Armagh City, Banbridge & Craigavon Pre POP consultation

Minerals and Petroleum Branch/Geological Survey of Northern Ireland (MAPB/GSNI) welcomes the opportunity to engage with Armagh City, Banbridge and Craigavon Borough Council in the preparation of its Local Development Plan (LDP). This paper summarises a number of key issues which the Council may wish to consider as it develops and considers its Pre Planning Options Paper.

MAPB/GSNI colleagues would welcome an opportunity to meet with the Council to discuss any issues that may arise from our response or offer any help that you may require. To arrange, please contact Lorraine Fleming Lorraine.Fleming@economy-ni.gov.uk or Yvonne Curran Yvonne.curran@economy-ni.gov.uk .

Geology

The Armagh City, Banbridge and Craigavon Borough Council area has quite a diverse geology relative to other district council areas in Northern Ireland. The dominant bedrock lithology is the Palaeozoic aged marine sediments of the Longford-Down terrane. These provide extensive sandstone resources that are exploited by a number of quarries in the council area. Rocks of the Newry granodiorite are located in the region from Katesbridge to Rathfriland in the south-east of the council area. The north-west is dominated by marine sediments of Carboniferous to Permian age with limited occurrence of the Triassic Sherwood Sandstone in the north-east near Lurgan. These sediments are in turn overlain by younger Tertiary basalts marking the southernmost reaches of the Antrim Plateau. The youngest rocks in the area comprise the Oligocence aged lignite and clay units of the Lough Neagh Clays Group.

Aggregates

The most recent information on aggregate extraction for the area comes from the 2016 annual mineral return made to the Department for the Economy. Twelve operators completed returns for the period in question though an additional 7 quarries are known to have operated in the area in recent years. In total, 151 people were employed in the production of 1.5million tonnes of aggregate at a value of £7.3m. The dominant material reported in terms of weight and value is sandstone, totalling more than all other commodities combined. Additional materials produced in the council area are limestone and sand and gravel (the latter from extraction operations in Lough Neagh) and limited clay/shale.

Aggregate extraction is likely to remain a major industry in the council area. Materials will be required for infrastructure development and the environmental benefits conferred by local supply should be encouraged. There may also be potential or a need to supply further afield within Northern Ireland and in the case of the high value greywacke, the European export market. Both local and wider economic benefits should be considered when preparing the Preferred Options.

The mineral planning maps produced by the British Geological Survey indicate the extent of the potential resources across the council area. Work has recently been carried out by the GSNI to further refine the availability of these resources when considered in light of the areas that cannot be exploited. Surface infrastructure development (roads and housing) or surface water features (rivers and lakes) were the two groups analysed. In considering the content of the Preferred Options Paper, and in particular the safeguarding requirements of the resources and the sustainable development of them, the council should remain aware of the impact that this surface sterilization can have. As an example, availability of the key greywacke sandstone resource (which contributes 63% of the quarry return by value) is reduced by approximately 50% through this exercise. Similar reductions are recorded for all the mapped resources in the council area. This information should be used to inform the designation of areas for mineral reserves and carefully considered if areas of constraint on mineral development are proposed.

Metallic Minerals

The area covered by the Borough Council has a history of metallic mineral mining dating back to the 1800's with reports of predominantly lead and coal being targeted by small scale operations. More recently, mineral prospecting licences have been issued by the Department to Dublin based junior exploration company Conroy Gold and Natural Resources. Conroy have been actively prospecting an area from Armagh City south to the border at Crossmaglen since the mid 90's, targeting base and precious metals. The company has a good relationship with landowners in the area and a variety of low impact prospecting techniques have been employed to refine potential targets, though to date no economic deposit has been identified. The area remains to be fully evaluated for its mineral potential and Conroy have been supported in their efforts by the Department through the consideration and award of mineral prospecting licences. Though there are currently no other companies interested in metallic mineral prospecting in the council area, additional mineral evaluation is being carried out through academic studies. It is important that the council understands the difference between the low impact mineral exploration process and more focussed mineral development and extraction. GSNI are available for consultation on any matter that relates to metallic mineral exploration to assist the council in the decision making process.

Land Stability

Introduction

Northern Ireland is generally composed of stable ground with some areas deemed to have variable degrees of land instability that are for example related to landslides, abandoned mines and compressible ground. Within areas of instability, subsidence and surface movement events have occurred in the past and could take place in the future.

The majority of landslide events occur naturally but can be triggered by human activity, particularly new development in susceptible areas. The most common forms of landslide in Northern Ireland are mudflows, peat bog bursts, rock falls and debris flows.

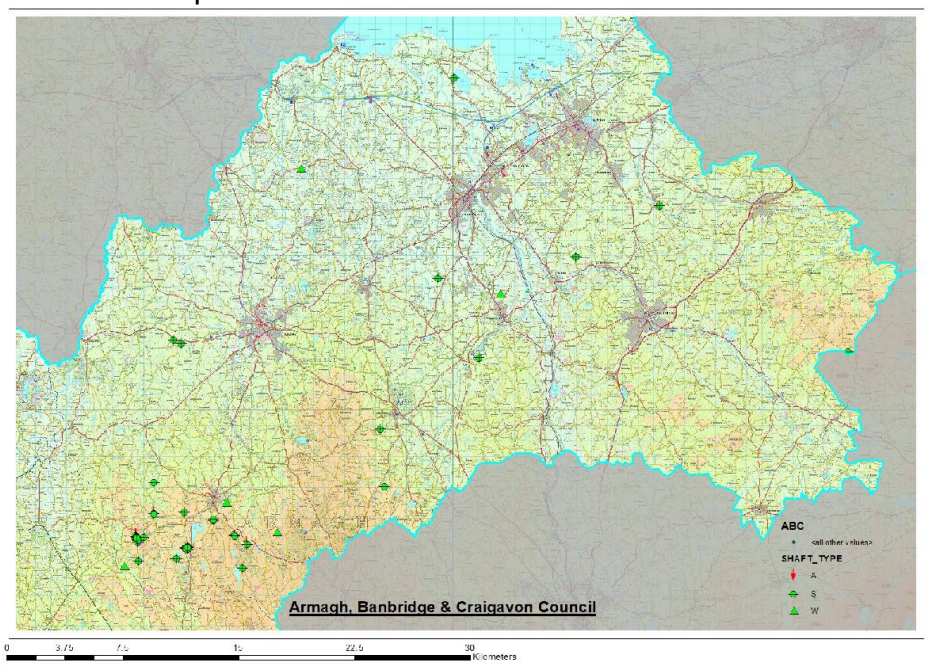
Northern Ireland has a rich history of mining activity which has left the legacy of over 2,400 mine shafts, adits and abandoned workings. These are predominately located in County Antrim and east County Tyrone with smaller concentrations in other locations throughout the Province. As with all underground cavities, the surface lands over abandoned mines may be susceptible to subsidence as a result of mine collapse. All historic mine sites in Northern Ireland classified as abandoned are vested in the Department for the Economy and are managed by the Northern Ireland Mines Oversight Committee (NIMOC).

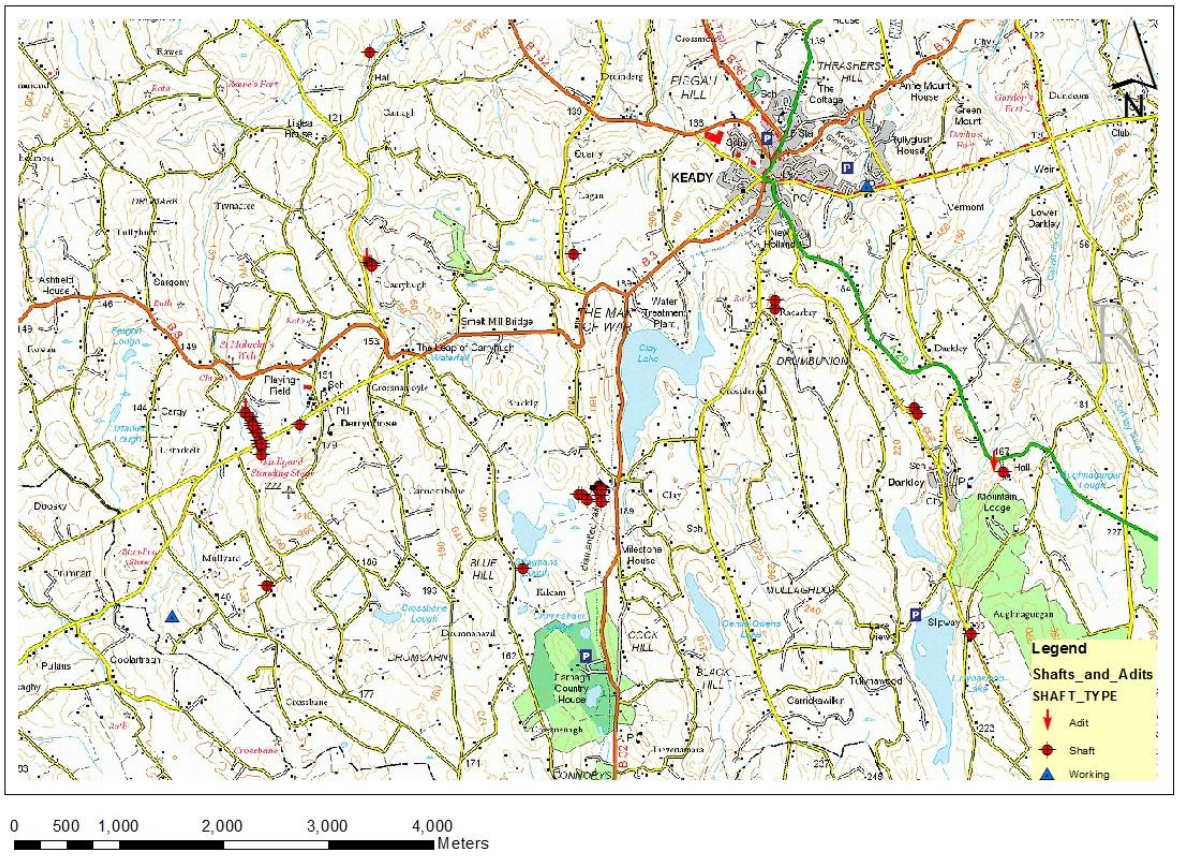
In Northern Ireland the most commonly occurring compressible materials include areas of peat, lacustrine and estuarine silts and clays. Subsidence of structures can occur in areas underlain by such materials if the foundations are inadequate. In addition, differential movement of the ground has the capacity to cause disruption to the infrastructure network.

The hazard posed by areas susceptible to land instability can be incorporated into procedures for land use planning to help aid future resilience. It is important that land stability be given adequate consideration for future planning of residential dwellings, commercial properties, infrastructure projects and recreational areas.

Armagh City Banbridge & Craigavon Borough Council Overview

The council area contains a total of 55 known abandoned mine workings, associated with historic lead extraction. These workings signify entrance portals and predominately take the form of vertical shafts. The mines are generally small scale and shallow with the largest concentrations located just south of the town of Keady. Where mine workings are located, underground voids will exist which may create land stability issues. Development over these areas should only be carried out after adequate assessments have been completed to ensure public safety. A number of the mines within the council area have associated spoil (mine waste) heaps in close proximity to mine entrances which can contain high concentrations of contaminants harmful to the public and environment.





Landslide occurrences within the council area are not significant. However they can occur in areas of steep sided slopes, triggered by climatic conditions and human activity during construction projects.

Groundwater

Introduction to Groundwater

Groundwater is water that is underground in both the loose material above bedrock and in bedrock itself. Contrary to popular ideas, groundwater is not like surface water in that, typically, it is not found in underground streams and lakes. Groundwater fills the tiny void space between grains of material or cracks in the ground. The proportion of voids affects how much water can infiltrate down through the ground to form what are known as aquifers. The greater the proportion of voids, the larger and more productive the aquifer will be.

As an example, the Sherwood Sandstone aquifer in the Lagan Valley contains 20 times more water than the Silent Valley reservoir can hold. Groundwater can range in age from being only a few hours old to a few thousand years old. The natural attenuation processes that go on in the ground serve to remove harmful chemicals and bacteria out of groundwater. The water itself dissolves out minerals in the ground so that it takes on similar chemical characteristics. Although groundwater

quality is variable across Northern Ireland, in general, groundwater is naturally found in a condition that is suitable for drinking without the need for any treatment.

In regards to Local Development Plans, groundwater can be viewed as a natural resource that requires careful protection and as a water source that can be used for growth and economic development. It is important that both aspects are given consideration so as to look after the valuable resource and to use it sustainably to enhance and support future development needs. Also, groundwater is essential for sustaining river flows and aquatic life during sensitive dry periods. Therefore it needs to be understood and carefully managed.

General Groundwater Overview

The Armagh City Banbridge & Craigavon Borough Council covers an area with a wide variety of groundwater conditions. Figure 1 shows the distribution of different aquifer classes.

The Sherwood Sandstone (SSG) outcrops are shown as the orange areas east of Lurgan and north-west of Armagh. These are the most regionally important aquifers in Northern Ireland. The prospects for a reliable and significant water supply from these aquifers are high, such that they have been used extensively for water supply for the last hundred years.

The red area on Figure 1, to the north of the council area is underlain by basalt rocks and Carboniferous limestones and sandstones. Whilst not presenting prospects as good as the Sherwood Sandstone aquifer, these have been exploited successfully by low to medium sized businesses and used for public supply in recent years. Many farms in this area use groundwater pumped from boreholes for a range of agricultural activities.

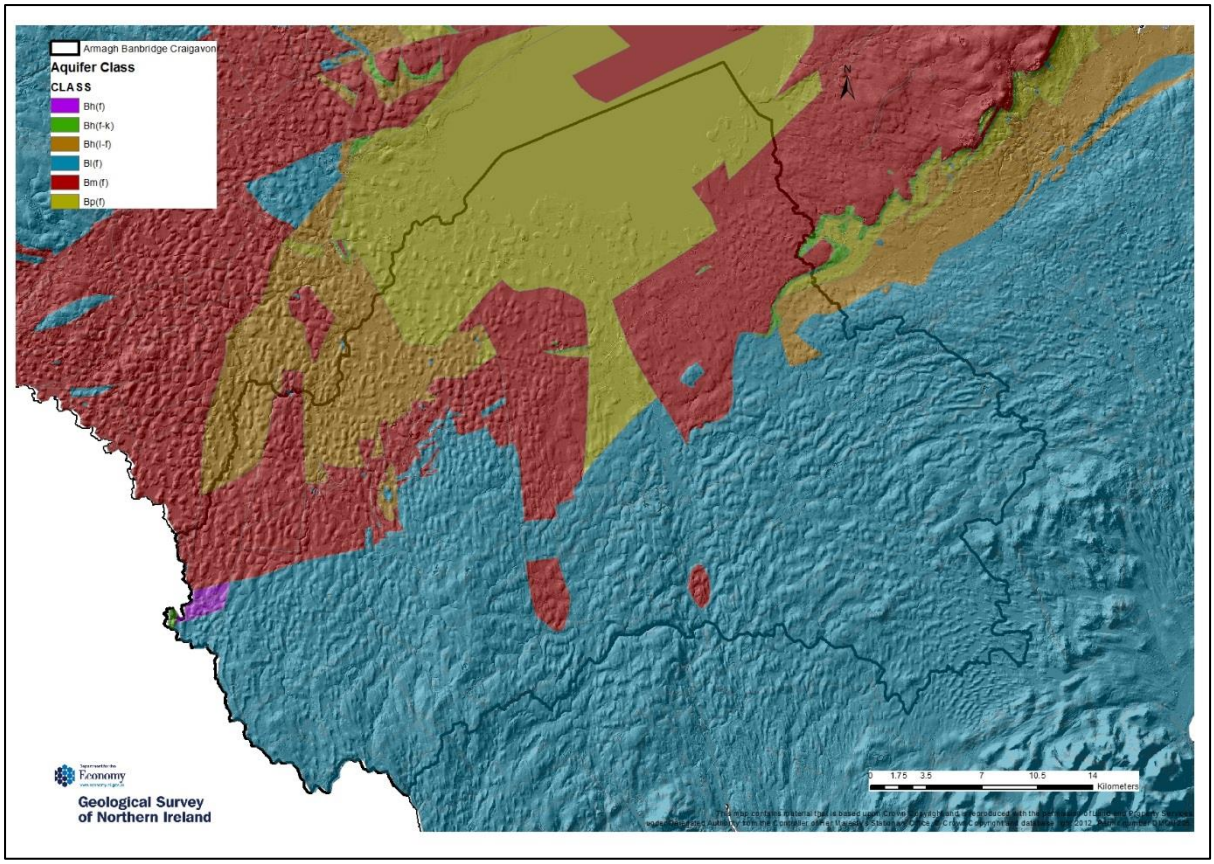


Fig1 – Aquifer classification across the Armagh Banbridge and Craigavon Borough Council

The area of blue to the south and east of the council area is underlain by tight rocks commonly referred to as greywacke. These present limited prospects for groundwater supplies. Some farms and isolated properties not served by mains water in this area use groundwater pumped from boreholes. Groundwater is stored and transported in discrete fractures making it difficult to drill a reliable borehole.

The area coloured mustard to the north on Figure 1 represents mudstone bedrock which does not present reliable prospects for obtaining a groundwater supply.

Current Status of Aquifers

In general, the current evidence shows that all of the aquifers within the council area are in a healthy condition. However, little is known about the groundwater resources within the council area. The Sherwood Sandstone aquifer (SSG) is the most utilised, with much of the light to heavy industry located there to enable access via vertical boreholes. Historically, the aquifers have been supplying water for industry for over a hundred years. Initially, the carbonated water industry made use of it and then it was used to drive steam engines to power heavy industry. Abstraction from the Sherwood Sandstone declined with the introduction of mains electricity but in the 1970's the Lagan Valley Aquifer project saw an array of boreholes across the aquifer supplying mains water, with little or no treatment requirements. Northern Ireland Water centralised production of water to Lough Neagh and stopped abstracting from the SSG aquifer in 2008.

However, companies still depend heavily on the water from the SSG aquifer for their production. There are still significant prospects available for new abstractions to take place from the SSG aquifer. The area to the north-east of Armagh is particularly promising.

The basalts and carboniferous limestones and sandstones are also under-utilised.

Groundwater and LDP

The prospects for groundwater abstraction within the council area are significant. The combination of access to both water and transport routes makes the council area an attractive place for business and industry. In particular, the Sherwood Sandstone aquifers, as shown in Figure 1, have historically provided reliable water supplies for over a hundred years and are not being abstracted to the same extent as in the past. Groundwater level monitoring suggests that these aquifers can sustain the current demand and are likely to be capable of supplying significantly greater abstraction. The coincidence of land zoned for business and industrial use above the SSG aquifers presents an attractive prospect to businesses either seeking to expand, locate or relocate. Ensuring that such land remains available for groundwater abstraction is important to ensure the resource remains accessible.

Sustainable Use of Groundwater

It is important that groundwater is used sustainably. Groundwater is recharged from rainfall infiltrating into the ground. It is important that the rate of abstraction from an aquifer does not exceed the rate of recharge minus the ecological flow requirements of terrestrial water bodies such as rivers and lakes. If it does exceed it, groundwater levels will decline resulting in mining of groundwater.

It is possible to manage this using groundwater monitoring and modelling. Decisions on the capacity of the Sherwood Sandstone aquifer to sustain a level of abstraction should only be made following careful and extensive investigation, monitoring and modelling.

Groundwater Regulation

Groundwater is regulated by the Northern Ireland Environment Agency (NIEA). All abstractions of groundwater over 20 cubic metres per day require an abstraction licence from the NIEA to operate. The licensing system operates on a ‘first come first served’ basis. Therefore once an operator has a licence, their investment is protected from others who may also wish to use groundwater.

Groundwater quality is also regulated by measures brought in by the EU Water Framework Directive. These include Nitrate Action Plans to regulate mainly diffuse pollution by land spreading. The Pollution Prevention Control regulations require businesses to operate a licence for the appropriate and careful management of all substances used during production processes. The principles upon which these regulations operate are the prevention of any hazardous substance being released into the environment and the limiting of the release of non-hazardous substances.

CatchmentCare Project

This EU Interreg VA funded project involves a component of drilling groundwater monitoring boreholes. Armagh City Banbridge & Craigavon Borough Council are joint partners along with the British Geological Survey, which staffs the Geological Survey of Northern Ireland. It is intended for some of the 50 boreholes to be located within the council area with the purpose of improving the understanding of both water protection and resource management. Particular focus will be given to the Blackwater catchment.