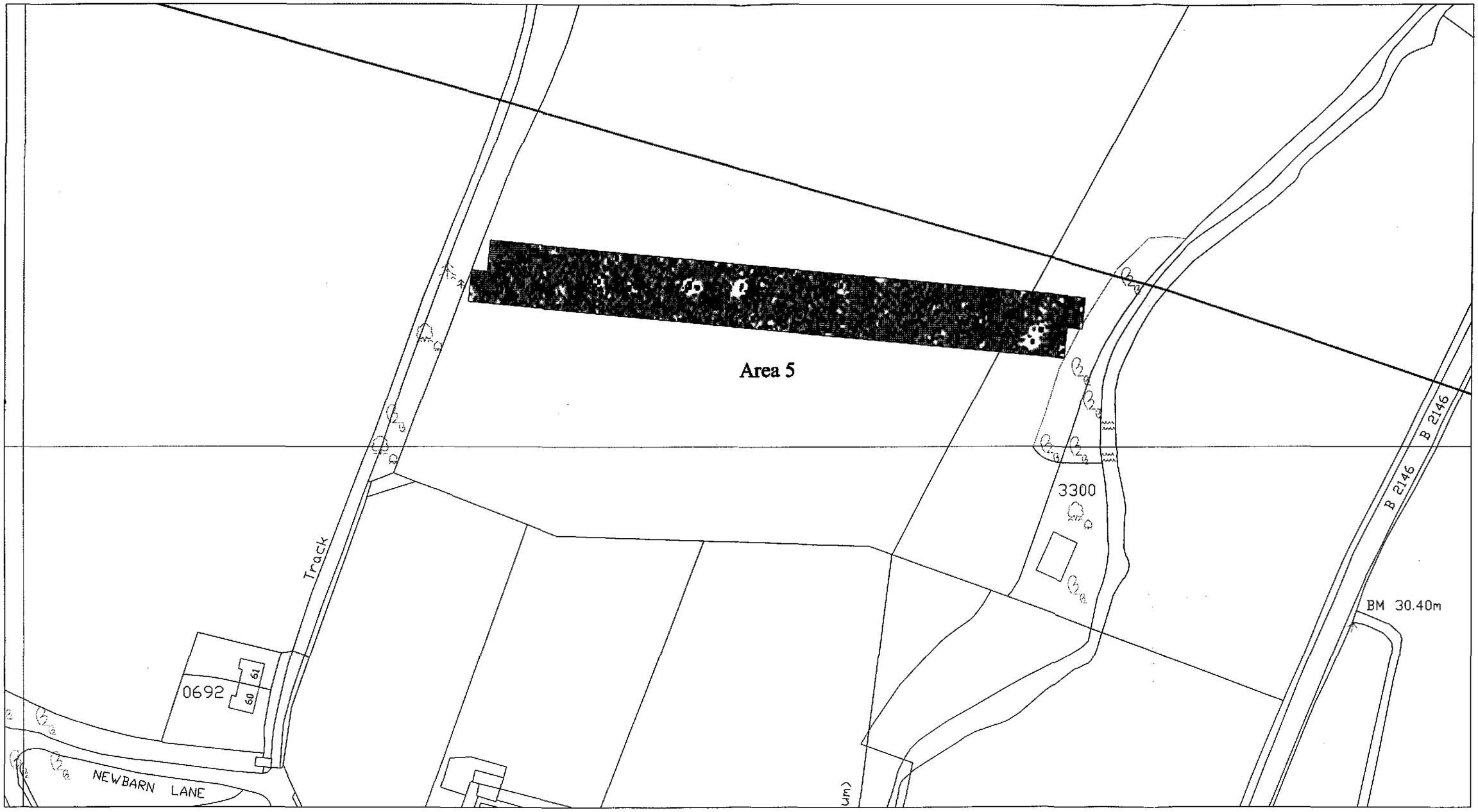


Figure 10

GSB PROSPECTION	PROJECT: 2000/124 Horndean to Newells Lane Gas Pipeline	TITLE: Summary Interpretation - Area 5	Reproduced from Ordnance Survey 1:10,000 Digital Mapping with permission of Her Majesty's Stationery Office, © Crown copyright Licence No. 2730AX

?Archaeology

Trend

Ferrous Response

0 metres 50

Figure 11

GSB PROSPECTION

PROJECT: 2000/124 Horndean to Newells Lane Gas Pipeline

TITLE: Greyscale - Area 6

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1.5

nT

-1

0 metres 80

Area 6D

Area 6C

Area 6B

Area 6A

6222

48.8m

HARES LANE

51.2m

0.91m FF

ED and Ward Bdy

CH

CF

CF

B 2146

B 2146

49.4m

Figure 12

GSB PROSPECTION

PROJECT: 2000/124 Horndean to Newells Lane Gas Pipeline

TITLE: Summary Interpretation - Area 6

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?Archaeology

Trend

Area of Magnetic Disturbance

Ferrous

0 metres 80

Area 6D

Area 6C

Area 6B

Area 6A

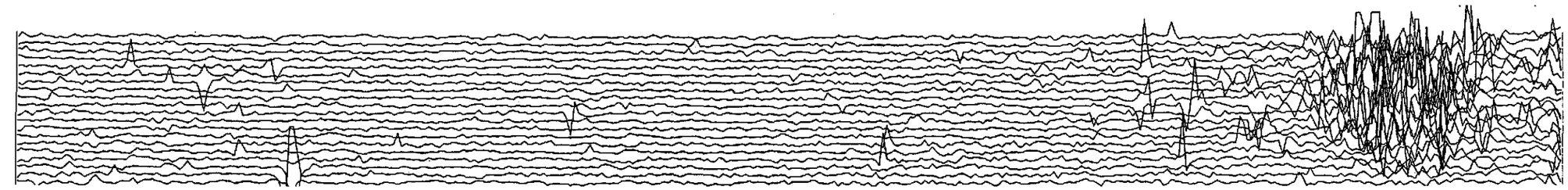
6222

HARE'S LANE

B 2146

Figure 13

HORNDEAN TO NEWELLS LANE GAS PIPELINE
Area 1



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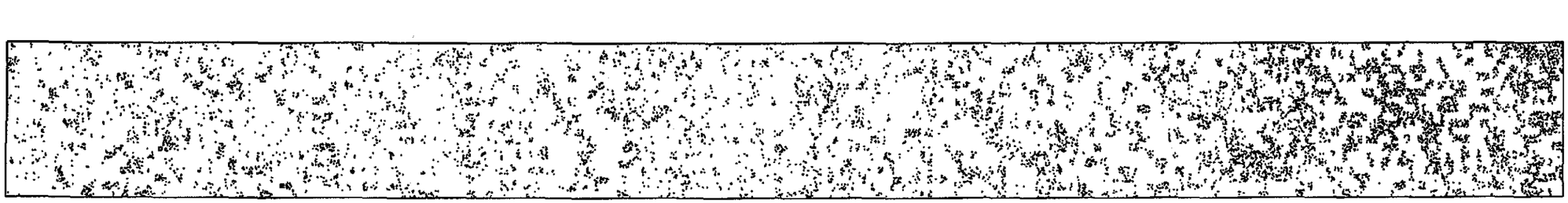

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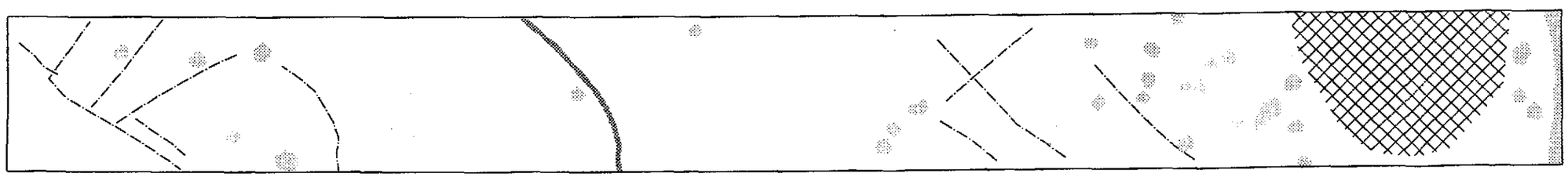


Trend

Negative Trend

Area of Magnetic Disturbance

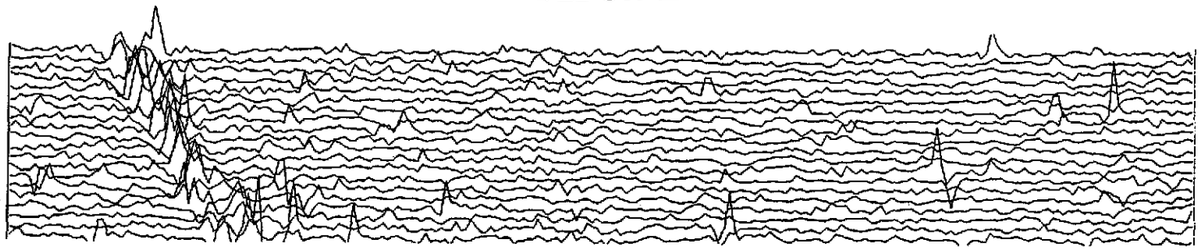
Ferrous Response

0 m 20

GSB Prospection 2000/124

Figure 14

HORNDEAN TO NEWELLS LANE GAS PIPELINE
Area 2



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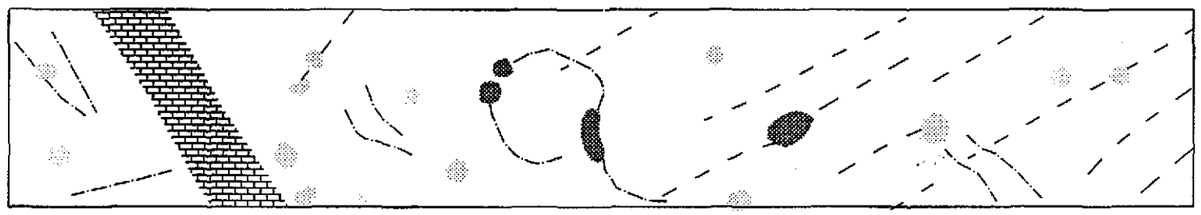
0.1



?Archaeology

Trend

Ploughing Trend

Trackway

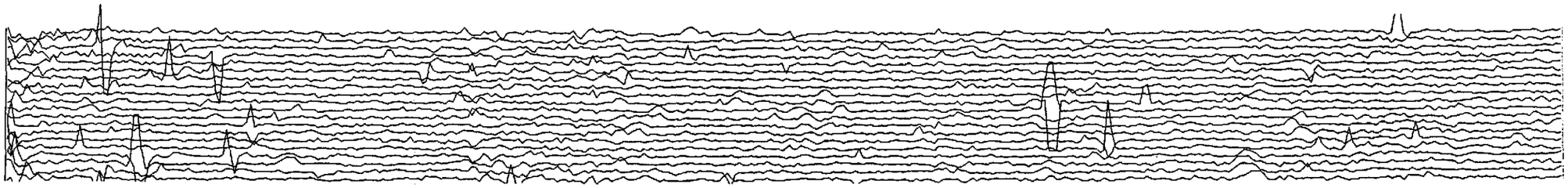
Ferrous Response

0 m 20

GSB Prospection 2000/124

Figure 15

HORNDEAN TO NEWELLS LANE GAS PIPELINE
Area 3



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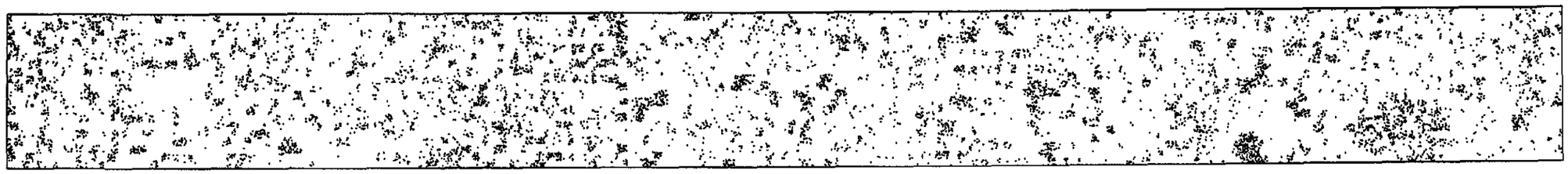

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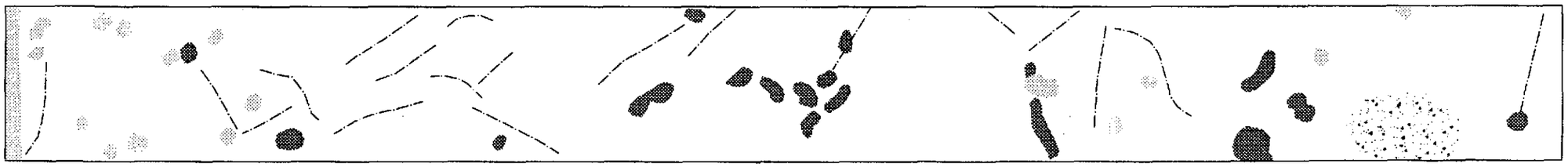


?Archaeology

Trend

Topographic Effect

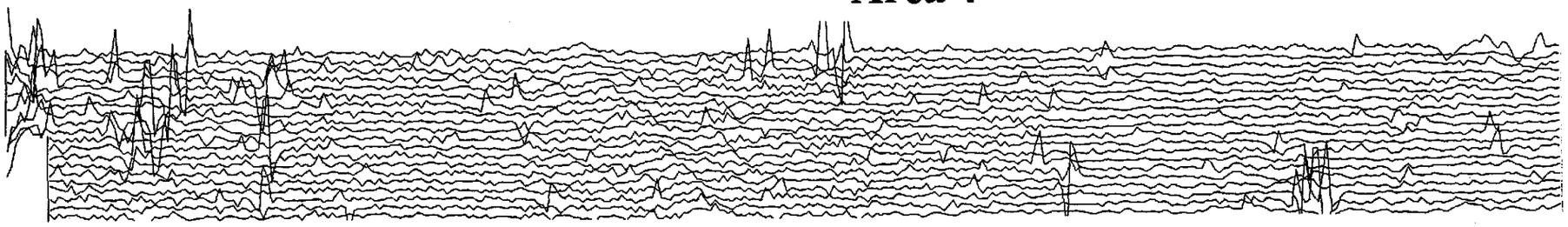
Ferrous Response

0 m 20

GSB Prospection 2000/124

Figure 16

HORNDEAN TO NEWELLS LANE GAS PIPELINE
Area 4



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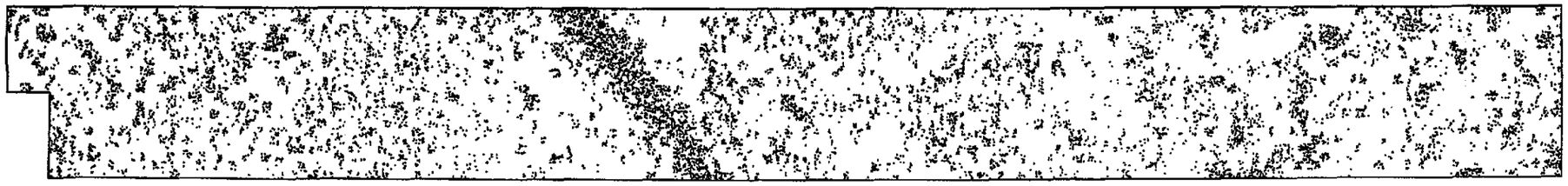
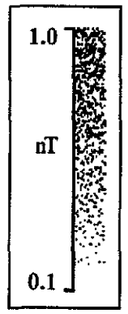
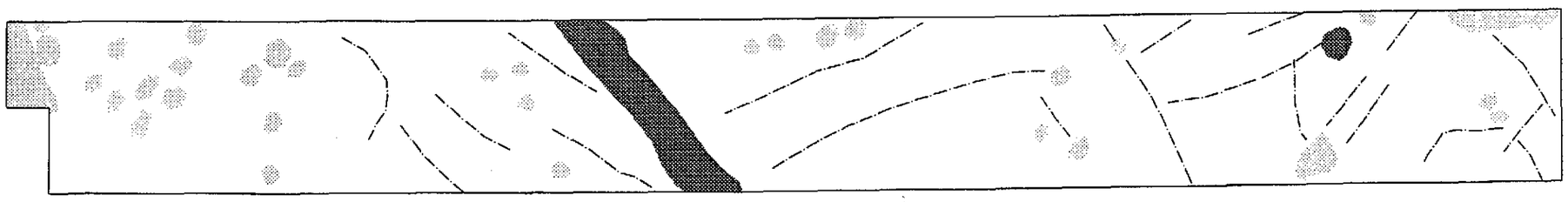






?Archaeology

Trend

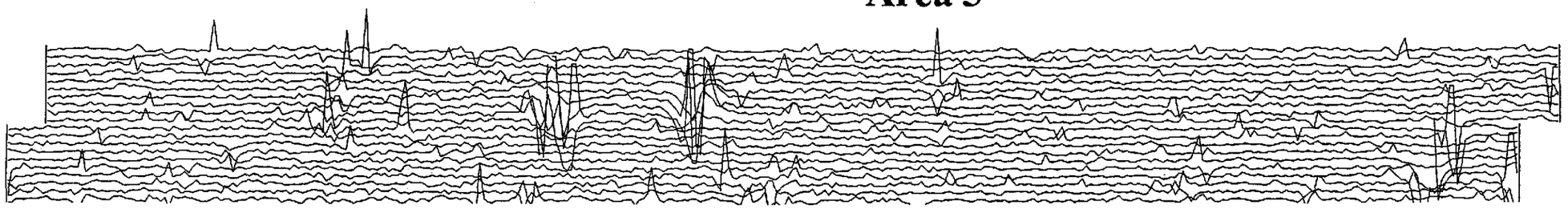
Ferrous Response

0 m 20

GSB Prospection 2000/124

Figure 17

HORNDEAN TO NEWELLS LANE GAS PIPELINE
Area 5



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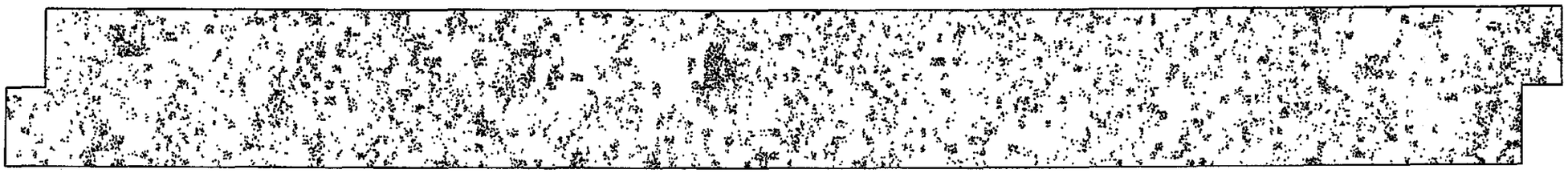

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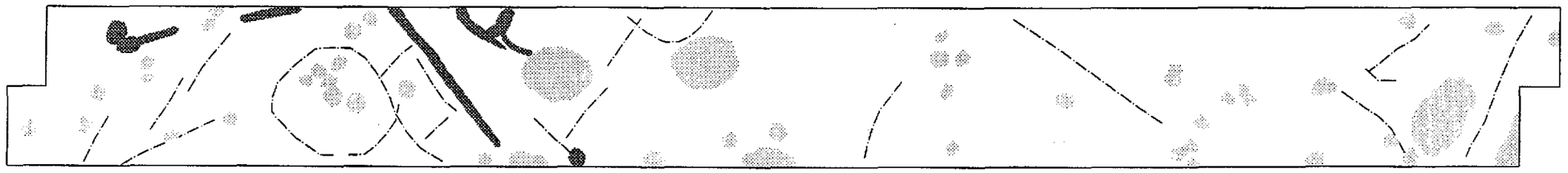


?Archaeology

Trend

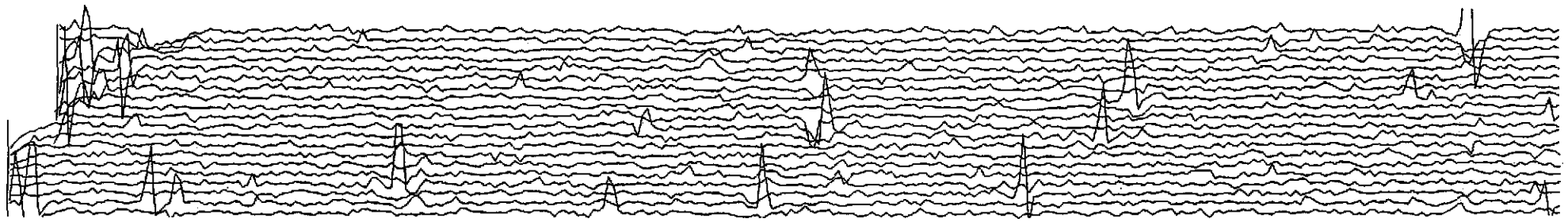
Ferrous Response

0 m 20

GSB Prospection 2000/124

Figure 18

HORNDEAN TO NEWELLS LANE GAS PIPELINE
Area 6A



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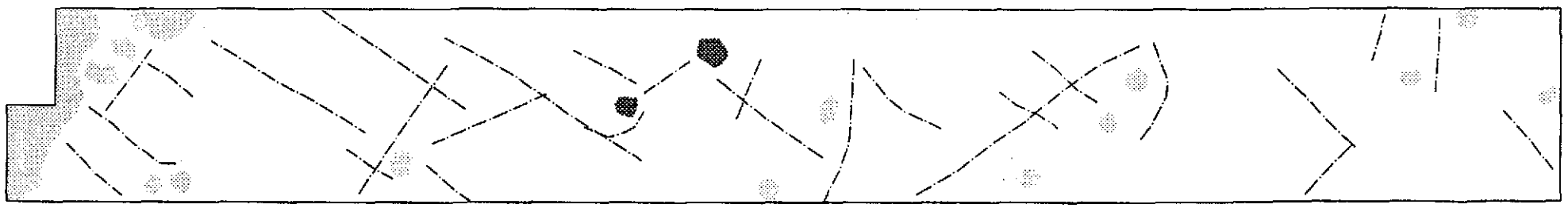


?Archaeology

Trend

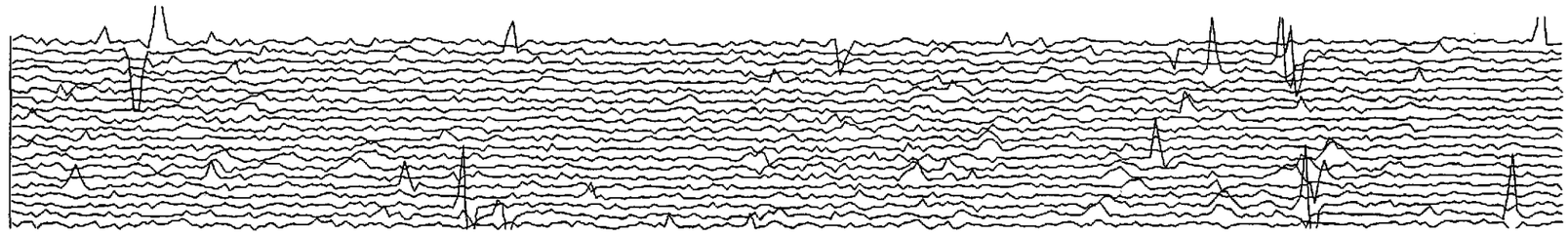
Ferrous Response

0 m 20

GSB Prospection 2000/124

Figure 19

HORNDEAN TO NEWELLS LANE GAS PIPELINE
Area 6B



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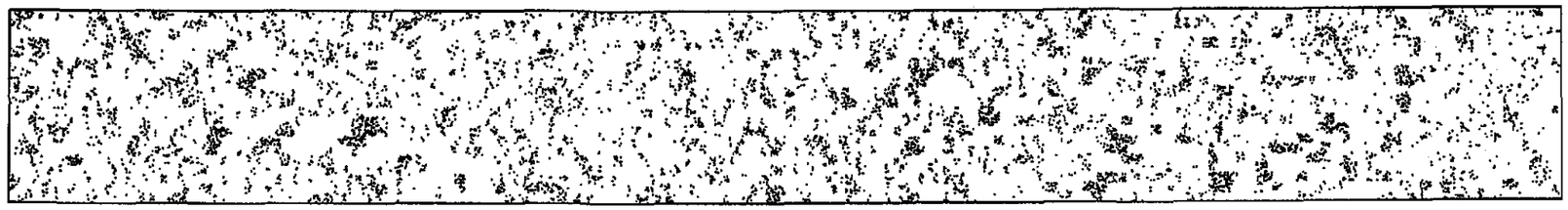

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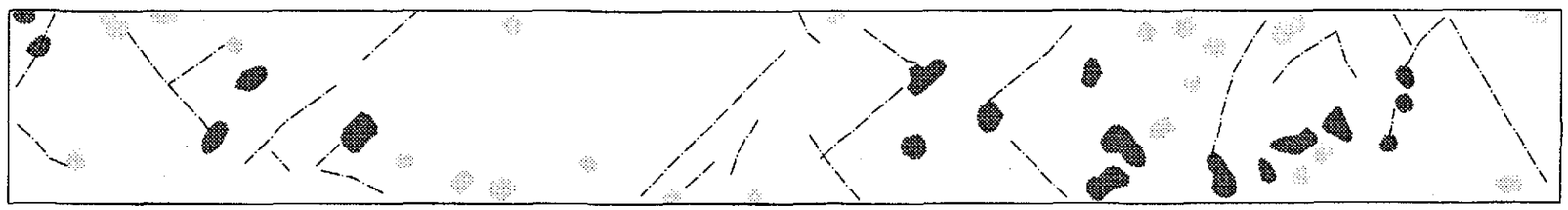


?Archaeology

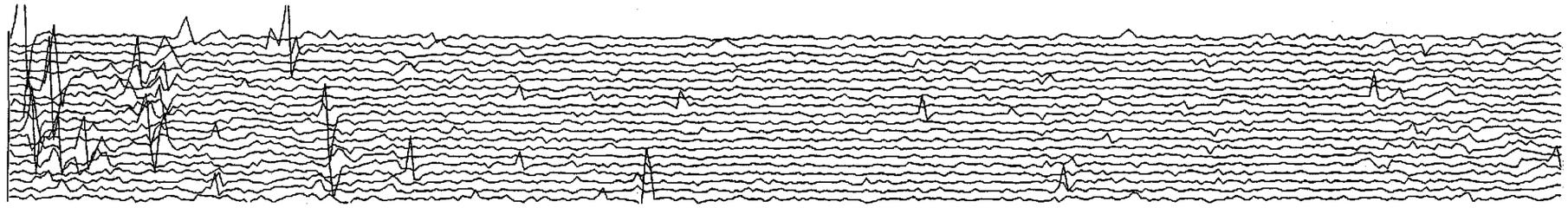
Trend

Ferrous Response

0 m 20

Figure 20

HORNDEAN TO NEWELLS LANE GAS PIPELINE
Area 6C



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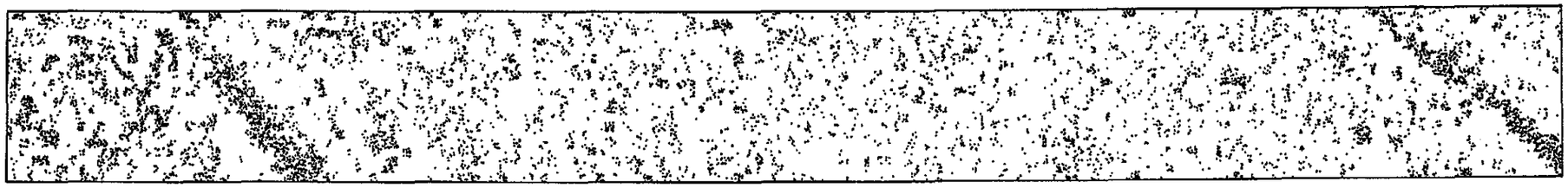

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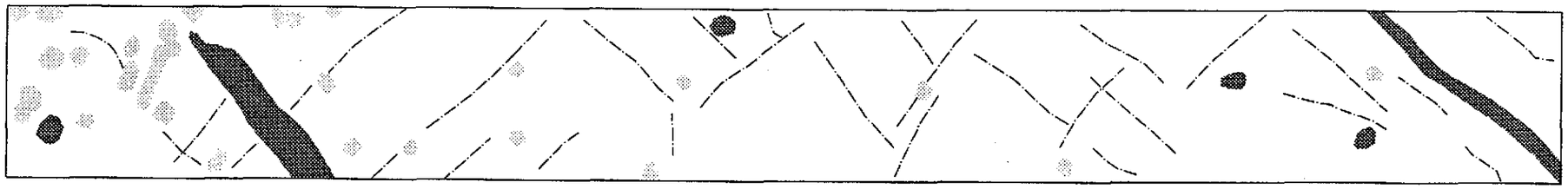


?Archaeology

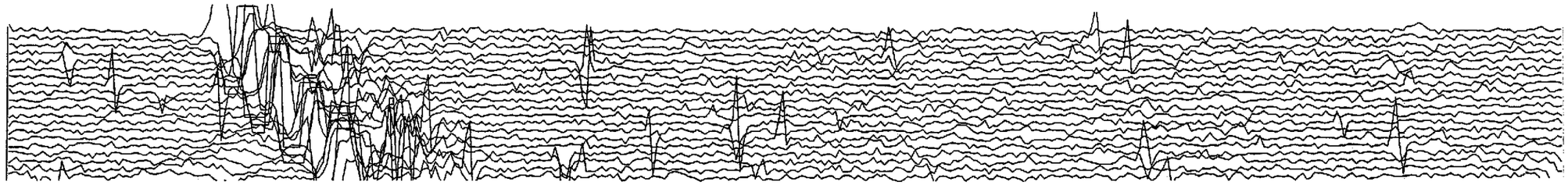
Trend

Ferrous Response

0 m 20

Figure 21

HORNDEAN TO NEWELLS LANE GAS PIPELINE
Area 6D



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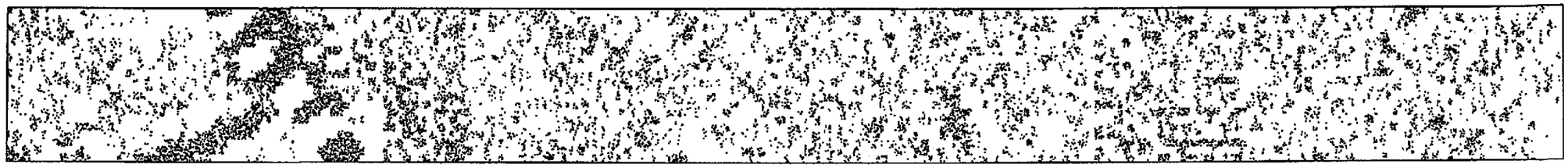

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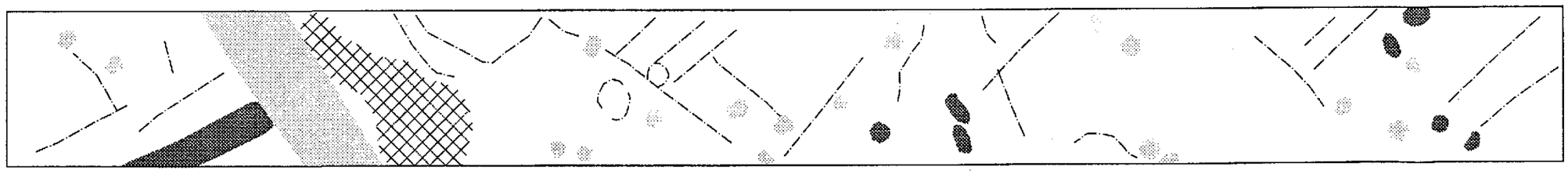

?Archaeology

Trend

Area of Magnetic Disturbance

Ferrous Response

0 m 20

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Figure 22

GSB

PROSPECTION