



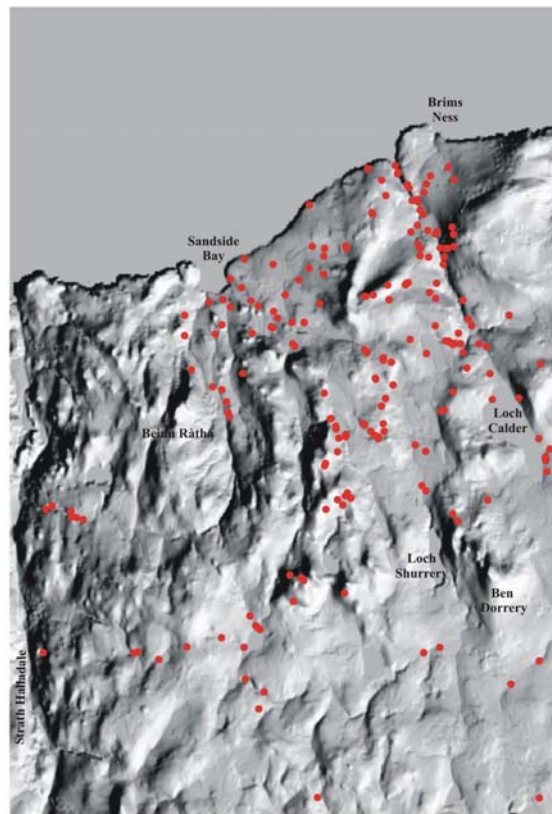
**British  
Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL

BRITISH GEOLOGICAL SURVEY

INTERNAL REPORT IR/04/119

# Caithness-Dounreay Project GIS Development, Update 2004





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Maria del Rio and Clive Auton

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showing major topographic  
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# Foreword

This report documents the development of an ArcView-3.3 GIS interface for the Caithness-Dounreay Project. It updates and amends descriptions of the GIS and its included datasets given in British Geological Survey (BGS) Internal Report IR/02/171R, which dealt with the developments up to November 2002.

The Caithness-Dounreay Project (formerly the Devonian and Quaternary of Caithness Project) includes datasets that have been generated from Commissioned studies, such Quaternary studies of the Dounreay Burn Catchment (Projects ERE 71900035 – 40) completed in 2001 and Dounreay area Petrology and Palynology studies (E 1666R71) all funded by the United Kingdom Atomic Energy Authority (UKAEA). It also includes datasets generated by on-going Science Budget tasks from the Caithness area within the Highlands and Islands Integrated Surveys Project (E 1263S71) and production of a revised 1:50 000 scale geological map of Sheet 115E (Reay) which was co-funded by BGS and UKAEA Dounreay (Projects ECF 7190002403 & ESB 7190002403). All require the digital capture and manipulation of a wide variety of datasets, sourced both from within BGS and externally. Consequently, the Caithness Project GIS has been critical to the efficient indexing, attribution, interrogation and geospatial referencing of data, principally concerned with the Quaternary and Devonian geology of the north eastern portion of the Scottish mainland.

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## Summary

This report describes the development and character of an ArcView-based GIS, principally covering the area of the Devonian and Quaternary of Caithness Project. It lists some 84 individual datasets (themes) that have populated the GIS in the 32 months since its inception. These themes range in character from satellite imagery covering much of NE Scotland, to corporate data sets (such as SOBI) and project-specific data (such as the location of taxonomically identified Devonian fossil fish specimens, within the collections of BGS, Scottish National Museum, the Hunterian Museum, Glasgow and elsewhere).

The report provides metadata on each data set. It explains how each data set has been treated within the GIS environment and how it can be accessed and manipulated by the non specialist user. The report also identifies new datasets that will be added to the GIS as the Project proceeds and describes which existing data sets will be superseded once corporate versions become available. This report essentially provides a 'snap shot' of a moment in time in the evolution of a complex and dynamic assemblage of datasets, that not only continue to grow, but also form the foundations upon which commissioned studies worth several hundreds of thousands of pounds are generated.

# 1 Introduction

One of the main tasks of the Devonian and Quaternary of Caithness Project when it commenced in 2001 was the construction and population of an Index GIS for the whole study area as outlined in Walton and Lee (2001). Since that time, data acquisition has focused on material generated during the resurvey of 1:50 000 scale Sheet 115E (Reay) and, in particular, the ground adjacent to the nuclear facilities at Dounreay. The Index GIS uses a number of geological and topographical datasets. It is accessed principally through an ArcView (©ESRI) interface.

An initial GIS interface, called **Caithnessgis.apr**, was created in 2001 and is continuing to be modified as the project progresses, and new data sets are constantly being added. Section 2 of this report lists and describes the datasets that were incorporated within the GIS up until November 2002. It indicates how they are managed within the GIS and, where appropriate, describes changes in the content, data links and management of individual data sets relative to that described in Internal Report IR/02/171R (del Rio and Auton, 2002). Section 3 mentions other features of the GIS, including the structure and contents of 'top level' folders within **Caithness\_GIS**.

The aim of this document is also to give a clear explanation to the non-specialist user of the types of themes within the GIS and describes how they were derived. It also gives some examples of how themes can be combined to produce new interpretive models of the geology of the project area at both regional and local scales.

## 2 Datasets compiled up to November 2002

The titles of the all of the datasets (themes) listed below follow the format used in the View 1 Table of Contents (TOC) within the GIS. They are listed in the sequence in which they were added to the GIS. All associated files are located on the BGS Murchison House V drive with the path **MHNTS9\V\Lr\IGSN\CAITHNESS\_GEOL\CAITHNESS\_GIS**.

### 2.1 COUNTIES\_SCOTLAND.SHP

This data set covers the whole of the Scottish landmass. It is being used in the project as a backdrop map and to geo-reference the datasets within the Caithness Project area, as defined by Walton and Lee (2001). Most of the remaining datasets cover the Project area alone.

### 2.2 TOPOGRAPHY

Ordnance Survey 1:50k colour topography raster files have been used to create two image catalogues producing reference backdrop maps at scales smaller than 1: 100 000. The individual tiles for these image catalogues, are called directly from **S:/OSdata/50kcolourraster**.

### 2.3 SCOT50K5

This theme shows the 50k scale Geological Sheet boundaries for Scotland (with their labels). This theme was included in the GIS as a guide to the entry of DigMap (V1) 50k solid (Bedrock) and drift (Superficial deposits) geological maps and is used in a similar manner for the entry of



newly digitized geological map data from the resurvey of Sheet 115E (Reay) and also for DigMap (V2) data which has recently become available.

## 2.4 FISHINDEX.DBF

This is a database of named Devonian fish fossils found within palaeontological collections held at BGS, the National Museum of Scotland and the Hunterian Museum, Glasgow. The data is generally restricted to fossil assemblages from sites within the project area and on Orkney.

This data is held as .dbf files under a folder called 'gis data' and they are linked in the GIS through a one to many link. To make queries and display the linked table ('fish\_details'), the user should use the tool shown below in the same way as the information button.



An alternative Identify tool, displays data as a table and support a related table.

The table contains taxonomic and locality information and, in some instances, data on stratigraphic context of the specimens. The raw data for these .dbf files are Excel sheets provided by Mark Dean and kept under the same folder. This data will be largely superseded by revised taxonomic determinations, together with new and updated locality information when on going biostratigraphical revision of Caithness fish faunas, by Mike Newman, is completed in 2006 (see Section 4.2.24).

By combining **Fishindex.dbf** with **doun\_fossloca.shp**, which contains details of fish fossils recorded in Nirex Report 658 (see 2.12 below), the user can obtain all of the spatial data (held by BGS up to July 2004) on Devonian fossil fish occurrences within the Project area and adjacent ground. By combining both fossil fish themes with the Solid (Bedrock) geology themes (such as **50k Geology**, **N658\_solid\_geology2.shp**, or **UKAEA\_Stratigraphicboundary**; see below) the user can directly relate the biostratigraphically significant fish faunas to a variety of the lithostratigraphic schemes that have been applied to Devonian flagstone sequences in Caithness. (**Figure 1**). The most up to date compilation was completed in March 2003 (Auton, 2003, figure 3) using:

- **Solid\_geology\_A4\_boundary\_obs**
- **reay\_2003\_A4\_solidgeo.shp**
- **Normal\_A4\_inf\_fault**

with **Fishindex.dbf** and **doun\_fossloca.shp**.

## 2.5 REAY\_WICK\_ROCK.DBF

These are .dbf files dealing with thin-sectioned rock samples. File **reay\_wick\_rock2.dbf** provides data on thin-sections of samples collected from ground surveyed during 2001-02, (Sheet 115E: Reay), together with previously sectioned rocks from throughout the Caithness and Sutherland portions of the original Caithness Project area (sheets 116 W: Thurso and 116 E: Wick) and also Sheet 115 W: Strathy Point, to the west. These 'previous' data are a sub-set generated and modified from the BritRocks corporate database. The sub-set was provided on an Excel spreadsheet by Emrys Phillips.


**115\_reay\_wick\_rocks\_only.dbf** and **115\_reay\_rocks\_only.shp** relate to petrographic samples from Sheet 115E alone and was provided on an Excel spreadsheet by Emrys Phillips (**Figure 2**). All of this data has now been entered into the BritRocks corporate database.

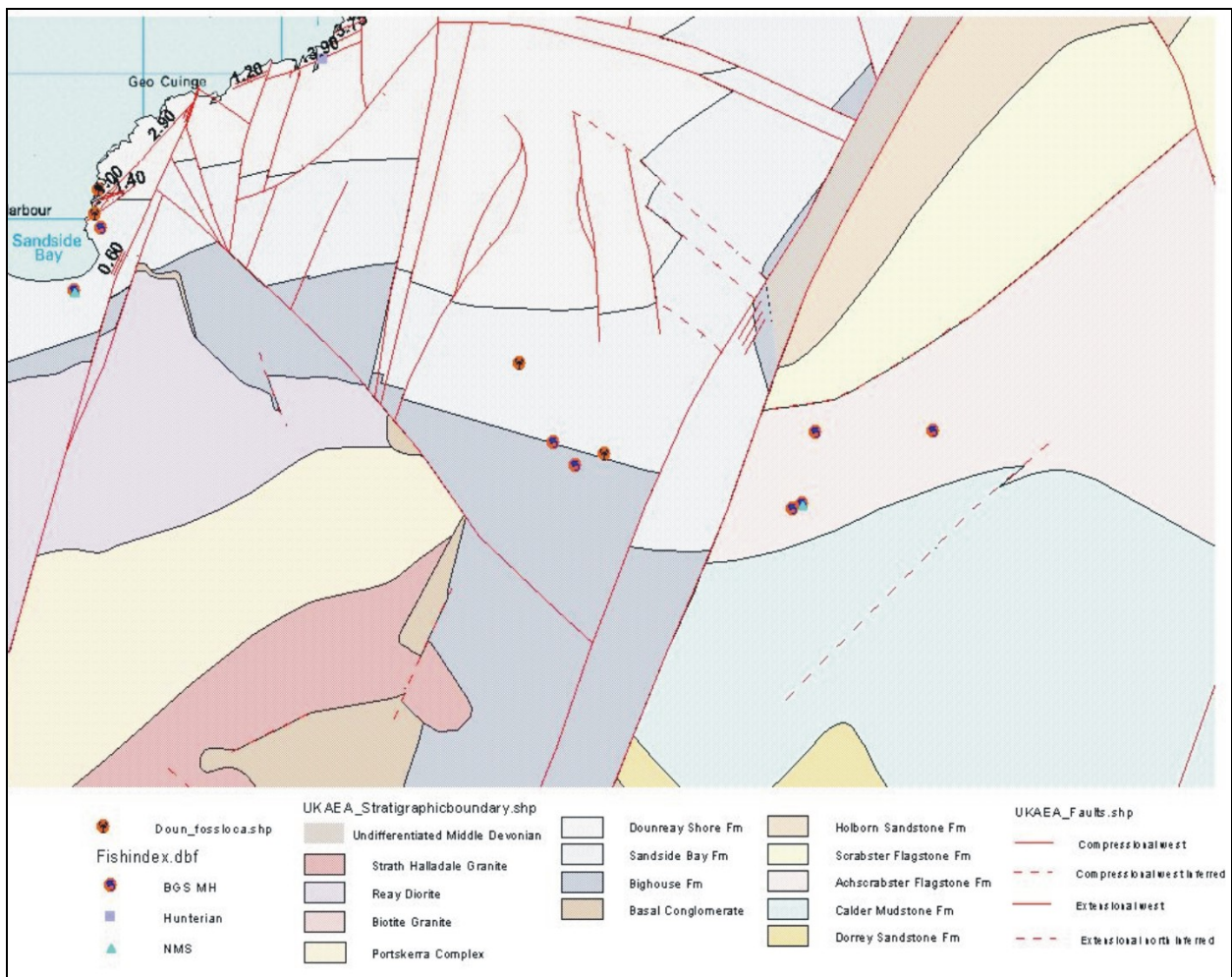
By combining any of these themes with any of the solid geology themes, in a manner similar to that described above for fossil fish, the user can assign petrological descriptions to named lithological units. In areas with abundant data, spatial variations in the petrological character of individual rock units can also be assessed.

## 2.6 BOREHOLE LOCATIONS

This theme links to the Single Onshore Borehole Index (SOBI) corporate database. It contains the borehole registration number, borehole name, the national grid reference, the drilled depth and start height of the borehole, as well as other details.

SOBI is held on Oracle on both the Keyworth database server (KWA) and Edinburgh database server (MHA) and managed by Rod Bowie. The structure of the table (BGS.SOBI) enables it to be used easily within the GIS. The user requires an Oracle ID to access this information.

The link to the database is a live link, meaning that each time the user wants to display the Borehole Locations shapefile, the connection with oracle has to be made by clicking on the Borehole Locations button , which will retrieve the data as a set of data point locations. This type of link allows the display of the most up to date information kept in SOBI. To use this



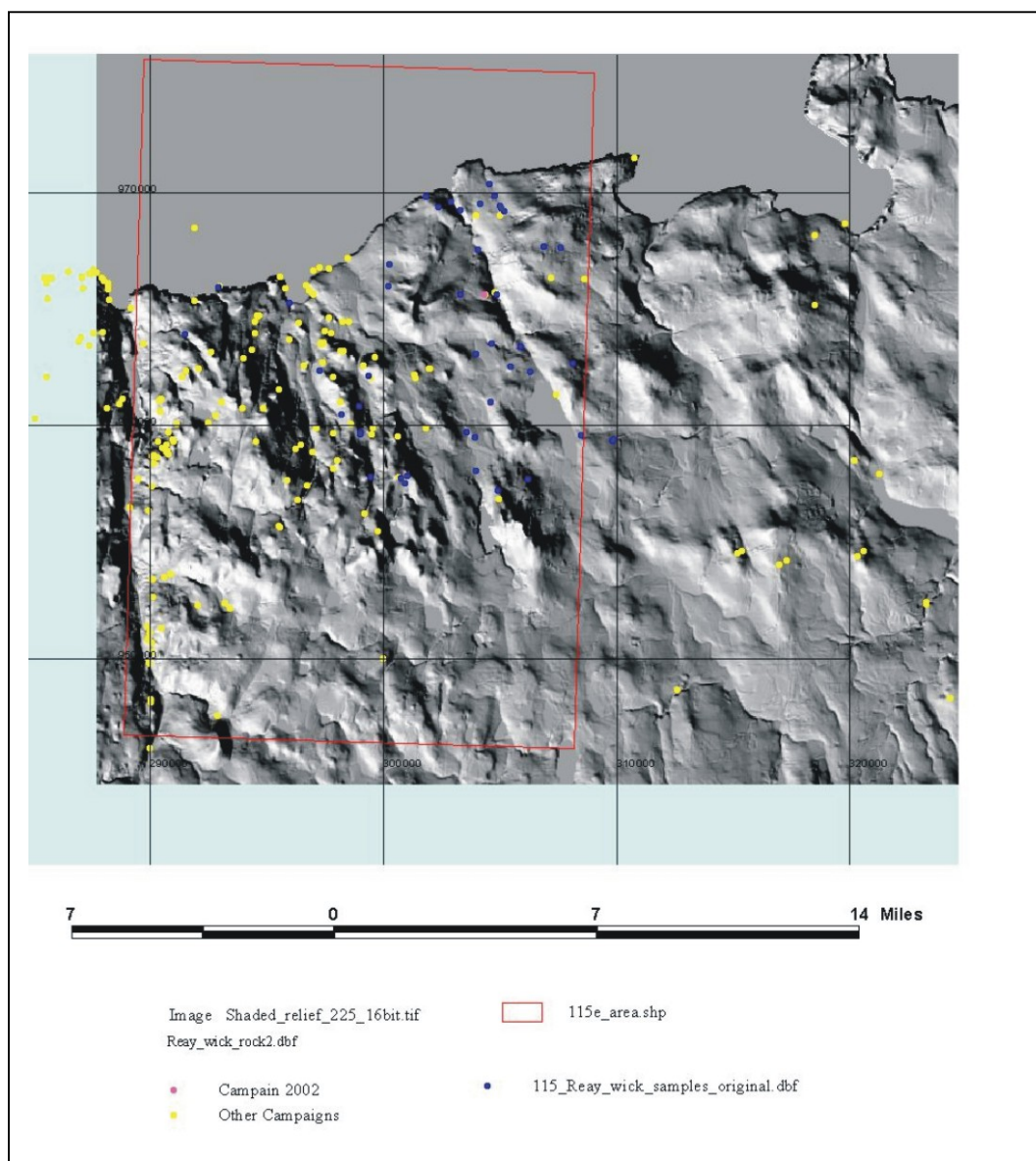
**Figure 1.** Distribution of named Devonian fossil fish assemblages in relation to UKAEA ‘Standard Solid Geology’ lithostratigraphy, Dounreay area; produced in ArcView by combining Doun\_fosloca.shp, Fishindex.dbf, UKAEA\_Stratigraphicboundary.shp and UKAEA\_Faults.shp.

capability the user needs to have set an Oracle ODBC driver called “Kwa” in the Microsoft ODBC administrator.

## 2.7 50K GEOLOGY

1:50k Drift and Solid geology polygons have been added to the project as two merged shapefiles, one for the Drift and other for the Solid. The Murchison House drawing office provided 1: 50k individual digital geological tiles covering all six sheets of the original Caithness project area (Reay, Thurso, Wick, Latheron, Cromarty and Beaully). These files are from DigMap (V1). DigMap (V2) Bedrock, Superficial Deposits, Mass Movement and Artificial Deposits themes have been added (during July 2004) and should supersede those from DigMap (V1) for all subsequent compilations of regional geological data.

The revised digital 50k geological data (polygons, lines and symbols) for Sheet 115E (Reay) have been created as a separate project: **Caithness\gis\_data\Reay\_2003\115e\_reay.mxd** within **Caithness\_gis** (see Section 3) These data were generated as Microstation files, by the Murchison House Drawing Office, and have been converted to Shapefiles. These contain significantly more geological data for the area than is present in either DigMap 50k(V1) or (V2) for Sheet 115E.



**Figure 2.** Major physiographic features and distribution of thin sectioned rock samples on Sheet 115E and surrounding area: Yellow dots ~ Britrocks data (pre 2000); blue and pink dots ~ samples collected during resurvey of Sheet 115E (2000-02). Generated by combining 115e\_area.shp, Shaded\_relief\_225\_16bit.tif, Reay\_wick\_rock2.dbf and 115\_Reay\_wick\_samples\_original.dbf

## 2.8 FAULTS.SHP

This presents fault line work at 1: 25k scale, digitized by Stuart Horsbrough (BGS Drawing Office), for the part of the ground covered by the detailed solid geology mapping of the Dounreay site area undertaken for UK Nirex by BGS in 1990-91 (Fletcher and Key, 1992). It includes subsequent modifications made by UK Nirex, to take account of seismic data reported in UK Nirex Report 658 (Nirex 1994).

## 2.9 N 658 FAULTS.SHP

This shapefile covers the same fault line work for the Dounreay area as **faults.shp**. However, it shows additional information on the inclination and throw of some fault planes. It was created by merging line work files, provided by Nicholas Golledge, under **V:/Lr/IGSN/Caithness\_geo/Caithness\_Gis/Caithness\_/Gis\_data**.

## 2.10 N658\_SOLID\_GEOLOGY2.SHP

This shapefile covers the Solid geology for the same area surrounding the Dounreay site as that covered by **faults.shp** and **n658faults.shp**. It was also digitized at 1:25 k scale. The associated table has been populated with the GSD Solid area dictionary. The raw data file for this shapefile, was provided by Nicholas Golledge. It is kept under the folder Nick\_geology with the name **n658\_solid\_geology.shp**.

## 2.11 50K\_WATER.SHP

This shapefile shows the outlines of bodies of standing water and Mean Low Watermark for the area surrounding the Dounreay site. It was created by merging two files provided by Nicholas Golledge, under **V:/Lr/IGSN/Caithness\_geo/Caithness\_Gis/Caithness\_/Gis\_data**.

## 2.12 DOUN\_FOSSLOCA.SHP AND DOUN\_NIREX\_BH.SHP

The **doun\_fossloca.dbf** file holds the locations of identified Devonian fossil fish found in the Dounreay area during Nirex studies in the early 1990's. This file has been converted into an ArcView shapefile **doun\_fossloca.shp** and its table has been populated according to the information obtained from UK Nirex Report 658 (Nirex 1994). Data within the **Doun\_Nirex\_BH.shp** file has been obtained from UK Nirex Report 658. It shows the location of two cored Nirex Dounreay boreholes (Dounreay Site Boreholes 1 and 2).

## 2.13 FLIGHT\_PHOTOS.SHP

Original data was provided by Douglas Tragheim (BGS Remote Sensing Section, Keyworth) in a file called 'all\_scotland\_photos(1988)'. It presents the locations of the centroids of aerial photographs taken for the Scottish Development Department (SDD) 'All Scotland Survey'. The table for **flight\_photos.shp** contains three more fields than the original file. These are the X Y co-ordinates and a unique identifier. This file is located under the folder **Caithness\_Gis/Caithness\_/Gis\_data/Flight\_lines/Flight\_Photo Shape File**.

## 2.14 FLIGHT\_LINES

This theme represents the flight line locations. The original data was provided by Douglas Tragheim in a file called 'all\_scotland\_sorties(1988)'. One extra field, "Fno", has been added to the table and it has yet to be populated. The data is located under the folder **Caithness\_/Gis\_data/Flight\_lines/Flight\_Lines Shape File**. Both shape files (Photos and

Sorties), when combined, provide detailed data on the extent of each air photo image within the 'All Scotland Air Photo' data set.

## 2.15 CORPORATE AIRPHOTO DATABASE

The design of the BGS corporate Air photo database (by Kenneth Lawrie, Information Systems Programme) was completed by end March 2003, as a collaborative task with the Dounreay/Caithness Project and digital copies of photography for much of the Caithness Project area were purchased (at a cost to the project exceeding £5 000). Population of the database, using the Caithness area images as 'pilot' for the corporate database, was to have commenced in 2003. Lack of staff funding has resulted in no progress towards this objective in more than 2 years. It is still envisaged, however, that when this task is completed the **All\_scotland\_photos(1988)** and **All\_scotland\_sorties(1988)** themes will be superseded for the project area. The link to the Corporate database will be a live link in a manner similar to that employed to link to the **Field Notebooks Cards** database.

It is envisaged that, in time, the user will be able to display scanned air photo imagery in the GIS via the above link.

## 2.16 SATELITE IMAGES

Satellite images have been provided for the area covered by the 115E, 116E and 116W 50k geological sheets. The satellite images have been produced by Colm Jordan (BGS Remote Sensing Section). They are named as follows:

- **Tm&relief120.tif**
- **Shaded\_relief\_225\_16bit.tif**
- **Shaded\_relief\_120\_16bit.tif**

These are located at the bottom of the TOC in View 1.

More recent satellite images have also been provided. These cover the whole of the project area (including Geological 50k Sheets 94W – Cromarty and 83E – Beaully). The images have been obtained from Microstation output and, although they have been converted to .tif images, they require the image analysis ArcView, extension to be switched **on** (this is the default setting) for a better display of colours. The images are named as follows:

**Cromarty\_94w.tif**

**Reay\_115e.tif**

**Lathron\_110.tif**

**Wick\_116e.tif**


**83e.tif**

**Thurso\_116w.tif**

## 2.17 BGS SCANNED PHOTOS

The BGS scanned photos database is a corporate database held on the Keyworth database server (KWA) and managed by Robert McIntosh. The structure of this table enables to be used easily within the GIS. The user requires an Oracle ID to access this information.

The link to the database is a live link, meaning that each time the user wants to display the BGS scanned photos locations data, the connection with the corporate database has to be made by

clicking on the BGS scanned photos locations button  which will retrieve the data. The data will be viewed as a set of data point locations.

To use this capability, the user needs to have an Oracle ODBC driver called “Kwdbase” set in the Microsoft ODBC administrator. Once all of the project photographs in the database are scanned they will be hot-linked to the scanned photos theme.

## 2.18 NIREX AIRBORNE GEOPHYSICAL SURVEY

This shapefile contains the UK Nirex airborne geophysical survey lines for the Dounreay area. All of the lines are named.

## 2.19 UKAEA\_STRATIGRAPHICBOUNDARY

This shapefile contains data on the Solid geology for ground in the vicinity of the Dounreay Nuclear facility. It was generated as shapefiles of data digitized by UKAEA, at 1: 10k scale. The TOC contains a list of the lithostratigraphic units currently used by UKAEA in the Shaft Hydrogeological Investigation Project (UKAEA Standard Solid Geological Map of the Dounreay Area – South and North sheets). It is basically a sub-set of the data presented in **n658\_solid\_geology.shp**, but at higher resolution, and with an updated attribution of the rock units.


## 2.20 UKAEA\_FAULTS

This shapefile represents the faults in the vicinity of the Dounreay Nuclear facility. It was generated by UKAEA from the same dataset as **UKAEA\_Stratigraphicboundary**. The most important feature of this shapefile is its attribute table, which holds important information such as the inclination, throw and trend of the faults.

## 2.21 UKAEA\_FAULTTYPEINDICATORS

This shapefile contains the fault graphic symbols, indicating fault type (normal/reverse/thrust etc) on the screen. It should be displayed with **UKAEA\_Faults**.

## 2.22 FIELD NOTEBOOKS CARDS

The BGS Field Notebook database is a corporate database held on the Edinburgh database server (mhdbase). The structure of this table (which contains Index Level data only) enables it to be used easily within the GIS. The link to the database is a live link. It requires an Oracle ID to access this information. Each time the user wants to display the BGS Field Notebook locations information, a connection has to be made by clicking on the BGS Field Notebook locations button . This will retrieve the data as a set of data points. This type of link allows display of the most up to date information held in the corporate database.

To use this capability the user needs to have an Oracle ODBC driver called mhdbase set in the Microsoft ODBC administrator. Once the Field Notebook cards are scanned they will be hot-linked to the Field Notebook theme

## 2.23 STREAMLINED\_BEDROCK.SHP

Locations of large-scale glacially ‘moulded’ streamlined bedrock landforms, interpreted from the shaded relief satellite imagery by Colm Jordan are included in the GIS. This shapefile, which

covers much of the northernmost parts of the Scottish mainland, does not hold any additional information at present.

#### 2.24 GLAC\_BEDFORM\_PRELIM.SHP

The locations of features recognised as ‘glacial bedforms’ from the interpreted satellite imagery are also included in the GIS. These are generally smaller scale than the stream-lined bedrock landforms. This shape file presents features, both associated with glacial erosion (roche moutoneés, glacial flutes and gouges etc) developed on Solid, and with glacial deposition (moraines, drumlinoid mounds etc) developed in the Drift deposits.

#### 2.25 MELT\_CHANNELS.SHP

This shape file portrays the locations of major glacial meltwater channels interpreted from satellite imagery. By opening **Streamlined\_bedrock.shp**, **Glac\_bedform\_prelim.shp** and **Melt\_channels.shp** together in the GIS, an accurate estimation of the patterns of ice-movement and glacial drainage on a regional scale can be gained (**Figure 3**).

#### 2.26 PEAT.SHP

This shape file shows the boundary of the principal spreads of peat in Caithness as interpreted from satellite imagery.

#### 2.27 TILL\_T\_SECTIONS.DBF

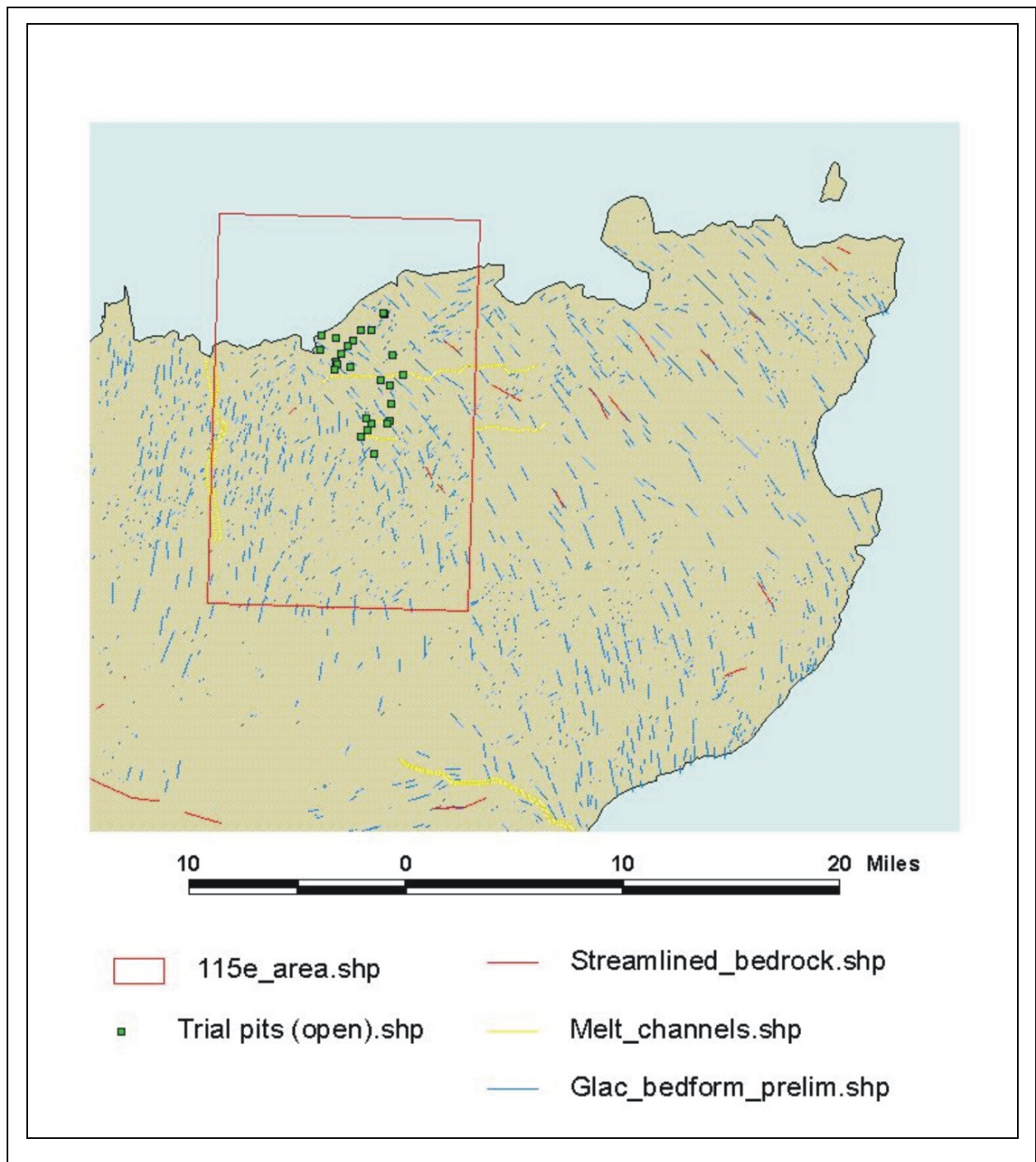
This .dbf file shows the sample point locations for the till samples collected for thin sectioning from the 1:50k Reay Geological Sheet area (115E). The data, provided by Emrys Phillips, has been separated from the rock samples file to be an independent theme.

#### 2.28 TRIAL PITS (OPEN).SHP

This theme shows the point location of trial pits sunk by BGS as part of the Dounreay Catchment Characterisation Study (Auton, Entwisle and Golledge, 2001). The data was has provided by Nicholas Golledge.

#### 2.29 115E\_AREA.SHP

This shape file show the outline of Sheet 115E (Reay). It was added to the GIS to enable graphic output to be trimmed to the area resurveyed during 2000-02.



**Figure 3.** Ice-movement direction indicators in Caithness derived from interpreted satellite imagery, and distribution of BGS logged trial pits in Quaternary sediments. Compiled by combining 115e\_area.shp, Counties\_Scotland.shp, Streamlined\_bedrock.shp, Melt\_channels.shp, Glac\_bedform.shp and Trial pits (open).shp.

### 3 Other features

#### DOUNREAY\_SITE\_BOREHOLES\_FAULTS.TIFF

This image was initially a CorelDraw file provided by UKAEA in 2003. It shows the positions of all known boreholes on the Dounreay site, and the (presumed) detailed positions of all faults



crossing the site area (as understood prior to renewed drilling and other geological investigations undertaken from late 2003 onwards). The original file was scanned and a raster .tif file produced. The .tif has been geo-referenced to fit the GIS and this has allowed National Grid References to be determined for all existing On-Site and Site-Area boreholes. This .tif was added to the table of contents (TOC) in the ArcView GIS in June 2004.

This image can also be displayed as a separate project called **115e\_reay.mxd** within **Caithness\_GIS\Caithness**, which also contains a complete copy of the attributed GIS of all of the data layers used to compile 1: 50 000 Geological Sheet 115E Reay (as issued to UKAEA Dounreay in July 2003). This ArcGIS, ArcMap project, document .MXD was created as an attempt to start the migration of the ArcView project “Caithness\_GIS” to the new ArcGIS 8.0. The migration is still in its initial stages, as customisation and addition of more data needs to be undertaken.

A complete copy of the attributed GIS, of all of the data layers used to compile 1: 50 000 Geological Sheet 115E Reay (as issued to UKAEA Dounreay in July 2003) can be displayed in **Caithness\gis\_data\Reay\_2003\ 115e\_reay.mxd** within **Caithness\_GIS**. This data was provided by the Murchison House Drawing Office.

In the ArcView GIS an Ordnance Survey National Grid, which changes scale according to the scale of display, is available in View 1. By default, this grid is visible in the view, to turn it **off**, the user should click under the view menu BNG overlay (as in the GDI) and choose **none**. To turn it on, choose one or more of the other available options.

**Caithness\_GIS\_Documentation** contains copies of all files listing the data acquisition and development of the Caithness GIS, since October 2002, as Word documents and Excel spreadsheets.

## 4 Datasets compiled since November 2002

This section documents updates made to the ‘Caithness Project’ GIS since the issue of Internal Report **IR/02/171R** “Caithness GIS Development” (del Rio and Auton, 2002), issued on 18/11/2002. It describes the new themes and capabilities added to the interface of the Caithness project GIS(not discussed in Sections 2 and 3) during financial years 2003/04 and 2004/05. The account provides metadata on each data set shown in the Table of Contents [TOC] in 2 customised Views (see below). It explains how each has been treated within the GIS environment and how the datasets can be accessed and manipulated by non-specialist users. This text augments and replaces information provided in Part 4 ~ Forthcoming Data Sets, of the previous report.

It is strongly recommended that, although **Caithness\_GIS** runs in ArcView3.3, initial examination of datasets be undertaken in **ArcCatalog**. This provides a more user-friendly and informative interface of file listings than is available in Explorer, or that can be readily determined from each Table of Contents in the respective ArcView 3.3 Views.

### 4.1 DATASETS USED

At the time of writing (July 2004), the project GIS, which was initiated on 26.11.2001 has two different views, **View 1** and **Dounreay\_Nick\_Files** and a total of 94 themes in both tables of contents.

- **View 1** contains all of the datasets described in del Rio and Auton (2002) and many more datasets added during the following 2 years making a total of 79 themes in the table of contents and more data can be retrieved through the customised buttons, such as

the 10k geology available for the area, the 50k\_v1 DigMap geology, SOBI boreholes, field notebook records, registered photographs (Imagebase) and scanned 10k field slips.

- **Dounreay\_Nick\_Files View** is a new view, which holds information and datasets provided by Nicholas Golledge. It principally deals with digital data acquired during the UKAEA commissioned study of the catchment of the Dounreay Burn (Auton et al., 2001). The new datasets added to View 1 and the datasets in Dounreay\_Nick\_Files View are described separately.

## 4.2 VIEW 1 UPDATE

### 4.2.1 115e\_reay\_solid\_geology\_polygons

This dataset was provided by the Murchison House Drawing Office. It represents the Solid (Bedrock) geology for Sheet 115E (Reay) as presented on the published 1:50 000 scale geological map (BGS, 2003). This data was acquired in April 2003. The file is kept under: V:/Lr/IGSN/Caithness\_Geol/Caithness\_GIS/Caithness/Gis\_Data/REAY50k\_2003

### 4.2.2 115e\_reay\_drift\_geology\_polygons

This dataset was provided by the Murchison House Drawing Office. It represents the Drift (Superficial Deposits) geology for Sheet 115E, published at 1:50 000 scale. This data was acquired in April 2003. The file is kept under:

V:/Lr/IGSN/Caithness\_Geol/Caithness\_GIS/Caithness/Gis\_Data/REAY50k\_2003

### 4.2.3 115e\_reay\_artificial\_geology\_polygons

This dataset was provided by the Murchison House Drawing Office. It represents the Artificial Deposits geology for Sheet 115E, published at 1:50 000 scale. This data was acquired in April 2003. The file is kept under:

V:/Lr/IGSN/Caithness\_Geol/Caithness\_GIS/Caithness/Gis\_Data/REAY50k\_2003

### 4.2.4 115e\_reay\_mass\_movements\_geology\_polygons

This dataset was provided by the Murchison House Drawing Office. It represents the Mass Movement Deposits geology for Sheet 115E, published at 1:50 000 scale. This data was acquired in April 2003. The file is kept under:

V:/Lr/IGSN/Caithness\_Geol/Caithness\_GIS/Caithness/Gis\_Data/REAY50k\_2003

### 4.2.5 115e\_reay\_fault\_geology\_lines

This dataset was provided by the Murchison House Drawing Office. It represents the Fault geology for Sheet 115E, published at 1:50 000 scale. The data was acquired in April 2003. The file is kept under:

V:/Lr/IGSN/Caithness\_Geol/Caithness\_GIS/Caithness/Gis\_Data/REAY50k\_2003

### 4.2.6 115e\_reay\_fossil\_horizon\_geology\_lines

This dataset was provided by the Murchison House Drawing Office. It represents the position of the fossil-bearing (Stromatolite) horizon mapped on 1:50 000 Sheet 115E. This data was acquired in April 2003. The file is kept under:

V:/Lr/IGSN/Caithness\_Geol/Caithness\_GIS/Caithness/Gis\_Data/REAY50k\_2003

#### **4.2.7 115e\_reay\_landform\_geology\_lines**

The dataset was provided by the Murchison House Drawing Office. It represents the landform geology (morphology 'linework' for mounds, ridges, drainage channels etc) on Sheet 115E, published at 1:50 000 scale. This data was acquired in April 2003. The file is kept under:

V:/Lr/IGSN/Caithness\_Geol/Caithness\_GIS/Caithness/Gis\_Data/REAY50k\_2003

#### **4.2.8 115e\_reay\_mineral\_vein\_geology\_lines**

The Drawing Office provided this dataset. It represents the mineral vein geology for Sheet 115E, published at 1:50 000 scale. This data was acquired in April 2003. The file is kept under:

V:/Lr/IGSN/Caithness\_Geol/Caithness\_GIS/Caithness/Gis\_Data/REAY50k\_2003

#### **4.2.9 Structural\_Symbols**

The Drawing Office provided this dataset. It is a point shapefile representing the structural symbols (strike and dip of bedding, foliations and lineations) for Bedrock units shown on Sheet 115E, published at 1:50 000 scale. This data was acquired in April 2003. Note: At the time of writing, conversion of the symbols in this file is still required, so their graphic representations accord with the approved BGS symbol scheme. The correct symbols are present in **115e\_reay.mxd** created in ArcMap (see above). The ArcView 3.3 file is kept under:

V:/Lr/IGSN/Caithness\_Geol/Caithness\_GIS/Caithness/Gis\_Data/REAY50k\_2003

#### **4.2.10 Fault\_dip**

The Drawing Office has provided this dataset. It is a point shapefile representing the fault dip (down throw) direction for faults on Sheet 115E, published at 1:50 000 scale. At the time of writing, conversion of the symbols in this file is still required, so their graphic representations accord with the approved BGS symbol scheme. The correct symbols are present in **115e\_reay.mxd** created in ArcMap (see above).

This data was acquired in April 2003. The ArcView 3.3 file is kept under:  
V:/Lr/IGSN/Caithness\_Geol/Caithness\_GIS/Caithness/Gis\_Data/REAY50k\_2003

#### **4.2.11 Borehole**

The Drawing Office provided this dataset. It is a point shapefile showing the boreholes located on the Sheet 115E. This data was acquired in April 2003. The file is kept under  
V:/Lr/IGSN/Caithness\_Geol/Caithness\_GIS/Caithness/Gis\_Data/REAY50k\_2003

#### **4.2.12 Glacial\_symbols**

The Drawing Office provided this dataset. It is a point shapefile representing the glacial symbols (striae, crag & tail etc) from 1:50 000 Sheet 115E. This data was acquired in April 2003. The file is kept under:

V:/Lr/IGSN/Caithness\_Geol/Caithness\_GIS/Caithness/Gis\_Data/REAY50k\_2003

#### **4.2.13 Structural\_symbols\_dip**

The Drawing Office has provided this dataset. It is a point shapefile representing the structural symbols dip direction for the Sheet 115e at scale 1:50000. This data was acquired on April 2003. The file is kept under:

V:/Lr/IGSN/Caithness\_Geol/Caithness\_GIS/Caithness/Gis\_Data/REAY50k\_2003

#### **4.2.14 Structural\_symbols\_nodip**

The Drawing Office has provided this dataset. It is a point shapefile representing the structural symbols for the Sheet 115e at scale 1:50000. This data was acquired on April 2003. The file is kept under V:/Lr/IGSN/Caithness\_Geol/Caithness\_GIS/Caithness/Gis\_Data/REAY50k\_2003

#### **4.2.15 Paly\_assemble**

This shapefile shows the position of Devonian micropalaeontology sampling points. It principally comprises samples that have been analysed for spores by Michael Stephenson. The data was compiled Michael Stephenson from field samples of Devonian flagstone sequences. This theme was created from the Caithness\_assemb database and its table was populated in June 2003, and shows barren or palyniferous samples collected within the Caithness flagstone sequence. It is kept under:

V:/Lr/IGSN/Caithness\_Geol/Caithness\_GIS/Caithness/Gis\_Data/Paly\_assemble.shp

#### **4.2.16 Caithness\_assemb**

This database file shows the locations and Palaeontology Registration Numbers of all samples collected for Devonian micropalaeontology in the Dounreay/Caithness Project area until June 2003. It holds the same information as the theme above but it makes not distinction between barren or palyniferous samples. It was compiled by Michael Stephenson from field and core samples of Devonian rocks. It is kept under:

V:/Lr/IGSN/Caithness\_Geol/Caithness\_GIS/Caithness/Gis\_Data/

The use of this theme, together with the Paly\_assemble theme (which will identify both barren and fossil-bearing samples), when combined with the Solid geology themes, will allow the user to identify fossiliferous and barren strata within the Caithness Flagstone sequence. This will aid biostratigraphic correlation of the onshore succession and regional correlation with the offshore Orcadian basin sequence.

#### **4.2.17 Builtup**

The Drawing Office provided this dataset. It is a polygon theme representing buildings of the nuclear facility at Dounreay for production of simplified A4 diagrams (see Figure 4). This data is kept under:

V:/Lr/IGSN/Caithness\_Geol/Caithness\_GIS/Caithness/Gis\_Data/ shapefiles\_Anthony/

#### **4.2.18 50k\_inland\_water\_boundary**

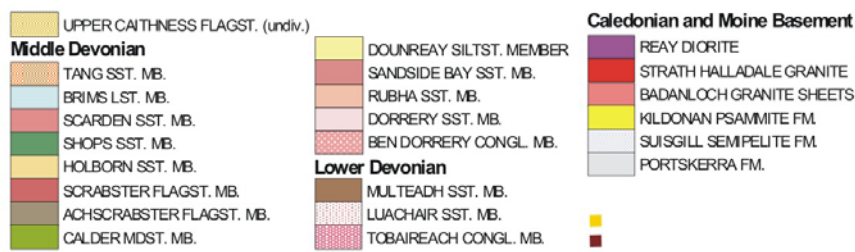
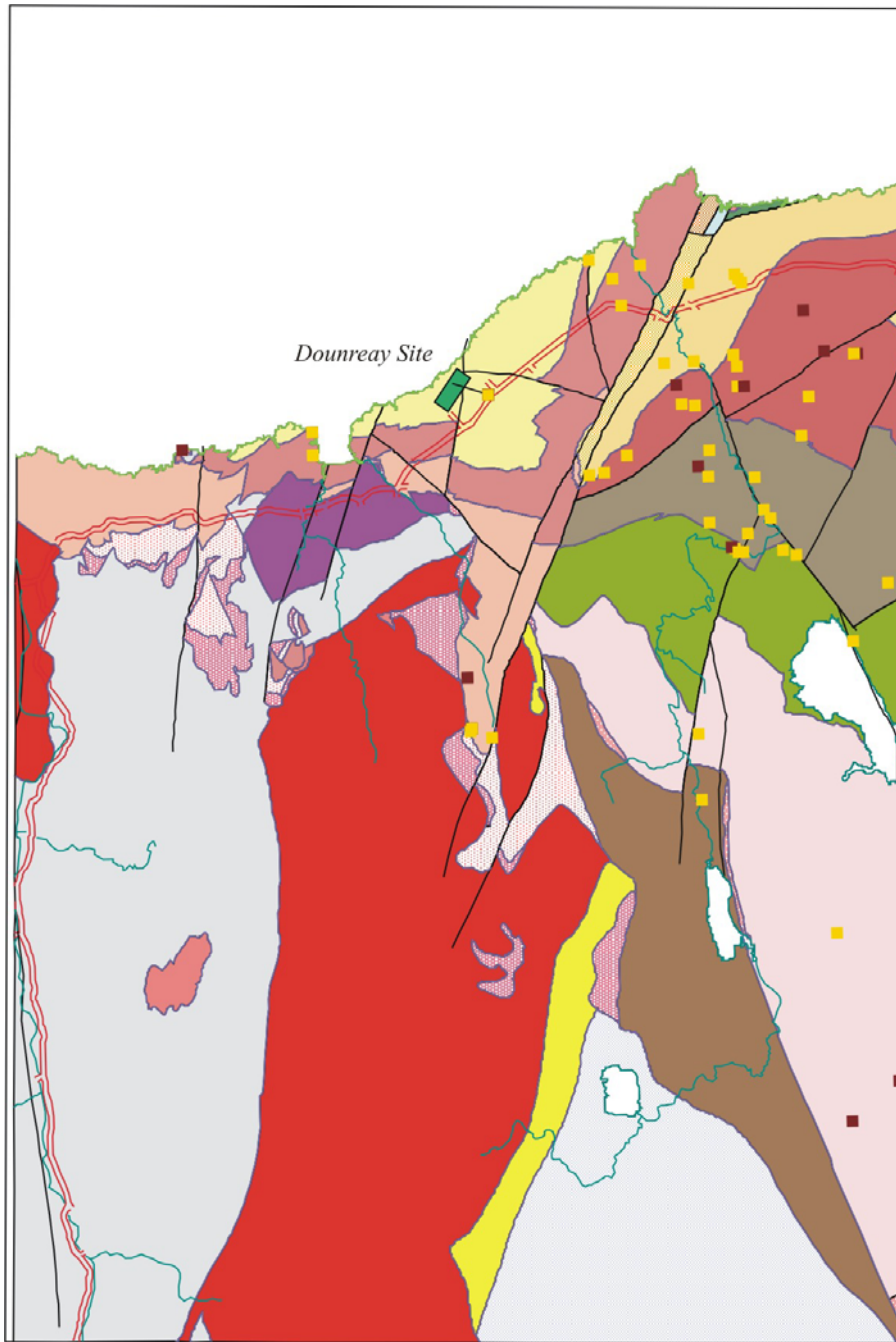
The Drawing Office provided this dataset. It is a line theme and, as its title suggests, it marks the inland water boundary (margins of rivers and lakes, simplified for production of A4 diagrams). This dataset is kept under:

V:/Lr/IGSN/Caithness\_Geol/Caithness\_GIS/Caithness/Gis\_Data/ shapefiles\_Anthony/

#### **4.2.19 50k\_mean\_low\_water\_mark**

The Drawing Office has provided this dataset. It is a line shapefile representing the low water mark, simplified for production of A4 diagrams. It is kept under:

V:/Lr/IGSN/Caithness\_Geol/Caithness\_GIS/Caithness/Gis\_Data/ shapefiles\_Anthony/



**Figure 4.** Distribution of palynology samples collected and analyzed during the resurvey of Sheet 115E (from Auton, 2003).

#### 4.2.20 Solid\_geology\_boundary\_obs

The Drawing Office provided this dataset. This line shapefile shows the Bedrock geological boundaries, simplified for production of A4 diagrams. It is associated with

**Solid\_Geology\_polygon.shp** (showing the bedrock lithologies) and **reay\_2003\_solidgeo.shp** (a bedrock undifferentiated layer, for a drift only diagram). All are kept under:

V:/Lr/IGSN/Caithness\_Geol/Caithness\_GIS/Caithness/Gis\_Data/shapefiles\_Anthony/

#### 4.2.20 Normal\_inf\_fault

The Drawing Office provided this dataset. This line shapefile represent a simplified pattern of faulting for production of A4 diagrams. It contains, both observed and inferred features, as attributed to the faults that correspond with those shown in **N 658 Faults.shp**.

It is also kept under: V:/Lr/IGSN/Caithness\_Geol/Caithness\_GIS/Caithness/Gis\_Data/shapefiles\_Anthony/

#### 4.2.21 Roads

The Drawing Office provided this dataset. It is shapefile showing the main roads (A 836 and A 897) in the Dounreay area. It is kept under:

V:/Lr/IGSN/Caithness\_Geol/Caithness\_GIS/Caithness/Gis\_Data/shapefiles\_Anthony/

#### 4.2.22 Caithness\_paly\_gis

This theme shows the location of samples collected for the micropalaeontology analysis. This theme will be eventually removed as **Paly\_assemble** includes the same data.

#### 4.2.23 List\_locality2.dbf

This .dbf file was generated from an excel table provided by Eileen Callaghan showing the localities for collections of macrofossils from Silurian, Lower and Middle Devonian strata that had been taxonomically investigated by Michael Newman (up until the end of 2003). Most of the localities occur within the Orcadian Basin, but some data from Cowie Harbour (Stonehaven) and west Wales is also included. This .dbf file is linked to another called "**fossil\_specieslist.dbf**" in a one to many relationship. The latter contains species lists, showing the types of fossils (fish, plants and trace fossils) the numbers of specimens held and their stored locations [NMS = National Museum of Scotland; MJN = private collection of M J Newman].

#### 4.2.24 10k geomapindex.shp

This shape file shows the location of the 10k geological maps produced by the Drawing Office and Geologists (using the Geological Spatial Database ~ GSD) for this project. A new Button, "**Geology**", has been customised to retrieve the 10k geological and topographic data themes provided. These include, 'Solid', 'Drift', 'Mass Movements', 'Water', 'Lineland', 'Arealand' and 'Compcl', as well as the 50k DigMap (V1) geological files held on the Q drive. The customisation for the retrieval of the 50k DigMap (V2) geological files held on the S drive will soon be available.

#### 4.2.26 10k mapindex.shp

This shows the georeferenced positions of 10k scanned maps (field slips) produced for this project. A new Button "**Scanned 10k**" has been developed for retrieving this data. Data available for retrieval is:

NC86SE\_NW.tif, NC86SE\_NE.tif, NC86NW\_SW.tif, NC86NW\_SE.tif, NC86NW\_NW.tif, NC8NWE\_NE.tif, NC86NE\_SW\_COUNTY.tif, NC86NE\_SE.tif, NC76SE\_NW.tif, NC76SE\_NE.tif, NC76NW\_SE (PART).tif, NC76NE\_SW.tif, NC76NE\_SE.tif, and SMALLBIT.tif

#### **4.2.27 Illite crystallinity**

This theme was added to the GIS in November 2002. The data was, produced as an Excel spreadsheet, by Simon Kemp (Geochemistry, Mineralogy & Hydrogeology Programme, Keyworth). It presents results of illite crystallinity determinations carried out on the samples of Devonian mud rocks (flagstones) collected in 2002, during the resurvey of Sheet 155E. It provides information on the burial history (depth/temperature) of the Caithness Flagstone sequence since its formation. It is kept under:

**V:/Lr/IGSN/Caithness\_Geol/Caithness\_GIS/Caithness/Gis\_data\CaithnessICsummary\_gis.dbf**

#### **4.3 VIEW DOUNREAY\_NICK\_FILES**

All of the datasets used in this view were collected for the Dounreay Burn Catchment Study (UKAEA Contract CPDT/T/4343). All are kept under:

**V:/Lr/IGSN/Caithness\_Geol/Caithness\_GIS/Caithness/gis\_data/NickFilesDounreayView.**

These data sets are all Commercial-in-Confidence. Most were originally digitally produced by N R Golledge, but several have been modified/augmented by the BGS Drawing Office in Murchison house; others were newly generated by Drawing Office staff.

##### **4.3.1 Quaternarydeposits.shp**

This shapefile presents the drift (Superficial Deposits) geology at 1:25 000 scale for the area and was provided by the Murchison House Drawing Office.

##### **4.3.2 Catchment2.shp**

This file shows the limits of the catchment study area (including Mean Low Water Mark) and was provided by the Murchison House Drawing Office.

##### **4.3.3 Mapped areas of peat**

The shapefile presents the peat zones within the complete area mapped. They are classified based on the thickness peat cover and the type of bedrock that it overlies (crystalline basement ~ Moine or Caledonian igneous intrusions, or Old Red Sandstone ~ ORS). The Data was provided by the Murchison House Drawing Office.

##### **4.3.4 Peat within catchment**

The shapefile represents the peat zones within the catchment area. It is a subset, generated by N R Golledge, taken from the shapefile showing the mapped areas of peat. It also classifies the thickness of the peat cover and the type of rock that it overlies (crystalline or ORS).

##### **4.3.5 Gpspoints.shp**

This shapefile shows GPS points (trial pit sites) in the complete mapped area. They are classified on the type of bedrock, and the thickness and type of Superficial Deposits that were encountered.

#### **4.3.6 Augertraverses.shp**

This is a point shapefile showing the positions of auger holes sunk along traverses across the peat-covered ground. The augering was undertaken to determine the depth of the peat. Cross-sections of the traverses, generated by N R Gollege are available as .tiffs and .jpg files within the **Dounreay\_Nick\_Files** (see below).

#### **4.3.7 Shebsterpeatprofile.shp**

This is a polygon shapefile showing rectangles that generally encompass the lines of all auger traverses. This theme has a hotlink associated with the cross-sections constructed from each traverse.

#### **4.3.8 50k\_mean\_low\_water\_mark.shp**

This shapefile was provided from the BGS Drawing Office (see above).

#### **4.3.9 Old\_red\_sdast.shp**

This is a line theme representing the boundary between the Devonian ORS sedimentary and crystalline basement rocks taken from the Nirex solid geology map at 1:25 000 scale (Nirex 658, 1994).

#### **4.3.10 Peattransects.shp**

This is a line theme showing the positions of the peat traverses.

#### **4.3.11 Dounreaysite.shp**

This is a polygon provided by the Drawing Office showing the location and extent of the Dounreay Site Area.

#### **4.3.12 Extended Mill Lade Catchment**

This line shows the Extended Catchment Area.

#### **4.3.13 Area mapped under contract**

This theme shows the extent of the area that was surveyed. It is several km<sup>2</sup> larger than the Extended Catchment Area.

#### **4.3.14 10kgrid**

Grid developed from the OS data

#### **4.3.15 Tin**

Tin Developed from the 10k grid.



## 5 Conclusions

The construction of the ArcView 3.3 GIS interface **Caithness.apr** has proved to be a highly efficient method of assembling and collating digital data sets from the Caithness project area. It has enabled the collation of both BGS corporate and project based digital data, of a variety of types, scales and vintages, with data from external sources notably UK Nirex and UKAEA. The GIS environment allows seamless integration and rapid interrogation of the combined data, to produce new insights into many aspects of the geology of the project area. The GIS is both flexible and user friendly and, given a small amount of experience, the user can produce high quality illustrative material for both publication and public presentations.

## 6 References

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- Del Rio, M AND AUTON, C A. 2002. Caithness GIS development. *British Geological Survey Internal Report*, **IR/02/171R**
- FLETCHER, T P, AND KEY, R M. 1992. Solid geology of the Dounreay district. *British Geological Survey Technical Report*, **WA/91/35C**.
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## 7 Appendix:

## Themes within View 1 TOC in July 2004

VIEW 1	Shapefiles/layers	Location
<b>Back-drop maps</b>		
	Os50kcolour.dbf	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\50k_os_topo\os50kcolour
	Counties_scotland.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\counties_scotland.shp
50k geological sheet outlines	Scot50k5.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\Scot50k5.shp
	115e_area.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\115e_area.shp
	Study_area.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\Study_area.shp
	10kmapindex.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\10kmapindex.shp
	10kgeomapindex.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\10kgeomapindex.shp
<b>Satellite images</b>		
	Shaded_relief_120_16bit.tif	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\satellites_and_DTMs\shaded_relief_120_16bit.tif
	Shaded_relief_225_16bit.tif	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\satellites_and_DTMs\Shaded_relief_225_16bit.tif
	Tm&relief120.tif	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\satellites_and_DTMs\Tm&relief120.tif
	Caitness_new_satellite_shaded_relief.tif	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\satellites_and_DTMs\Caitness_new_satellite_shaded_relief.tif
	Thurso_116w.tif	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\satellites_and_DTMs\Images\Thurso_116w.tif
	83e.tif	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\satellites_and_DTMs\Images\83e.tif
	Wick_116e.tif	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\satellites_and_DTMs\Images\Wick_116e.tif
	Lathron_110.tif	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\satellites_and_DTMs\Images\Lathron_110.tif
	Reay_115e.tif	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\satellites_and_DTMs\Images\Reay_115e.tif
	Cromarty_94w.tif	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\satellites_and_DTMs\Images\Cromarty_94w.tif
<b>Geology</b>		

drift (Superficial Dep.) original	50kdrift_geology.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\Geology_50k\50kdrift_geology.shp
Superficial depts ~rey	115e_reay_drift_geology_polygons.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\REAY50k_2003\115e_reay_drift_Geology_Polygons
solid (Bedrock) original	50ksolid_geology.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\Geology_50k\50ksolid_geology.shp
Nirex 25k	N658_solid_geology2.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\nick_geology\N658_solid_geology2.shp
simplified A4 diagram	Reay 2003 Solid Geology.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\Gis_Data\ shapefiles_Anthony\Reay 2003 Solid Geology.shp
	UKAEA_Stratigraphicboundary.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\DounreaySGMap\stratigraphicboundary.shp
simplified A4 diagram	Solid_geology_boundary_obs.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\Gis_Data\ shapefiles_Anthony\Solid_geology_boundary_obs.shp
solid (Bedrock) ~rey	115e_reay_solid_geology_polygons.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\REAY50k_2003\115e_reay_Solid_Geology_Polygons
artificial	115e_reay_artificial_geology_polygons.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\REAY50k_2003\115e_reay_Artificial_Geology_Polygons
mass movement	115e_reay_mass_movement_geology_polygons.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\REAY50k_2003\115e_reay_Mass_Movement_Geology_Polygons
<b>Faults</b>		
Nirex 25k (all)	Faults.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\Faults.shp
Nirex 25k with attribute designation	N 658 Faults.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\Faults.shp
UKAEA	UKAEA_Faults.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\DounreaySGMap\UKAEA_Faults.shp
	UKAEA_Faulttypeindicators.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\DounreaySGMap\UKAEA_Faulttypeindicators.shp
	Normal_inf_fault.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\Gis_Data\ shapefiles_Anthony\Normal_inf_fault.shp
Reay 50k	115e_reay_fault_geology_lines.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\REAY50k_2003\115w_reay_FAULT_Geology_Lines
	115e_reay_landform_geology_lines.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\REAY50k_2003\115w_reay_LANDFORM_Geology_Lines
	115e_reay_mineral_vein_geology_lines.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\REAY50k_2003\115w_reay_MINERAL_VEIN_Geology_Lines
	Structural_symbols.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\REAY50k_2003\structural_symbols
	Fault_dip.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\REAY50k_2003\fault_dip
	Glacial_symbols.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\REAY50k_2003\glacial_symbols
	Structural_symbols_nodip.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\REAY50k_2003\structural_symbols_nodip

	Structural_symbols_dip.shp	V:\Lr\IGSN\Caithness_Geol\Caithness_GIS\Caithness\gis_data\REAY50k_2003\structural_symbols_dip
<b>Features</b>		
water	50k_water.shp	V:\Lr\IGSN\Caithness_Geol\Caithness_GIS\Caithness\gis_data\50k_water.shp
	50k_mean_low_water_mark.shp	V:\Lr\IGSN\Caithness_Geol\Caithness_GIS\Caithness\Gis_Data\ shapefiles_Anthony\50k_mean_low_water_mark.shp
	50k_inland_water_boundary.shp	V:\Lr\IGSN\Caithness_Geol\Caithness_GIS\Caithness\Gis_Data\ shapefiles_Anthony\50k_inland_water_boundary.shp
geomorphology (interpreted from satellite)	Glac_bedform_prelim.shp	V:\Lr\IGSN\Caithness_Geol\Caithness_GIS\Caithness\gis_data\satellites_and_DTMs\Linework\Glac_bedform_prelim.shp
	Melt_channels.shp	V:\Lr\IGSN\Caithness_Geol\Caithness_GIS\Caithness\gis_data\satellites_and_DTMs\Linework\Melt_channels.shp
	Peat.shp	V:\Lr\IGSN\Caithness_Geol\Caithness_GIS\Caithness\gis_data\satellites_and_DTMs\Linework\Peat.shp
	Streamlined_bedrock.shp	V:\Lr\IGSN\Caithness_Geol\Caithness_GIS\Caithness\gis_data\satellites_and_DTMs\Linework\Streamlined_bedrock.shp
man-made A4 digram	Roads.shp	V:\Lr\IGSN\Caithness_Geol\Caithness_GIS\Caithness\Gis_Data\ shapefiles_Anthony\Roads.shp
man-made A4 digram	Builtup.shp	V:\Lr\IGSN\Caithness_Geol\Caithness_GIS\Caithness\Gis_Data\ shapefiles_Anthony\Builtup.shp
<b>Notes</b>		
	geology button	this button retrieves the 10k geology provided by the drawing office plus the 50k geology in the digmap folder in the q drive
	scanned 10k button	This button retrieves the scanned maps provided by Mike McCormac
<b>Airphoto themes</b>		
	Flight_lines.shp	V:\Lr\IGSN\Caithness_Geol\Caithness_GIS\Caithness\gis_data\flight_lines\Flight_lines.shp
	Flight_photos.shp	V:\Lr\IGSN\Caithness_Geol\Caithness_GIS\Caithness\gis_data\flight_lines\Flight_photos.shp
<b>Samples (fossils, rocks &amp; boreholes)</b>		
petrology (bedrock)	Reay_wick_rock2.dbf	V:\Lr\IGSN\Caithness_Geol\Caithness_GIS\Caithness\gis_data\Reay_wick_rock2.dbf
	115_Reay_wick_samples_original.dbf	V:\Lr\IGSN\Caithness_Geol\Caithness_GIS\Caithness\gis_data\115_Reay_wick_samples_original.dbf
	115_reary_wick_rocks_only.shp	V:\Lr\IGSN\Caithness_Geol\Caithness_GIS\Caithness\gis_data\115_reary_wick_rocks_only.shp
	Illite cristaline.dbf	V:\Lr\IGSN\Caithness_Geol\Caithness_GIS\Caithness\gis_data\CaithnessICsummary_gis.dbf

petrology (drift)	Till_t_sections.dbf	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\Till_t_sections.dbf
fish fossils	Fishindex.dbf	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\Fishindex.dbf
	Doun_nirex_bh.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\Doun_nirex_bh.shp
	Doun_fossloca.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\Doun_fossloca.shp
algae	115e_reay_fossil_horizon_geology_lines.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\REAY50k_2003\115w_reay_FOSSIL_HORIZON_Geology_Lines
	Borehole.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\REAY50k_2003\borehole
	List_locality2.dbf	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\fossil_dec_2003>List_locality2.dbf
<b>Palynology (spores)</b>		
	Caitnessgis_assemb.dbf	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\Gis_Data\Caitnessgis_assemb.dbf
	Paly_assemble.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\Gis_Data\Paly_assemble.shp
	Caitness_paly_gis.dbf	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\Caitness_paly_gis.dbf
<b>Miscellaneous</b>		
	Nirex Airbone Geophysical Survey.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\HL_Surveys_Dounreay\doun_hl.shp
	Trial pits (open).shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\gis_data\Trial pits (open).shp
	Notebook_temp.shp	V:\Lr\IGSN\Caitness_Geol\Caitness_GIS\Caitness\Notebook_temp.shp