

An Exploration Proposal to Study Graphite Mineralization within the Selected 01 Grid Unit Centred on Maduragoda near Dodangaslanda in Ridigama DS Division in Kurunegala District

Introduction

In May 2015, Technical Consultants of RS Mines (Pvt) Ltd. at Wijekoon House, Madipola, Matale made a preliminary field visit to areas around Maduragoda near Dodangaslanda in Ridigama DS Division in Kurunegala District and observed that considerable number of abandoned graphite mines and pits is identified in the areas centred on Maduragoda village.

During this field visit, the consultants also inspected the shafts and adits of the main abandoned mines in the area. In addition they also examined the abandoned shallow pits around the area.

They met elderly villagers who worked in these graphite mines when these mines were in operation and got relevant information about these mines including their mining history and reasons for terminating the mining activities.

According to them, during the first few decades of 1900, there had been considerable number of pits and mines were in operation in the proposed area. Among the factors contributed to the expansion of the graphite industry at this stage were the ability to export without much processing due to the extremely high purity, low mining cost, large production from shallow pits and the high demand.

Furthermore, the villagers stated that graphite mining activities in the area were terminated during 2nd World War period due to following reasons.

- Falling of graphite prices due to stiff competition after discovery of similar, good quality graphite in Madagascar
- Ventilation problems in the deeper mines
- Problems arisen due to dewatering in pits
- Haulage of mined graphite from deeper mines
- Limitation of mining activities upto the weathered rock in most of the shallow mines due to absence of proper blasting methods.

Villagers further stated that good quality graphite veins are still existed in all of the abandoned mines.

When analyzing the above facts, it could be stated that very primitive mining methods had been used during the peak period of graphite mining owing to the lack of

technology and mining professionals and also due to the eagerness to earn quick money. Most of the shallow pits in the area had been sunk in the weathered rock or top soil to produce graphite at a low cost and in fairly large quantities. This however, caused extensive damage to the ore body and consequently deep seated reserves had not been tapped but left behind. Therefore there is no doubt that considerable amount of graphite reserves still remains insitu within these abandoned mines for further exploitation.

Since the preliminary results are promising, RS Mines (Pvt) Ltd. has decided to submit an Exploration License application to Geological Survey and Mines Bureau (GSMB) to reserve selected 01 grid unit centred on Maduragoda near Dodangaslanda in Ridigama DS Division in Kurunegala District in order to conduct an exploration programme to assess the economic viability of graphite occurrences (Figure – 1).

With the exploration application, it is required to submit a project proposal to the GSMB as per the Terms of Reference issued by the Mineral Intelligence Unit (MIU) of GSMB.

As such, RS Mines (Pvt) Ltd. has decided to submit a project proposal, elaborating the proposed exploration programme, with a view to assess the economic viability of graphite occurrences within the selected 01 grid unit in the above mentioned area (Figure – 1).

If the results of the exploration programme become satisfactory, a BOI project for mining and processing of graphite within the promising areas of selected 01 metric grid unit and the production of high purity graphite powder for export will be initiated by the RS Mines (Pvt) Ltd.

- 1. Introduction about the Investor / Company Profile**
 - 1.1. Business Capability of the Company**
 - 1.2. Details of Previous Projects Undertaken by the Company**
 - **Mineral Sector**
 - **Non Mineral Sector**
- 2. Financial Capability of the Company**
 - 2.1. Audited Financial Statement for the Past Three Years**
 - 2.2. Fixed Assets**
 - 2.3. Annual Reports**

Answers to the Questions 1, 1.1, 1.2, 2, 2.1, 2.2 and 2.3 have already been submitted to the GSMB.

3. Exploration Program

3.1. Minerals to be Explored

RS Mines (Pvt) Ltd. has applied for an Exploration License for selected 01 grid unit centred on Maduragoda near Dodangaslanda in Ridigama DS Division in Kurunegala District from the Geological Survey and Mines Bureau (GSMB) to exercise the exclusive right to explore graphite for a period of two years. In this proposed exploration programme, special emphasis will be given to check the economic viability of graphite occurrences.

Graphite is the mineralogical name for one of the naturally occurring crystalline forms of carbon, the other varieties being diamond and charcoal. The name “Plumbago” is a commercial name used for graphite.

3.2. Details of the Location

<u>Zone - 1</u>	-	Grid No. 01 (Refer Fig. 1) <u>Co- ordinates</u> 174000E / 265000N
Province	-	Northwestern
District	-	Kurunegala
Divisional Secretariat Area	-	Ridigama
GN Divisions	-	Maduragoda, Meepitiya
Villages	-	Maduragoda Kotahena, Meepitiyakanda,
Map Name & Number	-	48 – Matale (1:50,000)

Entire Grid Nos.

(as per mineral titling reference of GSMB) - Total of 01 grid (Refer Table – 1 for grid identification numbers)

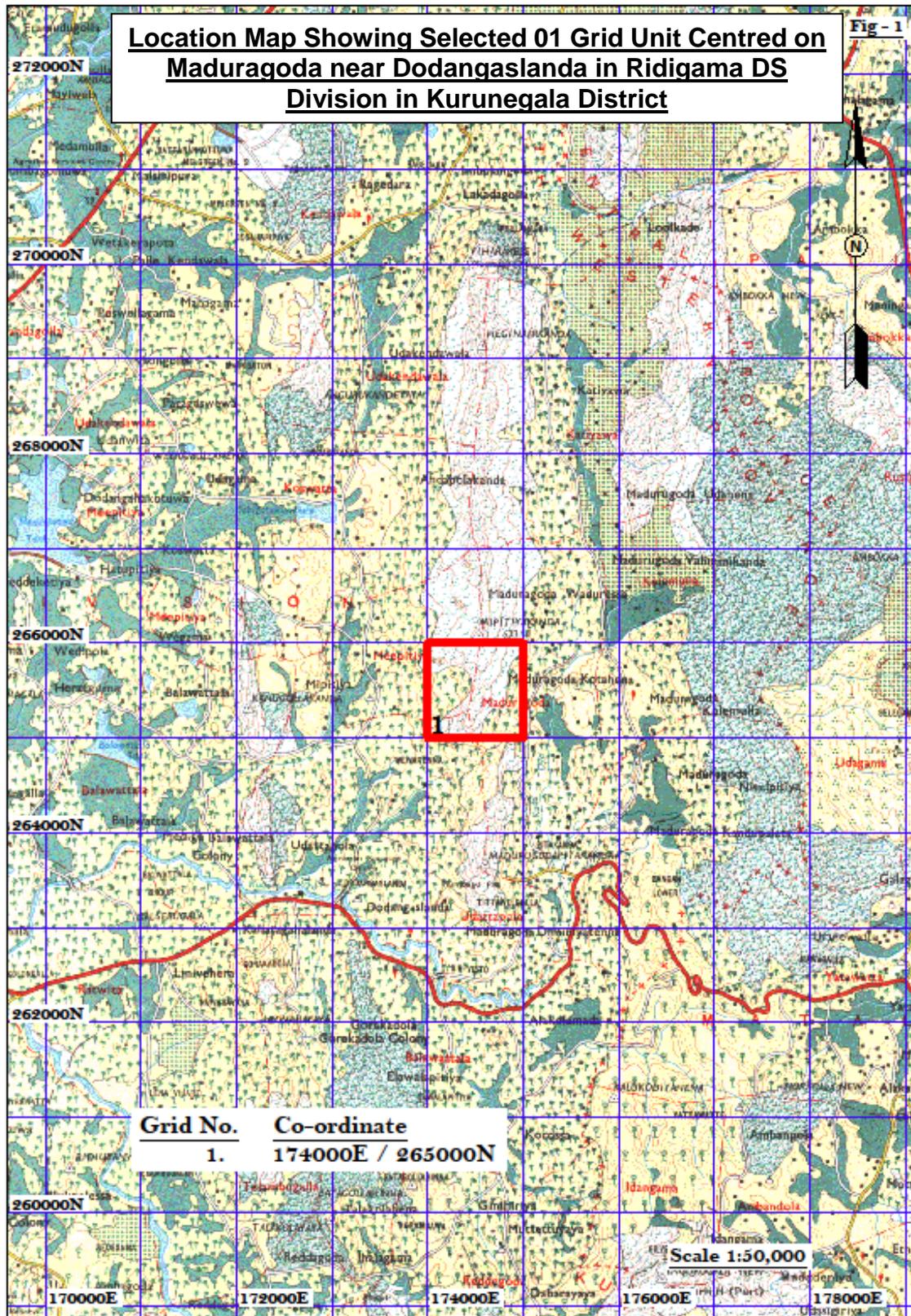
Table – 1: Grid No. as per mineral titling reference of GSMB

No.	Grid No.
1	174265

Location Map:

Location map showing proposed 01 grid unit centred on Maduragoda near Dodangaslanda in Ridigama DS Division in Kurunegala District is displayed in Figure – 1.

Location Map Showing Selected 01 Grid Unit Centred on Maduragoda near Dodangaslanda in Ridigama DS Division in Kurunegala District



3.3 Geology of the Area:

Ninety percent of the Island of Sri Lanka is underlain by Proterozoic high grade metamorphic rocks with Phanerozoic sediments being restricted to the coastal region. The Precambrian basement is divided into three major lithotectonic units, namely, Highland Complex (HC), Wannu Complex (WC) and Vijayan Complex (VC).

Geologically, the area covered by the proposed project located within the boundary zone of Highland and Wannu Complexes of Sri Lanka. Hence, both Highland and Wannu Complexes rocks are identified within the project area.

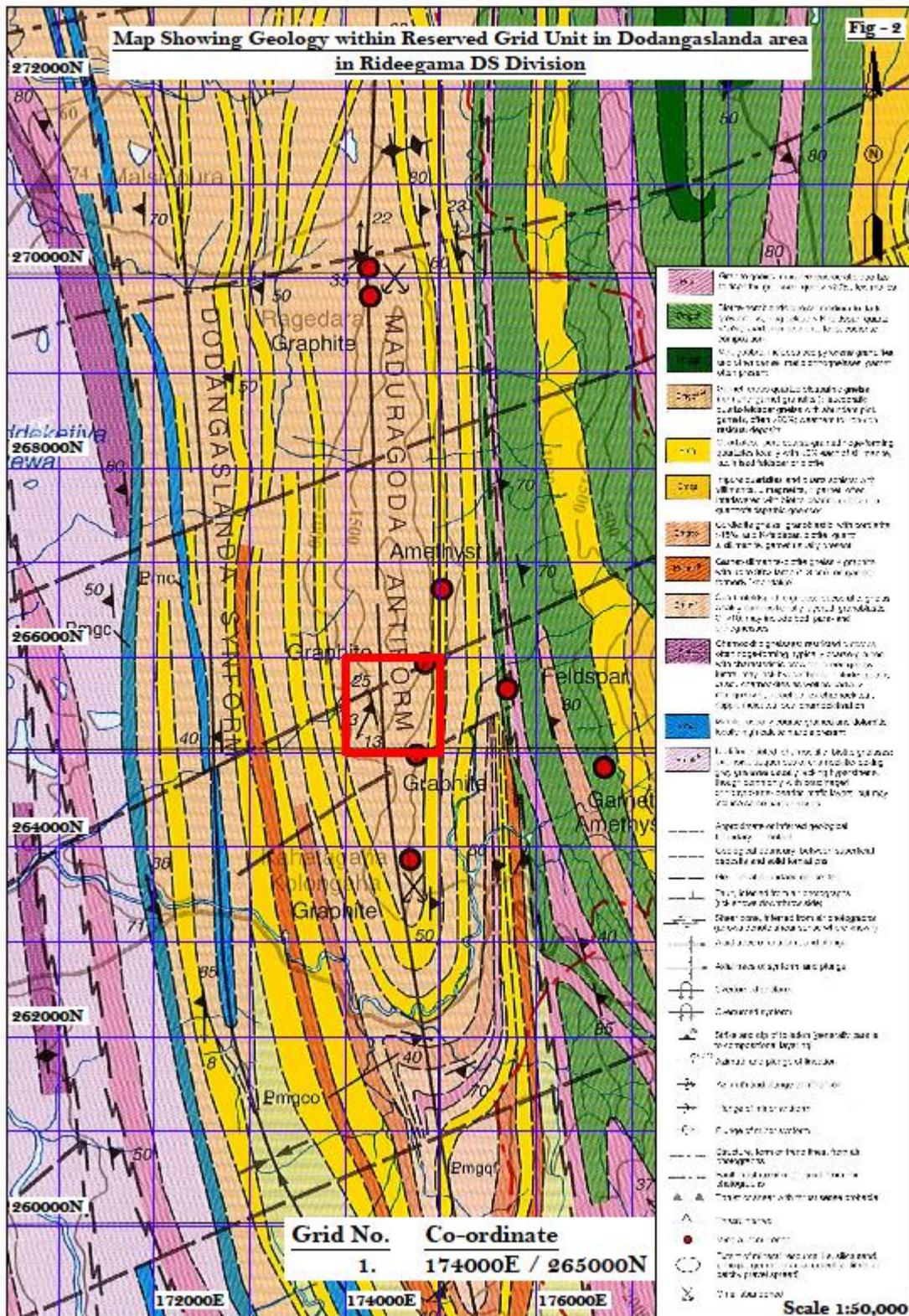
The Wannu Complex is mainly characterized by thick sequences of ortho gneisses comprises of amphibolite grade, migmatitic, granitic and granodioritic gneisses. The Highland Complex is entirely consists of granulite grade Proterozoic metamorphic rocks.

The rocks encountered in and immediate surrounding the selected grid unit are garnetiferous quartzo feldspathic gneiss, quartzite, impure quartzite, garnet sillimanite biotite gneiss, charnockitic biotite gneiss, biotite hornblende gneiss and granitic gneiss. These rocks represent medium scale synformal and antiformal structures identified in and around the proposed grid unit. N-S trending Maduragoda antiformal structure lies within the selected grid unit (Fig. 2). Well known Kahatagaha – Kolongaha graphite mine lies in about 1km south of the selected grid unit (Fig. 2).

NS to NNE-SSW trending and several tenths of kilometres long major shear zone is identified in about 500m east of the selected grid unit (Fig. 2).

NE-SW trending main lineaments could be identified within the selected grid unit and its NNW and SSE directions (Fig. 2).

During the geological mapping conducted by the GSMB in 1996, number of graphite old workings had been identified within the selected grid unit and its surrounding area (Fig. 2).



3.3.1 Graphite Mining in the Country (Historical Background)

The existence of graphite in Sri Lanka was known for a few centuries. The first record was in 1675 when the Dutch Governor Rykloft Van Goens in writing to his successor mentioned about the existence of Graphite in Sri Lanka. There is also evidence to say that during the Kandyan era, iron ore had been melted in graphite crucibles.

Trade in graphite, mainly for the pencil industry, seems to have been in existence from the 16th century. But it is only during the British time that this mineral was mined and exported, to be used in making crucibles for the casting of bomb shells and cannon balls. Graphite has been exported from Sri Lanka for the last 160 years, and in 1899 the mineral earned Rs. 2.2 million which was 22% of the total foreign exchange earnings at that time.

Before World War II there had been over 2,500 graphite pits and mines located in the South West and Central Highlands in Sri Lanka, but now only two underground mines and a few experimental mines are in operation.

In 1974 Mr. Rex A. Casinader did a study on the “Evaluation of the Graphite Industry in Sri Lanka” and has categorized the 1850 to 1973 period into three phases.

- (i) The fledgling phase (1850s to 1870)
- (ii) The prosperity and maturity phase (1870 to 1917)
- (iii) The decline and selective phase (1917 to 1973)

(i) The fledgling state

From about the middle of the nineteenth century to early 1870's is a period during which graphite established itself as one of the minor export industries of the island. Among the factors contributing to the development of the graphite industry at this stage, was the growing demand for Sri Lankan graphite due to its high carbon content. This quality graphite was particularly required by the crucible industry which was rapidly emerging in Great Britain and USA perhaps activated by the American civil war.

(ii) The prosperity and maturity stage

The period 1869 to 1918 may be characterized as a period of great activity for the graphite industry in Sri Lanka. This was the period that witnessed the scatter of nearly 3,000 graphite pit mines in the south-western quarter of the island, the crystallization of mining methods, viz the pit mines with mechanical aids (“mol pathal”) and primitive pit mines operated manually (dabare pathal). It is a matter for conjecture whether some of the graphite mining methods were borrowed from traditional gemming methods and practices. Gemming has been going on in Sri Lanka from ancient times and by the mid 19th century when graphite mining was entering the fledgling stage, there was in active

existence an established traditional system of gemming.

(iii) The decline and selective maturity

From 1917 to the present day, the graphite industry slipped down from being one of the major exports of Sri Lanka. In 1912 some graphite which matched the quality of that in Sri Lanka, was discovered in Madagascar. This resulted in stiff competition, the Madagascar graphite being extracted at a lower cost. The Sri Lankan production declined slowly but inexorably, with some outbursts of revival during World War I and II.

The share of Sri Lanka, which was half the world trade in graphite prior to 1912, had fallen to less than 2 percent in 1980.

The State Graphite Corporation of Ceylon was established in 1971, after the nationalization of the graphite industry. On this occasion the three mines of Kahatagaha, Kolongaha and Walakatahena were grouped into a single entity, the Kahatagaha-Kolongaha Mine. The Bogala mine was already the result of the merger of several old small mines, producing from the same ore bodies. At first these two mines were the sole producing units of the new Corporation known as State Mining and Mineral Development Corporation. The experimental graphite mine of Rangala was opened in 1973. The one at Ragedera was opened in 1976. After few years of operation, the Rangala and Ragedara mines were abandoned.

3.3.2. Status of Graphite Mining in Sri Lanka from 1980 - todate

In eighties, the only two graphite mines exist in the country were Kahatagaha – Kolongaha and Bogala mines and both mines were operated by the State Mining and Mineral Development Corporation.

In 1989, the Kahatagaha –Kolongaha mine was privatized and after few years of working, it was abandoned.

In 1996, the Kahatagaha –Kolongaha mine was taken over by the government and so far it is being run smoothly with limited production (average of 600 – 1,000 metric tons per year).

In 1992, the Bogala mine was privatized and it was taken over by a german firm. Sofar the mine is in operation with fair production (average of 3,000 – 5,000 metric tons per year).

Between 2000 – 2003 period, the Aluketiya mine was operated by a private firm and in 2003 it was abandoned. Ragedara mine, which was abandoned in early eighties, was recommenced in 2011 as an experimental mine with limited production.

Abandoned Graphite Mines / Pits within the Proposed Exploration Area

The selected grid unit could be considered as a single zone as shown in Figure – 1. Preliminary field investigations were conducted within the selected grid unit. Number of abandoned old workings (adits and shafts) was identified within the selected grid unit. All these old workings will be studied in detail during the proposed exploration programme.

Some of the abandoned shafts and adit structures are shown in following photographs (Plates: I - VI). During preliminary field investigations it was observed that most of the abandoned mines (vertical shafts and horizontal adits) were partly filled with debris materials.

Graphite bearing rock fragments could be seen within the dumped debris materials of the abandoned graphite mines in the proposed exploration area (Plate – IV).



Plate – I: A partly filled shaft structure in an abandoned graphite mine within the selected grid unit



Plate – II: A partly filled shaft structure in an abandoned graphite mine within the selected grid unit



Plate – III: A partly filled shaft structure in an abandoned graphite mine within the selected grid unit



Plate – IV: A partly filled shaft structure in an abandoned graphite mine within the selected grid unit



Plate – V: Adit and shaft structure in an abandoned graphite mine within the selected grid unit

Although number of abandoned graphite mines and pits are identified in the proposed exploration area, all of them are either fully or partly filled with water / debris materials. Therefore, during preliminary filed investigations, it was unable to gather further details about the abandoned mines. It is expected to get these details during the exploration stage.

3.4. Exploration Details / Commencing Locations:

Proposed Exploration Program

Two major aspects to be undertaken during the proposed study would be systematic exploration and evaluation of the region using the latest available technology and exploration techniques to produce a reliable resource estimate upon which further expansion will be based.

Detailed Geological Mapping

Initially, it is proposed to carry out detailed investigations within the selected grid unit (Figures – 1 & 2).

The initial survey will be focused on the detailed geological mapping within the area covered by the selected grid unit on 1:10,000 scale.

Prior to conducting field mapping, the proposed area (area covered by selected grid unit) will initially be studied by interpreting aerial photographs and satellite images. This will be done in order to study general structural pattern of the area. Then the area will be mapped in a systematic manner by making foot traverses perpendicular to the strike direction.

Once the potential areas are identified, a detailed survey plan will be produced to thoroughly study the selected occurrences.

Geophysical Survey (Electrical and EM Surveys for Graphite Prospects)

Graphite is one of high non-metallic conductors that present in nature and this characteristic behavior enables to screen the same from the surrounding formations. As a general practice Electromagnetic (EM) technique is considered as the main method for graphite investigation at depths.

Proposed survey covering 01 metric grid unit will be investigated using ground EM techniques.

Ground EM surveys will be conducted to identify possible subsurface and areal extent of the known graphite deposits that were abandoned in early nineties. As mentioned

above, when these abandoned pits were functioned, they produced high quality needle type semi crystalline pure graphite in large quantities.

It could be stated that very primitive mining methods had been used during the peak period of graphite mining owing to the lack of technology and mining professionals and also due to the eagerness to earn quick money. Most of the shallow pits in the area had been sunk in the weathered rock or top soil to produce graphite at a low cost and in fairly large quantities. This however, caused extensive damage to the ore body and consequently deep seated reserves had not been tapped but left behind. Therefore there is no doubt that a considerable reserves of graphite still remains insitu for exploitation. The initial geophysical survey is focused on a qualitative and quantitative analysis of the abundance of graphite in these selected areas.

The main target area for the proposed geophysical exploration is the clusters where mining has been conducted few decades ago. For qualitative analysis, the areas will be sub-divided into 200m x 200m sub grids (nominal areal extent) around the periphery of the old workings.

Core Drilling

Based on the results of the geological mapping and geophysical survey, suitable locations will be selected to undergo core drilling investigations, both on the top of the ridge structure as well as on the shaft, adit and cross cut structures. Under the core drilling exercise, selected number of drill holes will be put down in order to study the subsurface behavior of the promising areas.

During drilling investigations in addition to vertical drill holes, inclined drill holes will also be put down based on the outcome of the geophysical investigations. Drilling investigations will be conducted with the assistance of GSMB.

Sample Analysis

Representative samples will be collected from drill cores for analysis and in order to check the quality of the identified graphite occurrences. Sample analysis will be conducted at the Analytical Laboratory of GSMB.

Whilst the combined information will provide practically a Proven-Category estimate of the resource, it will also establish mining location/s, mining method/s, mine plan/s and environmental controls. The analytical results of drill cores will assist in the formulation of metallurgical flow sheets for the beneficiation of the ore.

Evaluation

This exploration survey will yield an accurate reserves estimate, quality variations, shape, size and continuity of ore bodies. The data generated by the drilling programme will be analyzed and evaluated utilizing state of the art specialized computer software packages. These are capable of providing three dimensional models of the ore deposit/s which will determine the method/s and scale of mining.

The computer models could be used to design sophisticated optimization programmes plan and efficient usage of the major and identify any other minor resources that could be of commercial significance.

4. Technical Capability of the Exploration Team

4.1. Details of the Exploration Team with bio-data should be submitted with the report

Exploration Team

Geological Mapping

The company wishes to get done the geological mapping work with the assistance of local geo consultancy related company.

Cleaning of Abandoned Adit and Shaft Structures

For this purpose the company wishes to get technical advice of the following professionals who has vast experiences in the field of mining of graphite.

Mr. E. Dahanayake (Mining Engineer)
Prof. P.G.R. Dharmaratne (Mining Engineer)
Mr. N. Ekanayake (Mining Engineer)
Mr. Dinalankara (Mine Geologist)
Mr. A. Mudunkotuwa (Geophysicist)
Mr. R. Manchanayake (Mine Superintendent))

With the advice of above expertise, cleaning of abandoned adit and shaft structures will be made. Simultaneously with the cleaning, strengthening of walls of these structures will be made.

Geophysical Survey

The company will conduct the geophysical survey (ground EM Survey) through a local firm.

Core Drilling

The company wishes to get done the core drilling work with the assistance of the local firm.

Drilling locations will be given by the consultants of the RS Mines (Pvt) Ltd. based on the results of geological mapping and EM survey.

Sample Analysis

The company wishes to get done the sample analysis work from the GSMB analytical laboratory.

Evaluation

Data gathered from geological mapping, geophysical survey, core drilling and sample analysis will be used for the evaluation of economic viability of graphite mineralization within the identified abandoned graphite mines and pits.

For this purpose, Technical Advice of the company consultants as well as experts of the universities will be obtained.

4.2. Equipment and other relevant resources available with the Exploration Team

Geo consultancy firm having following experts will be selected to conduct the geological mapping exercise.

- Geologists
- Technical Officers
- Cartographers
- Remote Sensing and GIS Specialists

Consultants of the Company

As mentioned above, the company wishes to get technical advice of the following professionals who has vast experiences in the field of mining of graphite.

Mr. E. Dahanayake (Mining Engineer)
Prof. P.G.R. Dharmaratne (Mining Engineer)
Mr. N. Ekanayake (Mining Engineer)
Mr. Dinalankara (Mine Geologist)
Mr. A. Mudunkotuwa (Geophysicist)

- **Safety Plan**

- Ventilation system, including ventilation fans and ductings will be erected when underground abandoned adit and shaft structures are cleared.
- If the abandoned shaft / adit structures are located within the soil cover or weathered rock, side slopes of the shaft structures and side slopes and top of the adit structures will be strengthened using timber planks and iron rods, simultaneously with cleaning.
- If the abandoned shaft / adit structures are located within the fractured / loosed rock formations, such sections will be strengthened by rock bolting / concreting / fixing, etc., simultaneously with cleaning.
- Checking for any Hazardous gases (CO, CO₂, SO₂, LEL gases, etc.) and level of oxygen in working areas within the cleared adit / shaft structures using Multi Gas Detector.
- Maintaining First Aid facilities at the exploration site.
- Ambulance with driver will be kept at the site office at all times during exploration programme to use in case of emergency situation.

- **Instruments Expected to Use During Exploration Programme**

- Geological compass and hammer
- Handheld Global Positioning System (GPS) equipment
- 1:50,000 Scale Topographic maps of the Exploration Area.
- Digital Camera
- Surveying Equipments (during land surveying)
- Differential Global Positioning (DGPS) equipment
- EM System (during Geophysical Survey)
- Drilling Machine with compressor and other accessories (during drilling programme)
- Hand Drilling Machine
- Multi Gas Detector

- **Insurance Cover**

Copy of the insurance cover for officers and workers (total of 4 workers) engaged in exploration activities are annexed.

4.3. Time Frame and Methodology

Detailed Geological Mapping

Initially, it is proposed to carry out detailed investigations within the selected grid unit (Figures – 1 & 2).

The initial survey will be focused on the detailed geological mapping within the area covered by selected grid unit on 1:10,000 scale.

Prior to conducting field mapping, the proposed area (area covered by selected grid unit) will initially be studied by interpreting aerial photographs and satellite images. This will be done in order to study general structural pattern of the area. Then the area will be mapped in a systematic manner by making foot traverses perpendicular to the strike direction.

Once the potential areas are identified, a detailed survey plan will be produced to thoroughly study the selected occurrences.

Geophysical Survey (Electrical and EM Surveys for Graphite Prospects)

Graphite is one of high non-metallic conductors that present in nature and this characteristic behavior enables to screen the same from the surrounding formations. As a general practice Electromagnetic (EM) technique is considered as the main method for graphite investigation at depths.

Proposed survey covering 01 metric grid unit will be investigated using ground EM techniques.

Ground EM surveys will be conducted to identify possible subsurface and areal extent of the known graphite deposits that were abandoned in early nineties. As mentioned above, when these abandoned pits were functioned, they produced high quality needle type semi crystalline pure graphite in large quantities.

It could be stated that very primitive mining methods had been used during the peak period of graphite mining owing to the lack of technology and mining professionals and also due to the eagerness to earn quick money. Most of the shallow pits in the area had been sunk in the weathered rock or top soil to produce graphite at a low cost and in fairly large quantities. This however, caused extensive damage to the ore body and consequently deep seated reserves had not been tapped but left behind. Therefore there is no doubt that a considerable reserves of graphite still remains insitu for exploitation. The initial geophysical survey is focused on a qualitative and quantitative analysis of the abundance of graphite in these selected areas.

The main target area for the proposed geophysical exploration is the clusters where mining has been conducted few decades ago. For qualitative analysis, the areas will be sub-divided into 200m x 200m sub grids (nominal areal extent) around the periphery of the old workings.

Core Drilling

Based on the results of the geological mapping and geophysical survey, suitable locations will be selected to undergo core drilling investigations, both on the top of the ridge structure as well as on the shaft, adit and cross cut structures. Under the core drilling exercise, selected number of drill holes will be put down in order to study the subsurface behavior of the promising areas.

During drilling investigations in addition to vertical drill holes, inclined drill holes will also be put down based on the outcome of the geophysical investigations. Drilling investigations will be conducted with the assistance of GSMB.

Sample Analysis

Representative samples will be collected from drill cores for analysis and in order to check the quality of the identified graphite occurrences. Sample analysis will be conducted at the Analytical Laboratory of GSMB.

Whilst the combined information will provide practically a Proven-Category estimate of the resource, it will also establish mining location/s, mining method/s, mine plan/s and environmental controls. The analytical results of drill cores will assist in the formulation of metallurgical flow sheets for the beneficiation of the ore.

Evaluation

This exploration survey will yield an accurate reserves estimate, quality variations, shape, size and continuity of ore bodies. The data generated by the drilling programme will be analyzed and evaluated utilizing state of the art specialized computer software packages. These are capable of providing three dimensional models of the ore deposit/s which will determine the method/s and scale of mining.

The computer models could be used to design sophisticated optimization programmes plan and efficient usage of the major and identify any other minor resources that could be of commercial significance.

Time Frame

<u>Activity</u>	<u>Time Frame</u>	<u>Months</u>
Detailed Geological Mapping	01 Month	Month - 1
Detailed Geophysical Study	01 Month	Month - 2
Core Drilling	02 Months	Months – 3 & 4
Sample Analysis	01 Month	Months - 4
Evaluation	01 Months	Month - 5
Writing of Exploration Report	02 Months	Months – 5 & 6

Note: Proposed time schedule for exploration work is given in Fig. 3.

After completion of above mentioned entire exploration work, all the collected data will be evaluated and potential economically viable areas and their boundaries will be demarcated. Based on the results, graphite ore concentrations of the entire exploration area will be evaluated and the results will be displayed in separate maps for easy evaluation. All the findings and other collected data during the entire exploration work will be presented in a detailed report in the form of tables, charts, maps, annexes, detailed descriptions, etc. The report will be expected to submit to the GSMB, after the conclusion of the above mentioned scheduled activities of the proposed exploration programme.

It is expected to complete the proposed exploration work within six months.

Based on the exploration results, the estimation of reserves of graphite ore concentrations within the study area will be made.

Note: 6-month progress reports will be submitted to GSMB, mentioning the progress of the exploration activities, at every 6-month period after obtaining exploration license. It is expected to obtain the exploration license in April 2015. Therefore, the first 6-month progress report is expected to submit in October 2015. The rest of the 6-month progress reports will be submitted to the GSMB, accordingly.

Fig. 3. Proposed Time Schedule for Exploration Work

No	Activity	Time Frame																							
1	Detailed Geological Mapping	■																							
2	Detailed Geophysical Study	■																							
3	Core Drilling	■																							
4	Sample Analysis	■																							
5	Evaluation	■																							
6	Writing of Exploration Report	■			■																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
		Time (Month)																							

5. Environmental Concerns during the Exploration Stage

5.1 Biological

There are no wildlife sensitive areas or forest sensitive areas fall within the proposed exploration area or its close surrounding. Generally, most of the selected area is covered by coconut plantation (Plate – V) and scattered bush type (mana) vegetation.



Plate – V: Presence of Coconut plantation within the proposed exploration area

When conducting EM survey, line clearing will have to be conducted. As a result, some bush type vegetation will have to be removed along the proposed lines. Other than the removal of bush type vegetation along the proposed lines, no any damage will be occurred to floral environment.

When conducting core drilling programme, bore hole locations will be selected within the open areas, avoiding areas with tree species. When conducting drilling works, only 4" diameter holes will be putdown. Since these drilling locations are selected within the open areas, disturbances will not be occurred to the tree species.

5.2 Socio Economic

The identified main abandoned mines are located away from the areas with human settlements. Hence, when conducting exploration work disturbances will not be taken place to human settlements.

Care will also be taken not to do any exploration activities within the any of the areas identified for tourism / archaeological sites / places of worship, etc.,

5.3 Physical

Only limited number of drill holes will be put down within the entire reserved area (within the selected 01 grid unit). Considering the limited number of proposed drill holes within the total area reserved by the company (01 square kilometer, the damage to the physical environment due to drilling activities is negligible. During drilling activities only 4 inch diameter holes will be put down.

During drilling work, some noise pollution will be occurred. Action will be taken to select drill hole locations away from the human settlements or other environmental sensitive areas. Considering the limited number of drill holes put down within the entire reserved area, impact due to sound pollution will be minimal.

Access to the drilling sites is only through the existing roads / cart tracks / trails. Properly maintained and serviced equipment and vehicles are used for these activities, movements and transporting workers to the exploration sites. Therefore, damages to faunal species by disturbing and spilling of wasted oil are very minimal during exploration work.

All drill holes will be properly covered, after completion, to avoid unexpected hazards / accidents.

6. Laboratory Analysis

Laboratory analysis of selected drill core samples will be made in order to check the quality of the discovered graphite occurrences.

7. Ore Reserve Estimation

This exploration survey will yield an accurate reserves estimate, quality variations, shape, size and continuity of ore bodies. The data generated by the drilling programme will be analyzed and evaluated utilizing state of the art specialized computer software packages. These are capable of providing three dimensional models of the ore deposit/s which will determine the method/s and scale of mining.

The computer models could be used to design sophisticated optimization programmes plan and efficient usage of the major and identify any other minor resources that could be of commercial significance.

8. Cost for Proposed Exploration Programme

As discussed in the exploration proposal, work involve in the proposed exploration are as follows.

- Detailed Geological Mapping
- Geophysical Survey (EM Surveys for Graphite Prospects)
- Core Drilling
- Sample Analysis
- Evaluation
- Writing of Exploration Report

Cost for Proposed Exploration Programme in 31 Grid Units

<u>Activity</u>	<u>Time Frame</u>	<u>Allocated Cost (Rs)</u>
Detailed Geological Mapping	03 Months	500,000/=
Detailed Geophysical Study	03 Months	1,500,000/=
Core Drilling	04 Months	3,000,000/=
Sample Analysis	03 Months	500,000/=
Evaluation	01 Months	500,000/=
Writing of Exploration Report	02 Months	500,000/=
Consultancy Fees for Consultants	03 months	2,000,000/=
Total Cost = 8,500.000/=		