GROUP ELEVEN
MINING AND EXPLORATION LTD.

Limerick Project

Gortdrum Block

BIENNIAL REPORT FOR

PROSPECTING LICENCE AREA 4498

Period ending 11th February 2019

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Introduction

This report summarises exploration work carried out by Group Eleven Mining & Exploration Ltd (Group Eleven) on Prospecting Licence Area (PLA) 4498 in County Tipperary during the 2-year period ending 11th February 2019.

PLA 4498 is being explored as part of a small group of licences which comprise of PLAs 4498 and 350, informally termed the Gortdrum Block by Group Eleven. The ground is contiguous with Group Eleven's 'Emly Block' which lies to the west. The license is located 5 km north of Tipperary town, and 40 km southeast of Limerick City. PLA 4498 covers an area of 23 sq. km. (Figure 1). PLA 4498 is a new licence whose boundaries are the same as former mining lease SML89, which expired on 31st December 1986. No PLA was issued upon expiry of SML89 until the issue of PLA 4498 to Group Eleven in February 2015.

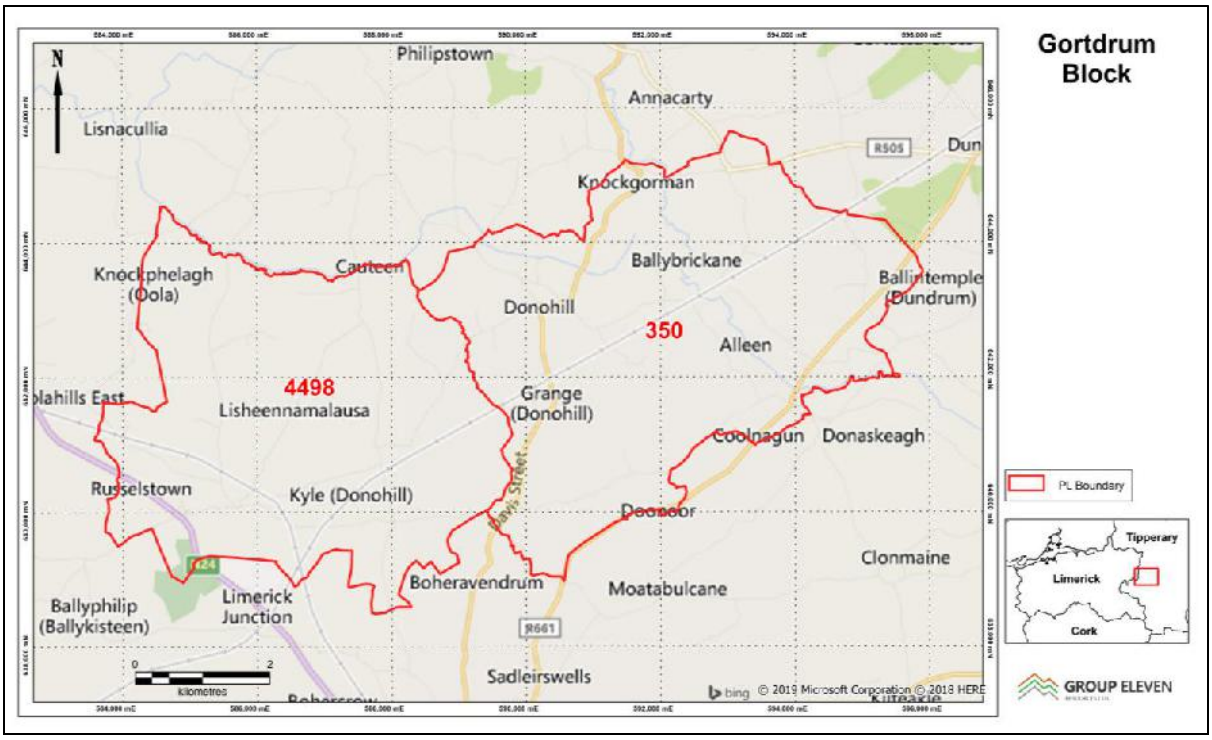

Figure 1: Map showing location of the Gortdrum Block

The licence is characterised by gently undulating lowland terrain with some gentle rolling hills. The land is primarily in agricultural use, mostly grazing, with a few areas of poorer scrubland, where bedrock is closer to the surface. The town of Tipperary lies to the south of the area and farms and ribbon development occur along roads throughout the area. Access to the area is via the N24 national primary route and a network of secondary roads and farm tracks. The main Dublin to Cork railway and a spur line to Limerick City, also pass through the area.

The Gortdrum project area is considered to be prospective for Lower Carboniferous hosted Cu-Ag deposits, similar to that mined at Gortdrum and discovered at Aherlow in Co Tipperary and Tullacondra, Mallow, Co Cork.

Exploration History

PLA 4498 is a new licence with no previous exploration work. However, the area was extensively explored by Gortdrum Mines Ltd and Irish Base Metals from 1962 to 1976 when the area was held under PLA 69 and various mining leases, the last of which was SML89. During this time the Gortdrum Cu-Ag/Hg deposit was discovered and mined. The key milestones were as follows:

- Discovered in 1962 by soil and stream geochemistry and geophysics (IP)
- By 1966, 16,000m drilled
- Pre-mining resource of 4.2mt @ 1.2% Cu, 23 g/t Ag
- Mining commenced in 1967 – open pit
- Produced copper/silver concentrates and mercury until closure in 1975
- Total production was 38,000t Cu, 2.9Moz Ag and 271t Mercury
- Mining Lease lapsed in 1986

The exploration history of PLA 4498 is summarised in the table below:

Table 1: Summary of exploration history of PLA 4498

Year	Company	Activity
1962	Gortdrum Mines Ltd	Discovery of Gortdrum deposit as a result of reconnaissance geological and geochemical exploration followed by drill target delineation from IP surveys
1963-66	Gortdrum Mines Ltd	Delineation drilling (G series holes), definition of Gortdrum orebody
1965-66	Gortdrum Mines Ltd	Exploration drilling immediately adjacent to deposit (B series holes)
1966	Gortdrum Mines Ltd	Extension of soil geochemistry to north east of mine area
1969	Gortdrum Mines Ltd	Exploration drilling to north east of mine along Gortdrum Fault (E series holes)
1972	Gortdrum Mines Ltd – Irish Base Metals	Conclusion of exploration drilling in Gortdrum area (focus shift of exploration north to Coonagh Castle and other Zn/Pb prospects)

Exploration in the Gortdrum area, since discovery of the Gortdrum deposit, was effectively in 4 phases:

- Phase 1: Discovery and delineation of the Gortdrum orebody (1962-66)
- Phase 2: Exploration immediately adjacent to the deposit (1965-66)

- Phase 3: Exploration north-east of the mine along strike of the Gortdrum Fault (1969-72)
- Phase 4: Exploration to the north of Gortdrum for Waulsortian hosted Zn-Pb mineralisation (1972 onwards)

No significant exploration has taken place in the area now covered by PLA 4498 since the early 1970's.

Geology

Regional Geology

The regional geology of the Limerick Basin area is well known following the work of Shepard-Thorn (1963), Philcox (1984), Strogen & Sommerville (1992), and more recent authors such a Blaney & Redmond (2014). This work has most recently been summarised for Group Eleven by Kelly (2018).

The Gortdrum Block lies at the south-eastern margin of the Limerick Basin and just to the southeast of the Limerick Volcanic centre and overlies a variable bedrock geology, which ranges in age from Devonian to Tournaisian (Figure 2).

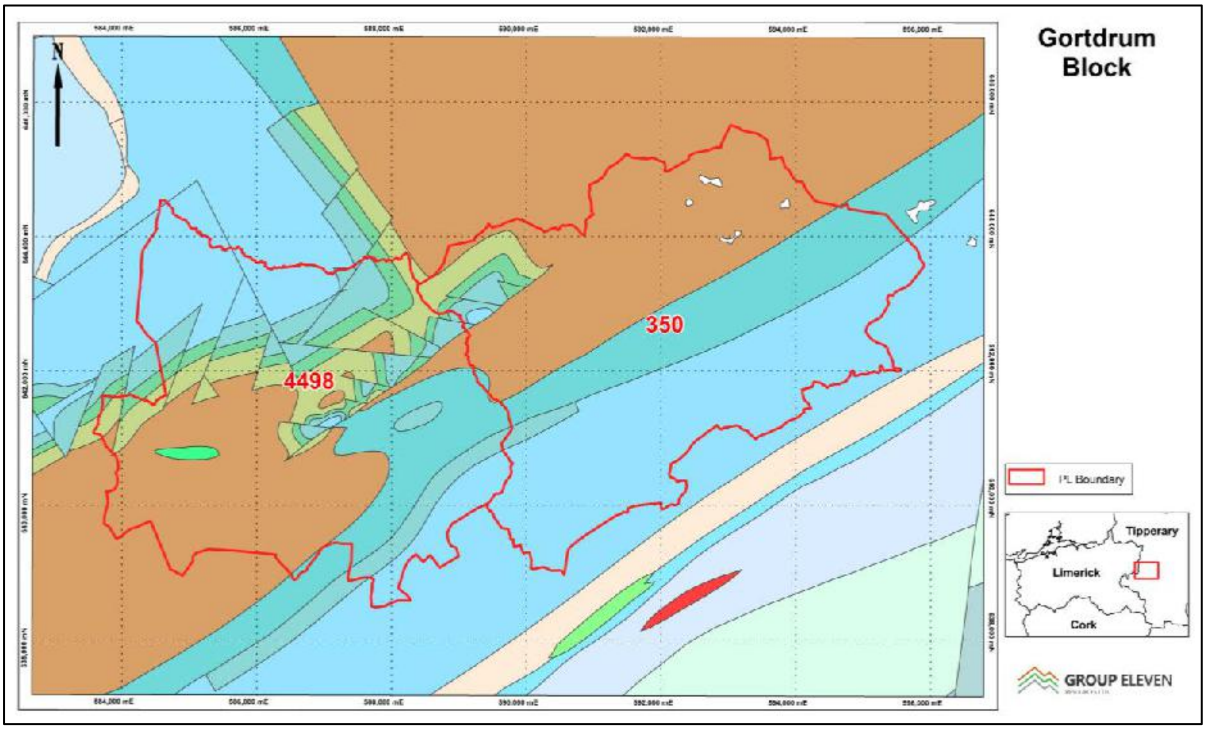

Figure 2: Gortdrum Block – Bedrock Geology

The stratigraphic sequence is described below:

Devonian Clastic Sequence

The oldest part of the stratigraphy exposed in the Limerick District is the uppermost Old Red Sandstone beds. These are Devonian to early Carboniferous in age and the lithologies are described as consisting of massive structureless sandstones and red to green siltstones, which are overlain conformably by the Lower Limestone Shales.

Lower Limestone Shale Group

The Lower Limestone Shale Group represents the initial marine flooding at the start of the Carboniferous transgression over the Old Red Sandstone continent. The Lower Limestone Shale sequence in the Limerick area (Philcox 1984) is largely understood from coastal sections and the Pallaskenry borehole (Somerville and Jones, 1985). The Lower Limestone Shale Group is sub-divided into the Mellon House Formation, the Ringmoylan Formation and the Ballyvergin Formation.

Mellon House Formation

The Mellon House Formation succeeds the pale-cream and white terrestrial sandstones of the uppermost Old Red Sandstone facies and is composed of dark-grey laminated siltstones, grey fine-grained sandstones and calcareous shales. Flaser-bedding and cross-stratification are common as are desiccation cracks. The Formation is 34.4m thick in the Pallaskenry borehole (LI-68-10), and is known to thicken to the north, but it thins to the northeast and east, being 12.5m in thickness at Ballyvergin.

Ringmoylan Formation

The Ringmoylan Formation is largely composed of dark-grey to black calcareous shales, with subordinate thin beds or bands of bioclastic limestone which are estimated to form only 20 – 30% of the formation. The formation is 31m thick at Pallaskenry but thickens northwards where 47m is recorded at Shannon and then thins north-eastwards, with 23.5m at Ballyvergin.

Ballyvergin Formation

The Ballyvergin Formation (or Ballyvergin Shale) overlies the Ringmoylan Formation and is composed of a distinctive green-grey non-calcareous mudstone with siltstone laminae. The formation varies from about 5m to 10m and marks a distinctive transition from argillaceous dominated sequence below to a carbonate dominated sequence above.

Argillaceous Bioclastic Limestone Group

The Argillaceous Bioclastic Limestone Group is composed of two formations, the Ballymartin Formation and the overlying Ballysteen Formation.

Ballymartin Formation

The Ballymartin Formation is composed of thinly-bedded pale-grey muddy limestones and dark-grey calcareous shales. The proportion of shale to limestone is approximately 1:1. The formation varies between 11.45m and 45.6m in thickness in the Limerick area. It is equivalent to the Lower Pale Limestone at Gortdrum and the Lower Ballysteen Limestone at Silvermines. It is distinguishable in core, but rarely outcrops and in mapping is generally shown as included within the Ballysteen Limestone Formation.

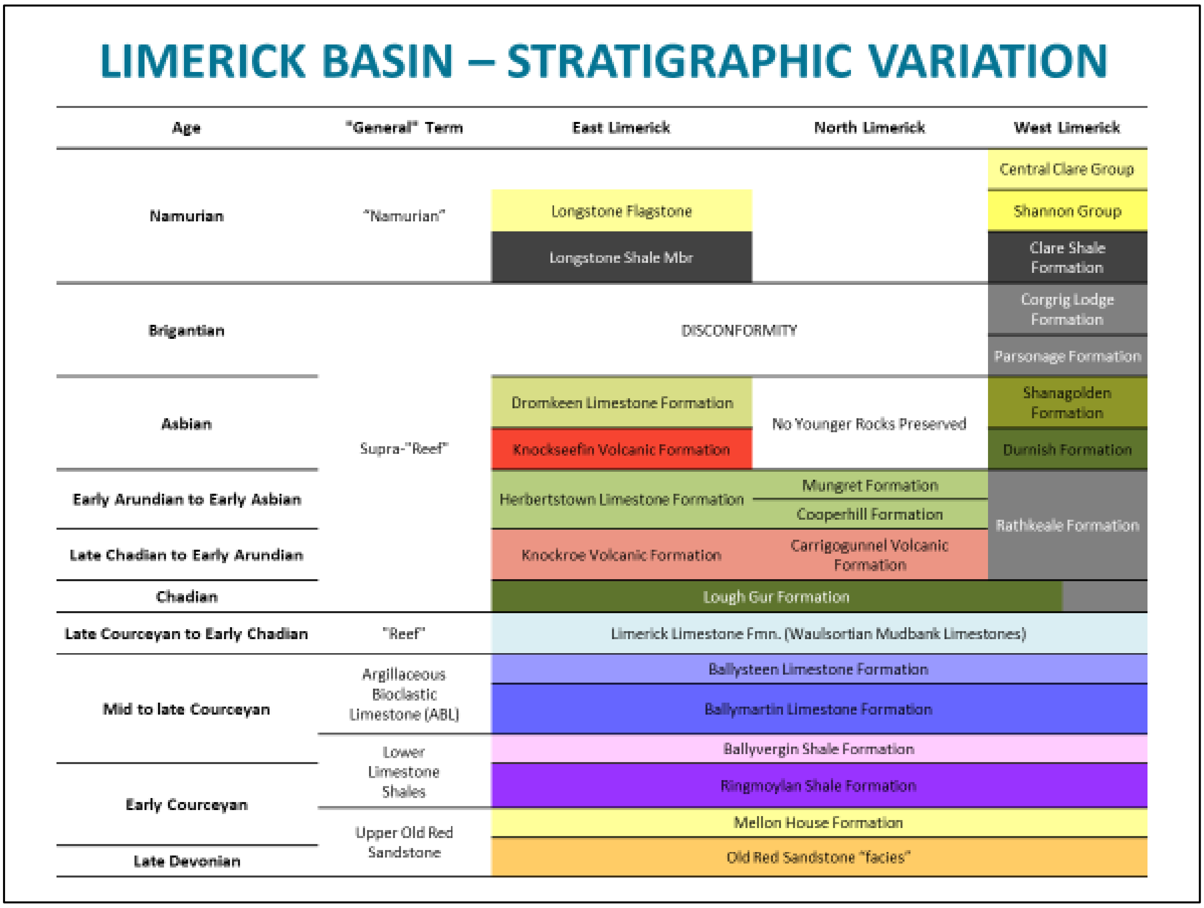

Figure 3: Stratigraphic Variation in Limerick

Ballysteen Formation

The Ballysteen Formation is distinguished from the underlying Ballymartin Formation by the development of thick, rather than thin, bedded, bioclastic, slightly argillaceous limestones with the initial unit forming a distinctive carbonate rich (>90% limestone) marker (Pallaskenry Member of Somerville and Jones, 1985). Above this, the formation can be sub-divided into three separate units, a lower unit of dark, well-bedded argillaceous wackestones, an upper unit of more markedly argillaceous limestones and a formally named uppermost unit, the Ballynash Member (also termed the Wavy Nodular

Limestone or Nodular Micrite Unit), composed of nodular micrites (frequently cherty) and shales that immediately precedes the onset of Waulsortian limestone deposition.

Waulsortian (Limerick Limestone Formation)

The Waulsortian limestones (Limerick Limestone Formation) form the primary host rock for hydrothermal alteration and base-metal mineralization in the southern Irish Midlands (Stonepark, Pallas Green, Silvermines, Lisheen, Galmoy, Tynagh etc.). The Waulsortian forms a complex composed of stacked mounds, sheets or tabular bodies of massive to poorly bedded biomicrite wackestone with large cavity spaces (stromatactis) infilled with reworked calcite muds and fibrous or later blocky calcite spar cements (Lees and Miller, 1995). These clean limestone units may be separated by slightly argillaceous to argillaceous (frequently cherty) “intermound or offbank” beds referred to as Waulsortian equivalent facies by some workers.

Drilling in the Stonepark and Pallas Green areas and interpretations from work in other areas of the Limerick Basin, indicates a highly variable thickness pattern in the Waulsortian on the northern limb of the Limerick syncline, from 140m to 440m, almost certainly related to both consistent westwards deepening and thickening of the formation, but also due to more local differential subsidence across syn-depositionally active structures.

Supra-Waulsortian Sequence – East and North Limerick

Lough Gur Formation

The Waulsortian limestones are overlain by dark-grey to black, cherty, argillaceous wackestones of the Lough Gur Formation. The Lough Gur Formation is equivalent to the Crosspatrick Formation in the Rathdowney Trend (Lisheen/Galmoy) and the Oldcourt Cherty Limestone Formation (Silvermines District). Formation thickness is variable, probably initially infilling relict topography on the upper surface of the Waulsortian mound complex, but thickness variations recorded suggest that a significant amount of lateral thickness variation in the Lough Gur and the underlying Waulsortian limestone is controlled by structurally influence facies variations.

The Lough Gur thickness is estimated at 100m in the east of the Limerick syncline, appearing to thin westwards. The upper part of the formation may contain tuffs and lavas associated with the onset of volcanism and the lavas and volcanogenic sediments of the Knockroe Volcanic Formation.

Knockroe Volcanic Formation

The Knockroe Volcanics consists of a complex package of volcaniclastic sediments, lavas and igneous intrusives of alkali basalt to trachytic composition. The initial phase of alkali basalt activity is marked by the emplacement of a significant number of large diatremes ranging from 100-500m in diameter and related to surface Maar cone development on the Carboniferous land surface at that time. The Knockroe volcanics vary in thickness from 250 to 500m and dating of interbedded limestones indicates a largely Chadian age for the volcanism, younging from west to east. Intrusives consist of a swarm of alkali basalt sills and dykes hosted within the Waulsortian and Lough Gur Formations and a late stage suite of porphyritic trachyte-syenite dykes and plugs. Blaney and Redmond (2015) clearly indicate that timing relationships determined from drilling in the Pallas Green and Stonepark areas show evidence for pre, syn and post mineralization volcanism.

Herbertstown Limestone Formation

The lower part of the Herbertstown Limestone Formation was deposited during the end of the Knockroe volcanism and is composed of coarse grainstones, composed of oolitic and coralline limestones. Deposition of Herbertstown facies continued for a significant period, from the late Chadian to the early Asbian and a total thickness of 500m is estimated for the formation. North of the Stonepark area at Mungret and Cooperhill, the formation can be sub-divided into informal sub-units (the Cooperhill and Mungret Formations) based on carbonate shelf facies. The Herbertstown Formation is of Arundian to early Asbian age.

Knockseefin Volcanic Formation

The Knockseefin volcanics represent a second major phase of volcanism in the east Limerick area in the Asbian. They are petrologically similar to the Knockroe volcanics, being composed of ankaramitic lavas and tuffs, but unlike the Knockroe volcanics, there are no trachytes recorded.

Dromkeen Limestone Formation

The Dromkeen Limestone Formation is distinguished from the Herbertstown Limestone by the more massive bedded, finer-grained and paler grey colour of the limestones. They are described as being similar lithologically to the Ballyadams and Clogrenan Limestones present further east in the Tipperary area. Where the Knockseefin Volcanic sequence is absent, the Dromkeen directly overlies the Herbertstown Limestones, otherwise it overlies the Asbian volcanic rocks of the Knockseefin Formation.

Namurian

The Lower Carboniferous carbonate dominated sequence is overlain by a sequence of clastic-dominated sedimentary rocks marking a major change from marine carbonate conditions to deltaic clastic sediments. Beds of Namurian age are mapped by the Geological Survey in the southern part of PLA 2654 to the southwest of Tipperary town and within the Limerick volcanic centre (Longstone Formation).

Local Geology, Structure and Mineralisation

Prospecting licence area 4498 is underlain primarily by Devonian clastic rock and the overlying Tournaisian carbonates, consisting primarily of the Lower Limestone Shales and Ballysteen Limestone (Figure 4). The major Gortdrum Fault, which is a regionally significant structures traverses the centre of the area, striking ENE-WSW, and downthrows to the northwest, bringing in the younger carbonates.

The historical literature (Steed 1986, Thompson 1966) describe the carbonates in terms of the Dark and Pale Limestone. These units are considered to be the Ringmoylan Shale and Ballysteen Limestone (Table 2).

Table 2: Stratigraphic Nomenclature Gortdrum

Current Stratigraphic nomenclature (Philcox)	Gortdrum Stratigraphic nomenclature (Steed, Thompson etc.)	Lithology	Unit thickness (m)
Waulsortian Limestone	*Not seen in mine area*	Clean micritic limestone	~ 400 +
Ballysteen Limestone Formation	Middle and Upper Pale Limestone	Argillaceous Bioclastic Limestones	290
Ballymartin Formation	Lower Pale Limestone?	Thin bedded, slightly argillaceous limestone	40
Ballyvergin Shale	Mudstone	Grey-green non-calcareous mudstone	3
Ringmoylan Shale	Dark Limestone	Bioclastic limestone with interbedded black shale	25
Mellon House Beds	Transition Beds	Calcareous shale and sandy limestones	32
Upper Old Red Sandstone	Upper Old Red Sandstone	Pale dolomitic sandstone with red and green siltstone & shale	270

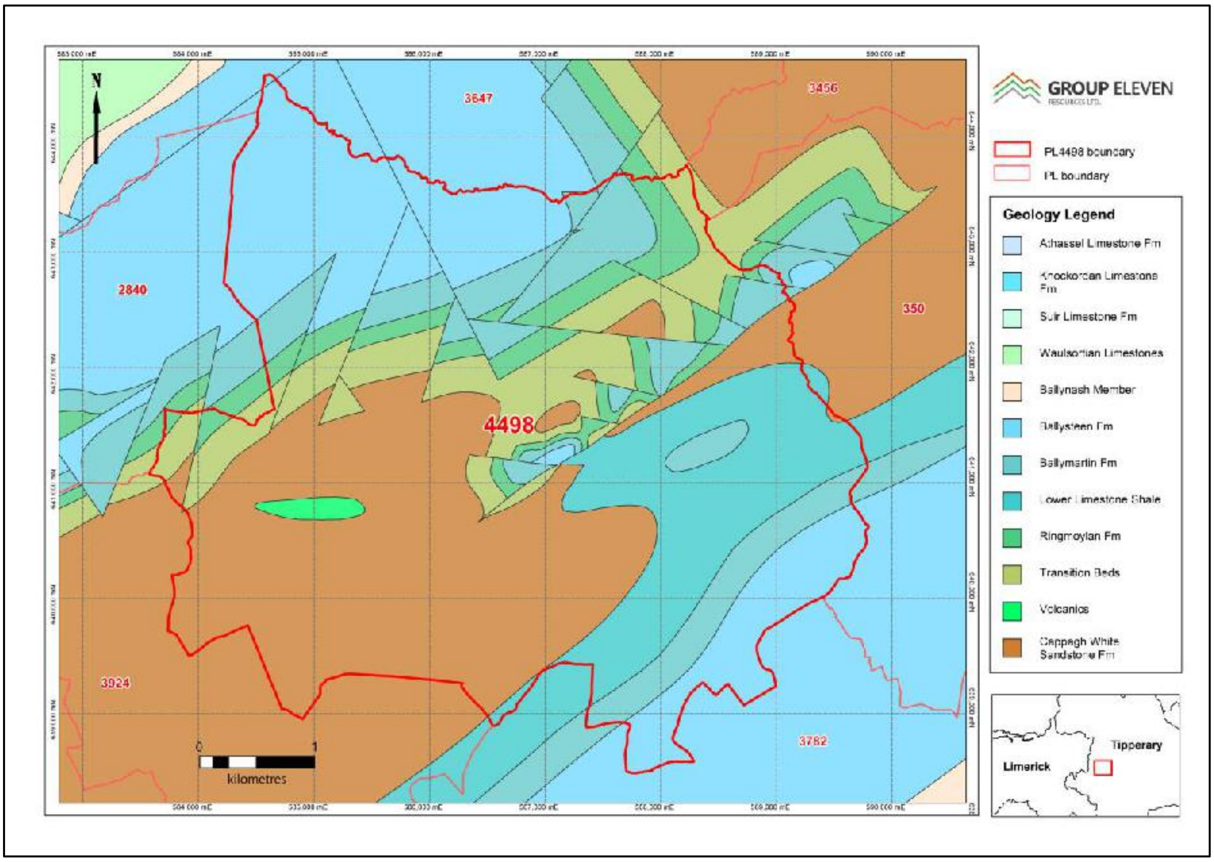

Figure 4: Map showing the bedrock geology of PLA 4498

Gortdrum Deposit Geology, Structure and Mineralisation

The following section on the geology of the deposit is compiled from Steed, Thompson and a number of other authors, such as Tyler, who have provided informal descriptions of the deposit. The Gortdrum Fault (Figure 5) is by far the most important factor controlling the distribution of mineralisation at Gortdrum.

It is genetically related to the regional folding and appears to have developed primarily to accommodate the intersection of three opposing folds in the hanging wall of the fault. These are the east-west Pallas syncline to the north, the north-south Slieve Phelim anticline to the north-east and the ENE Emly perianticline to the south-west. The Pallas syncline is eliminated against the fault approximately 8000 feet ENE of the mine. The north-south axis of the Slieve Phelim anticline is rotated to join with the ENE axis of the Emly anticline. This is achieved in the hanging wall of the Gortdrum Fault by a series of small dextral offsets of the N-S fold axis, along east-west and WNW striking faults, which are subsidiary or secondary to the main Gortdrum Fault. Both the Slieve Phelim and Emly anticlines have well-developed crestal synclines. Gortdrum is located in a small structural basin formed where the crestal syncline of the Emly anticline is intersected by the much offset crestal syncline of the Slieve Phelim anticline. A second, although only weakly mineralised structural basin occurs 8000 feet east of Gortdrum, where another section of the offset Slieve Phelim crestal syncline intersects the east-west Pallas Syncline. Figure 6 below shows the position of the Emly and Slieve Phelim anticlines.

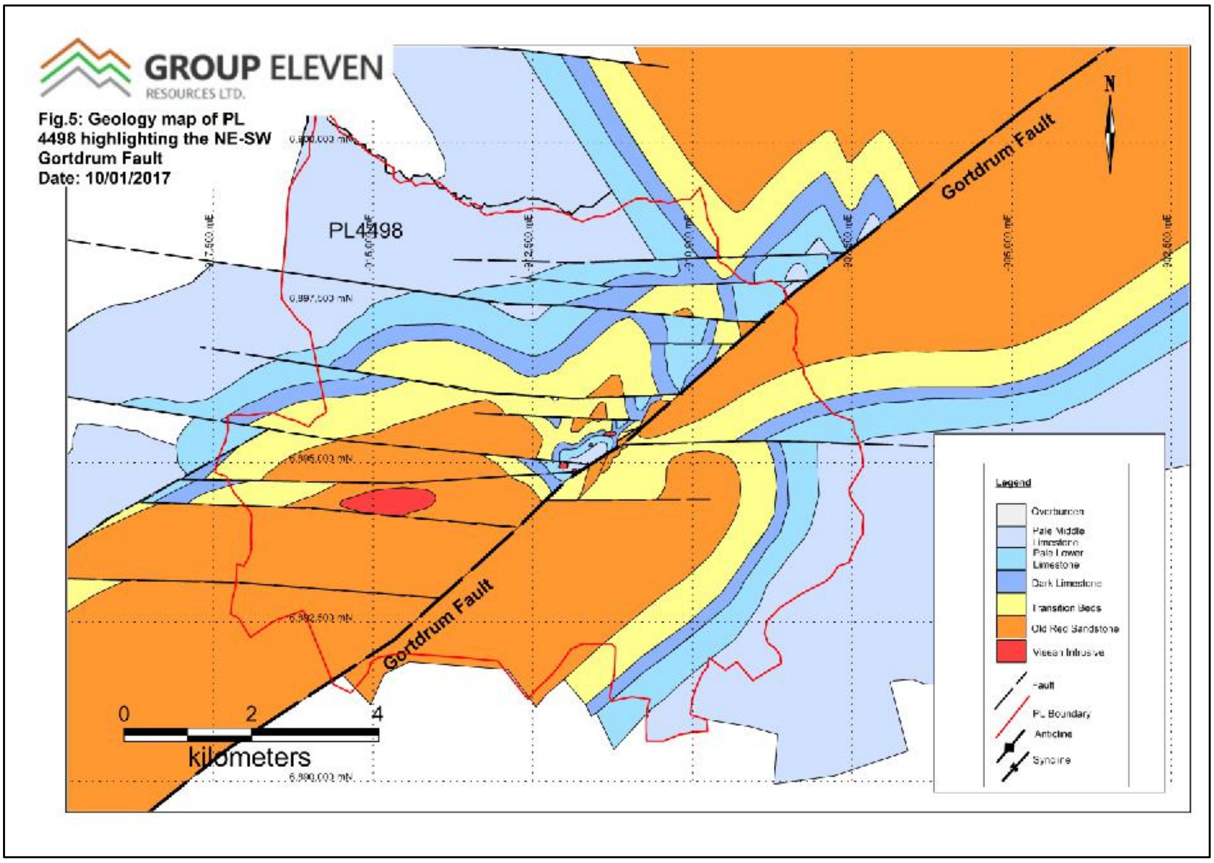

Figure 5: Geological map of PL4498 highlighting the NE-SW Gortdrum Fault

There is no evidence at Gortdrum to suggest that the Gortdrum Fault was active during sedimentation. In the case of the Pallas syncline the Visean succession contains 2000 to 2500 feet of basic lavas, tuffs and agglomerates. Associated with these extrusive rocks are a swarm of close spaced east-west striking dykes and small plugs of basalt. Gortdrum is close to the southern edge of this dyke swarm and at least 3 small plugs and ten dykes were exposed in the open pit. All of these small plugs and dykes have been subjected to hydrothermal alteration. In many cases this has progressed to the point where the basalt has been reduced to a rock composed essentially of clay minerals and carbonate. Within the deposit these dykes were referred to as Buff Alteration Zones. In places this alteration was accompanied by extensive dolomitisation and silicification of the wall rock limestones. Post-dating basalt dyke intrusion and hydrothermal alteration was a period of tuffisite or igneous breccia formation. These breccias are nearly always closely associated with the earlier dykes and plugs; they occur as thin dykes often no more than a few millimetres thick, and small irregular plug-like bodies. All of this intrusive material is, without exception, pre-faulting and folding.

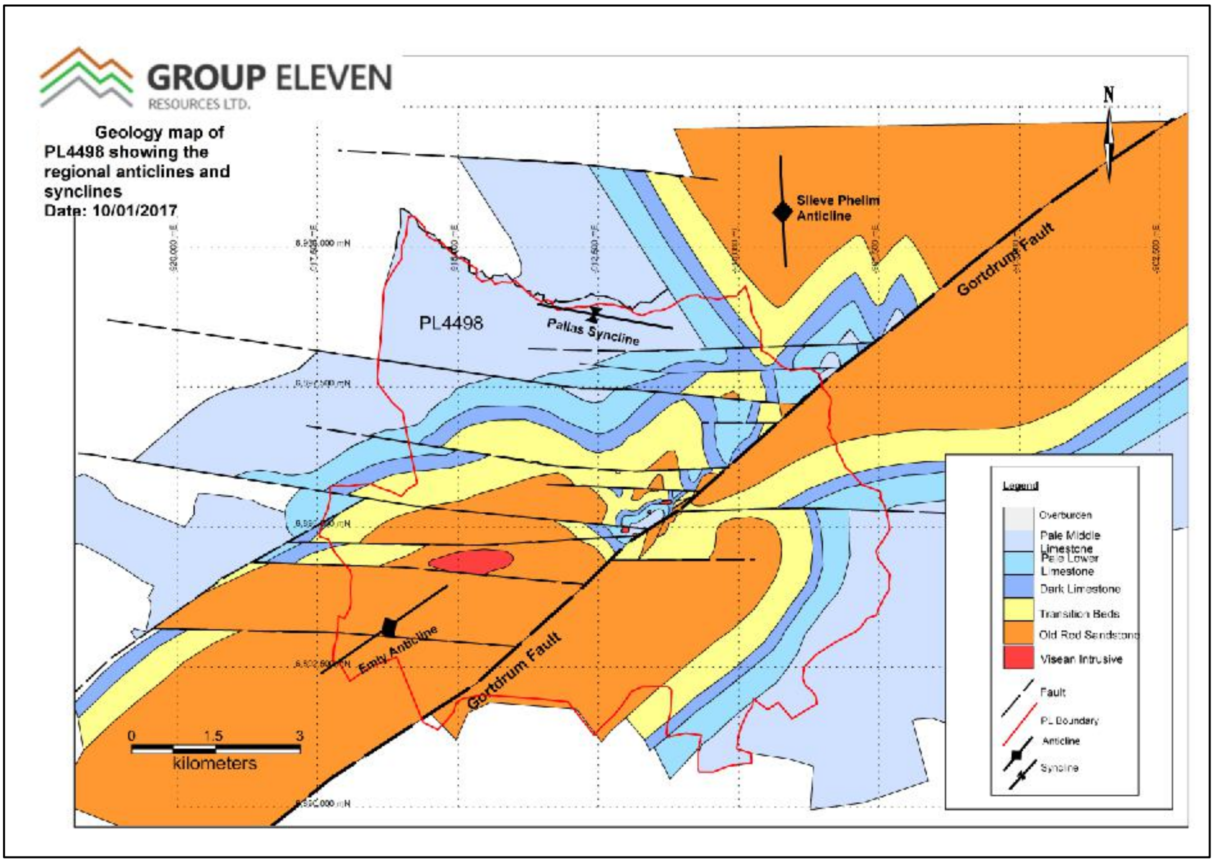

Figure 6: Geology map of PL4498 showing regional anticlines and synclines

Orebody Geology

The orebody is clearly divisible into two halves (Figure 7). The western ore zone cross-cuts severely deformed limestone and shales in the hanging wall of the Gortdrum Fault. The southern boundary of the ore is the Gortdrum Fault: the northern boundary is an assay wall. The western ore zone can be further divided into two sub-zones. The main sub-zone is adjacent to the fault. The smaller sub-zone is centred on a wide altered dyke, the main Buff Alteration Zone. This dyke zone is severely faulted and sheared. Such deformation along dykes in the hanging wall of the Gortdrum Fault is typical, the dykes having provided obvious planes of weakness, along which stress release could be channelled during movement along the main fault. Mineralisation along the dyke dies out rapidly westwards as the dyke and Gortdrum Fault diverge.

The eastern ore zone is in the footwall of the Gortdrum Fault and is contained within a narrow wedge of severely deformed limestones bounded by the Gortdrum Fault to the north and a subsidiary structure, the South Wedge fault to the south. East, beyond the limits of the open pit, this structure re-joins the Gortdrum Fault. The limestones within this fault wedge dip very steeply to the north-west.

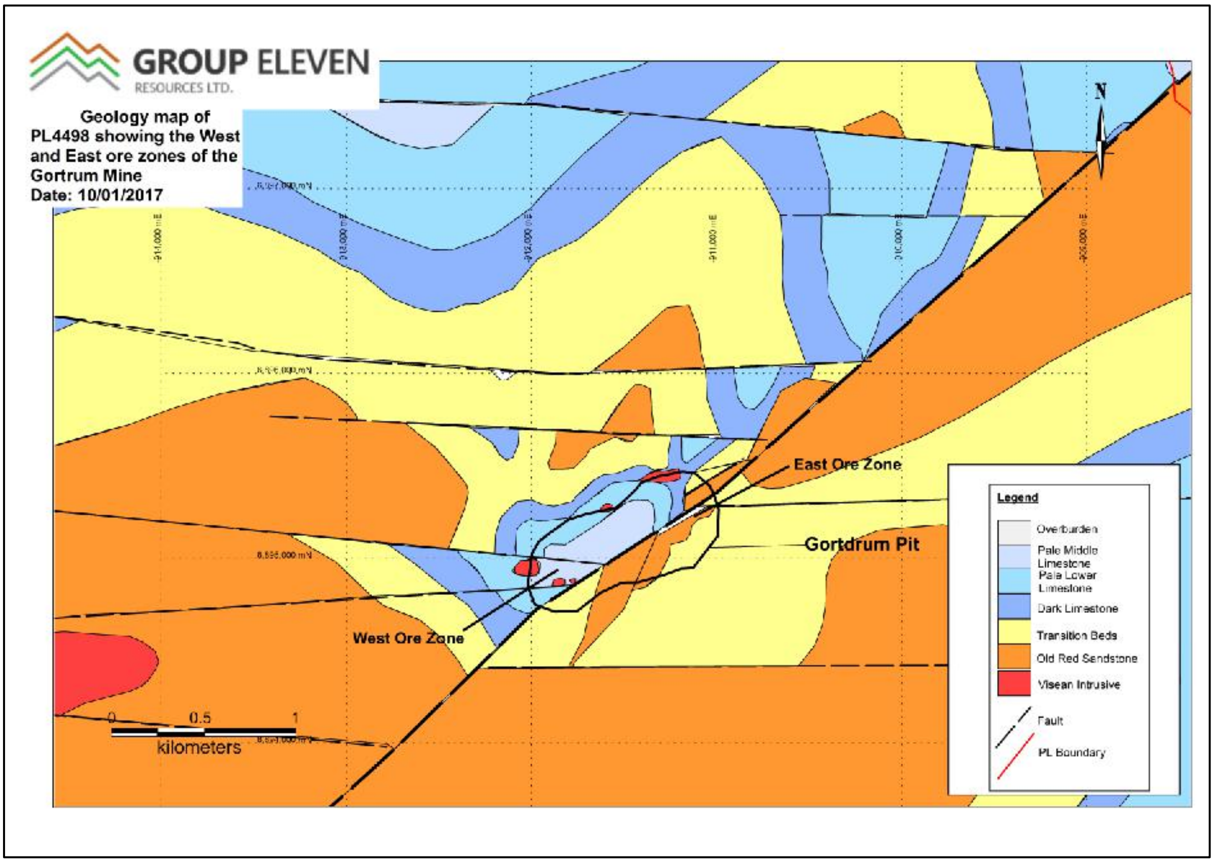

Figure 7: Geology Map of PL4498 showing the position of east and west ore zones

The South Wedge fault and wedge structure are cut off above, at the eastern end of the deposit, by an over thrust block of Old Red Sandstone and Transition Beds. The thrust plane in turn, is dislocated by the Gortdrum Fault, which is the only fault structure known to offset the thrust, and a small saucer of over thrust material is isolated north of the Gortdrum Fault. To the south-east the thrust most likely passes into bedding slip within the Old Red Sandstone. The South Wedge fault is almost certainly an over-steepened bedding slip, initiated originally within the very shaly units of the Transition Beds. Both wedge development and thrusting are interpretable in terms of secondary stress release structures during strike slip movement along the main Gortdrum Fault; they do not imply more than one period of major tectonism. The absence of major mineralisation in the hanging wall of the Gortdrum Fault, immediately north of the wedge, can be most easily explained by late, post-mineralisation, sinistral movements along the Gortdrum Fault, of the order of 1000 feet. This would mean that at the time of mineralisation the west end ore zone was located immediately north of the east end ore zone. Figures 8 and 9 show cross sections through the West and East orebodies, respectively

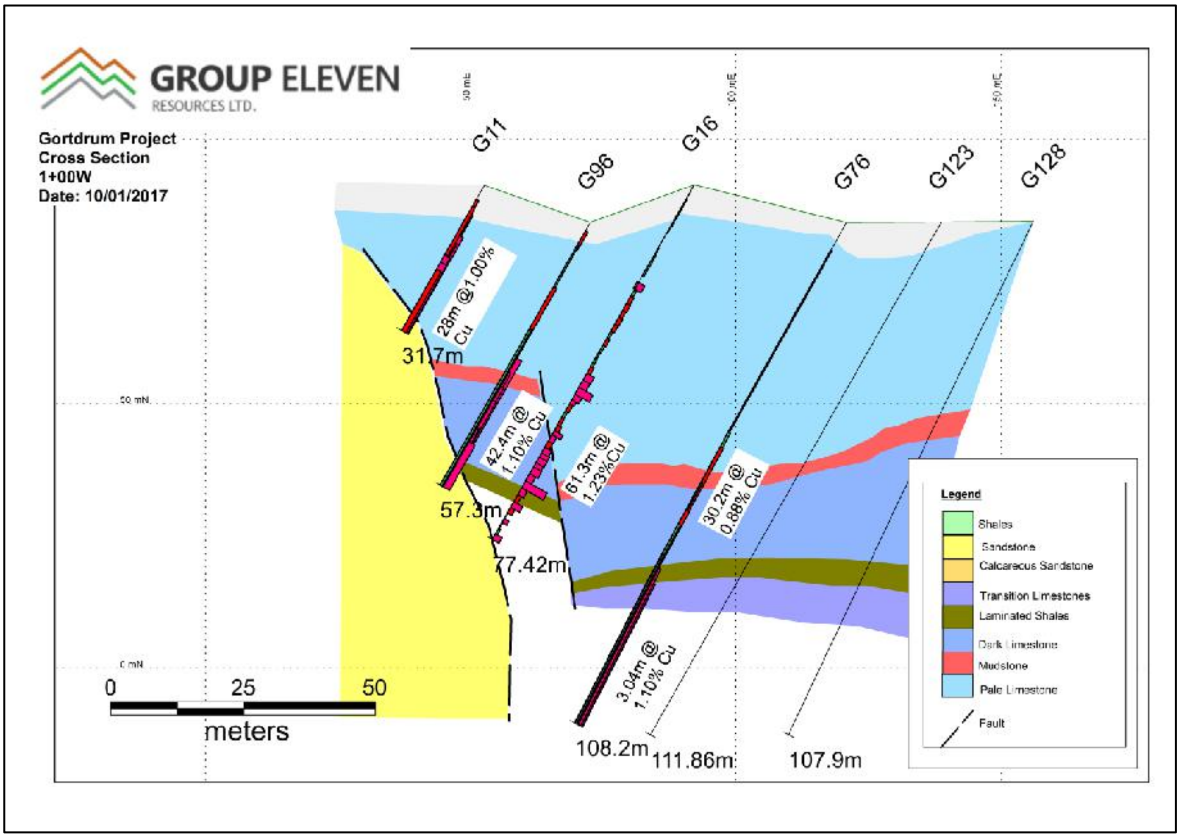

Figure 8: Cross Section 1+00W, West orebody

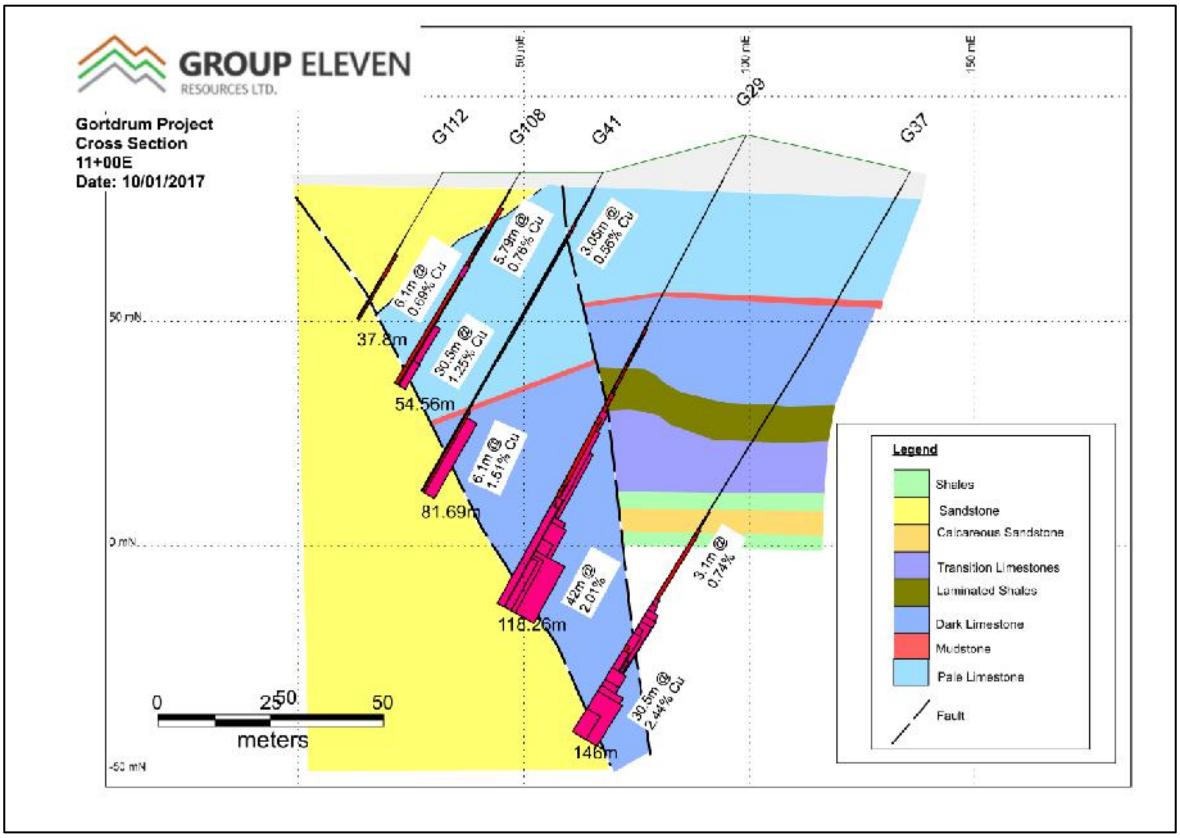

Figure 9:Cross Section 11+00E, East orebody

Mineralisation

The copper mineralisation occurred in four sulphide phases. These in order of decreasing abundance were bornite and chalcocite in eutectic intergrowths, chalcopyrite and tennantite. In general, bornite and chalcocite increased with depth at the expense of chalcopyrite and tennantite. Tennantite is the only significant host of arsenic and antimony in the deposit. This makes it possible to use assay data for these two elements to quantify the amount of tennantite in the deposit at any one point. At any one level the tennantite content of the ore decreased with increasing copper grade, which in turn increased with increasing severity of deformation of the host rocks. Hence the ore with the lowest tennantite content at any given elevation within the western ore zone, was adjacent to the Gortdrum Fault.

The tennantite became more arsenious with depth. The mean arsenic: antimony ratio increased from 3:1 to 7:1 between 100 and 200 feet below surface. Most of the mercury was contained within the tennantite. This is demonstrated by the constant antimony to mercury ratio throughout the orebody. Mercury therefore decreased in depth in step with the tennantite.

Previous work by the current Licensee

As there had been no licence holder for this area since 1986 when SML89 expired, and no exploration carried out on the ground since 1972, work by Group Eleven focused on compiling the relevant data necessary to guide its future exploration programme. A huge amount of non-digital data exists for the area, mostly held in scanned reports and maps.

Two primary data sources were used to develop a database for the project:

- The Mines Records database (GSI)
- PL reports database (EMD)

The Mines Records database contains details of Gortdrum Mines Ltd activities from 1962 – 1976. This includes:

- Drill logs of all 'G' and 'B' series holes drilled in the mine area (approximately 13,000m)
- Annual reports for Gortdrum Mines Ltd
- Drill Plans (mine area)
- Geochemistry and geophysics maps
- Groundwater reports
- Mercury studies report
- Uranium Study Report
- Ore Reserves and concentrate shipments reports
- Ownership and royalty reports

- Underground mining study
- Open pit Stability review

The EMD database of previous exploration reports contained a number of historical reports for the area (Table 3).

Table 3: Avaialble reports

Year	Company	Primary exploration activities
1964-65	Gortdrum Mines Ltd	Geochemistry
1965-66	Gortdrum Mines Ltd	Drilling and IP
1966-67	Gortdrum Mines Ltd	Drilling and geochemistry
1967-68	Gortdrum Mines Ltd	Drilling and IP
1968-69	Gortdrum Mines Ltd	Drilling and geochemistry
1969-70	Gortdrum Mines Ltd	Drilling and geochemistry
1970-71	Irish Base Metals	Geochemistry, geophysics, drilling
1971-72	Gortdrum Mines Ltd	Geophysics and drilling
1972-73	Gortdrum Mines Ltd	Geochemistry, geophysics, drilling
1973-74	Gortdrum Mines Ltd	Geochemistry, geophysics, drilling
1974-75	Gortdrum Mines Ltd	Geochemistry, geophysics, drilling
1975-76	Irish Base Metals	Geophysics and drilling

Given the huge amount of data available, Group Eleven has focused on three key areas for data compilation, with a view to guiding its future exploration work. These were:

- Compilation of 'E' series drill hole information (north –east of Gortdrum)
  - Reason: to examine the exploration potential east from Gortdrum along the Gortdrum Fault

- Compilation of 'G' and 'B' series drill hole information
  - Reason: To examine the distribution of mineralisation in relation to the Gortdrum Fault

- Analysis of data around the 'Wedge Ore Zone'
  - Reason: to understand the potential volumes of high-grade ore remaining under the Eastern Pit

Data for 210 holes from the 'G' and 'B' and 'E' series was compiled into a database. Table 4 gives a summary of the drill hole compilation to date:

Table 4: Summary of drill hole compilation to date, PLA's 4498 and 350

Hole Series	Total number of holes captured	Collar Info (total holes)	Survey Info (total holes)	Assay Info (total holes)	Lithology Info (total holes)	Total meterage
'G'	136	136	136	104	0	11,749m
'B'	28	28	28	13	0	1,202m
'E'	40	40	40	9	0	2,938m

In addition to compilation of the drill hole data outlined above, numerous geological, geophysical and geochemical maps have been georeferenced, and a new geology map covering PL4498 and PL350 has been compiled from the best and most accurate geology information.

Work by current licensee during reporting period

Group Eleven's exploration activities in the Gortdrum area have largely been related to regional work in the Limerick Basin to obtain a better understanding of the overall geological framework, before further local studies commence.

For PLA 4498 exploration work in the current period has included:

- Capture of Historical Soil geochemistry
- Rock & Tailings Sampling
- Review of Structural Setting
- Regional Stratigraphic Review
- Regional Structural Interpretation
- Regional Airborne Magnetic survey.

These are all discussed below.

Data Compilation

At present Group Eleven is undertaking a regional data compilation in Limerick to capture all the soil, and relevant deep overburden, geochemistry, which is not currently available. A total of 1080 historical soil samples have been captured (Figure 10) for PLA 4498 as part of this regional work.

Work is also in progress to capture historical ground gravity data for the regional and where possible incorporate the information into large scale dataset, levelled to the national DIAS dataset. This work is on-going but, as yet, has not been completed for the Gortdrum area.

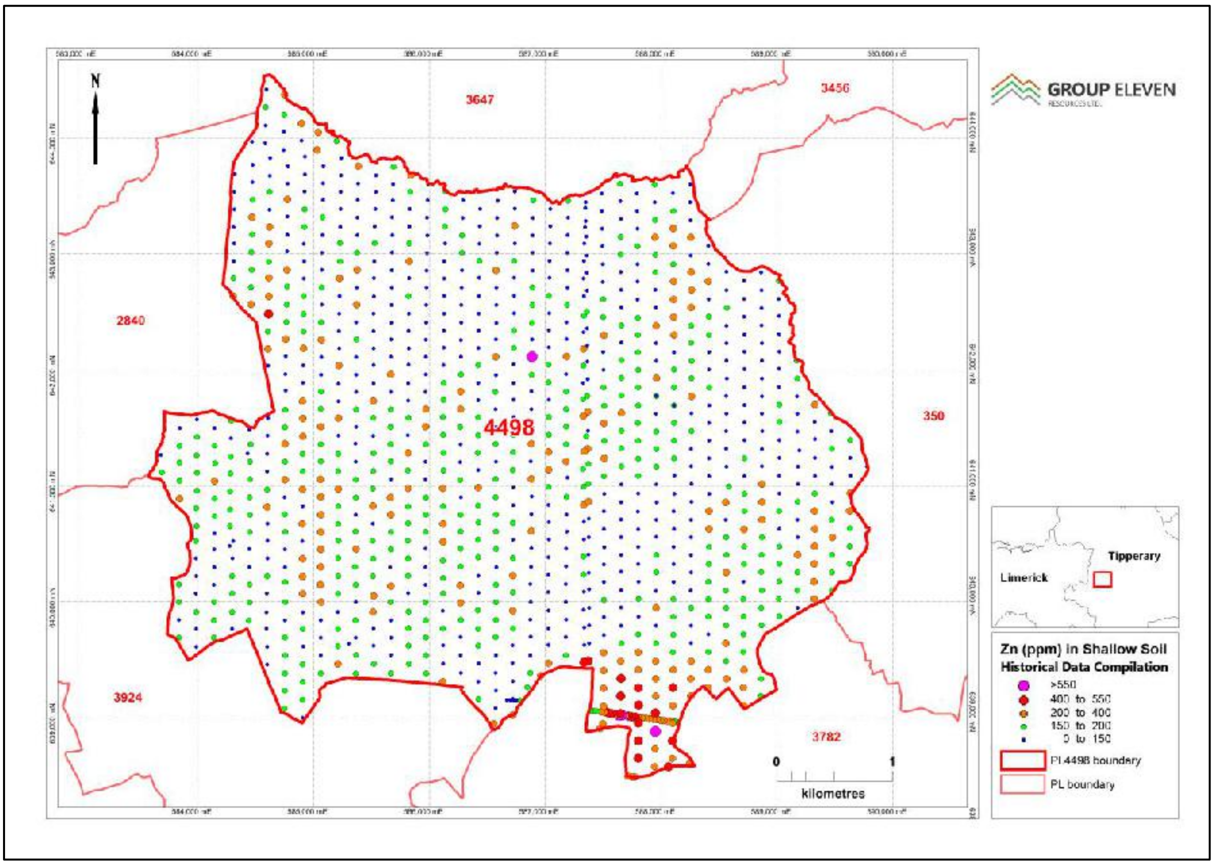

Figure 10: Historic soil sampling data

Structural Review

Group Eleven are currently completing a regional structural review of the Limerick Basin to place the known mineralisation into a regional structural context and to assist with focussing exploration in new areas. As part of this work regional cross sections have been reinterpreted and areas with known mineralisation such as Gortdrum are being reviewed. This work is being carried out by Group Eleven geologists, in conjunction with structural geologists, Dave Coller and Alastair Beach.

The Gortdrum Fault is a major, northerly down throwing structure, with a significant component of inversion but remains in nett extension (Figure 11). The structure is thought to relay west of the mine to a similar large fault in the Oola area.

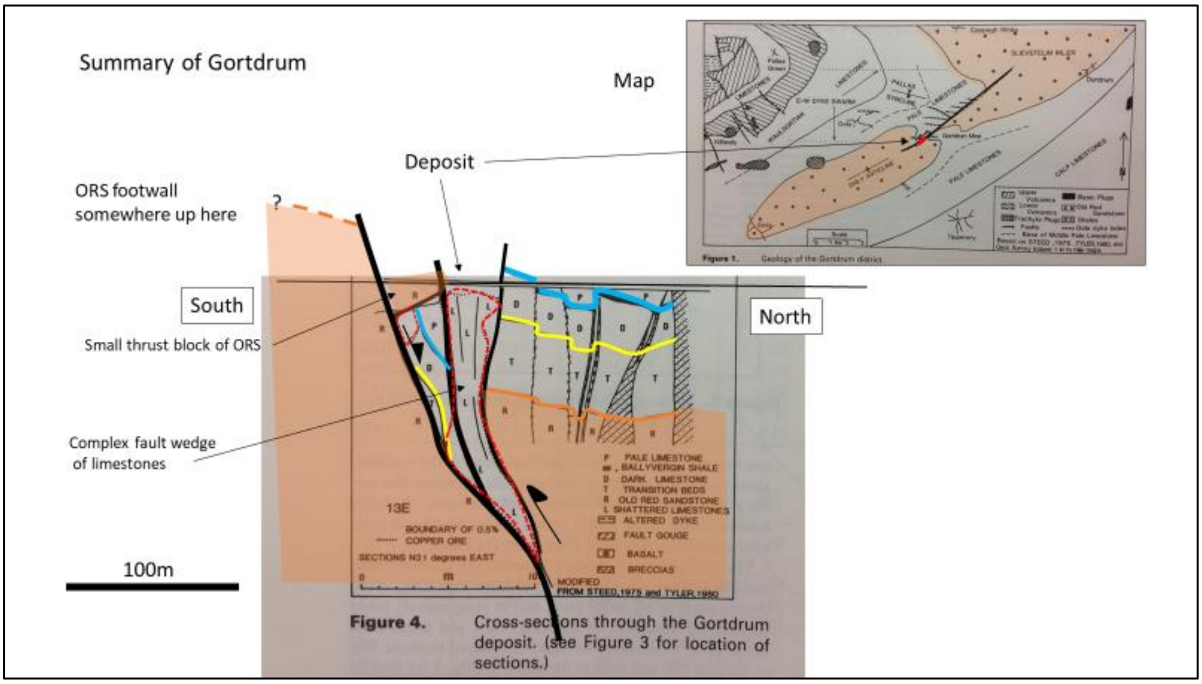

Figure 11: Gortdrum cross-section

The current work on the regional structure is aimed at determining some of the controls on mineralisation in the Limerick Basin. Northern dipping normal faults appear to have been some of the earliest structures, which were cut by southerly directed normal faults and slides developed as part of the early Visean rifting. Many of the northerly dipping structures show various degrees of inversion, related to the Variscan compression, as seen in the Gortdrum mine area, where the pre-inversion displacement on the fault is thought to be c.300-400m. The Variscan compression also develops the broad ENE trending anticlines, cored by Devonian clastic rocks, which form a prominent feature in the Gortdrum area (Figure 12) and in the west of the Limerick region.

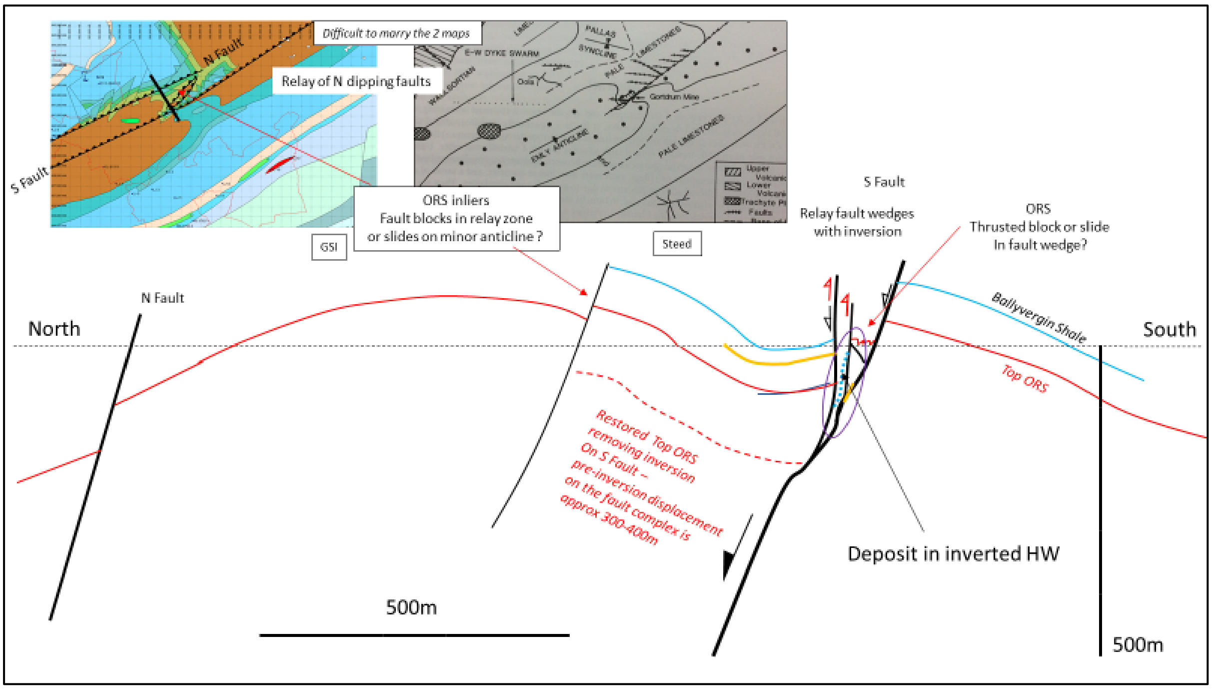

Figure 12: Regional Cross-Section

Sampling at Gortdrum Mine

A programme of sampling has commenced at Gortdrum to assist with the understanding of the mineralising system and how it is related to other mineral occurrences in the Limerick Basin. This work is being carried out in conjunction with Dr Sean Johnston of iCRAG.

The work has recently commenced and has consisted of the collection and analysis of a number of samples from the historical tailings at Gortdrum and the collection of a series of mineralised samples from Gortdrum which are now being analysed by Dr Johnston at iCRAG.

The results of the currently available analysis are reported in the template which accompanies this report. The results of the iCRAG research work are not yet available and will be reported in the next period.

Tellus Airborne Geophysical Survey

Group Eleven is jointly funding the next phase of the National Tellus airborne geophysical survey in co-operation with the Geological Survey. The survey planned for 2018 will cover a large portion of counties Limerick and Tipperary and this work will cover PLA 4498 with detailed, magnetic, radiometric and frequency domain electromagnetics (Figure 13).

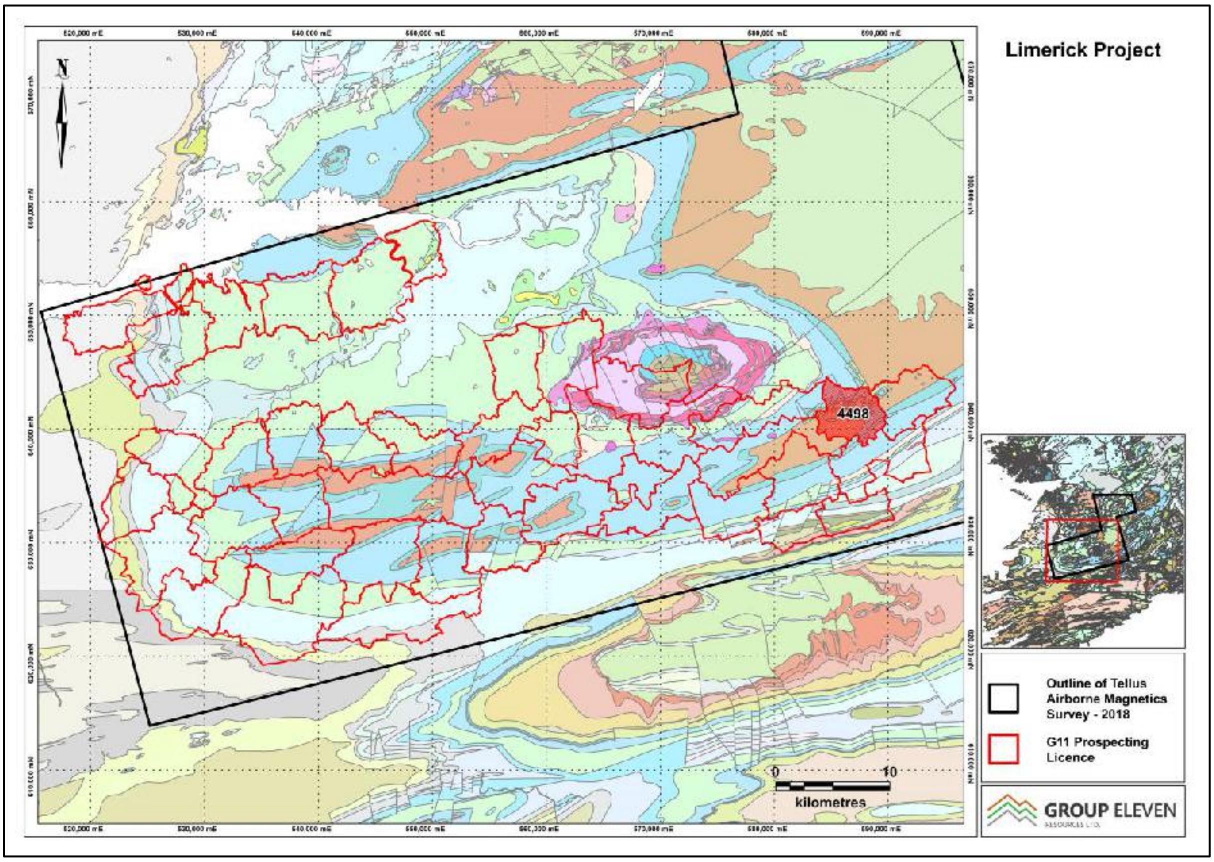

Figure 13: Planned Tellus Geophysics Survey coverage 2018 (showing PLA 4498)

The survey was scheduled to commence in April 2018 but due to unforeseen delays by the contractor has only recently commenced. The work is now 80% completed and a data release is currently expected in the first half of 2019. Therefore, although some expenditures have been incurred, the results of this survey are not yet available and will be reported as soon as datasets become available.

Stratigraphic Review

Dr John Kelly of SLR Consultants carried out a review of the Limerick Basin on behalf for Group Eleven to help understand the structural and stratigraphic framework of the prospecting licence block. The study also aimed to gain an understanding of how this framework and structural components developed in the Dinantian (Lower Carboniferous - Tournaisian - Viséan), and how they compare with other mineralized regions and finally to define areas of higher exploration potential for Irish-type base metal deposits.

The regional geology is described above, and Dr. Kelly has sub-divided the region into a number of sub-regions based on their tectono-stratigraphic history (Figure 14) in the early Visean. Comparative Stratigraphic sequences across the basin are shown in Figure 7 and indicate that until the onset of rifting in the late Courceyan/Early Visean a relatively uniform stratigraphic sequence occurred across the region.

Tectonic controls of facies and sedimentation become more apparent from the late-Courceyan with the development of the Waulsortian. The data on the overall thickness variation in the Waulsortian is largely limited to the East Limerick and Pallas Green – Stonepark areas, but significant thickness variations are recorded in the Waulsortian, from a minimum of 140m in the east to up to 400m in the immediate area of Pallas Green and Stonepark. Available data indicates that to the west the Waulsortian either maintains similar thicknesses as at Pallas Green or may further increase in thickness at some point to the west. It is important to note that previous estimates of exceptional Waulsortian thicknesses in the Limerick Basin and the East Clare Basin of up to and in excess of 1000m have not been confirmed by drilling (although thicknesses in the order of 800m have been recorded in other areas, e.g. west of Ballinasloe). The increase in thickness to the west is interpreted as being due to more rapid subsidence to the west, presumably controlled by extension in the region and active faulting downthrowing to the west or southwest. The development of Waulsortian equivalent facies also occurs in some areas which may point to local tectonic controls.

In the north Limerick area, the immediate post-Waulsortian lithostratigraphic unit is the Lough Gur Formation, the cherty argillaceous wackestones and packstones of this unit representing a period of deepening that effectively ended Waulsortian deposition as Waulsortian type carbonate production was impacted by water deepening and the influx of clastic sediment. In the west, the Waulsortian is overlain directly by deeper water shales and thin limestones of the Rathkeale Formation, indicating that a significant depth increases to the west had been established at the end of Waulsortian deposition.

The Lough Gur Formation is known to exhibit significant lateral thickness and probably facies variations in the Pallas Green and broader area, attributed in older academic publications to infill of top Waulsortian Complex topography, but more likely to be as a result of syn-depositionally active faulting. The published Pallas Green data (Blaney and Redmond 2015) clearly indicates that variations in the upper part of the Waulsortian and the immediate Supra-Waulsortian facies present in the Palls Green – Stonepark area are similar to those recorded at Lisheen and other areas of the Rathdowney trend area.

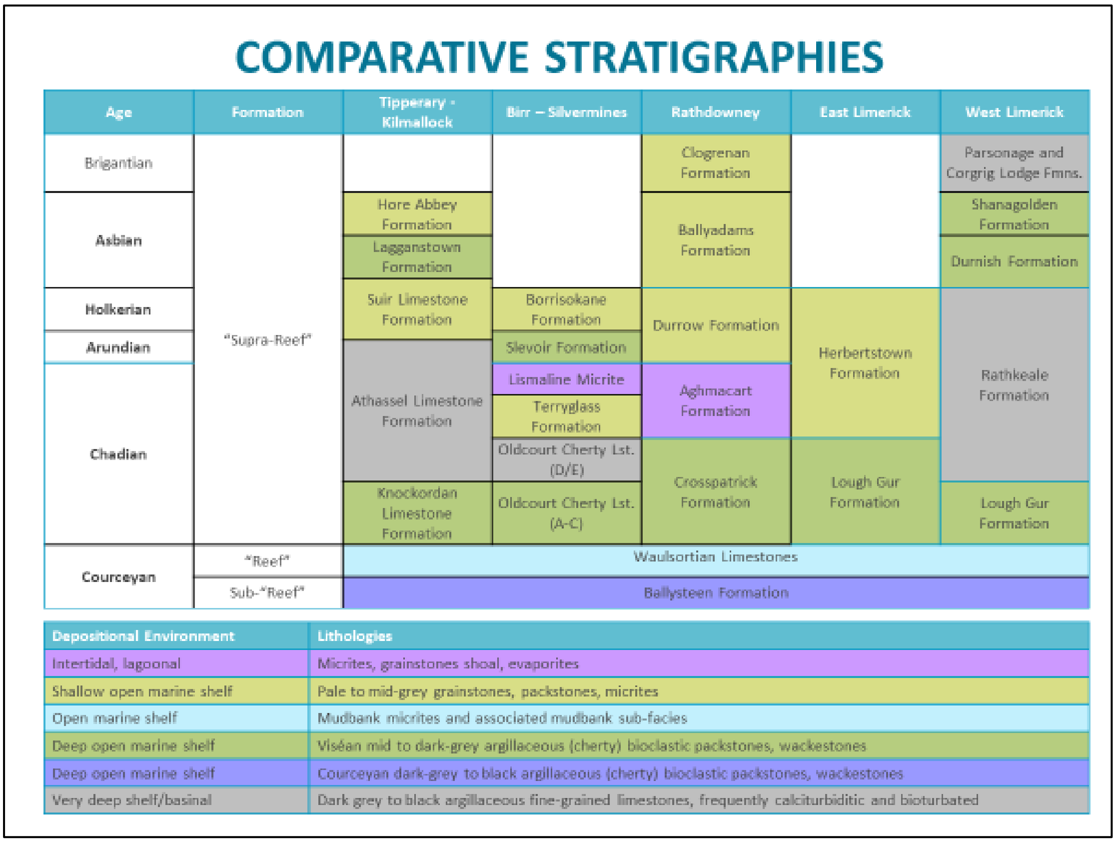

Figure 14: Stratigraphic Sequences, Nomenclature and Facies (Kelly 2018)

Unlike the Dublin and north/central Irish Midlands basins, where the end Waulsortian platform broke up into defined shallow shelf and deep-water basins in the late Chadian or Arundian, the Limerick area did not develop in a similar way. The Limerick area developed into a broad west dipping ramp with a depth-controlled facies gradation across north Limerick from shallow water grainstones etc. in the east, cherty argillaceous limestones in the Mungret – Cooperhill areas and deep-water shales and limestones to the west in the Cappagh Castle and Rathkeale areas. It is interpreted that this ramp was controlled by a major, syn-depositionally active north – south or northwest – southwest, east to northeast downthrowing growth structure.

The Kerry Head inlier likely lies to the west of this structure and forms part of its footwall. The facies and thickness variations in the Waulsortian and supra-Waulsortian sequence indicate that this structure was active from the Courceyan to at least the Asbian. As no evidence for such a structure is evident in the Namurian sequences, it would appear that the ramp controlling structure ceased movement in the late Viséan and was subsequently buried by the younger Carboniferous strata. The ramp would therefore have developed on an extending hangingwall to such a structure and it is probable that a number of syn-ramp structures would have developed to accommodate the extension which occurred during the ramp development. Such accommodation structures may have provided local extensional zones where space was created to enable magma and fluid flow and enable the emplacement of both the volcanics and the hydrothermal systems.

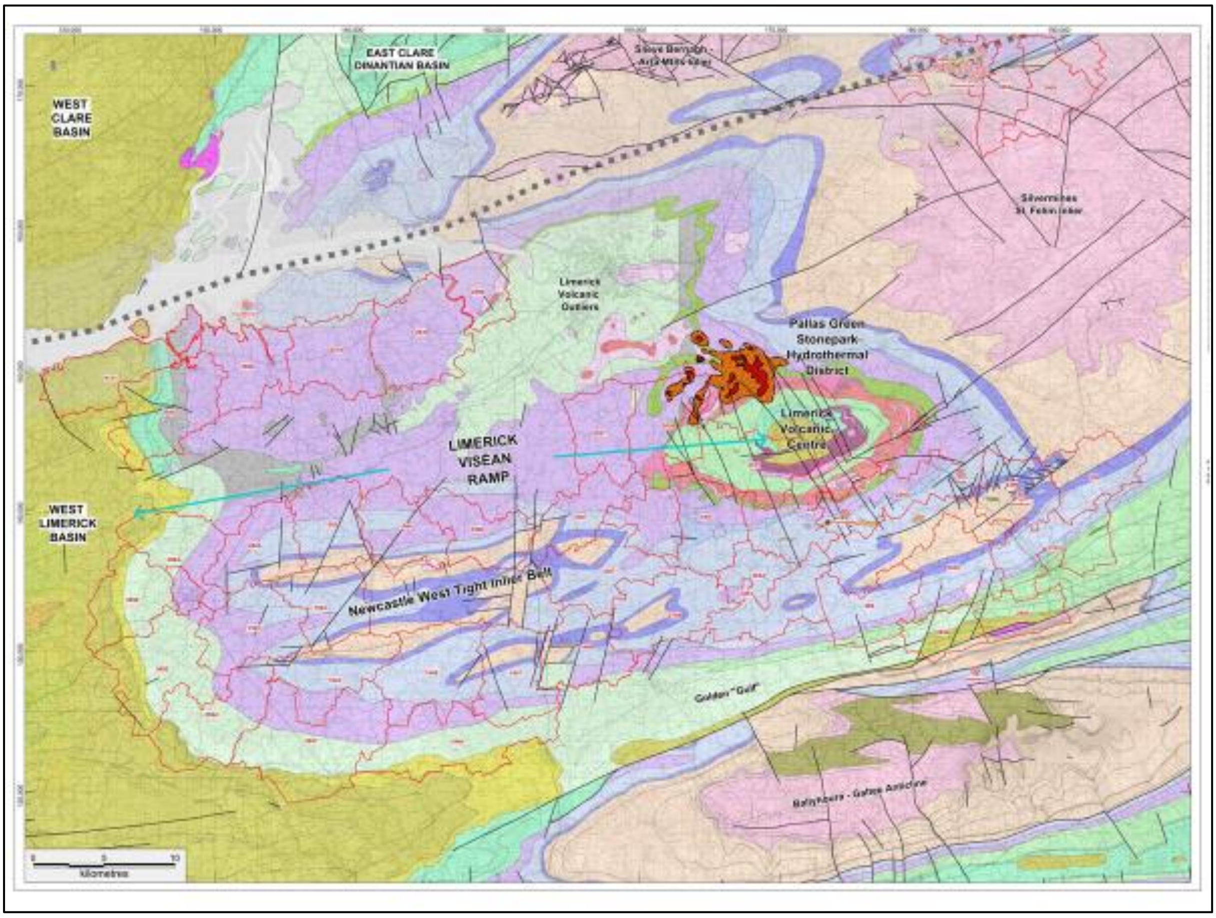

Figure 15: Tectono-Stratigraphic Divisions of the Limerick Basin (Kelly 2018)

Basin Analysis Summary

The Limerick Dinantian Basin sensu stricto is bounded by the following features/regions (Figure 15):

- The eastern boundary is defined by the Slieve Felim/Silvermines Lower Palaeozoic Inlier.
- The northern boundary is bounded by Iapetus Suture (River Shannon).
- The southern boundary is defined by the Aherlow – Galty east-west structures and their extension to the west.
- The western boundary is not defined but is interpreted as a syn-depositionally active north –south or northwest – southwest, east to northeast downthrowing growth structure Dinantian growth fault which controlled the Limerick Ramp and was probably buried by the younger (Namurian) sequence.

The gross overall thickness increase in Waulsortian to the west, indicates initiation of differential subsidence during Waulsortian deposition and possibly before Waulsortian deposition commenced (i.e. differential subsidence is active during Waulsortian deposition).

Basin subsidence assessment indicates a major increase in subsidence and sedimentation rates during the late Courceyan and earliest Chadian, during the period of deposition of the Waulsortian and Lough Gur formations and immediately prior to the onset of the Knockroe Volcanics. On-going differential subsidence from the late Courceyan to at least the Asbian led to development of a Carbonate Ramp, with a shallow shelf sequence to the east and a deep water basinal sequence to the west, with mid-ramp facies developed between the two end facies. The ramp is likely to have developed on a tilting fault block, controlled by a major east-downthrowing growth fault west of the ramp (i.e. west of Rathkeale). Absence of any evidence for the major ramp-controlling structure within the Namurian west of Rathkeale suggests the structure may have been buried by the Namurian sequence. Tectonic space creation within the Limerick Ramp may be related to extensional accommodation structures which acted as the focus for both volcanic and hydrothermal fluid pathways.

The main Limerick Volcanic Centre is located in the eastern (shallow) part of the Limerick Ramp, although evidence exists for volcanic centres much further west (e.g. agglomerates at the top of the Rathkeale Formation). Volcanism has been shown to be pre, syn and post mineralization, suggesting that the main hydrothermal event occurred in the late Chadian to Arundian. The scale and extent of the known hydrothermal systems in Limerick (extent and thickness of BMBs and known tonnage etc.) indicates that they are the largest base of Waulsortian hydrothermal systems in Ireland.

The limited exploration drilling in the areas to the west and southwest of the known deposits at Pallas Green and Stonepark has intersected BMB, minor mineralization and haematised Waulsortian indicating that additional hydrothermal systems are present to the west and southwest of the known hydrothermal system.

Structural Study

A district scale structural study was undertaken by Dr F X Murphy using Sentinel-2 imagery, processed and interpreted along with SRTM DEM, gravity and airborne magnetic data for a large area covering Group Eleven's Limerick Prospecting Licences.

Setting

The Limerick District study area is located in the Limerick Basin at the southwestern corner of the Irish Zn-Pb Orefield. The basin is considered to have formed due to the reactivation of Caledonian-age faults within a dextral transtensional stress regime related to Courceyan-Chadian NNE-SSW directed extension. Since the basement structures in the Limerick area are predominantly northward-dipping their transtensional reactivation produced a series of half-graben bounded by northward-downthrowing structures, although a series of southward-downthrowing faults occurs in the north of the study area to the south of the Shannon Estuary.

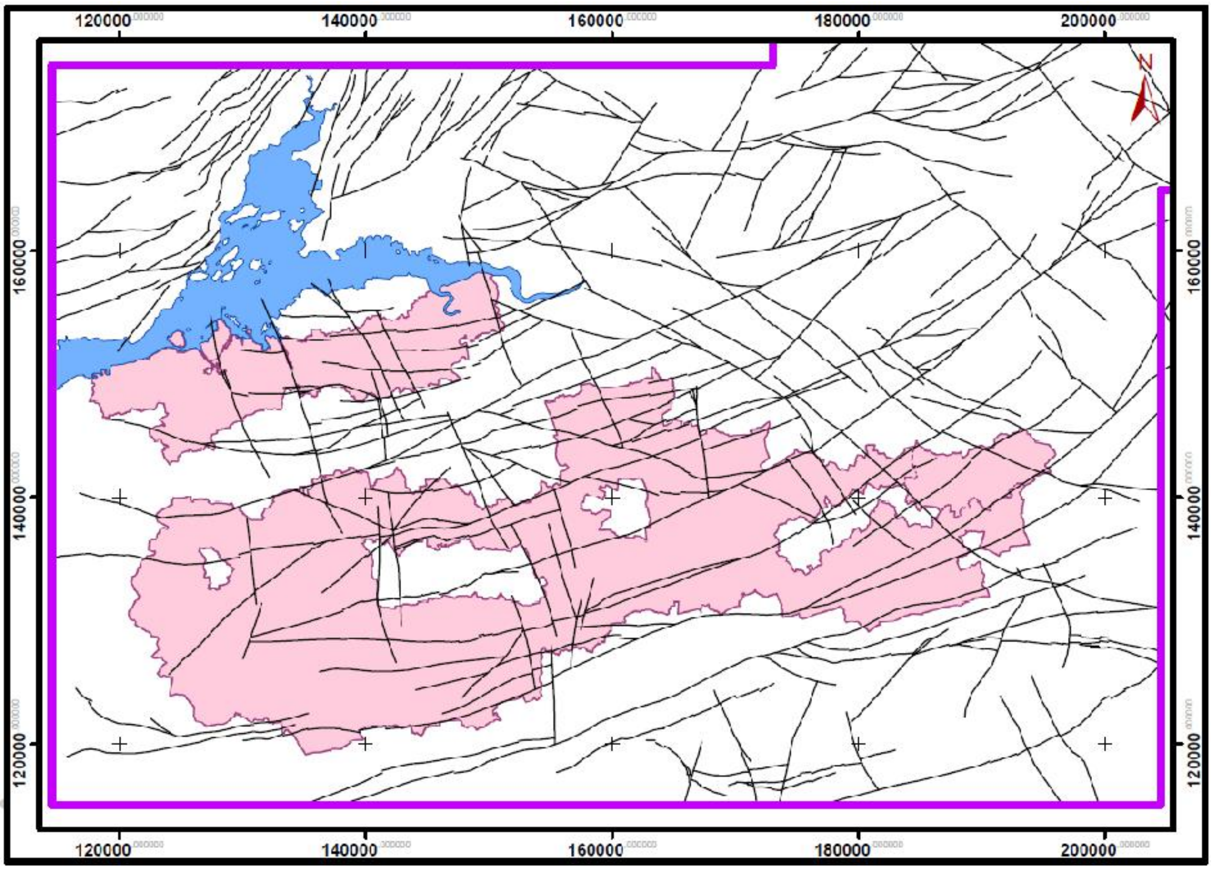

Figure 16: Major Faults and Lineaments in Limerick District (Murphy 2018)

Structural framework of Limerick District

A number of major lineaments (Figures 16 & 17) have been identified across the study area based subtle topographic features, drainage features and textural or tonal contrasts as well as gravity and aeromagnetic linear features. Five main lineament trends are present in the Limerick District: ENE/E-W, NE-SW, NW/WNW, NNW-SSE and NNE/N-S. ENE/E-W trending structures are the most prevalent. A series of ENE-WSW trending lineaments identified across the Slieve Felim Inlier correspond to recognized faults including the Clare, Ballyneety, Dromkeen, Coonagh Castle and Oola Faults. They represent northward-downthrowing extensional faults formed due to the reactivation of Caledonian basement structures. They have been extrapolated along strike to the west and commonly show a strike swing from NE/ENE trends in the east, ENE-WSW in the centre and to E-W/WNW trends in the west. They have formed a series of small northward-downthrown half-grabens with widths of 4-5.5 km. A zone of southward-downthrowing faults occurs to the north of the Clare Fault Continuation and can be correlated with the N-Fault complex identified on the recent Adventus Zinc Corporation's seismic profiles.

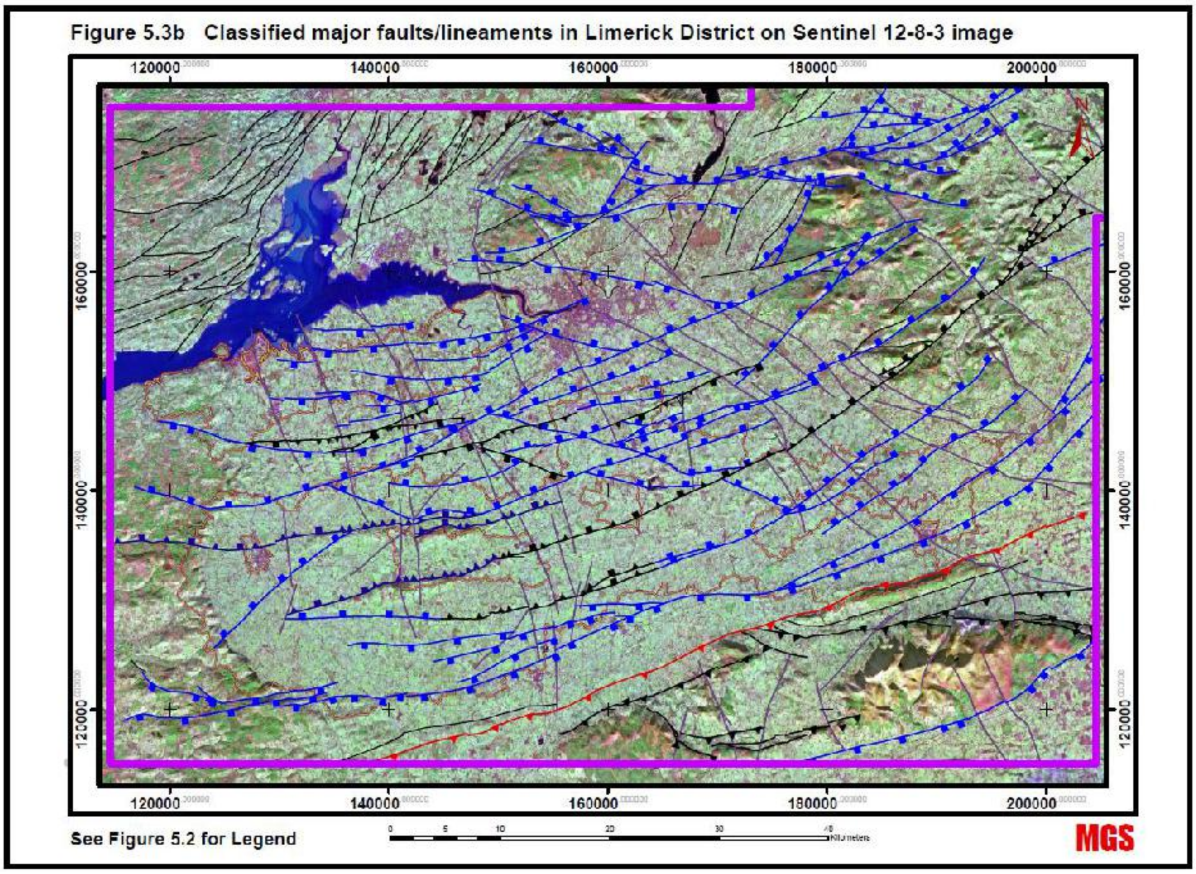

Figure 17: Major Faults & Lineaments (on Sentinel 12-8-3 image) (Murphy 2018)

Variscan inversion has resulted in reverse movement along some of these structures such as the Coonagh Castle Fault. Some of the faults to the north of the Clare Fault are associated with inversion and the Adventus seismic profiles also show a southward-dipping structure in the footwall of Clare Fault to have also undergone inversion. Part of the Ballyneety Fault along the northern perimeter of the Limerick Volcanic Complex (LVC) has undergone inversion. Sections of the Dromkeen Fault and the Coonagh Castle Fault along the northern flanks of Old Red Sandstone cored periclinal inliers to the east of Newcastle West have undergone some inversion but remain in net extension. However, it is possible that south of these structures are southward dipping faults which have undergone Variscan inversion. Inversion also occurred on a section of the Oola Fault along the southern flank of a third Old Red Sandstone periclinal inlier to the south.

Another NE/ENE trending structure has been interpreted to occur on the southern flank of the Emly Inlier and has been traced to the southwest of the study area. It corresponds to prominent gravity and aeromagnetic lineaments. It is interpreted to be a southward-downthrowing extensional structure and is thought to represent the continuation of the Navan-Tipperary Line (NTL). A series of southward downthrowing major extensional faults in the Kilmallock-Bulgaden-Charleville area may have formed due to footwall collapse in response to large normal displacement on the NTL. This structure splits into a series of subparallel southward-downthrowing extensional faults farther to the west as it reaches a higher structural level in the stratigraphy.

An ENE-WSW trending northward-directed thrust fault occurs along the northern flank of the Galty Mountains Inlier. It is likely to have formed due to the reactivation of a south-dipping extensional structure which in turn probably formed due to the extensional reactivation of a Caledonian basement fault. A zone of WNW/NW trending major faults/lineaments, which commonly correspond to prominent gravity and aeromagnetic lineaments, has been identified between the LVC and the southwestern flank of the Slieve Felim Inlier. It correlates with the "Limerick Trend", a zone of alteration and mineralization. A number of WNW-ESE trending fault have also been identified in the central part of the study area to the west of the LVC. They are considered to be mostly northward-downthrowing extensional faults and probably formed contemporaneously with the extensional movement on the adjacent ENE-WSW trending major faults as part of a linked fault system. However, the Adventus seismic profiles show that one of these faults, which they termed the GB-Fault, is a south-dipping inversion structure.

WNW-ESE trending faults within an ENE-WSW trending dextral transtensional zone would have been favourably orientated for extension and it is possible that the "Limerick Trend" has formed as a tensional zone in response to the opening of the Limerick Basin within a dextral transtensional stress regime. It may have been generated due to the extensional reactivation of late-stage Caledonian transverse faults in the basement. Similarly, the emplacement of mafic intrusions associated with a NW-SE trending corridor of aeromagnetic highs that can be traced from the Shannon Estuary across some of Group Eleven's prospecting licences in the west may have been controlled by the extensional reactivation and dilation across another NW-SE trending transverse basement structure. NNW-SSE trending major transverse structures are most prevalent in west-centre of the study area. Some of these structures are known to be associated with extensive dolomitization. Several NNW/N-S trending major transverse structures have also been identified in the central part of the study area.

Exploration targets

A total of 17 exploration targets (Figure 18) have been identified within Group Eleven's prospecting licences in the Limerick District on the basis of the results of the interpretation of Sentinel-2 satellite imagery and DEM data as well as gravity and aeromagnetic data. They are based on criteria including the presence of major extensional faults, intersections between major extensional faults and major transverse faults, extensionally reactivated Caledonian faults in the basement, inflections and splays along major faults, breached relay zones between overlapping major faults, prominent gravity and/or aeromagnetic lineaments, proximity to corridors of mafic intrusions, the presence of suitable stratigraphy and proximity to known base metal mineralization.

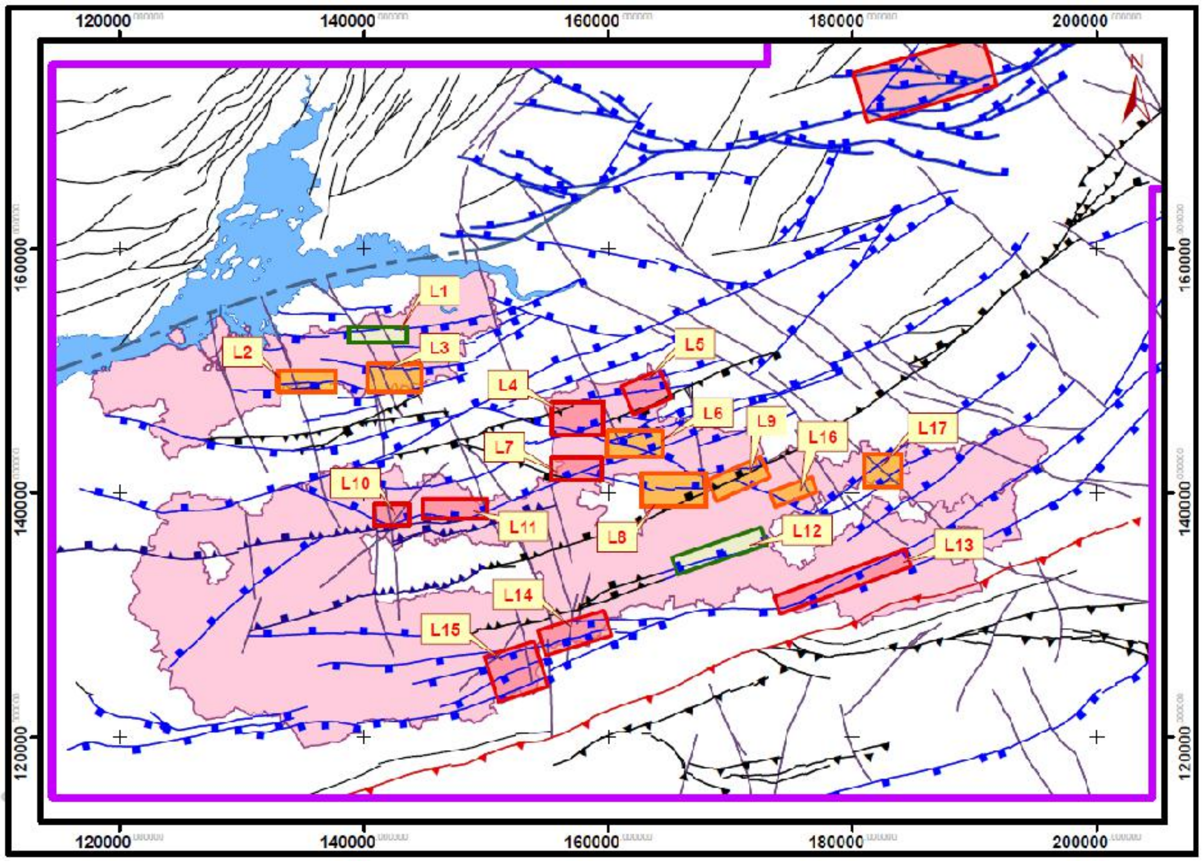

Figure 18: Target areas and Major Faults (Murphy 2018)

Target area L17 lies immediately west of PLA 4498. The target lies on the northward-down throwing NE-SW trending Oola Fault and also contains a subparallel footwall splay off this structure which forms bounding fault to the Emly inlier within the eastern part of PLA 2840. These faults are cross-cut by a NW-SE trending major transverse fault which is part of the "Limerick Trend". The area is mostly underlain by Ballysteen Limestone. However, it does contain the historic Oola Mine which contained E-W trending veins with copper, lead and silver mineralization which were exploited in the nineteenth century and appear to be associated with dykes. This area may have further potential for undiscovered base metal and silver mineralization.

Environmental

Group Eleven is committed to conducting all exploration activities within environmental guidelines. A review of specifically protected sites in the Emly Block was undertaken with information compiled from the National Parks and Wildlife Service. This includes a review of SPAs, SACs and NHAs;

- An NHA is an area considered important for the habitats present or which holds species of plants and animals whose habitat needs protection.

- A SAC is an area of conservation value for habitats and/or species of importance in the European Union designated internationally under the Habitats Directive.
- A SPA is an area of conservation value for birds of importance in the European Union designated internationally under the Birds Directive.

There are currently no protected areas within or immediately adjacent to PLA 4498 (Figure 19). The nearest SAC is related to the River Suir catchment in PLA 350 to the east.

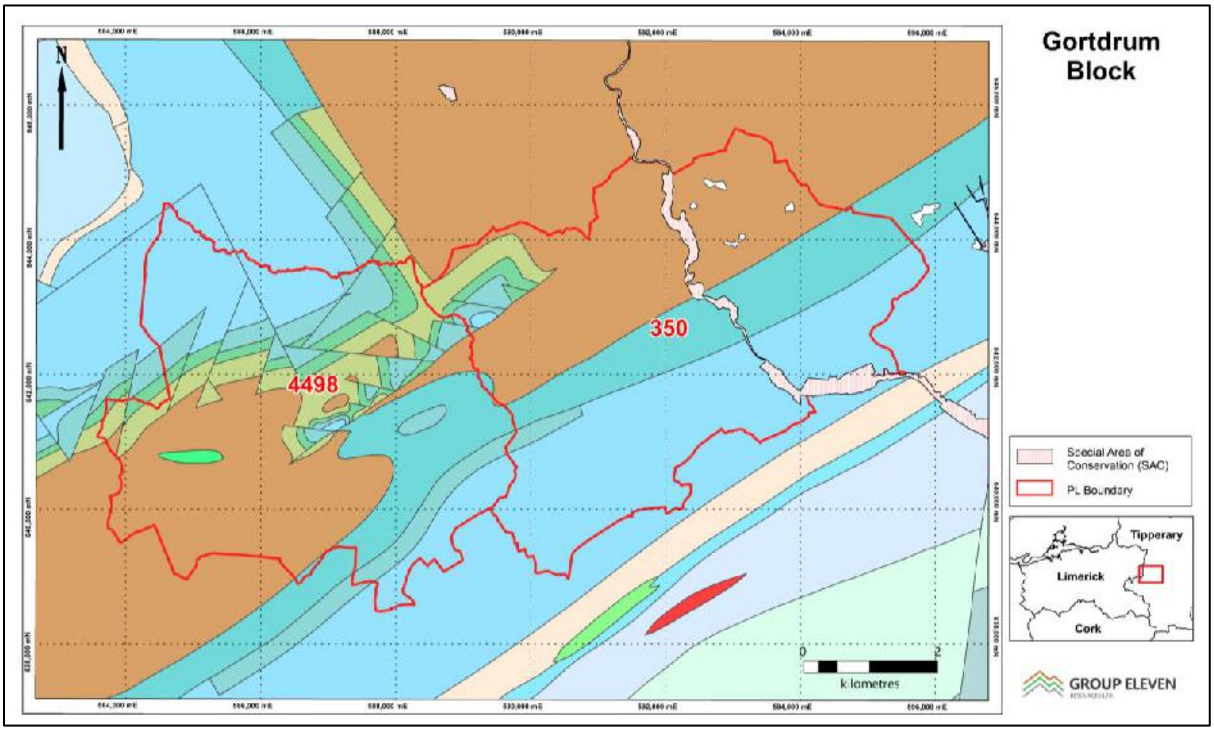

Figure 19: Protected sites in PLA 4498

To date, exploration activity on PLA 4498 has had no environmental impact. Group Eleven has also proven their commitment to undertaking work which complies with all environmental regulations by submitting an appropriate assessment screening report prior to sampling in the vicinity of Protected Sites. Furthermore, the proposed work programme for the upcoming reporting period will be undertaken in a manner to minimise any potential impact on the protected areas outlined above.

Results and Discussion

Group Eleven is in the progress of carrying out regional and local studies to help understand the potential importance and prospectivity of PLA 4498. Work is also in progress on the capture of relevant GIS data sets for the area, such as soil geochemistry and gravity data, to assist in this analysis. The primary target for this area is Cu-Ag mineralisation within the sub-Waulsortian limestones. Due to the presence of the historical Gortdrum mine, there is extensive data available for the area. There appear to be indications of potential along the strike of the Gortdrum Fault and to the north of the deposit. Further regional and local studies will be aimed at defining potential future drill targets.

Conclusions and recommendations for further work

Recommendations for further work for the next two-year period include:

- Completion of the digital capture and analysis of historical datasets
- Completion of the research work in progress at iCRAG and further analysis of the structural setting of the mineralisation
- Analysis of current Tellus geophysical surveying, to help improve the overall geological interpretation.
- Targeting and definition of potential areas for drilling, if warranted

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