GOVERNMENT OF NWFP
DIRECTORATE GENERAL MINES AND MINERALS

STUDIES & CATEGORIZATION OF MARBLE AND DIMENSION STONE POTENTIALS IN NWFP

By

Geological Survey & Evaluation of Marble and Granite Resources in NWFP
Exploration Promotion Division, DGMM

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EXECUTIVE SUMMARY

The NWFP Province having a total area of about 74,521 Km² is dominantly composed of mountainous terrains covering about 70% area in the north and plateau to plain topography in the south over an area of about 30% of the Province.

Generally, the northern part of the Province being the mountainous terrain contains extensive and huge deposits of dimension stones. The southern portion of NWFP is dominated by the huge potential of rock salt, gypsum, limestone, silica sand, coal and clay deposits in addition to the potential of oil & gas.

The dimension stones are broadly categorized:

(i) Light Colour
(ii) Dark Colour

Marble occurrences of different shades and grades are located in Buner, Swat, Swabi, Malakand, Nowshera and Chitral districts. But the best quality of marble is found and mined from different areas of Buner. The marble occurs in attractive colours of white, grey, brown, green and black and have great demand for its high quality. The inferred resource of marble in NWFP are estimated as about 4.209 billion tones.

Granites or hard dimension stones occupy extensive areas in Mansehra, Swat, Dir, Kohistan and Chitral districts. These are ranging from light grey, dark grey to black colours. Most of the granite deposits are located in very rough and rugged terrains and remote and inaccessible areas. Best occurrences of black granite studied in Manshera district, wherein about

25 tenements have been granted to private investors. Workable/mineable resources of granites have been estimated to the tune of 45 billion tones.

Vast deposits of serpentinites/ultramafics occur in Kohistan, Swat, Malakand and Chitral districts. Two localities in Swat district have been identified as best, on the basis of having production capability of large size blocks and easy accessibility. These deposits are located near Shangla and Malam Jaba. The resources are estimated upto about 1.2 billion tones.

The category of ordinary stones marble include soft rocks amenable to cutting & polishing. Slates, limestone, dolomite, gneisses and quartzites etc. are generally not included in this category as the substitute of marble and granite. This category of decorative stones are scattered throughout NWFP and the resources are estimated in billions of tonnes.

The Exploration Promotion Division, Directorate General Mines & Minerals launched a PC-II scheme titled "Geological Survey & Evaluation of Marble And Granite Resources in NWFP" with a total cost of Rs.7.05 million for a period of 3 years. The objectives of the PC-II scheme may be summarized as under:

a). Regional scale resource mapping of marble and granite occurrences for categorization and resource estimation of the dimension stone potential.

b). Database generation through compilation of marble and granite tenements granted by DGMM.

c). Scanning of marble and granite potential for identification, categorization and prioritization of suitable outcrops amenable to extraction of standard blocks.

d). Orientation studies i.e establishing geological, geotechnical and mining parameters for development of model quarry of marble and granite commodity.

e). The ultimate objective of the proposed survey and studies is to create necessary database for categorization and quantification of marble and granite potential through geological survey and resource mapping plus orientation studies for development of model quarry. This is pre-requisite to planning and development of marble and granite sector.

Keeping in view the targets of the scheme, 6 Nos. target areas for selection of sites for in-situ block quarrying of marble in Buner district. Nine number deposits found suitable and selected for extraction of granite blocks and two locations for model quarry development for serpentinite in Swat district.

Most of the private parties have been using primitive methods for the extraction of the blocks. New quarrying methods are required to produce blocks to meet the demands of domestic and international market. The introduction of block quarrying technology has left no place in market for irregular and substandard blocks. Growing demand for dimension stones has necessitated more mechanization and application of advance technology. If one such project is initiated in NWFP, It would set the modern trend in stone industry in the province. The block cutting technology would:

i) Eliminate the losses caused by the present mining practice.

ii) Produce large size, formed and regular blocks in the quarries.

iii) Enhance the depth of the mineable deposits to some extent, thus increasing present reserve estimates manifold.

iv) Geo-technical studies for selection of right outcrop for quarry development.

v) Ensure regular production of the dimension stones for long term contracts.

vi) Setup a trend to gradually modernize the processing plants, and would:

vii) Inspire the private investors to adopt the new technology.

By the application of in-situ block cutting technology, the production will be increased manifold. Further more, processing of marble into standardize size will also compete the International market against the dimension stone. This will contribute to the flow of foreign exchange in the country.

Most of the area of the northern part of the Province is remote and inaccessible. So the process of survey and investigation should continue and search should be made for identification of more sites and the deposits should be re-examined and studied. Similarly, all other deposits which may not produce big blocks should be worked out for production small but regular blocks as foreign market does exist for small blocks of specially beautiful stones is those of Buner area in other parts of the Province.

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NORTHERN AREAS

Brep
Mastuj
IshPeru
Dorah Pass
Shoghor
Sor Laspur
Shandur Pass
36° N
Ughuthi
Gilgit
Chitral
Drosh
Kalam
Kalkot
Dasu
Lowari Pass
KOHISTAN
Dir
Khwazakhela
Besham
Mingora
Batgram
Bajaur
Saidu
Buner
Malakand
Mansehra
JAMMU AND KASHMIR
Shallagay
Mardan
Abbottabad
Swabi
Peshawar
Nowshera
HariPur
Parachinar
Islamabad
Kohat
Karak
Miran Shah
Bannu
Indus Highway
Gandi
Lakki
Wana
Tank
D.I. Khan
72° E
32° N

LEGEND

- Capital
- Provincial Capital
- International Boundary
- Provincial Boundary
- District Boundary
- Road
- District
- Town / Village
- Int. Airport
- Dom. Airport

0 50 100 150 Km

GEOLOGICAL SURVEY AND EVALUATION OF MARBLE AND GRANITE RESOURCES IN N.W.F.P.

DIRECTOR GENERAL MINES AND MINERALS

LOCATION MAP OF NWFP

Reproduced from Atlas of Pakistan — DATE: Oct. 2004

EPD — CONTR-35\LOCATION MAP.DWG

1. INTRODUCTION

NWFP is endowed with enormous potential of dimension stones, which include marble, granite, serpentinite and other stones. The potential marble bearing areas, having variety of marble occurrences of different colour and shades are located in prominent areas of Buner, Swat, Nowshera, Swabi and Chitral. At present more than 80% marble in raw form is being marketed to Sindh and Punjab province, where these are processed into the desired size in the form of marble tiles, tabletops and other decoratives.

Private sector is involved in the mining and further processing of the marble in NWFP but due to lack of know how and for getting immediate return, they use the primitive methods of mining by using indiscriminate blasting for recovery of marble lumps rather than regular geometrical blocks. This practice has greatly damaged the marble sector.

To regularize the marble sector, the DGMM has launched a scheme "Geological Survey & Evaluation of Marble & Granite Resources, NWFP" to scan the marble bearing areas, which are suitable for large size block extraction. The ultimate objective of the proposed survey and study is to create necessary database for categorization and quantification of marble and granite through geological mapping and survey followed by development of a model quarry. In order to avoid wastage of marble, new quarrying methods are required to produce blocks to meet the demands of domestic and international market that will ultimately contribute to the GDP of the country in

the form of local revenue and the generation of foreign exchange. This will benefit the local population of the area by the generation of the employment opportunities, enhancement in the socio-economic status and by product infrastructure development in the less developed and remote areas of the province.

2. SURVEY & EVALUATION OF MARBLE/GRANITE RESOURCES OF NWFP

Dimension & Decorative Stones

In ancient human civilization of about 4000 years, the use of compact and polishable stones can be traced in the prestigious architecture as well as in the medium and huge size sculptures. Its use is dominant in the structures of the Mediterranean's region including Middle East and South Asian countries.

In common usage these are termed as decorative or ornamental stones. These stones are put to architectural use and are utilized for external and internal beautification and decoration of edifices and building.

These may be classified as soft and hard stones and are commonly called marbles and granites respectively.

2.1 PRINCIPAL ROCKS USED AS DECORATIVE STONES

Genesis		Composition		
Magmatic	Intrusive	Siliceous		Carbonates
		Acidic	Mafic-Ultramafic	
		Granite Syenite Diorite	Peridote Gabbro	
	Effusive	Porphyry	Basalt	
Matamorphic	Ortho	Gneiss Quartzite	Serpentinite	Marble
	Para			
Sedimentary	Clastic	Sandstone		Travertine Alabaster
	Chemical			
	Organogenic			

Intrusions

Igneous/ Plutonics ____ Light colour granites

Effusive/volcanics ____ Dark coloured granites

Metamorphic —— Ortho < Granite
Gneisses – Light coloured Granite
Matamafites

Para < Hard – Quartzite etc. – Granite
Soft – Carbonates – Typical Marble
Other – Ordinary Stone Marble

Minerals is a dominant source, which can be used as the mean and vehicle of development for the remote, hilly and rugged terrains of NWFP. Exploitation of mineral resources of NWFP, should, therefore, receive top priority.

Search for metallic minerals is a long strenuous process and require long term planning, sophisticated technology and huge investment. The exploitation of decorative stones, on the other hand is much quicker, less risky and the least expensive of mining enterprises.

High quality dimension stone deposits lie exposed in NWFP. It is high valued abroad and can be sold at premium prices in the International market. Thus subsector of minerals, as such, has potential of value addition warranting development technology as well as human resources.

Based on the studies carried out under the project, the dimension stones has been categorized as light & dark colour.

2.1.1 **Marble**

Genetically, the term marble is essentially used for metamorphosed pure limestone but commercially, used for any soft rock or stone with pleasing appearance, which takes good polish. Such rocks include fossiliferous limestone, crystalline limestone, onyx, travertine and evidently the true white, red, gray or black marble.

In geological process, the limestones are converted into marble by thermal metamorphism, through heat emanated from igneous intrusions and by dynamo-thermal or regional metamorphism as a result of strong directed pressure and temperature. The temperature effect is indicated by small imbricate folds. The high temperature effect is indicated by the presence of various accessory minerals, such as tremolite-actinolite and diopside. The presence of schists and gneisses in the vicinity of the deposits generally indicate dynamo-thermal metamorphism.

The chief constituent in marble is calcite followed with or without by few percent of quartz. Other accessory minerals are graphite, hematite, limonite, chlorite, mica and hornblende. Metamorphism alters and recrystallizes the constituent minerals and usually deforms the internal structures, sedimentary features and fossils.

2.1.1(a) **Colour**

Pure marble is brilliant white but generally marbles have various shades from light grey to black, which are probably produced by disseminated carbonaceous matter. The green tint in marble results due to the presence of chlorite. Pink and red coloures are imparted by the presence of hematite and manganese carbonate. Yellow and green tints are caused by the presence of limonite.

The colour may be uniform, mottled or patterned. The streaks and bands, commercially designated "veins" often impart exquisite beauty to the stones. Uniformity in colour or colour

banding is commercially very important. Considerable care is taken in mining to follow certain seams or beds having uniform design or colour.

2.1.1(b) Texture

The texture of marble depends upon the size, mutual relationship and orientation of calcite crystals. For example, for fine texture, the range of grains per cubic centimeter is upto 20,000, having grain diameter of 0.37mm, whereas for coarse texture, the range of grains per cubic centimeter is to 70, with diameters of 2.44mm. The absorption of water (bad effect) depends on grain size. In general the water absorption increase with the increase of grain size. In most marbles, grains are irregular in shape and remain closely interlocked; the inter granular spaces being extremely minute. The complex fabric is what enables marble to withstand disintegration on exposure. Mostly the grains show aligned orientation, although in some cases, it is random but the crystallographic axes are approximately aligned in a common direction. The cleavage of calcite produces a mosaic of bright reflecting surfaces, which makes the rock to take a brilliant polish.

2.1.1(c) Grade/Quality of Marble

The density of marble generally ranges between 2.6 and 2.8. Its hardness is between 3(calcite) and 4(dolomite) on Harmful elements, i.e iron, pyrite, fractures, etc. the Moh's hardness scale. The abrasive hardness is generally enhanced by the

amount of quartz and silicate minerals present, which make the stone more resistant to sawing.

2.1.1 (d) Uses

Hard marble is required for paving steps and floor, whereas soft marbles are desired for sculptures and decorative purposes. Softness is also advantageous for easy workability and for low cost of processing and finishing.

Marbles have low porosity due to their interlocking crystalline fabric, ranging from 0.0002 to 0.5 percent. Good marble should have low porosity or water absorption ratio (0.1 to 0.7%) for withstanding rains and moisture.

The other important and useful property of marble is its strength to hold under pressure, characterized by modulus of rupture, which is expressed in pounds inch (Psi) or in bars in the SI(System-International) unit (1 bar = 14.5 Psi approx) or more recently in mega pascals (MPA=10 bars or 145 Psi). The modulus of rupture of good marble is around 1800 Psi).

In Pakistan real and pure marbles are mostly located in North West Frontier Province and FATA. From north toward south of NWFP, the marble bearing localities are situated in Chitral, Swat, Buner, Mardan, Nowshera districts, and also in Hazara.

2.1.2 Granites

Genetically, granites are pheno crystalline, quartz and feldspar rich, light coloured rocks, occurring as intrusive masses. They are hard rocks, having hardness of 5 to 7 on Moh's scale. Their hardness is considered an important quality for their use as building stones.

The term granite in commercial stone industry is, however, used for a variety of hard rocks viz: intrusive, extrusive and irrespective rock type and genesis, metamorphic rocks. This includes true granite and fine to coarse-grained igneous rocks, granite gneisses, diorite, gabbros, andesite, rhyolite, basalt, pyroxinites, hertzburgites, norite, syenite, anorthosite, amphibolite, hornblendite and quartzitic rocks etc. These are classified as leuco-granites or white coloured granites and melano-granites or black granites when used as polished dimension stones because occurrences of quartzite as mata banded rock.

Basalts and diabase are aphinitic, quartz – free, dark and heavy rocks occurring in flows, dykes and sills are main sources of black, grey.

2.1.2(a) **Colour**

The colour of granite is governed chiefly by the colour of the contained feldspars ranging from pale pinkish grey to pink to salmon to strong red. When pink or red colour is absent, granite range from light to dark colour, which is controlled by the ratio of feldspars and quartz to biotite and hornblend.

The colour of granite for use as dimension stone and tiles is extremely important. Some granites, such as Swedish granites, are widely known for a certain colour such as red. There are occasionally true black granites but in all cases the uniformity of colour is high desirable and is the single most important consideration.

2.1.2(b) **Texture & Grade/Quality of Granite**

The chief textural requirement is the uniformity of grains. Whatever the size of the grains, it must be uniform and grains should be uniformly distributed. The hardness of granite however, not only effects their quarrying but also it requires a special treatment for their cutting and polishing. Certain structural features, such as, fractures and sheet and bedded structures, internal linear or planar orientation in granites may need special technology for producing dimension blocks. Hairline fractures, quartz veins, dykes and veinlets and knots of dark minerals, may render the rocks valueless for decorative purposes.

The granites must be very sound, not susceptible to scaling and must have low porosity and high compressive strength. The scaling in large part is probably caused due to the presence of sulphates. The compressive strength of granite lies between 8,000 and 53,800 Psi and that for use as dimension stone should be in the range of 20,000 to 24,000 Psi.

The fine grained basic and ultrabasic rocks which are composed of varying proportion of plagioclase and ferromagnesiam minerals are tough and sound due to their finely crystalline compact texture. Harmful elements i.e iron, micas and pyrite are also present.

The most beautiful granite in Pakistan for cutting dimension block is located in the Nagar Parkar area of Sind Province.

Equally good quality hard rock deposits of varied colours and shades are found in Hazara, Swat, Kohistan and Chitral districts of NWFP.

2.1.2(c) **Uses**

The major uses of dimension granite are in monuments and memorials, for buildings as brides as foundation blocks, in arches, columns and steps and for highways and floors as curbstones and paving blocks. Minor amount of broken rocks are used in filter beds, as riprap material in dams and as poultry grit.

Besides the use of granites as dimension blocks, thin polished and finished granites slabs of 2cm or as thin as 1cm are in high demand. These slabs are being used as thin veneers and panels to clad buildings and walls.

More than ever, granite is a serious choice for many installations. It can be used anywhere one would use marble, and may other places where one would not. Because of its toughness, resistance to acids and to physical wear makes it a great choice for kitchens, fireplaces, furniture tops, entryways and many other places of public passage or those subject to wear and tear. Granites now represent about 40% of the total world's production while marbles represent 55%. Well polished slabs and blocks of granites are many times more valuable than those of marble.

2.1.3 Serpentinites/Ultramafic Rocks

Serpentinite, which are commercially lumped with marble, is genetically a very different rock. Massive serpentinite is the dense aggregate made up of the groundmass of serpentine, a hydrous aluminum silicate $H_4 Mg_3 Si_2 O_9$, Serpentinites may be described as the metamorphic rocks of ultramafic composition. The olivine in the peridotites get altered and converted partially or wholly into serpentinites. It is mainly found in the vicinity of and associated with gneisses, granulites, metamorphosed limestones and dolomites, talc and chlorite schists. Its colour is green, yellow or black, dotted or striped. It has greasy luster or feel. The density is around 2.6 and hardness ranges from 2.5 to 4, matching well with true marble.

2.1.4 Ordinary Stones Marble

The decorative and dimension stones other than granites and true marbles are categorized as ordinary stones marble. These may be excavated as blocks and can be polished but not in some case may be inferior to marble and granite in quality. Limestone, slates, gneisses and quartzites are included in this category.

3. AN OVERVIEW OF MARBLE INDUSTRY

In Buner area mainly good quality marble deposits exposed in the Permian to Mesozoic age formation like Doma formation, Kashala formation, Nikanai Ghar formation and Saidu formation.

The Nansar, Babuzai and Shamozai marble out crops are exposed in Distt Mardan and Buner are the part of Saidu formation . Marble bounded in Saidu formation is black in color fine grained jointed and fractured, but some parts of same marble especially in Shamozai area, have grey to dark grey colour with calcite veinlets commercially known as Zebra Marble. Mostly Saidu formation marble is partially marbalized as compared to other formations.

The Bampukha, Turusak, Daggar marbles in Buner area exposed in the Nikanai Ghar formation. The marble bed of Bampukha is whitish in color, fine grained and compact with open spaced, joint & fracture. Extraction of geometrical sizeable block is possible from different deposits. Turusak and Nansar marble is Jet Black in color fine grained, compact and have open spaced joints fractures.

Dimension stone occurrences are confined to the northern part of NWFP and the adjacent parts of tribal belt. The extensive marble resources are those of Mardan-Buner belt within a linear extension of about 50 km, mainly white and grey coloured. The finest quality of marble is being mined from this area. Presently more than 150 leases have been granted to private parties for prospection and mining purposes. The other vast and potential marble bearing area is the elongated horizons of Shoghore and Gaherit marble in Chitral.

The Chitral marble is mainly white in colour and has vast potential for systematic development and quarrying. Other occurrences are scattered in Nowshera, Mardan, Swabi, Swat districts and Malakand Agency.

More than 220 units have been installed and are operating in NWFP for processing of marble and granite blocks and boulders. Out of these, 144 are in Buner, 30 in Mardan, 34 in Peshawar, 20 in Nowshera, 15 in Swabi and 6 in Mingora and the remaining are in Chitral, Hazara and other localities. The NWFP has also a vast potential of a variety of granite resources of different shades and textures. The term granite is here assigned to rocks harder than marble but amenable to extraction of blocks and processing to cut & polished tiles and tops and other decoratives. The extensive belt/batholiths of Trichmir, Karakorum, Kohistan and Indian blocks have significant outcrops for development of granite quarries. A number of dark coloured granites have been identified in Mansehra, where the about 25 leases have been granted to private investors.

The vast resources of dark and dark green coloured serpentinites/ultramafic rocks are spread over large areas in Kohistan, Swat and Malakand areas along suture zones geological belts of metabasites in Chitral, Dir, Swat and Kohistan have more extensive potential for delineation of outcrops of green shades granites of Kohistan Island Arc. The belts of serpentinites and metabasites have a lateral extension of more than 100 km. with significant width in tens of kms.

About 50 mineral tenements have been granted for prospection and mining of serpentinite in Shangla and Malamjaba areas of Swat to various private parties.

The year wise production of various dimensions stone, i.e from 2000-2001 to 2005-2006 is given in the table given below.

(In Tonnes)

Category of Dimension Stones	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006
Marble	388722	405441	460202	235475	571331	375586
Granite	4242	4820	2827	2871	4913	2374
Serpentinite	1018	2483	2131	1155	2173	385
Slate Stone	119498	161142	324266	120166	220733	45809

Source : Licensing Division, DGMM

The average annual production of marble from the country is 497,317 metric tones, whereas the average annual production of marble from NWFP is 406,126 metric tones, showing a major contribution in the production of marble sector. Production of granite and serpentinites are not encouraging.

4. GEOLOGICAL SETTING

Regionally the rocks of Buner and Swat are highly deformed and metamorphosed along the northern margin of Indian mass bounded by the Indus suture mélange of Tahir Khali etal (1979). The Indus suture zone separates the cretaceous intra-oceanic magmatic block (Kohistan Island Arc) in the north from the older Gondwana Continental fragment (Indian Plate) in the south. The two geologic domains are referred to upper Hornblendic group and lower Swat-Buner schistose group of Martin etal (1962), respectively. Different formations exposed in Shangla and Buner areas represent the meta carbonate units of the Precambrian sedimentary formations of the Indian plate margin. The formations are overlain by Paleozoic to Mesozoic sequences, underthrusted against the Main Mental Thrust (MMT) to the north of marble prospects. Based on geological mapping of one degree sheet (43 B) by the GSP in the year 2004, the carbonate bearing formations of the Indian plate margin in Malakand, Swat(Shangla-Besham), Buner and Mardan (including Swabi & Nowshera) are categorized as per given table.

Geological Formation	Age	Localities	Rock Units
Saidu Formation	Late Mesozoic	Buner (Nansar) & Babuzai	Graphitic Phyllite and schist with minor calcite marble.
Nikanai Ghar Formation	Middle Mesozoic	Buner (bazargai, Bampokha, Tursak, Daggar, Matwanai, Nansar.	Calcite marble, Dolomitic marble and minor phyllite.
Kashala Formation	Early Mesozoic	Swat, Buner, Mardan	Calcite marble, schistose marble, dolomite marble, calcareous phyllite.
Marghazar Formation	Triassic		Horn blende schist, amphibolite, biolite schist, phalogophyite marble.
Doma Formation	Permian to late carboniferous	Shangla, buner (chagharzai) & Mardan (pallo dheri).	Calcite marble, phlogophite marble, tremolite marble, dolomite marble.
Nowshera Formation	Devonian.	Kandar, Pirsabakm Maneri, ghundai Tarako and Bagh.	Sandy dolomite, limestone, Marble with calcareous quartzite.
Manglour Formation	Precambrian	Pacha, loesar dome	Garnet schist, mascovite quartz schist, tremolite marble, calcite marble.
Gandaf Formation/ Krora Formation	Precambrian	Shangla marble	Graphitic schist, calcite, dolomite and tremolite marble.
Swat granite gneiss	Paleozoic	Illium, malamjaba, shangla, chenglai, Babaji Kandao.	gneiss, mega crytstic granite.

Swat granite include augen gneisses and tourmaline granites. The augen gneisses are characterized by the presence of large Potash feldspar augen in a ground mass of quartz, feldspar and biotite, while the tourmaline granites are characterized by the presence of black tourmaline crystals and absence of biotite and feldspar augen. The augen gneisses are unconfirmably overlain by the Alpuri schist

and tourmaline granites occurr as an intrusive sill-like body into the augen gneisses and surrounding quartose metasediments.

The term Alpuri schist was introduced by Kazmi etal (1984) for the lower three units of lower Swat–Buner schistose groups of Martin etal (1962). The Alpuri schist consists of the following units.

a) Quartz mica schist and amphibolites.
b) Calc-schist and schistose marbles.
c) Graphitic schists.

a) Quartz Mica Schist & Amphibolites

The unit consists of feldspathic quartzite, quartz, mica (garnet) schist, biotite schist, biotite ziosite schist, quartz-muscovite schist, quartz horn blende schist and amphibolite beds are 1-20 meters thick and have contact with calc-schist and schistose marbles. Near the contact, it contains coarse massive epidote and epidote-amphibolite lenses.

b) Calc-Schist & Schistose Marbles

It consists of calc schist, garnet actinolite, calc schist and schistose marble with minor amount of massive white to gray marble. The schistose marbles thinly laminated with interbeds of calc- schist. They are light to dark gray, some times banded (white and gray colored), and consists of calcite, graphite, quartz and muscovite. The calc- schists vary from light grey to brownish gray in color and consists of calcite and silicate minerals, which som times form alternating layers, ranging in thickness from 1 to 5 cm. The calc- schist and schistose

marbles have a short contact with the underlying amphibolites.

c) Graphitic Schist

This unit overlies the calcschists and schistose marble which is dark gray in color and consists of graphite-quartz muscovite schist, which is phyllite in character.

The whole sequence of Alpuri schist is abruptly terminated by a fault called as "Niknai Ghar Fault" (Ahmed etal), being placed near these units against a thick, white, massive and dolomitic marble units known as "Nikanai ghar Marbles".

Nikanai Ghar Marble:

This was named by Nikanai Ghar village near Tursak (Buner) as "Nikanai Ghar Marble" and is distinguished as a separate formation. Previously it was included in the marble and calc schist unit of the lower Swat-Buner schistose group(Martin etal1962).

Lithologically the formation consist of marble with minor amount of quartzites, calc- schist and graphitic schist. The marble are massive, thick bedded, coarsely crystalline and partly dolomitic with poorly preserved fossils. These are white, light gray to dark gray in color. The upper contact of the formation is not exposed, while the lower contact with the Alpuri schists is marked by the "Nikanai Ghar Fault". The marble and associated meta sedimentary sequences are possibly correlating to the Gandaf formation and karora formation.

Precambrian age (early to late proterozoic) overlying the early proterozoic formations of the kotla and Besham complexes in the east, towards Besham. In the south west towards Alpuri, swat and Buner, the formation of Marghazar, Duma, Kashala, Nikanai Ghar and Saidu are overlain. Geological formation comprising pellitic, psammatic and graphitic schists, gneisses and the inerbedded calcareous schists including marble are representing the Stratigraphic column of late Mesozoic to early Proterzoic.

The altitude of the Lithological units in general is north-south commonly with steep dip towards west.

5. GEOLOGICAL OCCURRENCES OF MARBLE IN NWFP

The geological occurrences of marble in NWFP are classified into the blocks as given below:

i. Marble of Karakorum block
ii. Marble of Kohistan Island Arc block
iii. Marble of Indian Plate block

5.1 **Marble of Karakorum Block:** The Chitral district lies in the extreme northern part of NWFP. It covers more than 15000 Km^2 area of the great Hindukush ranges, which is the westward continuation of the Karakorum. Geologically the Chitral district can be divided into three tectonic units.

a) The unit lying on the northwestern side of the Reshun fault is composed of Paleozoic metasediments, which have been intruded by the Hindukush granitoids. The metasediments include the Charan quartzite, Shoghore formation, Sarikol Shale, Wakhan formation, Atark unit and the isolated quartzites and minor limestone of Baroghil.

b) The central unit, which lies between the Reshun fault and the MKT is composed of the Mesozoic metasediments, intruded by the western Karakorum granitoids. The Wakhan formation, green schists, Chitral slates and the Reshun formation are included in this unit. The Northern Suture Melange (NSM) separates the Asian plate from the Kohistan Island Arc. The NSM is composed of volcanic, sedimentary and serpentinite block in a slate matrix.

c). The unit exposed on the south eastern side of the NSM represents the northern part of the Island Arc. It consists of cretaceous metasediments and volcanic rocks intruded by granites, tonalites and diorites.

The marble of the Chitral district lies in the Reshun formation of the central unit. It occurs in the form of three spatially separated strips in the southern part of the Chitral district. Marble occurs in wide spread areas. The marble of the Reshun formation crops out into two bans for the full length of the area. White, fine grained marble is available in large quantity at Gahirat, just near the main road between Drosh and Chitral town. The other marble localities are in Bumboret, Rumbur and Birir valleys of Kafiristan, in the Chitral Gol, Shoghor and also in Shishi valley.

5.2 Marble of Kohistan Island Arc Block : No significant marble deposit occur in the Kohistan Island Arc sequence. The Kohistan Island Arc has been considered as intra-oceanic Island Arc developed in response to northwards subduction of the New-Tethyan oceanic lithosphere. It is characterised by a complex interplay of magmatism, deformation, metamorphism, uplift and erosion. It is made up of a variety of cretaceous and tertiary igneous and subordinate sedimentary rocks, which can be grouped in several distinct units on the basis of age and lithological characteristics.

Marble occurrences are very sparsely distributed in the NWFP portion of the Kohistan Island Arc, that can be observed in Dir,

Kohistan and upper Swat. These are highly sheared, fractured and large blocks can not be obtained.

5.3 Marble of the Indian Mass Block: The Indian Mass within Pakistan has a long and complicated thermo-tectonic history dating back to at least the early proterozoic and, possibly, late Archean. A wide range of metamorphic assemblages has been reported. The Indian Mass rocks to the south of the Indus Suture have been divided into internal zone and external zone sequence by Treloar etal (1991). The internal zones rocks are metamorphosed and cropout to the north of the Panjal-Khairabad Trust. The external zone is unmetamorphosed and occurs to the south of Panjal-Khairabad Thrust.

Marble occurrences are confined to the internal zone metamorphosed rocks. These deposits are widespread in Buner area. In the Buner and Swat districts, the marble occurrences are located in the lower Swat Buner Schistose Group that covers most of the area of lower Swat, western part of Chakesar and northeastern part of Mardan district. The lower Swat Buner Schistose Group is further subdivided into Marghazar formation, Kashala formation, Saidu formation and Nikani Ghar formation.

The important marble occurrences of the Buner district are located in the Nikani Ghar formation. The Kashala formation also contain marble deposits both in Swat and Buner districts.

The Kashala formation constitutes vast areas of lower Swat, Buner and Mardan districts. Due to its compositional and metamorphic

changing behavior from north to south, it has been divided into two type localities. The first type locality occurs near Dome Sar that consists of garnet or epidote bearing calcareous schists, which contain marble of grey to brown colours. The second type locality occurs near Baroach where it contain marble with interlayers of phyllite.

The Nikkani Ghar formtion occurs in the form of large lanticular body. It is composed of white to dark grey, thick bedded marble with interlayers of graphitic phyllite and quartzite. The contact between the Nikani Ghar formation and Kashala formation is gradational.

Doma formation also contain marble and is located northeast of Daggar town. It forms gradational contacts with both the Kashala and Nikani Ghar formation. The marble of Doma formation is generally whitish grey to grey, fine to medium grained and thin to medium bedded.

6. OCCURRENCES AND LOCATION OF DIMENSION STONES

MARBLE

The marble deposits of NWFP are located in Peshawar, Mardan, Malakand and Hazara Divisions.

6.1 PESHAWAR DIVISION

6.1.1 Nowshera Pink Marble (Kandar Deposit)

Geographic Location

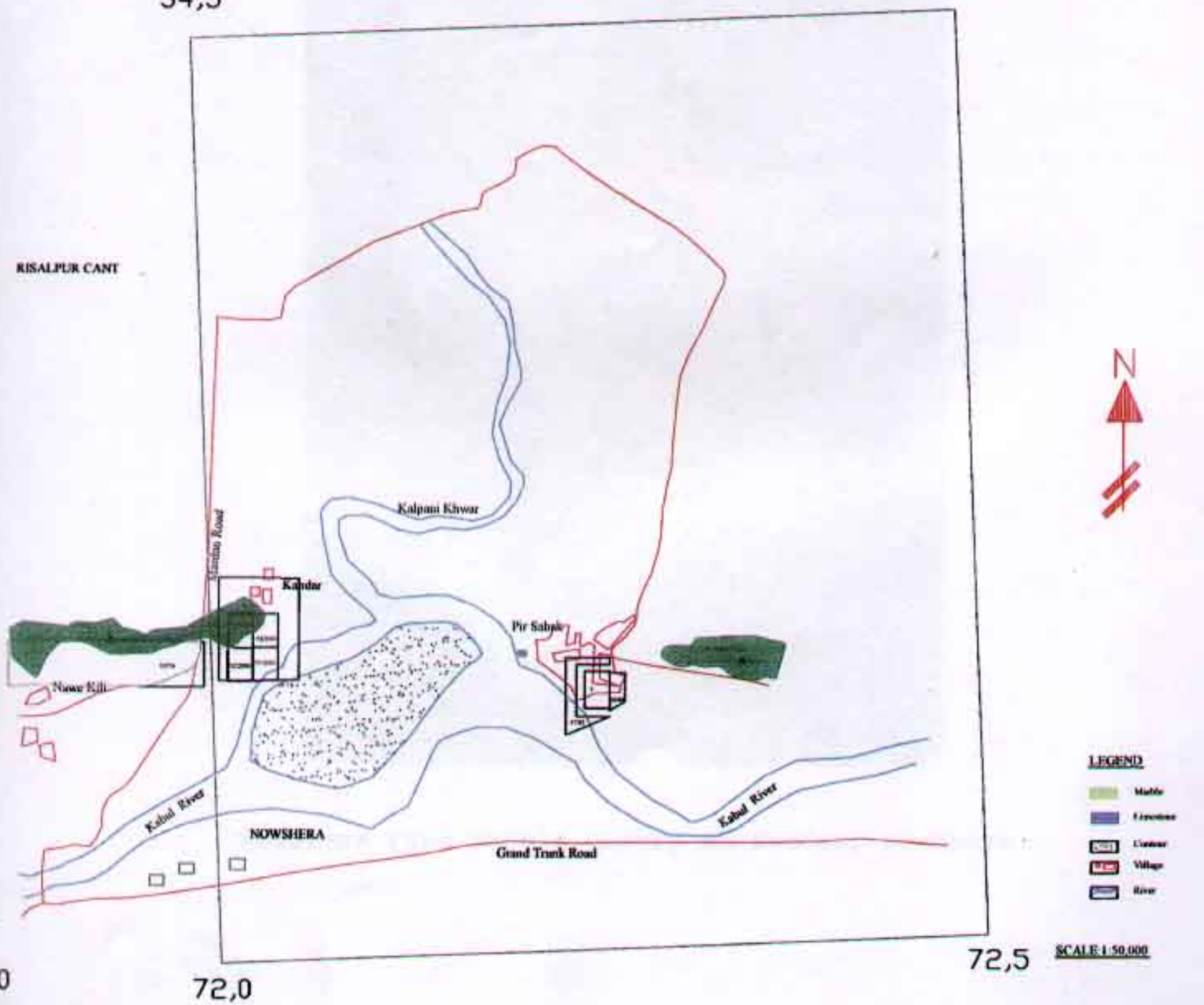
The Nowshera Pink Marble deposit is situated at Kandar about 2 km to the north of Nowshera Town at the left bank of Kabul river a drainage system joining the Indus at Khairabad.

The marble occurrences occupy the low altitude in low lying hills. Climatically, the area is attributed to the monsoon region. Summers are warm to hot and winters are cold with rains. Forest and vegetation cover is very low. The nearest stations are Nowshera & Risalpur, which are hospitable and scenic places with facilities of reasonable accommodation, education and health besides public offices etc.

Accessibility

The deposit is accessible through all weather Grant Trunk road at a distance of 32km from Peshawar and 2km at the north of Nowshera town at Nowshera Mardan road which passes in the eastern half end of deposit. The electric power grid station is

34,5



34,0

72,0

72,5

GEOLOGICAL SURVEY AND EVALUATION MARBLE & GRANITE RESOURCES IN NWFP.

MAP SHOWING MARBLE DEPOSITS IN KANDAR AND PIR SABAK AREAS.

situated at Nowshera. Skilled mine workers are available for quarrying. Water is available for mining and electric power for mechanizing the mine site and having processing of marble blocks into the tiles and other commodities. Local market for finished products is available in Mardan, Nowshera and Peshawar.

Field Description

Geology (Local): The deposit is located in the low lying hills (Lat 34º 1′ 30″ N : Long 72º 1′ 00″ E) in topographic sheet No.43B/4. The hill is 2.5 km long and extends in a nearly east west direction with an average width of 400 meter. The hill is mainly composed of impure limestone and dolomite with subordinate phyllite, crinoidal limestone and quartzite belonging to lower Paleozoic age. The general strike of the marble is in east west direction with moderate to high angle dip towards north.

Structure/Fabrics

Moderately Close Fractures: Fractures spaced 0.5 to 1.0 foot. The grains are equigranular.

Joints: Two sets of joints are developed and there are widely spaced, so blocks of standard size as 1.5m x 12 m x 1m can be extracted.

Bedding: The bedding is medium to thick bedded and massive.

Foliation : Concordant

Mineralogy

Texture: Coarse textured grains generally averaging over 2mm. composition consists mostly of calcite and dolomite. The marble

contains numerous calcite filled veins, vienlets and cavities. Yellowish to dark brown coatings and patches of ferruginous material are common along these fillings.

Hardness: It is compact and hard.

Color: the marble is pink with streaks and patches of white, grey, red and brown colors. It is equigranular. The reserves have been estimated as 6 million tonnes.

6.1.2 Pirsabak Marble

Geographic Location

The Pirsabak marble deposit is located at a distance of about 6 km to the north east of Nowshera and to the east of Kandar deposit at the left bank of Kabul river a drainage system joining the river Indus at Khairabad.

The marble deposit having the low altitude in low-lying hill. Climatically, the area is located to the monsoon region. Summers are warm to hot and winter are cold with rain. Forest and vegetation cover is low. The nearest station is Nowshera a district Head Quarter with facilities of reasonable accommodation, education and health besides public offices.

Accessibility

The deposit is accessible through Grand Truck road at a distance of 36 km from Peshawar and 2 km to the north of Nowshera town. The electric power grid is situated at Nowshera. Skilled mine workers are available for quarrying. Water is available for mining and electric power for

Quarry Site at Pallo Dheri, Katlang

Water is available for mining and electric power for mechanizing the mine site and having processing of marble blocks in to tiles and stabes etc. Local market is available for finished products is available in Nowshera Mardan and Peshawar.

Field Description

Geology (Local): The deposit is found in the strike extension of the Kandar marble deposit in the low lying hills in Pirsabak village (Lat 34º 1' 35" N, Long . 72º 2' 45" E) topographic sheet No. 43B/4. The Pirsabak hillock extends in length for about 300 meters with an average width of 150 meters and height of 22 meters respectively. The hillocks is composed of poorly metamorphosed limestone and dolomite. It contains a marble horizon. The marble bed strikes in east-west direction and deps

Structure/Fabrics: Moderately close fractures: Fractures spacing 0.5 to 1 foot.

Joints: Two sets of joints are developed and these are widely spaced, so blocks of standard size 1.5 m x 1.2 m x 1 m can be extracted.

Bedding: The bedding is medium to thick bedded and massive.

Foliation Concordant:

Mineralogy

Texture: Coarse grained. Grains generally averaging over 2 mm.

Composition: Deposit consists of calcite and dolomite. The marble contains numerous dark brown coatings and patches of ferrugeneous material are common along the fillings.

Hardness: Compact and hard.

Color: The color of marble is pink with streaks and patches of white, grey, red and brown colors. The marble is equigranular. The reserves has been estimated as 0.13 million tonnes. The deposit is
undeveloped due to limited quantity and the dispute of ownerships.

6.2 MARDAN DIVISION

In Mardan Division, marble deposits are located near Pallo Dehri, Shamozai in Mardan Distirct and Ghundai Tarako, Maneri in swabi district.

6.2.1 Pallo Dehri Deposit

Geographic Location

The marble is found in a hill at a distance of 1 km from Pallo Dehri village. 28 km at the north east of Mardan via Gujrat. The marble deposit having the low altitudes. Climatically, the area is located in monsoon region. Summers are warm to hot and winters are cold with rain. Forest and vegetation cover is moderate. The nearest station is Mardan a distt head quarter with facilities of reasonable accommodation, education and health besides, public offices etc.

marble blocks in to tiles and other commodities. Local market is available for finished products in Mardan and Nowshera.

Field Description

Local Geology: Marble deposit is lying with a strike extension of 1400 m with an average width of 600 m. thickness of marble beds is 6 m. it is found on toposheet no. 43B/3. The hill is composed of marble with subordinate tremolite marble, phlogophite marble with quartz veins (Duma formation). Pallo Dehri marble deposit extending in north west direction and dip varies from 40^{0} –55^{0}NE. The thickness of marble bed is 8 meters. Pyretic crystals are sparsely present.

Structure/Fabrics

Moderately close fractures: Fractures spaced 0.5 –1 ft.

Joints: 2 sets of joints are developed, so blocks of standard size i.e. 1.5 m x 1.20 m x 1 m can be extracted at places.

Bedding: the bedding is thin to medium bedded.

Foliation: foliation is examined in the marble beds.

Mineralogy

Texture: Fined textured.

Composition: The marble consist of calcite, tremolite, phlogophite, mica and quartz. Cubes of pyrite crystals are sparsely distributed within marble, due to which dark brown coating is found on the weathered surface.

Hardness: compact and hard.

Color: dark gray to white in color. The marble is equigranular. The deposit remind undeveloped due to local problems.

Composition: The marble consist of calcite, tremolite, phlogophite, mica and quartz. Cubes of pyrite crystals are sparsely distributed within marble, due to which dark brown coating is found on the weathered surface.

Hardness: compact and hard.

Color: dark gray to white in color. The marble is equigranular. The deposit remind undeveloped due to local problems.

6.2.2 Shamozai Deposit

Geographic Location

The marble deposit is located in a hill at a distance of 8 km north east of Katlang Town and 23 km from Mardan. The marble deposit having the low altitude. Climatically, the area of the marble deposit is located in monsoon region. Summers are hot and winters are cold with rains. Fores and vegetation cover is low to moderate. The nearest station is katlang and Mardan. Mardan is distt head quarter with facilities of reasonable accommodation, education and health etc.

Accessibility

Shamozai marble deposits are accessible from Peshawar about 90 km through national high way and 7 km at the north east of Katlang town. The electric power grid station is situated at Mardan city. Skilled mine workers are available in the surrounding area for querying and electric power for mechanizing the mine site and basing processing of marble blocks into tiles and other commodities. Local market is

Transportation of Black Marble at Shamozai
Mine Site (Katlang)

available for finished products in Mardan, Nowshera and Peshawar.

Field Description

Local Geology: Marble deposit is lying with a strike extension of 1100 meters with an average width of 600 meters. Thickness of individual marble bed is 6 meters. It is located on topographic sheet No. 43B/3. The hill is composed of calcite marble and dolomite marble. It is the intercalation of white and gray calcite grains known as Zebra Marble. The deposit is extending in north west direction and dips 50^0 NE. Pyrite is sparsely distributed.

Structure/Fabrics

Moderately close fractures: Fractures spaced 0.5 – 1ft.

Joints: two sets of joints are developed, 50 blocks of standard size i.e.1.5 m x 1.2 mx 1.0 m can be extracted.

Bedding: Medium to thick bedded.

Foliation: Concordant foliation can be observed in the marble bed.

Mineralogy

Texture: Medium to coarse grained.

Composition: The marble is mainly composed of calcite. The other mineral present in traces.

Hardness: Compact and hard.

Color: Dark gray with white calcite veins.

6.2.3 GHUNDAI TARAKO DEPOSIT

Geographic Location

Ghundai Tarako deposit lies at a distance of about 10 km to the north west of Swabi city in Ghundai Tarako hill. The marble deposit have the low altitude in low lying hill. Climatically, the area is located in the monsoon region. Vegetation is low to moderate. Summers are warm to hot while winters are cold with rain. The nearest station is Swabi a district Head Quarter with facilities of reasonable accommodation, education and health.

Accessibility

The deposit is accessible at a distance of 52 km from Mardan and 11 km to the north west of Swabi town. The electric power grid station is situated at Swabi where as 11 kv transmission line is present in the area. Skilled mine workers are available for quarrying. Water is available for mining and electric power for mechanizing the mine site and basing process of marble blocks into tiles and slabes etc. Local market for finished products is available in Swabi and Mardan.

Field Description

Local Geology: The deposit lies in Tarako hill (Lat 34°13′ 00″ N, Long 72° 25′ 15″ E) in topographic sheet No. 43B/8. The hill is 1.75 Km long and 5 km wide. It is composed of crystalline limestone, marble, dolomite and quartzite, of Paleozoic age. The marble is mainly found in the north western and central portion of the hill. The marble is thin to

medium bedded is well jointed and fractured. The general trend of the beds is northwest and dips about 45^0 NE. The average chemical analysis indicates CaO 52.9%, MgO 2.64%, Al_2O_3 + Fe_2O_3 0.35%, SiO_2 0.54%, and Loss in ignition 43.72%.

Structure/Fabrics

Open fractures spaced 0.5 foot to 1 foot.

Joints: Closely spaced joints are found and due to two sets of joints the blocks upto 1.5m x 1.2m x 1m are easily obtained. The smaller blocks are mostly used for making chips and rough wall making for local dwellings.

Schistosity: Due to which the rocks are split up in thin, irregular plates.

Foliation: Different minerals segregate into layers parallel to schistosity.

Mineralogy

Texture: Saccharoidal, uniform in Texture and finely crystalline.

Composition: Consists mostly of calcite and dolomite with grayish calcite veins. Yellowish to dark brown coatings in the weathered surface. Pyrite crystals are rarely found in disseminations. The grains are equigranular.

Hardness: The marble is hard, compact and massive at places. At the western end of deposit the marble bed is thin bedded, crushed and fractured due to which Chowkas, Kandas and boulders are present in large quantity.

Color: The color is white with parallel grayish calcite veins, yellowish to dark brown coating due to ferruginous material. Its tentative reserves are 9 million tones.

6.2.4 MANERI DEPOSIT

Geographic Location

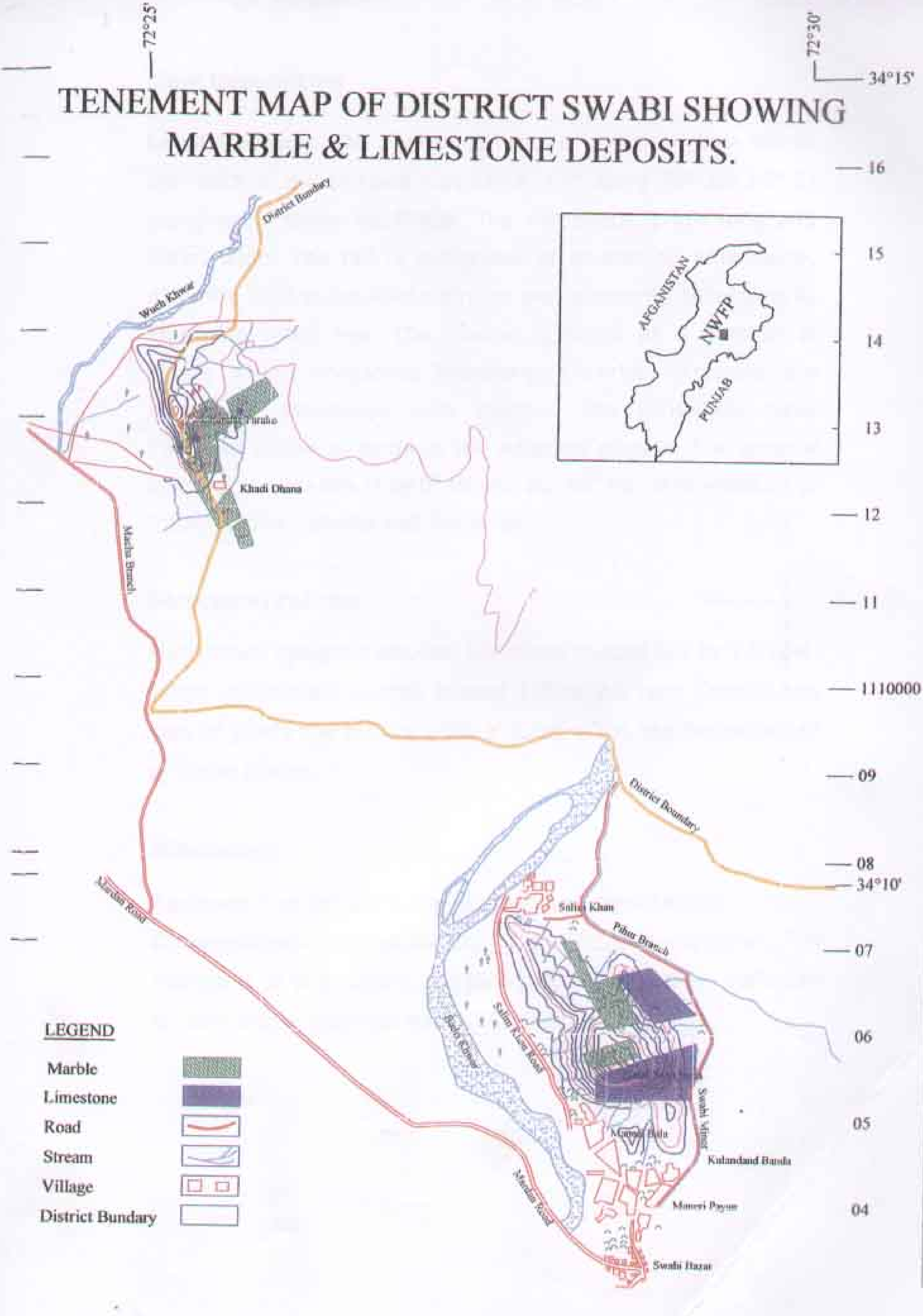
The marble is found in a hill lying between Maneri and Salim Khan villages at a distance of 1 km to the north of Swabi town. The limestone and marble occurrences occupy low to moderate attitude.

Climatically, the area is attributed to the monsoon region. Summers are warm to hot and winters are cold with rain. Forest and vegetation cover is low to moderate. The nearest station is Swabi with the facilities of reasonable accommodation, education besides public offices etc.

Accessibility

The deposit is accessible by Mardan Swabi high way at a distance of 47 km from Mardan an d1 km to the north of Swabi town.The electric power grid station is at Swabi. Skilled mine workers are available for quarrying. Water is available for mining. Local market is available for finished products in Swabi and Mardan.

TENEMENT MAP OF DISTRICT SWABI SHOWING MARBLE & LIMESTONE DEPOSITS.



Field Description

Local Geology: The deposit is located in Maneri Bala hill to the north of Swabi Town (Lat 34º 8′ 15″, Long 72º 28′ 15″ E) topographic sheet No.43B/8. The hill about 2 km long and 600m wide. The hill is comprised of crystalline lime stone, dolomite with subordinate phylite and quartizite belonging to Siluro-Devonian age. The marble is found at a number of places within crystalline limestone. Dolerite intrusions are commonly associated with marble. The intrusions have imparted yellowish tings to the adjacent marble. The general trend of the marble is N40^0 W and dip 65^0 NE. It is medium to thick bedded, jointed and fractured.

Structure/Fabrics

Moderately spaced fractures. Fractures spaced 1.0 to 2.0 feet. Joints moderately jointed spaced 1.0 to 2.0 feet. Due to two sets of joints the blocks 1.5m x 1.2m x 1m can be extracted at some places.

Mineralogy

Texture: The marble is fine grained and equigranular.

Composition: Consist mostly of Calcite and dolomite. The marble is of poor grade and inconsistent in quality. Yellowish to dark brown coatings due to intrusion.

MALAKAND DIVISION

Buner District

Different parts of Buner district contain extensive deposits of superior quality marble. The marble occurs in attractive colours of white, grey, brown, green and black and have great demand for its high quality. The important marble deposits are located at Bagh, Swawi, Bampokha, Barkilli, Daggar, Tursak, Yakhdara, Mirdara, Matwanai, Bazargai and Nansar areas.

Bampokha Marble Deposit

Location : Bampokha marble deposits occurs at a distance about 1 km to south east of Bampokha village at 30^0, $30^/$ 43" and 72^0, $16^/$, 40" on topo sheet No-43B/6.

Topography: Topographically area have medium to high altitudes hillocks and gentle slopes with semi plane areas. Mainly the deposits of good quality marble available at low altitudes hillocks near Bampokha village.

Accessibility: The deposits of Bampokha marble is easily accessible through all weather truckable roads to main marking town Buner and further throughout the country in all weather condition. Area is thinly populated and have other infrastructure like power experienced labour besides roads. Water is available in vast quantity for mechanized mining and for processing of marble blocks into tiles and other commodities.

Sunny White Marble Blocks Processed at Bampokha (Buner)

Field Description

Geology : Geologically, the Bampokha marble deposit area fall into the metamorphosed sedimentary belt of Niaknai Ghar formation. Previously it was included in calc schist unit of lower Swat-Buner schistose group (Martin et al 1962). Lithologically the Nikanai Ghar formation consist graphitic schist with minor quartize, calc schist and calcareous formations. Marble is massive thick bedded, coarsely, crystalline grains with widely spaced vertical joints. At places these deposits are partially dolomatic. These deposits are white, light gray to dark gray in color. The commercial name of these marble are Sunny grey and Sunny White. General strike is N65 E and dep 30^0 to 40^0 NW.

Structure

Fabrics: Lower contact of Nikanai Ghar is faulted with Alpuri Schist due to movement of fault are moderately shattered and produces bedding joints and fractures, mostly joints are vertical or near to vertical but extraction of sizeable and suitable blocks are possible from same deposit.

Mineralogy: Marble have a uniform texture, color and grain size. Marble is medium to coarse grained, white in color and have homogeneous texture and color with pleasant appearance. The harmful minerals are at minimum side.

The whitish gray to gray in color marble of Bampokha area is also medium to coarse grained with uniform and homogeneous color continuation. The Bampokha area is also having a deposit whitish gray to gray color. In the local

market marble is commercially known as Zebra Marble in the area. The marble resources of Bampokha area has a considerable length and width with 386.5 million tones of reserves (inferred) and feasible for extraction of large size geometrical blocks as required in the market.

Nansar Deposit

Location

The Nansar marble deposit is located at a distance of 1 km to the north east of Nansar village of Distt: Buner. Marble deposits is located on survey of Pakistan topo sheet No.B/2 and B/3 with grid reference of 34°. 29'.30"N , 72°.15'.45"E)

Accessibility

Marble area is connected with all means of communications, like the metalled and non metalled truckable roads and tracks to main market areas. The deposit can be approached throughout the year in all weather conditions, power is available in nearby vicinity and easily manageable for mining. Water is available in vast quantity for drilling and processing unit. Technical labour is also available for development of mining.

Field Description

Marble bed is the part of Nikani Ghar formation and bounded by the calcareous graphitic schist of lower Swat Buner schistose group of rocks. The lenses of quartzite and micaceous schist along with quartz veins are also found. The marble horizon is ranging in thickness from 20 to 30 meter

and extended toward north south upto 3000 meter. Marble is medium to thick bedded compact, hard and have wide spaced clay filled joints and fractures. Marble is fine to medium grained with ferruginous colouration at places. Generally the colour of marble is grey to dark grey. General trend of the horizon is north south with west ward dip. Ore reserves are estimated to the tune of 142.27 million tonnes.

Structure/Fabrics

The marble deposit has wide spaced clay filled joints and fractured. Deposit is medium to thick bedded, compact, hard with minor quantity of siliceous material.

Mineralogy

Marble have uniform grey to jet black color with fine to medium grained texture. Marble have undesired minerals in minor quantity like pyrite and quartz but take excellent polish.

Bazargai Deposit

Location

The marble deposit of Bazargai area located at a distance of 2 km South East of Bazargai village on survey of Pakistan topo sheet No. 43B/6 (34°.32'.20"N.,72°.19'.15"E). These deposit lies at a distance of one kilometer from Swabi and Jowar road.

Topography

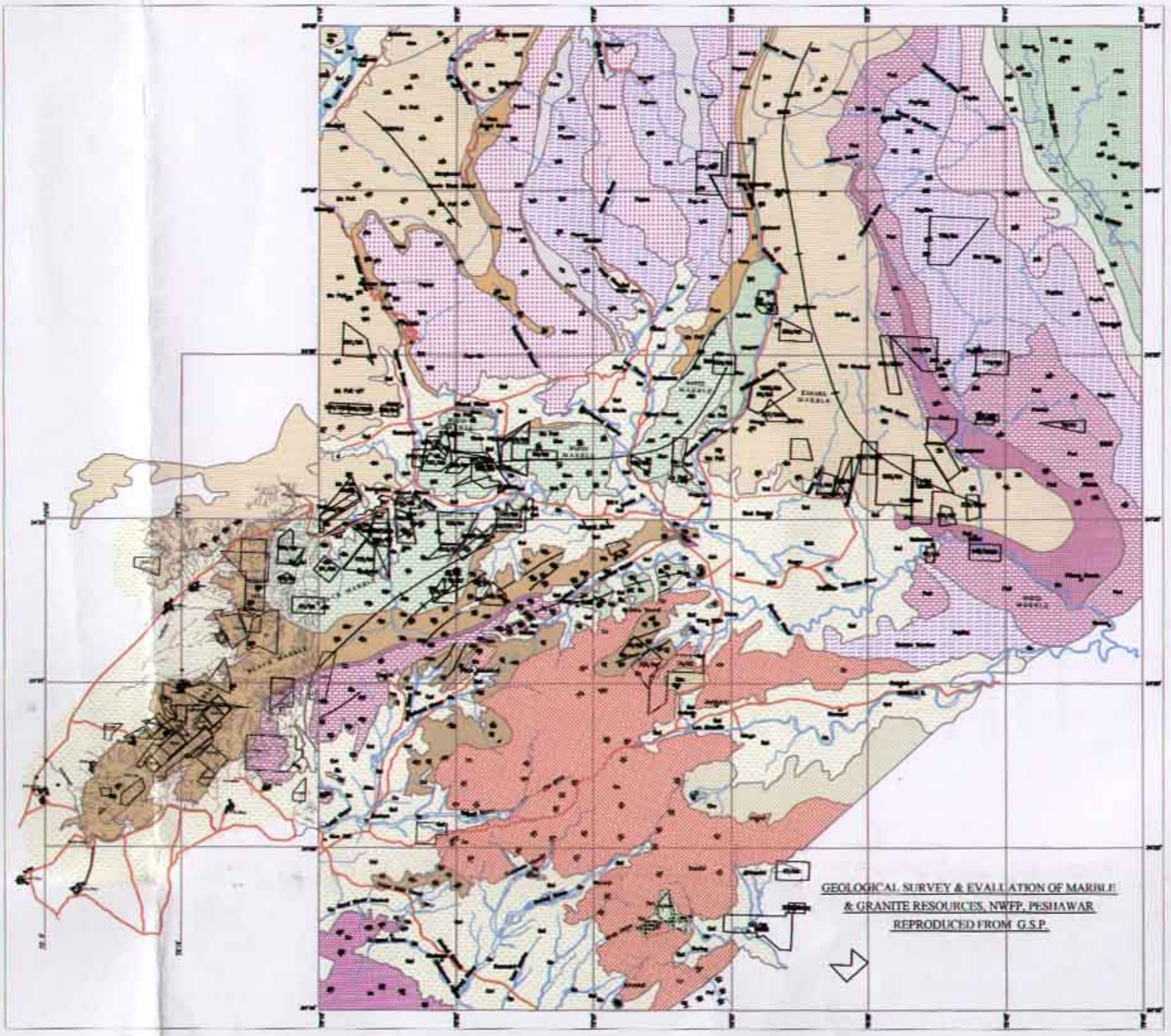
Topographically the area lies in low lying altitude hills with scrace population. Climatically area falls in monsoon region

A

View of Marble Quarry at Bazargai, Buner

Squre Marble Blocks at Bazargai Quarry, Buner

PRELIMINARY GEOLOGICAL MAP OF THE BUNER AND MARDAN AREAS
SHOWING MARBLE & GRANITE DEPOSITS



GEOLOGICAL SURVEY & EVALUATION OF MARBLE
& GRANITE RESOURCES, NWFP, PESHAWAR
REPRODUCED FROM G.S.P.

LEGEND :

with adequate rainfall in summer. Summer season is hot and winter season is cold in the area.

Accessibility

Area is easily accessible through all weather fair condition with metalled and unmetalled truckable roads/tracks. Technical labour, electricity power and water is available in near by vicinity which is easily manageable for development purpose.

Field Description

Marble bed is stratigraphically fall to Kashala formation. Kashala formation is the part of lower Swat Buner schistose group which comprises micacious schist, calcareous graphitic schist with minor lenses of quartzite and amphibolites. The Kashala formation is parallel to Nikanai Ghra formation in the area. The marble deposits are bounded within the micacious and calcareous graphitic schist. Marble is medium to thick bedded compact hard, medium to coarse grained with whitish to grey in color. Beds have open space fractures and joints. The sizeable blocks can be easily extracted. Generally marble beds are trending north south with westward gentle to steep dip.

Structure/Fabric

Open spaced joints and fractures are present due to which large standard and geometrical shaped blocks i.e 1.5mx1.2mx1m can be extracted easily.

Joints	:	Two sets of joints are present.
Foliation	:	Concordant
Hardness	:	It is compact and hard

It is pure marble and composed of upto 94% calcite. This is one of the largest and productive deposit in Buner District.

Mineralogy

Marble have homogeneous whitish to grey color, medium to coarse grained. Calcite crystals are uniform· harmful minerals like silica, pyrite and mica are on minor side. Due to its location and position, installation of block cutting machinery for model quarry is recommended.

Tursak Deposit

location

Tursak marble deposit occurs at a distance of 2 km south east of Tursak village on survey of Pakistan Topo sheet No.43B/6 at 34º, 31' .00" N long 72º,21'.51" E. Deposits are located in low altitude hills, falls in same stratographic units of Bampokha deposits Nikanai Ghar formation of lower Swat Buner schistose group.

Topography

Area is lying into lower to moderate altitude hills, with small population. Climatically area lies in monsoon region with adequate rainfall. Summer is hot and winter is sever as compared to surrounding areas.

Black Marble Quarry at Torsak, Buner

Accessibility

Deposits of Tursak area are easily accessible through all weather conditions with metalled and unmetalled truckable roads from the main city of Distt: Headquarter Daggar. Area is thinly populated and have other infrastructures in the near by vicinity.

Filed Description

Geologically area of Tursak is present in the metamorphosed sedimentary. Nikanai Ghar formation belongs to the lower Swat Buner calc schistose group. These marble deposits are bounded in the calcareous schist with miner quartzite lenses. Marble deposit is medium to thick bedded, massive, compact, hard and fine to medium grained. Marble have wide spaced concordant joints filled with clay. At places reddish brown spots of ferruginous material occurs along the calcite veinlets. Generally the deposits are jet black in color with very pleasant appearance. The larger blocks of size 1.5 m x 1.2 m x 1.0 m can be extracted easily. The marble deposit extends for about 1 km, have an average thickness of 200 m.

Structure Fabrics

The widely spaced concordant joints filled with clay are available in beds of thick deposits but the fractures and joints are not harmful during mining for extraction of sizeable geometrical block. Generally the Nikani formation is trending north south with dipping west.

Mineralogy

The deposits have uniform texture and color. The grain size is fine to medium, pleasant appearance. It is dominantly composed of crystalline calcite with negligible amount of other minerals. These

deposits are compact and slightly hard due to minor quantity of siliceous material. Marble takes very excellent polish with pleasant color.

Daggar Deposit

Geographic Location

The marble deposit is trend at month in vicinity of Daggar town a distt head quarter. The marble deposit is located in low to moderate latitude. Climatically, the area is located in monsoon region. Summers are warm to hot while winter are cold with rain. Forest and vegetation cover is moderate. Being a distt head quarter with facilities of reasonable accommodation, education and health facilities beside public offices. The deposit is located (Lat 34^0 $30'$ 45"N, 72^0 $28'$ 59" E) on toposheet No. 43B/ 6.

Accessibility

The deposit is accessible from Peshawar at a distance of 104 km through national high way and 30 km at the north east of Mardan. The electric power grid station is located at Sowarai. Skilled mine workers are available for querying and electric power for mechanizing the mine site and hasing processing of marble blocks into tiles etc. local market is available for finished products.

Field Description

Local geology: The marble deposit is associated with Kashala formation with calcareous schist and crystalline lime stone. The rock sequence is folded into several asymmetrical anticlines and

synclines. The rocks are thin to medium bedded, jointed to fractured so the blocks of commercial size can rarely be obtained. The rocks having gentle dip.

Structure/Fabrics

Fractures are open spaced.

Joints: Close joints and space is filled with clay material.

Foliation: Foliation can be observed in marble bed.

Mineralogy

Texture: Fine to medium textured.

Foliation: Foliation is observed in the rocks.

Composition: Mainly composed of calcite crystals with negligible amount of other minerals.

Hardness: Compact and hard. It is mostly used in building stone.

Barkili Deposit

Geographic Location

The marble deposit is located at a distance of 2 km to the south west of Barkili village. The deposit is located in moderate altitude. Climatically, the area is located in monsoon region. Summers are hot and winter are cold with rains. Forest an vegetation cover is moderate. It is near to Daggar a distt head quarter with the facilities of reasonable accommodation, education and health facilities beside public offices. The deposit is located (Lat 34^0 26′ 38″ N, 72^0 29′ 04″ E) on survey of Pakistan toposheet no. 43B/7.

Accessibility

The marble deposit is accessible through metalled and unmetalled fair weather roads from Daggar. The electric power grid station is located at Swawai. Skilled mine workers are available for querying and electric power for mechanizing the mine site and hasing processing of marble blocks into tiles and other commodities. Local market is available for finished products.

Field Description

Local Geology: The marble is found at the contact of granite and formed mainly as a result of contact metamorphism. The deposit strikes $N60^0$ E and dips at 65^0 SE. It is traversed by numerous calcite veins and veinlets. Ferruginous coatings and patches of yellowish to dark brown colors are commonly found on the surface. Microfolding is found prominently at places.

The marble is intruded at places by delorite dypes and sills. Actenolite and tremalite have developed in small quantities along these intrusions. The blocks as big 1.5 meter x 1.2 m x 1.0 m can be obtained easily. The northern part of the marble deposit is of better quality as compared to the southern part. The physical tests indicates its specific gravity as 2.71, water absorption, 0.153^0 % and modules of rupture 2000 psi. These values compare purely with the standard specification. The marble bed is 1000 meter long and 200 meter thick. Its tentative rserves above the ground level have been estimated as 5 million metric tons. The marble is of great demand due to its attractive green color.

STRUCTURE/FABRICS

Moderately closed fractures. Fractures spaced 0.5 – 1.0 ft.

Joints: 2 sets of joints are developed, so the blocks of standard can easily be extracted.

Mineralogy

Texture: Medium textured.

Hardness: The marble is hard, compact and massive at some places.

Color: The marble is predominately of white to light grey color with pink, brown and green patches.

Matwanai Deposit

Geographic Location

The marble is located along the tributary of Barandu Khwar, at west of Matwanai village distt Buner (Lat 34° 28' 45" N, long 72°35' 40" E) on toposheet No. 43B/11. It is located about 30 km at south of Daggar. Climatically, the area is located in the monsoon region. Summers are pleasant and winters are cold with rains. Forest and vegetation cover is moderate. The nearest station is Daggar a distt head quarter with facilities of reasonable accommodation, education and health besides public offices etc. The deposit topographically lying into moderate to high altitude hill.

Transportation of White Marble Block at
Dewana BaBa (Buner)

Accessibility & Infrastructure

Marble deposits are connected with metalled and unmetalled truckable in all weather conditions from distt head quarter. Electric power and water is available in nearby vicinity for mechanized mining and for processing marble blocks into tiles and other commodities. The experience labour is also available in the area for the development of mining.

Field Description

Local geology: The deposit is associated with schistose rocks of lower Swat-Buner group. It is located in Nikanai Ghar formation and is interbedded with impure crystalline lime stone. The marble strikes at N 79^0 W and dips at 78^0 north. It is medium to thick bedded. The marble is traversed by irregular and wavy pattern of calcite veinlets. Sparse intercalations of quartz mica schist which range upto 2 meters in thickness are common. The marble bed at ground level are estimated at 1.2 million tonns. Blocks of standard size of 1.5 m x 1.2 m x 1.0 m can easily be mined. Commercial name of Matwania marble is "Spogmay".

Structure/Fabrics

Moderately closed fractured are filled with clay material.

Joints: Widely spaced. Two sets of joints are developed, so the blocks of standard size, geometrical shaped can easily be exploited.

Schistosity: Schistosity and foliation can be observed in beds.

Mineralogy:

Texture: Coarse textured and saccaroidal.

Matwanai White Marble Blocks at Dewana BaBa, Buner

Composition: the marble bed consist of calcite. The grain size is medium to coarse with uniformity. It has negligible amount of quartz crystals. Marble is hard due to silica but can take good polish.
Color: Milky white. The grains are equigranular.

Yakh Dara Deposits

Location

The Yakhdara marble deposits is located at a distance of 12 km to north east of District Headquarter Daggar. Area is connected with metalled and all weather truckable unmetalled road with other main market towns. Marble deposits is located on Topo sheet No. B/10 with 34° 31′ 40″N and 72° 36′ 00″E.

Topography

The Yakhdara area deposits topographically is lying into moderate to high altitude hills. Climatically area is present in monsoon region receiving low rainfall annually. Summer season is pleasant and winter season is cold.

Accessibility & Infrastructure

Marble deposit is connected with metalled and un metalled truckable road in all weather conditions from the Distt: Headquarter Daggar, Buner. Electric power and water is available in nearby vicinity for mining purposes and for processing of blocks into tiles and other commodities. The experienced labour is also available in the area for mine development.

Field Description

Marbalized zone of Yakhadara area stratigraphically fall into the lower Swat Buner schist group. The marble deposits are located in Kashala formation parallel to the Nikanai Ghar in Yakhdara area in Dissr Buner. Marble deposit is bounded with in the calc graphitic schist with minor quantity and extended upto 25 km towards west of Yakhadara village. Deposit is medium to thick bedded, fine to medium grained whitish in color, compact, hard and slightly siliceous. Clay filled wide spaced joints and fractures are also present in the deposits. The marble deposit of Yakhadara area takes good shiny polish with pleasant color appearance. In local market Yakhadara marble is known as White Carara marble.

Structural Fabrics

The marble deposit has concordant wide spaced joints and fracture are filled with the clay Material. Generally the marble deposit is medium to thick bedded, compact with minor lenses of quartz and schist. General trend is north south with dipping west in the area.

Mineralogy

The deposit has uniform texture and color grain size is fine to medium with uniformity. It is dominantly composed of calcite crystals with negligible amount of quartz crystal, marble is slightly hard due to silica but takes excellent polish and have nice appearance.

Mirdara Deposits

Location

Mirdara marble deposit lies to north of Yakhadara marble deposits in the same bed at a distance of 1 km from Midara village. Deposit is located on survey of Pakistan Topo sheet No.43B/10(34° 32′ 00″N ; 72° 36′ 30″E)

Topography

Area falls into moderate to high altitude topographically. Tectonically rocks in the area are highly folded into several symmetrical anticlines and synclines..

Accessibility & Infrastructure

Area is connected with all weather truckable metalled road to Tehsil and Distt: headquarter. Water is available in sufficient quantity for mining purpose. Electric power is also available in nearby vicinity and easily manageable for further development in mining and establishing the processing unit.

Field Description

Marble deposit of Mirdara is stratigraphically located in Kashala formation and bounded with in calcareous schist along with minor quantity of quartz and graphitic schist of lower Swat Buner schistose group. Marble deposit is thin to medium bedded, fine to medium grained, whitish to gray in color, compact and slightly siliceous. Wide spaced clay filled joints and fractures are also common.

Generally formation trending north south with dipping towards west in gentle to vertical position.

Structure Fabric

Marble deposit is thin to medium bedded, compact with minor lenses of quartz and schist. Joints and fractures are wide spaced and filled with clay material. Generally rocks are folded and make many anticlines and synclines in the area. Extraction of sizeable geometrical blocks required in the market are not possible due to the diagonal common joints and fractured in the marble deposit.

Mineralogy

Marble is fine to medium grained, compact, hard and have maximum calcite crystals. Marble color is gray to jet black with uniform texture and grain size. Light gray color marble takes good polish and have excellent appearance. Generally color is uniform and quality of harmful mineral like Silica and Iron is in lower side

Bagh Deposits

Geographic Location

The deposit is located to the north west of Bagh village distt Buner. The deposit is found in moderate altitudes. Climatically, the area is located in monsoon region. Summers are warm to hot and winters are cold with rain. It is of equal for Swabi and Dagger with facility of reasonable accommodation, education and health facilities. The deposit is located 30^0 $17'$ 46" N, 72^0 $28'$ 23" E) in topsheeet No. 43B/7.

Accessibility

The deposit is accessible at the south of Dagger and at the north east of Swabi by all weather fair metalled road. The electric power grid station is present in the nearly vicinity for mechanizing. The mine site and hasing processing of marble blocks into tiles and other commodities. Local market is available for finished products.

Field Description

Local Geology: The marble beds are surrounded by granite extensions, dolomite, dykes and sills are also associated with marble. The bedding is thick to medium and massive at places. Small veinlets of loosly contained calcite are sparsely distributed. The marble bed strikes generally 25E and dips 50^{0} - 75^{0} NW. the marble is jointed, fractured large blocks can be extracted with great difficulty. The marble extends intermittently in length for 2 km with an average width of 300 meters. Its reserves above the ground level is estimated at 30 million tones. The deposits have worked extensively at two places along the strike length. The geo-technical studies indicate its specific gravity to be 2.7, water absorption 0.17 % and modules of ruptures 1520- 1820 psi .

Structure/Fabrics

Moderately close fractures. The fracture spaces .5 – 1.0 ft.

Joints: 2 sites of joints are developed and the space is filled with clay material.

Mineralogy

Texture: fined to medium grained and equigranular.

Composition: The marble is mainly composed of calcite with minor amount of harmful minerals.

Color: White

Hardness: Hard and compact.

Swawi Deposit

Geographic Location

The deposit is located in a small hillock near Swawi village distt Buner. The deposit is located at low altitudes. Climatically, the area is located in monsoon region. Summers are warm to hot and winters are cold with rains. The nearest stations are Swabi and Swarai, with facilities of reasonable accommodation, education and health facilities besides public offices. The deposit is is located at Lat 34° 17′ 27″ N, long 72° 30′ 15″ E on the toposheet no. 43B/11.

Accessibility

The deposit is accessible from Swabi and Sowari through all weather fair roads from Swabi and Sowarai. Skilled mine workers are available for querying and electric power for mechanizing. The mine site and for processing of marble blocks into tiles etc. Local market is available for finished products.

Filed Description

Local geology: It is found in the strike extension of Bagh marble deposit. The marble strikes N 65° E and dips at 75° South. The marble is medium to thick bedded, jointed and fractured. Large

blocks of 1.5 meters x 1.2 m x 1.0 m can be extracted. The marble is pure and contained an average CaO 52.67%, MgO 0.4 %, SiO_2 0.58 % and less on ignition 43.64 %. The marble extends 500 meters in strike length and 100 meters thick. Ore reserves above the ground is estimated as 0.5 million matric tonnes. The marble is being quarried in the form of lage blocks and transported to market factories while the smaller blocks are used rarely for chips making and construction.

Structure/Fabrics: Moderately closed fractured.

Joints: 2 sets of joints developed and space is filled by clay material.

Mineralogy: Fine to medium grained and equigranular.

Composition: The marble is mainly composed of calcite with minor amount of other minerals like Silica etc.

Color: White

Hardness: Hard and compact.

SWAT DISTRICT

There are many marble deposits in Swat District. These are mostly confined to the Kashala formation, Doma formation and Buner – Swat schistose group. But good quality marble deposits are few as compared to the adjacent Buner district. The important marble deposits are located at Dandai, upal and Shangla areas.

Spin Kanri Deposit

Geographic Location

The deposit is located in the north western vicinity of Alpuri village, along Besham Mingora road in district Shangla. The deposits lie in moderate altitude. (lat. 34° 53′ 58″N ; long 72° 39′ 00″E)

Climatically, the area is located in the mon soon region. Summers are warm and winters are cold with rains & snow. The area lie near the Alpuri town with facilities of reasonable accommodation, education and health. Water is available from Khan Khwar drainage system having perennial water source for mining. The electric power is available for mechanizing the mine site and basing processing of marble blocks into tiles and other commodities.

Field Description

Local Geology:- The marble deposit and meta sediments belongs to Gandaf formation or Karora formation of pre Cambrian age. Geologically, the rock units are divided into (i) marble (ii) amphibolite and other schistose rocks in the inter bedded sequence

with variable thickness. The marble beds are thin to medium bedded, jointed and fractured and large blocks can not be extracted.

Mineralogy

Texture: Medium to coarse grained, fractured are closely spaced.
Joints: Angular pattern of joints are present. The cavity between joints is filled with clay material.
Composition: Marble is mostly composed of calcite with minor amount of harmful minerals.
Color: White to grey and contains greenish and brownish patches.
Hardness: 2-3.5

Dandai Deposit

Geographic Location

The deposit lies at Thakot Banna road, crosses the Indus rivers and also exposed in Dandai along Karakuram Highway district Shangla. The deposit lie in moderate altitude. Climatically, the area is located in monsoon region. Summers are warm to hot and winters are cold with rain and little snow in high altitudes. The deposit lie at approximately equal distance from Batagram distt and Besham with facilities of reasonable accommodation, education and health facilities. The deposit is located (Lat 34° 48′ 33″ N, long 72° 56′ 47″ E) on topographic sheet No. 43B/13.

Accessibility

The deposit is accessible 28 km at west of Batagram and 30 km at south east of Besham by Karakuram highway. The electric power

grid station is situated at Batagram and Besham for mechanizing the mine site and basing processing of marble blocks into tiles and other commodities. Indus river drainage system is also present. Market is available for finished products in the above mentioned cities.

Field Description

Local Geology: The deposit is found within the Kashala formation in calcareous sequence of Buner-Swat schistose group consist of pelletic schists, graphite and granite gneisses are associated. The marble is medium bedded, hard, compact, striking east west and dip, 45^0 NE. the marble is jointed, fractured and large blocks can be extracted with difficulty..

Structure/Fabrics

Fractures are closely spaced.

Joints: Radial joints are present. The space between joints is filled with clayey material. Joints are closely spaced.

Mineralogy

Texture: Fine to medium grained, compact, hard and have best finishing properties.

Composition: the marble is mainly composed of calcite with minor amount of harmful minerals.

Color: White to grey and contains greenish and brownish patches.

Hardness: Hard and compact.

The calcite graines are equigranular. Chowkas, kandas and boulders are extracted, which are mostly used for chips making in local construction.

Upal Deposit

Geographic Location

The marble occurs near Upal village located to the southwest of Besham, distt Shangla near Besham Alpuri metalled road. The deposit lies in moderate to high altitude. Climatically, the area is located in monsoon region. Summers are warm and winters are cold with rains and snow in high altitudes.

The deposit lie in between Besham and Alpuri with facilities of reasonable accommodation, education and health facilities. Water is available from Khan Khwar drainage system having perennial water source for mining. The electric power grid station is located in Besham for mechanizing the mine site and basing processing of marble blocks into tiles, slabes etc. Present market is available in Besham and Alpuri for finished products. The deposit lie (lat 34° 51′ 56″ N, long 72° 48′ 5″ E) in topographic sheet No. 43B/13.

Field Description

Local Geology: The marble deposit and meta sedimentary rocks belongs to the gandaf formation or Karora formation of pre Cambrian age (early to late proterozoic) formation of the Kotla and Besham complexes in the east. In the west towards Alpuri the formation is overlain by duma, Kashala and Saidu formation of late Paleozoic to Mesozoic age up to the MMT.

Geologically the rock units are divided into (i) marble and (ii) amphibolite and other schistose rocks in the inter bedded sequence

with variable thicknesses. The host rock is garnet mica schist. The rocks are thin to medium bedded, fractured and jointed and large blocks can not be extracted.

Mineralogy

The marble bed mainly composed of calcite without any prominent undesired minerals.

Color: Mostly white to gray in color.

Hardness: 2 - 3.5.

Besides the above mentioned localities, other small occurrences are formed in different parts of Swat District. These occurrences are of little marble market value. The notable among these are,

(i) Charbagh (Lat 34° 46′ 55″ N, long 72° 19′ 53″ E)
Topographic sheet No. 43B/5

(ii) Chaligai (Lat 34° 42′ 30" N, long 72° 15′ 19″ E)
Topographic sheet No. 43B/5

(iii) Maniar (Lat 34° 43′ 01″ N , long 72° 15′ 16″ E)
Topographic sheet No. 43B/6

(iv) Berikot (Lat 34° 40′ 19″ N , long 72° 13′35″E)
Topographic sheet No. 43B/2

(v) Yakh Tangi (Lat 34° 49′ 48″ N, 72° 38′ 00″E)
Topographic sheet No. 43B/9

(vi) Manglaur (Lat 34° 42′ 20″ N, long 72°19′ 03″ E)
Topographic sheet No. 43B/5

(vii) Kalan (Lat 34° 19′ 12″ N, long 72° 12′ 50″ E)
Topographic sheet No. 43B/11

(viii) Karapa Kandoa (Lat 34°19′ 23″ N, long 72° 28′ 13″ E)
Topographic sheet No. 43B/7

(ix) Ranial (Lat 34° 53′ 52″ N, long 72° 47′ 40″ E)
Topographic sheet No. 43B/13

(x) Nalam Pur (Lat 34° 43′ 22″ N, long 72° 21′ 57″ E)
Topographic sheet No. 43B/9

There are many deposits in Swat distt. These are mostly confined to the Kashala formation, Doma formation, Buner-Swat schistose group. But good quality marble deposits are few as compared to the adjacent Buner distt. The important marble deposits are located at Dandai, Upal and Shangla areas.

SHANGLA MARBLE DEPOSIT

Geographic Location

The Shangla marble deposit is situated in Shangla Par valley, drained by Khan Khwar, a drainage system joining the Indus river at Besham in the east. The marble occurrences occupy the altitudes ranging from 1100 to 2400 meters on either side of Khan Khwar. Climatically, the area is located in monsoon region. Summers are warm and winters are cold with little snow fall other wise rain. Forest and vegetation covers are moderate. The area is also famous for production of world famous gemstones, Swat Emeralds. The nearest stations are Alpuri and Besham, which are hospitable and scenic places having facilities of reasonable accommodation and health facilities besides public offices etc.

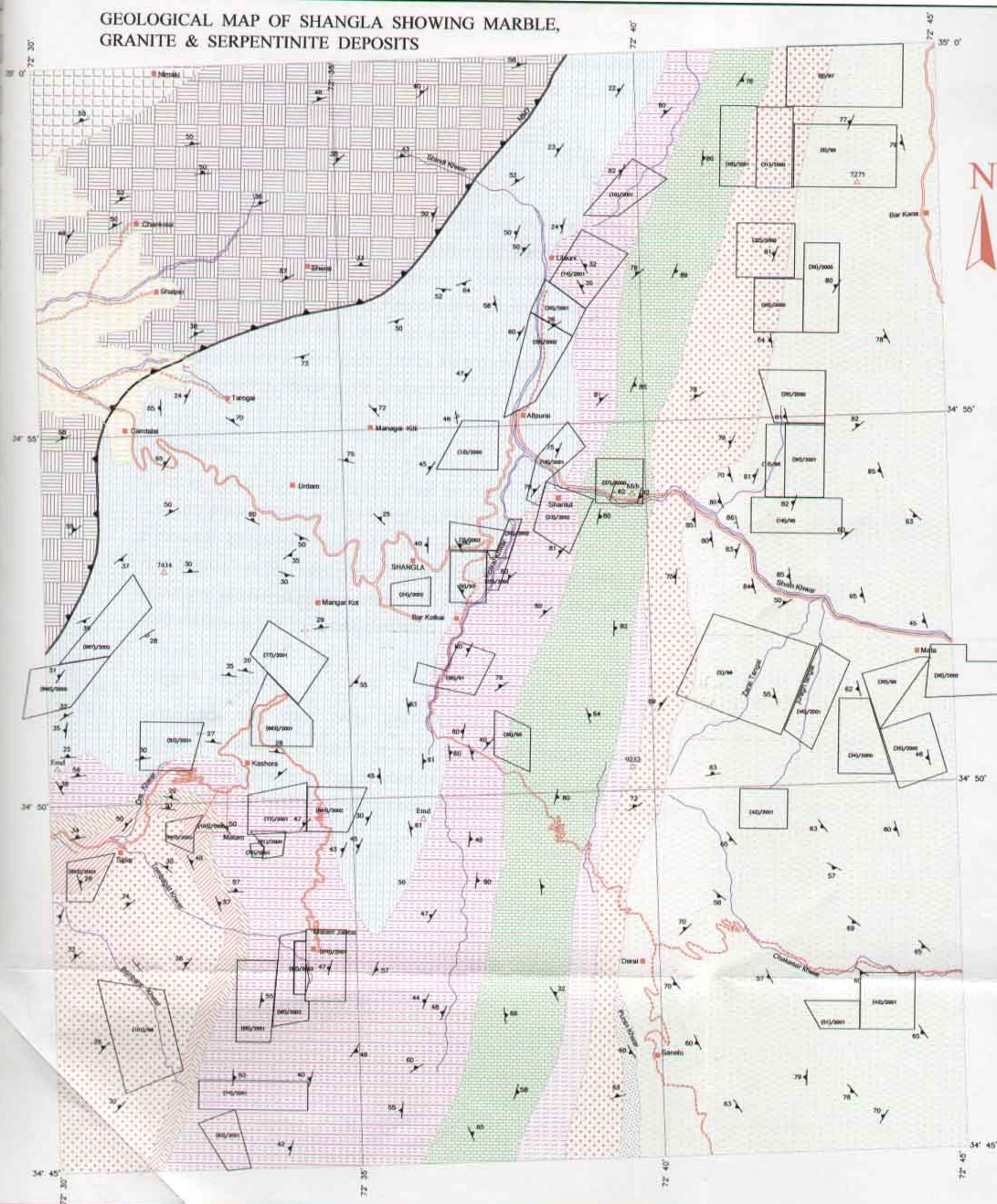
Accessibility

The deposit is accessible through all truckable routs to which leads both ways i.e. 70 km to Mingora in the west and 15 km to Besham in the east Alpuri. The district headquarter lies at a distance of 9 km Alpuri towards Mingora.

Infrastructure

The road access to the deposit area is reasonable to support transportation of truckable load of marble blocks and boulders. The electric power grid station is at a distance of 15 km at Besham. Skilled mine workers are available in the surrounding areas.

GEOLOGICAL MAP OF SHANGLA SHOWING MARBLE, GRANITE & SERPENTINITE DEPOSITS



Salkhala Formation
Swat Granite Gneiss
Tonawal Formation
Marghazar Formation
Doma Amphibolite

Kashala Formation
M.M.T Melange Zone
Massive Amphibolite
Alluvium

House
Road metalled, Unmetalled
Khowar, Nala
Lease
Main Mental Thrust

GEOLOGICAL SURVEY & EVALUATION OF MARBLE, & GRANITE RESOURCES IN NWFP.

Drawing No : GSO SHANGLA DWG

The site is located at the bank of the Khan Khwar with perennial flow of water which can support the demand of required demand for mining and processing operations and power generation for mechanizing the mine site and basing processing of marble blocks into tiles and other commodities.

Geology Local

The marble deposits and associated meta sedimentary sequences are correlating to the Gandaf formation or Karora formation of Precambrian age (early to late proterozic) formation of the prospect area is overlain by the doma, Kashala and saidu formations of late Paleozoic to Mesozoic age upto the limit of MMT. The locality of the marble occurrences near Dehri (Mata Awan) constitute the prospect area. The marble deposits are drained by Lara Tangai.

Topography

The area of mining lease is bounded by reference grid (1186500-1187400 meter north and 3172000-3172900 meter east) on survey of Pakistan toposheet No 43B/9. the covered area is extending for 900 meters along north south and 600 meters of east west extinction. elevation ranges from 1150 meters at the road side upto 1650 meters at the top peak elevation.

Shape & Altitude

Geologically the rock units are divided into (i) marble (2) amphibolites and other schistose rocks in the thick bedded sequence with variable thickness. The marble deposit is occur as intermittent beds running parallel in a north south direction. Most of the marble

White Marble Blocks at Dheri Matta Awan, Shangla

beds are thick to medium bedded, massive and compact. The interbedded marble and amphibolite horizons shows a conform north south strike direction with 60^0-70^0 dip to the west.

Dimension & Quality of the deposit

There are about 16 marble beds trending north south for 8000 meters along strike. The thickness ranges from 7-10 meters. The depth were extension of the marble beds are less than 4 meters. The dip depth wise extension of the marble beds is 1150 meters.

Mineralogy

Majority of the marble beds of area are composed of calcite without any prominent undesired minerals. There are some scanty pyrite cubes present in minor amount.

The marble deposit is white in color, thick bedded, massive and compact and moderately fractured and jointed. The texture is medium grained. There are prominent hands of yellow color of oxidize pyrite veinlets parallel to schistosity planes.

Laboratory test study

Hardness: 3-3.5

Sp.gravity: 2.72-2.82

Water absorption: 0.0925 - 0.3121

Calcite: 32-70%, Dolomite 10-50%, muscovite 5%, biotite 0-2%, quartz 0-6% or a mineral traces 1% and other accessories 6%. Total reserves of prospects are estimated as 35 million tonnes.
Composition: The marble is mainly composed of calcite with actinolite, tremolite, and quartz with small quantities.
Color: Is green and contains patches of white, grey and black colors. The green color is found in all shades ranging from light to dark ones.

CHITRAL MARBLE DEPOSITS

Various workable marble deposits are found in different parts of Distt: Chitral. On the basis of their geological position & geographic location from north to south. These have been divided into the following belts/Marble region.

Marble Deposits of Mastuj Valley

Geographic Location

These deposits are located in Mastuj valley, lying on both banks of Mastuj river in the vicinities of Purvak, Sunighar and Awi. Topographically, the deposits are lying on low to medium attitudes. The elevation of Purvak village on main Buni-Mastuj road is 2500m. Climatically the area is attributed to arid region (out of the reach of the monsoon). Summer is pleasant with less rain while winter is severe cold with rain/snow falls. There is no forest/trees on the mountains and are barren. The nearest station is the Boni (head quarter of the Mastuj Subdivision), where reasonable facilities of accommodation, health education beside public offices are available.

Accessibility

The deposits are accessible through all weather truck able road. A 72 km metalled road from distt: head quarter Chitral leads to Buni, on ward the above mentioned deposits are approachable through 20 km non metalld road on right & left bank of mastuj river. How ever during winter season the road onward from Buni sometimes remained closed due to snowfall.

Infrastructure

Being located on main Buni-Mastuj road, the deposit has the required infrastructure facilities including access to the above mentioned deposits. The electric power grid station is at a distance of about 30 km (30 km south-west of Buni) at Reshun. The marble deposits are located on both banks of Mastuj river, which is also drained by Purvak, Sunoghar & Awi-goles with perennial flow of water which can support the demand of required water for mining and processing operation. The area is a feasible site for hydel power, which is the need of mechanizing the quarry site and processing of marble blocks into the tiles and other commodities.

Filed Description

Geology: Geologically, Mastuj area falls in the central sedimentary belt of the Chitral region, which is dominantly composed of the Shogram formation of Devonian age and Reshun formation (Shale, conglomerate, sandstone, limestone/Dolomite etc). with structure tenement of Reshun fault. Further south is the Kesu-Buni zone

pluton. The marble deposits are lying on the Reshun fault zone and thus highly shattered and contained joints/cracks.

The marble deposit form a linear belt of about 200 meter wide and extended in North-East direction upto Yarkhun valley and South-West direction in to Barrinzi-gol for about 40 km. The general attitude of this belt is North-East with dip towards North-West.

Structure/Fabrics

As mentioned earlier that these deposits are associated with Reshun fault zone, therefore these have been subjected to structural disturbance. Due to these tetonic movements, the deposits are moderately shattered with development of Joints & cracks.

These structure fabrics are mostly closed spaced, not favorable for extraction of large size marble blocks. However feasible for extraction of various sizes of boulders. These structure fabrics have been noticed in the Purvak, Sunoghar and Awi marble prospects. No further detail survey along the belt in North-East & South-West direction has been carried out.

Mineralogy

The Mastuj valley deposits studied in the above mentioned three different localities are super white in colour (homogeneous) and of fine grained equigranular texture. Mineralogically, it is dominantly composed of calcite & qtz with no or negligible amount of other ore mineral. These are soft to medium hard rocks and can easily be cut and take excellent polish.

Potential

Although the marble belt has considerable length & width with thousand million tones resources, but due to their structural position, these deposits at Sunighar, Purvak at present are not feasible for extraction of large size geometrical blocks except for various size of boulders.

However, the entire belt need detail survey to identify more areas/sites, which may be feasible for extraction of standard size blocks. These marble deposits are of high class/best quality due to its uniform fine grain size & super white homogeneous color and good appearance after cutting and polishing.

Shoghor Marble Deposits

Geographic Location

The deposits are located in Shoghor area (Lutkoh valley) on main Chitral-Garam Chashma road 20 km to the North of Chitral town (Distt: head quarter). The area is drained by the Lutkoh river, the valley deeply incised drainage system joining the main Chitral river. The marble belt occupy the medium altitudes.

Climatically, the area had arid climate, pleasant summer with less rain fall and very cold winter with more rain/snow fall. The area is barren i.e. free of forest/tree & less vegetation. The nearest station is Chitral, which is hospitable & scenic place with facilities of best accommodation, health, education and public office etc.

Accessibility

The well-exposed side of the Shoghor marble belt is located on all weather truckable road. A metalled road of 20 km from Chitral town leads to the Shoghor marble deposit. Further access to the North-East extension of the these deposits at Sewakht and Partsan is through non metalled jeapable road of about 3- 6 km respectively from Shoghor village.

The South-West extension of this belt at Birir area is accessible though non metalled all weather truckable road via Ayun. A metalled road of 20 km from Chitral leads to Ayun, onward from Ayun 8 km non metalled small truckable road leads to the marble deposits located about 2 km South-West of Birir village.

Infrastructure

The Shoghor marble deposit has excellent infrastructure facilities in shape of access, manpower, electric power and water. The Chitral hydel power is located about 15 km South of these deposits. The Shoghor marble deposits are lying on both sides of Lutkoh river, which can easily support the demand of the required water for mining and processing. The area is also feasible for local hydel power, which will support the mining activities in the area.

The marble prospect of Sewakht, Madashel and Partsan are near to the truckable road access, however the present jeapable road from Shoghor can easily be widened. Other facilities i.e. manpower, electric power and water is good. Ojhor gol drained these areas is the main stream with sufficient all perennial water.

5-Kv hydel power station on Ojhor gol at Madeshel locality is also available. The Birir marble deposits have also well developed infrastructure facilities with road access, power, main power & water.

The perennial water of Birir gol can support the mining as well as processing of marble into slabs and other commodities. The Birir gol is itself feasible for local high power hydel grid station. Moreover, a hydel power station of Ayun is at about 8 km distance from the Birir marble prospects.

Field Description

Geology: Geologically, the Shoghor marble belt has occupied the central sedimentary belt of Chitral region. This marble bearing belt is 2-3 km thick and extended for about 50 km in North-East direction upto Partsan and in South-West direction upto Birir area. This belt is lying in between two major faults i.e. Kring fault in the South & Partsan fault in the North.

On its South-West direction is the dominant rock sequence of Chitral slates while on the North-East side is the Awarith green series and Wakhan formation i.e. schist, slates phylites & garnet bearing schist. The western flank of Tirch Mir pluton intruded into Wakhan formation is lying about 8 km to the west of this belt in Ojhor valley.

Structure/Fabrics

The marble deposits are generally medium to thick bedded, massive, compact and moderately fractured/jointed. However, these joints/fractures are open spaced which are greatly helpful during

extraction of standard size marble blocks. Local faults upto hundred meter long & mostly parallel to the general trend of the marble beds are also noted at places but these may have no any direct effect on the entire belt of the marble belt.

Mineralogy

The marble deposits of Shoghor marble belt is generally medium grained, however fine grained deposits are also found in different places (Partsan etc) along the entire belt. Medium to coarse grained marble deposits are also reported from Kalash valley.

Mineralogically, these deposits are dominantly composed of calcite/dolomite with minor quartz & mica. There are some scanty pyrite cubes in some of the marble deposits i.e. Sewakht area.

The different color workable marble zones i.e. gray, white, pink, super white and jet black are found along the belt. The belt is dominated by white color marble with gray shades and subordinate horizons of white, pink & black horizons. The pink & black color deposits are common in Shoghor, Sewakht while super white marble is found in Partsan site.

Potential

The entire belt has good potential of different colors and shades marble with thousand hundred tonnes resources. So far only a few sites have been studied and has been leased out to private mining companies. In order to identify more feasible marble sites, the entire belt need detail geological survey.

At present more than 10 Nos prospecting leases for marble have been granted in different areas (Shoghor, Sewakht, Parstan & Kalash valley) along this belt. The white marble with pink color bands is of best quality and high demand in the market.

These are soft to medium hard rocks and have good appearance after cutting & polishing. The super white marble deposits of Partsan are in the form of sheets/horizontal beds or slumped blocks. These are mostly fractured/jointed and at present not feasible for extraction of standard size blocks however suitable for mining of various size boulders and less geometric marble blocks.

Shishi Marble Deposits

Geographic Location

These deposits are located on Topo sheet No 38m/11 in different localities of Shishi valley. The Shishi valley is located about 10 km to the North-East of Drosh town. The Shishi valley started from Purit and terminated in Madaglasht area and occupied a total area of about 40 km^2.

The deposits are found as isolated bodies in on altitudes of low to moderate relief, while in few places i.e. Kalas, the marble deposits are exposed on road side.

The Shishi valley is covered with medium to thick forest, vegetation and the only green belt of Chitral region. Climate of the area is arid having pleasant summer season with moderate rain and cold winter

with more rain/snow. The area is feasible throughout the year for mining activities.

Accessibility

The Shishi marble deposits are mostly on road side or in different gols/nallas, and most of these are easily accessible. The Kalas marble prospect is accessible through all weather truckable road of about 40km from Drosh town while other marble prospects are accessible through Jeepable road being utilized for transportation of timbers and are being constructed on time to time by the contractor or Forest Department.

Infrastructure

All the marble deposits of the Shishi valley have excellent infrastructure facilities having good access & sufficient water for mining operation/processing is available in Shishi river itself as well as in its tributaries.

A hydel power grid station constructed by Shydo Department and now under WAPDA control is located at the start of Shishi valley. More over further feasible sites are available along Shishi river for making more hydel power stations needed for mechanized mining sites and basing processing of marble blocks into the tiles and other commodities. Manpower is also available in the area. Drosh is the nearest town (Sub Divisional Headquarter) where all facilities of reasonable accommodation, health, education & public offices are available.

Field Description

Geology: Geologically the Shishi marble deposits are lying in melange zone of Northern Suture Zone (NSZ) of Kohistan Island arc environments. The Northern Suture Zone is 4 km wide zone of metasediments, ultrabasic, volcanic, schist carbonates including marble. It is bounded to the south by Reshun formation, Purit formation & Lowari pluton while in North by Kesu-Buni zone pluton.

The marble deposits are in the form of lenses which are medium to thick bedded but highly shattered and mostly closed spaced jointed/ fractured.

Mineralogy

The Shishi marble deposits are super white color with very fine-grained homogeneous texture. Mineralogically, the marble is dominantly composed of calcite with out any inclusion of pyrite, mica etc. The marble deposits are soft to medium in hardness and have excellent appearance with unique look in the field. The marble deposits of Shishi is unique one and have best quality on the basis of its uniform super white color & very fine grained homogeneous texture. It has high priced in the market with great demand.

Potential

As the marble deposits are associated with northern suture zone, which is a major thrust of 4 km wide & 100 km along with local faults/folds. Due to such structural position, these are mostly closed spaced jointed/cracked and thus not feasible for extraction of standard size marble blocks. However in few prospects 10 % geo-metrical blocks can be extracted while the remaining are feasible for

the extraction of various size boulders. In view of its superior quality, further study is required to identify workable sites for extraction of maximum standard size marble blocks as well as boulders.

Gehret Marble Belt

Geographic Location

The Gehret marble belt is 1-2 km thick and more than 50 km long. It is well exposed on main Drosh-Chitral road at Gehret area about 15 km to the north of Drosh town (sub divisional head quarter). This belt is extended in North East direction upto Golen gol & South West direction upto Swir/Dam gol. In North-East direction, it follow high cliffs of the mountain and exposed in various gols/nallas i.e. Gehret gol, Broze-gol & Kaghozi-gol, while in South-West direction, it is exposed in Kaogol, Jingerat gol, Swir and Dam gol respectively.

This belt follow high cliffs of the mountain on North-East & South-West direction with high altitudes ranges. However, its best section is exposed in various gols/nalas and along road sides.

The marble belt in North-East side is free of vegetation & forest while on South-Western side thin forest is present. The climate of the area is arid i.e. warm summer with less rain fall and cold winter with high rain/snow. The prospective sites of the marble deposits are workable throughout the year.

Accessibility

The Gehret marble deposits is lying on main Drosh-Chitral road and easily accessible through all weather truckable road of about 15 km

from Drosh town and 30 km from Chitral city. The Gehret-gol and Broze-gol marble deposits are accessible through 2 & 3 km all weathered non metalled truckable road along Gehret-gol and Dalim village respectively. The Jingret marble prospect is lying along Jingret road inside the nalla and located at a distance of about 15 Km. from Drosh.

Infrastructure

All the above exposed prospects of marble have well developed infrastructure facilities having good access, availability of water and electricity for mining operation and processing. Manpower is also abundant in these areas. WAPDA hydel power station is situated about 10 km to the North-East of Drosh town, while a private local hydel power is also available in Ayun village about 10 km to the north of Gehret.

Filed Description

Geology: The Gehret marble belt is lying in the Southern belt of the Chitral region bounded in the North by Kaghozai green Schist and in South by Kesu Bonizone pluton. Interbeds of slate/schist with considerable width & length are also noted at places within the Gehret marble belt. The Kaghozai green schist is massive, thick, compact, partially fractured/jointed, 200-400 meter wide & extended along North-East & South-West direction for about 40 km. These rocks can also need detail geological survey for potential of dimension stone.

Further south of Kesu-Bonizome pluton is the Northern Suture zone, which is 4 km wide of meta sediments, ultrabasics & basic rocks, schist & carbonates. The general trend of the marble beds is North-East with North-West ward dipping.

The Gehret marble belt is generally thick bedded, massive and compact with moderate joints/fractures. These joints/fractures are mostly parallel to the general orientation of the beds and are widely spaced which are helpful for extraction of standard size marble blocks.

The marble deposits are medium to coarse grained, however fine grained horizons have been found at places. Theses deposits are mostly white in color with gray shades. No pink or workable black zones of marble have been identified so far.

Mineralogically, majority of the marble deposits are composed of mono mineralic constituents being dominated by recrystalized calcite + qtz with out any undesirable minerals. These marble deposits are soft to medium hard and have excellent cutting & polishing characteristics.

Potential

The so far identified marble prospects at Gehret, Jingeret, Broze-gol, Kaogol, Jingeret & Swirgol along the entire belt has billion tones of marble deposits. However, these deposits can be enhanced many folds, if the entire belt is subjected to detail survey for identification of more workable marble sites. The Gehret marble has high market down distt: in the country on account of its white color, good

appearance, excellent cutting/polishing nature and famous as "Chitral White".

The Gehret marble belt has good potential but needs scientific Mining for extraction of standard size geometrical blocks. At present more than 10 No. leases have been granted along the marble belt to different parties.

Arandu Valley Marble Deposits

Geographic Location

The Arandu valley marble deposit is located in the Koti-gol area of Arandu valley. The Koti-gol is located about 10 km in South-West of Mirkani Fort, which is itself located about 20 km South-West of Drosh Town.

The Koti-gal marble deposit is situated upstream on both sides of Koti-gol. The deposits are lying on low altitudes on the stream level, gaining height following the slopes on both sides of the stream.

The climate of the area is arid with very warm in summer while cold in winter. There is very low rainfall in summer while more rain/snow fall in winter season. The area is covered by thin to medium forest & tree of fire wood. Koti-gol is the left tributary of Kunar river.

Accessibility

The marble area is accessible through all weather 2-3 km jeapable road along the Kotigol, which is some time remained out of use due to flood in summer season. The Koti-gol is accessible through all

weather metalled truckable road from Mirkani Fort. From here, the Lowari top is about 30 km. The Barikat area of Afghanistan is lying about 60 km to the west of Mirkani Fort. This route via Afghanistan to Peshawar remained open through out the area, while the route through Lawari top is closed during winter season.

Infrastructure

The area has moderate infrastructure facilities with good access, perennial water is available in Koti-gol for mining operations & camp site establishments. No electricity power is available on deposit sites, but the main WAPDA GRID LINE passing along the Mirkani-Arandu road, so electricity arrangement could be made easily. Manpower at cheaper rate is available in the area Drosh town is the nearest station where reasonable accommodation, education and health facilities are available.

Field Description

Geology: Geologically, the deposits area is lying in Kohistan Island Arc environments on the northern margin of Kohistan Island Arc, & South of MKT. The main Lithalogy of the area is Mirkani granite, lawari pluton, tonnalites, meta sediments, volcanic, slate/phyllites.

The deposits form a linear belt of more than 0.5 km thick & extended in East direction upto Asheriat valley & in west upto Dommel Nissar for about 2-3 km. On both sides, the deposits are terminated/pinches out to few meter thick.

The deposits are thick bedded, massive, moderately fractured/jointed. The fractures/joints are closed to wide spaced mostly parallel to the general trend of the marble belt.

A part from the general fractures/joints, local faults/folds are also common, but these have no major effect on the whole mass of the marble deposits. Isolated massive bodies of marble deposits free of the structure fabrics are found along the entire belts, having variable dimensions.

Mineralogy

The marble deposits are dominantly white with grey shades. Few workable beds of fine grained marble with greenish shades are also found in few places. Few zones of white marble are also found along the entire belt, but are of less significance at present. Yellowish color at places is due to alteration. The marble deposits are generally medium grained in texture, however few zones of fine-grained marble are also noted. Minor logically, these deposits are dominantly consisting of calcite, dolomite, with disseminated fine grains of pyrite, phyrotites & mica.

The deposits are generally, medium to hard, however having good cutting and polishing characteristics.

Potential

The area has good potential of marble deposits but their quality and grade yet to be established. The deposits are not uniform in color, texture and also have variable structural fabrics.

The area need more survey to delineate good feasible mining zones for extraction of sizeable marble blocks. In general, the deposits can be subjected to bench mining for extraction of sizeable marble blocks. Further detail survey will also identify more super white fine grained marble horizons as well as green shades/fine grained marble zones, as the chances of finding of these zones are bright.

MALAKAND AGENCY

The marble deposits of Malakand Agency are located near Pirkhel, Mekhband, Janapur and Harmal Kandao. The host rocks are found in calcareous rocks with granite and granite gneisses. The marble is mostly thin to medium bedded, jointed, fractured, sheared and of inferior quality. Although the marble deposits are large but good quality marble is of limited extent.

Pirkhel Deposit

Geographic location

The deposit is located at the north-west of Malakand and at the west of Batkhela Town.

Topography

Topographically the Pirkhel deposit is lying in moderate altitude hill.

Accessibility

The area is connected with all weather fair truckable road about 21 Km. at the west of Batkhela Town which in turn is connected with Mardan-Swat Highway. Electric power is available and the grid station is situated at Batkhela. Swat river drainage system is also present at a small distance which will help in the development of mine and electric power for processing the marble blocks into tiles and other commodities. Manpower in the form of skilled labours are also available. Batkhela is the local market for finished products of marble.

Field Description

Geology (local): The marble deposit occurs in the hill about 300 meters to the west of Pirkhel village (lat 34° 34′ 50″N; Long71° 48′ 27″E) on the topographic sheet No.38N/14. It is found in calcareous rocks closed to the contact with Kalangi granites. The marble strikes N55°E and dips 45°SW. The deposit is thin bedded, jointed, fractured and sheared, the marble is traversed by a number of calcite and qtz veins. Small crystals of Chalco pyrite and pyrite are sparsely disseminated.

Due to open and diagonal joints and fractures the large standard geometric blocks can not be extracted so it is mostly used as a building stone in local construction.

Foliation : Disconcordant foliation is observed in marble.

Texture: It is fine grained to medium grained.

Composition: Mainly consist of calcite, other harmful minerals found are qtz, chalco pyrite and pyrite crystals.

Colour: The marble is white to light gray and contains yellowish brown, staining of ferruginous materials. The calcite crystals are equigrannular.

Mekhband Deposit

Geographic Location: The deposit is located at the south – west of Batkhela and the north –west of Dargai towns.

Topography

The Mekhband deposit is situated in moderate altitude hill.

Accessibility

The area is connected with metalled and unmetalled fair weather road, about 31 Km. south –west of Batkhela and 10Km. from Kalangi. The deposit is situated just on the Khawar having perennial water, can be used for development of mine. Electric power is also available for processing of marble blocks into tiles and other commodities. Skilled labours are available locally. Batkhela is the local market for marble finished products.

Field Description

Geology (local): The deposit is found in the strike extension of Pirkhel deposit and is in the Mekhband Village, District Malakand (lat 34° 36′ 13″N; Long71° 49′ 36″E) in the topographic sheet No. 38N/14. The marble is medium bedded, jointed and fractured. Pyrite and chalco pyrite crystals are sparsely disseminated. The standard, geometrical blocks i.e 1.5m x 1.2m x1m can be extracted. The marble deposit trending N50°E and dips at 45° SW. The marble deposit is not consistent in quality and grade and so is being worked on small scale.

Texture: Medium textured

Joints: 2 sets of joints are present, so blocks of standard size can be extracted.

Fracture: Open spaced fractures are mostly present and cavities are filled with clay material.

Composition: The marble is mostly composed of calcite with chalco pyrite and pyrite crystals are sparsely. Harmful minerals are found in minor amount.

Colour: The marble is white to grayish white and contains patches and staining of ferruginous material. The grains are equigrannular.

Janapur Deposit

Geographic location

The area lies in a hillock near Janapur village, District Malakand in the west of Batkhela town.

Topography

Topographically the Janapur deposit is lying in hill having moderate altitude.

Accessibility

The area is connected with metalled and unmetalled fair weather road about 23 Km. at the west of Batkhela Town. The deposit is

situated near Khawar (perennial), the water of which can be used for the development of mine. Electric power is also available for processing of marble blocks into tiles, slabs and other commodities. Skilled labours are available locally. Batkhela is the local market for finished products.

Field Description

Geology (local): The marble deposit is located in a small hillock (lat 34° 36′ 13″N; Long71° 47′ 7″E) in the topographic sheet No.38N/14. It strikes N30°E and dips at 55°-65° SW. The deposit is medium bedded, fractured and jointed. Ferruginous coatings of reddish brown colour are common. The marble blocks of standard, geometrical shaped may be extracted with difficulty. The deposit as a whole is not sound enough to produce good quality marble.

Joints: 2 sets of joints are present at one place.

Fractures: Close spaced fractures are present.

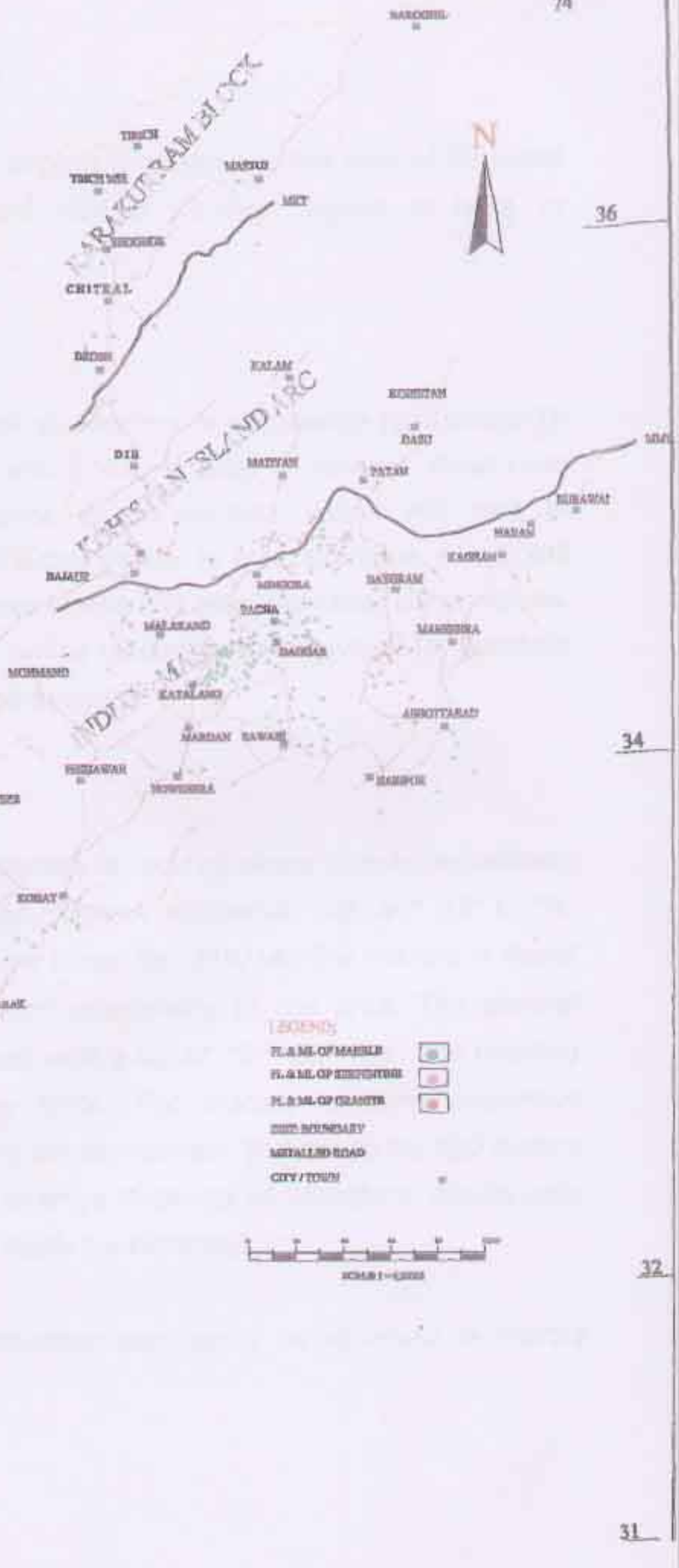
Composition: The marble is mainly composed of calcite while other harmful minerals are present in minor quantity.

Textures: Compact and medium textured.

Foliation: Concordant foliation is observed.

Colour: Some beds are pure white and free from blemish and some beds are gray. The calcite grains are equigrannular.

MAP OF N.W.F.P SHOWING DISTRIBUTION OF DIMENSION STONE LEASES



Harmal Kandao Deposit

Geographic Location: The deposit is situated at the west of Batkhela Town. Topographically the Harmal Kandao deposit is lying in moderate altitude hill.

Accessibility

The area is connected with all weather fair truckable road about 19 Km. at west of Batkhela and 3 Km. at west of Kalangi. Swat river drainage system is present in the vicinity, which will help in mechanizing the mine. Electric Power is also available which will help in processing of marble blocks into tiles and other commodities. Manpower in the form of skilled labours are also available. Batkhela is local market for finished products.

Field Description

Geology (local): The deposit is located along Loe-Agra-Batkhela road near Harmal Kandao, District Malakand. (lat 34° 37′ 01″N; Long71° 45′ 43″E) in topo sheet No. 38N/14. The marble is found in quartz mica schist found extensively in the area. The general strikes of bed is N80° East with a dip of 70° -80° NW. The bedding varies from medium to thick. The marble contains numerous irregular and cross cutting calcite vainlets. It extends for 300 meters in strike length with an average thickness of 25meters. Blocks upto 1.5.m x 1.2m x 1m can easily be extracted.

Foliation: Concordant foliation may easily be observed in marble beds.

HAZARA DIVISION

Marble deposits are found in the metasedimentary rocks in some parts of Hazara Division. But the marble is not of good quality and can not fulfill the requirements of the market. The main reason for the inferior quality is the intense tectonic environment, due to presence of faults i.e Main Mantle Thrust(MMT) and Pir Panjal. Therefore compact/large blocks of standard size are rarely obtained. Furthermore, the marble deposits are located in remote and inaccessible rugged terrains.

Some significant deposits of marble are located in Kaghan area of Mansehra District. In Abbottabad and Kohistan only small unnoticeable deposits of marble are found.

Lohar Banda Deposit

Geogrpahic Location : The marble deposit is located at the north of Abbottabad and Mansehra.

Topography

Topographically the Lohar Banda deposit is lying in moderate altitude hill.

Accessibility

The area is connected with all weather fair truckable Mansehra-Jalkhad Highway about 168 Km. at the north of Abbottabad and 143 Km. from Mansehra. Water is available , and the Kunhar river drainage system is flowing just beneath the marble deposit, which will help in the development of mine and electric power for

PRELIMINARY GEOLOGICAL MAP OF THE HAZARA DIVISION SHOWING MARBLE & GRANITE DEPOSITS

CHITRAL

GILGIT AGENCY

KASHMIR

SWAT

MUZAFFARABAD

ATTOCK

N

SCALE
1 : 250,000

73°30'

35°30'

35°

34°30'

34°

LEGEND

processing of marble blocks into tiles and other commodities. Manpower in form of skilled labour are also available. Mansehra and Abbottabad are the local markets for marble finished products.

Field Description

Geology (local): The marble deposit occurs in the hill in Lohar Banda, situated just on Kaghan road in the topo sheet No.43F/10 (lat 34° 41' 39"N; Long73° 34' 36"E) in metasedimentary rocks of Sharda group having calcareous rocks with interbedded graphitic schist. The marble bed is thin bedded, jointed, fractured and sheared. Orientation is N25° E/73° SW. Large blocks of standard size cannot be extracted; only boulders and kandas are mined for local construction are being used.

Foliation: Disconcordant foliation is observed in marble bed.

Texture: Fine textured.

Composition: Mainly composed of calcite crystals other harmful minerals are present in negligible amount.

Colour: White to grayish white, contains yellowish brown staining of ferruginous material. The calcite grains are equigranular.

Phagal Deposit

Geographical Location: The deposit is located away 800m just at the north of Lohar Banda deposit.

Topography

Topographically the Phagal marble deposit is also lying in moderate altitude hill.

Accessibility

The marble deposit is also situated on the Mansehra-Jalkhad Highway. Water is available in the form of Kunhar drainage system, which will help in the development of mine and electric power for processing of marble blocks into tiles and other commodities. Manpower in form of skilled labour is also present. Abbottabad and Mansehra are the local markets for finished products.

Field Description

Geology (Local): The marble deposit is located at a distance of about 800 meter from Lohar Banda deposit (lat 34° 44′ 05″N; Long73° 33′ 25″E) on the topo graphic sheet No.43F/10. The marble bed is thin bedded, jointed and fractured, having green veins of one centimeter thick of calcite veins. Trend of rocks is N20°E/70°SW. It is 93m long, 480m high and 45m wide. This deposit is also not suitable for extraction of marble blocks but mainly used in local construction.

Foliation: Disconcordant foliation is observed.

Texture: Fine texture is observed.

Composition: The marble is mainly composed of calcite, other harmful minerals are present in minor amount. The calcite grains are equigrannular.

Kanian Deposit

Geographic location

The marble deposit is located about 1.5 Km. from the Phagal deposit.

Topography

Topographically the marble deposit is situated at moderate altitude hill.

Accessibility

The marble deposit is present on Kaghan-Jalkhad Highway near to Phagal deposit. Its water, electric power and manpower is similar to Phagal deposit.

Field Description

Geology (local): It is also found in Sharda group. (lat 34° 44′ 10″N; Long73° 33′ 30″E). The marble deposit is thin bedded, jointed and fractured. The deposit is 60m in length, 480m high and 40m wide. Thickness of individual marble bed is 0.60m. Trend of the bed is N25°/63° SW. Because of fractured position and joints, the

deposit is not suitable for block extraction but can be used for local construction purposes.

Foliation: Disconcordant foliation is observed.

Schistosity: Well developed schistosity is observed in the rocks.

Textures: Fine textured.

Composition: Mainly consists of calcite. Other undesirable minerals are found in minor amount.

Colour: White to grayish white, contain yellowish brown staining of ferruginous materials. The calcite grains are equigrannular.

OTHER MARBLE DEPOSITS IN HAZARA

Mansehra District: The important marble occurrences are located at Saccha Kalan (lat 34° 37′ 07″N; Long73° 14′ 04″E) on the topo graphic sheet No.43F/2, Malkandi (lat 34° 38′ 16″N; Long73° 29′ 30″E) on the topo graphic sheet No.43F/6, Naranj Shaheed (lat 34° 56′ 13″N ; Long72° 46′ 13″E) on the topo graphic sheet No.43F/6, Thakot (lat 34° 46′ 54″N; Long72° 56′ 00″E) on the topo graphic sheet No.43B/13, Shotar (lat 34° 48′ 03″N; Long72° 56′ 30″E) on the topo graphic sheet No.43B/13 and Matta (lat 34° 51′ 37″N; Long72° 44′ 47″E) on the topo graphic sheet No.43B/13.

The marble is white, gray, greenish gray and brownish. Some banded varieties are also found. The marble is fine to medium textured, compact and generally takes good polish. It is highly sheared, jointed and large size blocks are rarely obtained. The marble is mostly used in making chips and in road construction.

7. OCCURRENCES/LOCATIONS OF GRANITE

Granites are widely spread in the northern parts of NWFP. These are of various shades and grades, ranging from white-grey, dark – grey and black.

The granite deposits from Chitral, in the north to the Shewa – Shahbazargai, in the south and Hazara in the East area are summarized as:

i) Granites of the Hindukush terrain
ii) Granites of the Karakoram terrain
iii) Granites of Kohistan Terrain and Shyoke Suture Zone
iv) Granites of Himalayan Terrain

7.1 Granites of Hindukush Terrain

This include the plutons of Tirich Mir, Garam Chashma and Kafiristan in the Chitral District. The Tirich Mir and Kafiristan plutons consist of hornblende – biotite granodiorite gneiss containing upto 5cm long plageoelase crystals. The Tirich Mir and Kafiristan granites are dark grey or dark coloured granites.

Garam Chashma intrusions are typical leuco – granites (containing two micas, tourmaline and garnet), associated with the highest grades of metamorphism. The Tirich Mir Plutons has an associated band of gabbroic rock along the Tirich fault.

69
70
72
74
37
36
34
32
31
PAKISTAN
72° E
76°E
CHINA
36°N
NORTHERN AREAS
JAMMU AND KASHMIR
NWFP
AFGHANISTAN
32°N
68°E
76°E
PUNJAB
64°E
BALUCHISTAN
28°N
IRAN
28°N
72°E
INDIA
SINDH
64°E
68°E
BAROGHIL
TIRICH
KARAKURRAM BLOCK
MASTUJ
TRICH MIR
KOSHT
MKT
BROGHOR
CHITRAL
DROSH
MIRKHANI
DAMMAL NISSAR
KALAM
KOHISTAN ISLAND ARC
KOHISTAN
DASU
DIR
MADYAN
PATAN
MMT
BESAL
BURAWAI
NARAN
KAGHAN
MINGORA
SAIDU
JHATORAM
MALAKAND
INDIAN MASS
MANSEHRA
MARDAN
CHARSADA
ABBOTTABAD
SWABI
PESHAWAR
NOWSHERA
GHAZI
HARIPUR
ORAKZAI
KOHAT
KURRAM
AHMADZAI
KARAK
BANNU
N WAZIRISTAN
S WAZIRISTAN
TANK
D I KHAN
LEGEND:
MARBLE
GRANITE
SERPENTINTE / ULTRAMAFIC
ORDINARY STONE SLATE / QUARTZITE
LIMESTONE
AREA SUTIBLE FOR EXTRACTION OF SQUARE BLOCK OF MARBLE
AREA SUTIBLE FOR EXTRACTION OF SQUARE BLOCK OF GRANITE
DIST. BOUNDARY
METALLED ROAD
Fault
Water
0
10
20
30
SCALE IN KILOMETER

7.2 Granites of Karakoram Terrain

These are the rocks of Karakoram granitic belt, which extends for about 800 km with maximum width of about 30 km. The western portion of the Karakoram granitic belt is exposed in Kesu-Bonizome area and to the west and south of Kohistan Island arc. It extends from Mastuj to Kesu and beyond at a distance of about 100 km. The batholic here consists of deformed diorite, quartz diorite and granodiorite, intruded by younger, undeformed granitic dykes and pegmatites.

The most abundant rocks are medium to coarse grained, porphyritic adamallite and quartz monzonite.

7.3 Granites of Kohistan Terrain & Shyoke Suture Zone

Kohistan batholith is a principal unit of the Kohistan megmatic arc, which constitutes a 300 km long and upto 60km broad belt to the west of Nanga Parbath. In Chitral district, it is well exposed to the south of Shyoke suture mélange.

The Kohistan batholith is a composite and consists of numerous large to small plutons, plugs, dykes and sheets, emplaced over a time span of about 75 million years.

A wide range of rocks has been reported to constitute the batholith. These rocks include gabbros, hornblendite, diorite, quartz diorite, adamallite granodiorite, granite, tonalite, trondhjemite, aplite, pegmatite etc. Locally, as many as five pulses of intrusions can be

observed within a few ten of meters. Multiple intrusive activity is best seen in the Indus valley section where dykes and sheets of leuco-granites, 1 to 10m thick, occur in swarm and network.

The intrusions display a variety of textures and structures, depending upon age, composition, cooling history, size etc. These may be fine grained to pegmatitic, idiomorphic to allatrio morphic, non-porphyritic, undeformed to strongly deformed etc.

The Kohsitan batholith is intruded by low-medium – K basalt, basaltic andesite and trachy andesite dykes, upto 4m thick.

7.4 Utror Volcanics

Utror volcanics constitutes a part of Dir group and comprises about 3000m thick red, green, grey, white rocks. They form a NE trending belt extending from eastern Afghanistan through Bajaur, Jandul, Shrignal and Utror. Due to explosive volcanic activity, the fragmental rocks (breccia, agglomerate, tuff) are much more common than flows. The volcanic stratigraphy is very complex and no location of eruptive centers.

The Utror volcanics are predominantly silicic but andesite and basalts are common in Dir.

7.5 Drosh Volcanics

The Drosh volcanics occur in a thin belt to the south of the Shyoke suture in southwestern Chitral. They are well exposed on the road

south of Darosh and in the lower Shishi valley. Overlying the Purit formation, they are a sequence of thickly bedded andesites.

In the section to the north of Lowari Pass, a series of steeply dipping basic to acidic meta-volcanics, with intercalating metasediments, including marble, is intruded by a foliated diorite bodies. These rocks have linear fabric and are cut by deformed mafic dykes. Further north are green schist facies tuffaceous rocks with some andesitic lava. These are intruded by small diorite and granodiorite bodies.

.6 Shamran Volcanics

To the east of Shandur Pass, there are gently northward – dipping, low grade meta volcanics termed as the Shamran volcanic group. The Shamran sequence contains flow of basalts, andesite, and abundant rhyolite. Explosive activity is reflected in abundant fragmental rocks (breccia, agglomerate, tuff). Most volcanics are epidotised and greenish grey, but some are reddish and purple due to iron oxide. These are also cut by younger plutons and andesitic dykes.

.7 Kalam Volcanics

These volcanic rocks are exposed near Kalam and south of Dir. In Dir area the rocks are underlain mostly by Barawal Banda slates and Utror volcanics.

They range from basalt to andesite, dacite and rhyolite flows, conglomerate, breccia and tuffs.

7.8 Chilas Complex

The Chilas Complex is a large body of mafic-ultramafic rocks, extending from Nanga Parbath to eastern Afghanistan. Much of the complex is made up of gabbro norites, which is mostly uniform with local layers of pyroxinites and anorthosite. Quartz diorite and pyroxene diorite occur in subordinate proportion.

The main gabbro norites contain small bodies (commonly less than 5km^2 in area) of ultramafic – mafic – anorthositic composition. These bodies consist of dunites, peridotite, pyroxinite, troctolite, olivine gabbros, gabbro norite and anorthosite.

These bodies display excellent depositional structures such as modal layering, graded bedding, slump folding etc. The rocks are cut by a suit of amphibolite dykes.

7.9 Kamila Amphibolite

This is a complex belt of amphibolites and a variety of other rocks occupying the southern part of the Kohistan arc. It consists predominantly of amphibolite and subordinately of hornblendites, hornblend gneiss, diorite, granitoids with minor pegmatites and meta sediments.

The amphibolite can be divided into two categories:

a) Fine grained and banded, which are thought to be of volcanic origin.
b) Medium to coarse grained, homogeneous and gneisses, which are considered as of plutonic origin.

The relative proportion of the meta-volcanic and meta plutonic amphibolites vary along the strike of the arc. The belt exposed in the valleys to the south of Chilas is composed essentially of fine to medium grained amphibolite of volcanic origin. Westwards in the Indus, Swat and Dir valleys, more than two third of the belt is made up of metamorphosed plutonic rocks.

7.10 Granites of Himalayan Terrain

All of these granites are confined to the northern edge of the Indian Plate or to the south of the Indus suture. These granitic rocks are characterized by strong gneissose fabric and are porphyritic/porphyroblastic with feldspar crystals upto 15cm long are found at places.

However, the Mansehra granite is non-foliated in the southern part, the deformation line being marked by a line just passing north of Mansehra. The Swat granitic gneisses are non-foliated at the base. Brief description of these granites are summarized as:-

7.11 Mansehra Granites

Mansehra granites covering more than 2000 km² area. According to calkins etal (1975), they constitute a sheet tightly folded along with country rocks. They range from granite to granodiorite, are calc-

Mansehra Light Coloured Granite Quarry Site.

Dolerite Dyke (Black Granite) in Mandao (Phulra)
Mansehra

alkaline in chemistry and composed of quartz, albite-oligoclase, K-feldspar, biotite and small quantities of a number of other minerals, including garnet.

Shams(1969) classified these rocks into:

- Susal gali foliated granite
- Mansehra Porphyritic granite
- Andalusite granite
- A massive weakly porphyritic tourmaline granite

There are other associated minor bodies of pegmatites, aplites, albitites and granite porphyrites.

Generally, Mansehra granite is light colour, medium to coarse grained and characterized by feldspar megacrysts upto 15cm long. Black or dark grey granites bodies are located at many places towards the west of Mansehra. About 20 leases have been granted to the private investors in this area.

Fractures and joints are widely spaced. So geometrical black granite blocks of standard dimension can easily be obtained.

7.12 Swat Granitic Gneisses

These rocks are very similar to those of Mansehra granite and are of the same age. Like Mansehra, they also appear to have emplaced in a sheet and tightly folded. From the geological map, it is indicated that the eastern bodies of these granites passes into those of Mansehra across the Indus.

In lower Swat, the grinitic rocks are divided into:

i) Porphyritic calc-alkaline granodiorite gneisses with white microline megacrysts.

ii) Equigranular porphyritic biotite granites.

iii) Equigranular to porphyritic tourmaline muscovite granites.

Generally the Swat grinitic rocks are light coloured, medium to coarse grained, fractured and jointed. The fractures are oftenly wide spread and therefore blocks of standard geometrical size can be extracted. The presence of small hair like cracks may be reflected and may effect the small slabes and tiles.

7.13 Ambela Granite Complex

These are spread over 900 Km^2 area. Three major groups of rocks can be distinguished.

Group 1, consists of granites and Alkali granites and occupy about 70% of the batholith.

Group 2, comprises quartz syenites, felspathoidal syenites, ijolite and carbonatite.

Group 3, composed of invaded dolerite and lamprophyre dykes, and occupy about 5% of the area.

Granites are coarse grained showing yellowish colour on weathered surface. The alkali feldspars constitute upto 60% of these rocks. The quartz is present upto 20% by volume.

Syenites & Quartz syenite are medium to coarse grained and mostly weathered with the development of yellowish colour. The rocks have

undergone intense weathering so the rocks are not sound at the surface. For exposure of sound and compact rock, the weathered surface has to be removed.

These are subjected to intense deformation giving rise to abundant fractures and joints. However, the joints and fractures are not closely spaced. So large blocks of standard dimension can be obtained.

7.14 Tarbela Granites

The Tarbela alkaline complex comprises gabbroic rocks, dolerites, granites, albite carbonate rocks and carbonatites. The outcrops stretch for about 4 km but many outcrops have been removed or covered during the construction of the dam. Some of the gabbroic intrusions display in situ differentiation, with one intrusion grading from pyroxinitic outer margin to leucograbbroic/dioritic interior, with a core intrusive albitites.

The rocks are mostly massive and of light grey to dark grey in colour. Fractures and joints are common, forming two sets, vertical and oblique. Weathering effect is prominent at the surface, making the rocks weak down to a depth upto 10'. However, blocks of big size may be extracted below the weathered zone.

7.15 Shewa – Shahbaz Garhi

The granites constitute a triangular area of about 35 km^2 near Shahbaz Garhi. The rocks are acidic porphyritic/microgranites with basic intrusions. Isolated outcrops of such rocks occur 15 km to the

south and further north near Rustam, suggesting that these sheared volcanics/subvolcanic rocks may once spread upon a much larger area.

The rocks are light coloured, medium to coarse grained, hard, compact and homogeneous in texture. Large cracks/fractures appear on the outer surface due to which big blocks are dislodged/isolated. Weathering effect is prominently seen. Geometrical blocks of the required standard size can not be extracted. For extraction of standard size blocks removal of the weathered zone will be necessary, which may not be feasible due to economic point of view.

Square Blocks of Green Granite at Shamozai Quarry
(Swat)

OCCURRENCES OF ULTRAMAFIC ROCKS/SERPENTINITES

Serpentinites and other associated ultramafic rocks occur along the Shyoke Suture or MKT Melange in Chitral district and in the Indus Suture Melange, trapped between the Kohistan arc and the Indain plate. The Shyoke Suture Melange forms a thin tectonic wedge between the Kohistan – Laddakh arc sequence and the southern meta-sedimentary belt. It consists of grey to green slates, interbedded clastic sediments and blocks of green stone and sheared lenses of serpentinites. Serpentinites occur in subordinate proportion because the alteration has not been intense and has not produced high grade serpentinization.

The Indus Suture Melange or MMT contains at least three prominent mafic-ultramafic complexes resting on the suture. These are Tora Tiga in Dir, Jijal along the Indus and the Sapat near Kaghan. Other prominent zones along the Indus suture zones are:

Bajaur – utmankhel, Mingora – Shangla, Allai and Babusar areas.

The ultramafic rocks are mostly peridotites, harzburgite, dunite, websterite, hornblendite, pyroxinites and serpentinites. Lenses of meta gabbro, ampnhibolites, dolerite are sporadically distributed.

The rocks are hard, massive, brownish to green or grey and medium grained. The serpentinites are green to dark green and black fine grained and occur in different size, the largest being the 7x1m lensoid serpentinized mass near Shangla. Large size and massive bodies of serpentinite occur near Manglaur in Malamjaba area.

Serpentinites can broadly be grouped as massive and friable types. In several places, the friable type surrounds the massive. Massive serpentinite, green to black, retains the gross textural features of the parent ultramafic rocks, but break with a hackly rather than grainy fracture. Large blocks of standard size can be extracted from the massive deposits.

Friable serpentinite is similar in colour to massive serpentinite, but it retains non of the textural features of the igneous rocks. So friable serpentinites are not suitable as dimension stones. Serpentinite deposits at Shangla and Malamjaba may be selected for mining and development of square block modal quarries.

CATEGORIZATION OF DIMENSION STONES

Dimension stones spread over extensive areas of northern parts of NWFP. Best and largest deposits of marble are confined to the Buner district. Granites deposits have vast occurrences in Hazara, lower and upper Swat, Kohistan, Dir and Chitral districts. Serpentinites/ultramafic dimension stones occur in Kohistan, Swat and Chitral districts.

On the basis of colour, texture thickness of beds outcrops. These dimension stone deposits have further been categorized as:

Marble: On the basis of colour, texture, structure and other physical properties, the marble deposits of NWFP have been categorized as below:

Buner district contains the best and largest marble deposits. The important localities of marbles of variegated colours are shown in the table given below.

S.No.	Name of Locality	Colour	Thickness of Beds
1	Bampokha	White, Zebra, White Grey	Thick bedded. Square block can be obtained.
2	Nanser	Grey to dark grey	Medium to thick bedded. Square blocks can be extracted.
3	Yakhdara	White	-do-
4	Tursak	Black	-do-
5	Bazargai	White to White Grey	-do-
6	Swawi	White	-do-
7	Barkilli	Green with White, Grey and Black patches	-do-
8	Matwanai	Milky white known as spogmai	-do-

- In Buner area, the marble deposits of rest of the areas are either thin bedded or highly fractured and have low or very little capability of production of square blocks.

- Marble of the Swat district are mostly thin to medium bedded, highly fractured and are not suitable for extraction of standard size big blocks.

- In Nowshera area marble is found in pink to all shades of brown, grey and white colours. It has attractive appearance, and takes good polish. Important deposits are located at Nowshera Kandar village, on Nowshera – Mardan road and near Pirsabak village. Standard size blocks can be extracted from the area.

- The marble occurrences in district Swabi, are located in Ghundi Tarako and Maneri villages. These are generally thin to medium bedded and large block of standard size can be obtained with difficulty. They are of poor grade and of inconsistent quality.

- In Hazara area, marble deposits are found at several places in small quantity. As this region has subjected to tectonic deformation, therefore all the marble deposits are highly sheared and sound blocks of required size are rarely obtained.

- In Chitral district, the marble deposits are wide spread. The marble is white, light grey, compact and finely crystalline. Most of the deposits could not be developed due to their occurrences in rugged topography, remoteness and inaccessibility. However, the marble deposits of Gheriat and Shoghore have better prospects due to their good quality and their location along the main roads.

Granites: On the basis of colour, two categories of granites have been established.

(i) Light coloured
(ii) Dark coloured

Light coloured granites spread over an extensive area. These include the Ambela granite, large portions of Mansehra and Swat, DiR granite, Kamila amphibolite, the Kohistan batholith and the maximum portion of the Chitral granites. These are generally medium to coarse grained, thick bedded to massive and of inhauxtable quantity.

Dark/black coloured granites are distributed in the different localities of Mansehra district i.e Chore Kalan, Mohar, Darband, Shergarh and Bandi Parao.

Dark coloured/black granites are distributed in the form of small bodies in the main granite belt of Kohistan, Dir and Chitral districts.

In Hazara division about 25 leases have been granted to private investors.

Serpentinites/Ultramafics: Vast resources of serpentinites/ ultramafics occur, in Swat, Kohistan and Chitral districts, along the suture zones. They range from black to dark green and pale green colours.

- The serpentinites bearing horizons/belts have lateral extension of more than 100 km with a considerable width. Some important localities of ultramafics/serpentinites are Malam Jaba, Shangla in Swat district, Jijal in Kohistan district and Tora Tiga in Dir district.

10. INFRASTRUCTURE & LOGISTIC

EXISTING FACILITIES

The inventory covers roads, railroads, electric and power supply and population centers for drawing manpower.

Roads are the only means of transport in the region. Important connections for transportation of marble and granite blocks and marble and granite blocks to the Karachi Port are Peshawar, Nowshera, and Hattar. At present all blocks and marble products are transported by trucks to Lahore and Karachi for local and foreign markets.

Wapda grid lines (11 KV) are the source of power in the area. Springs, underground water and perennial streams and rivers are the source of water. There is no paucity of manpower near marble and granite deposits.

The infrastructure around all important deposits of granite, marble and serpentinites, in the NWFP is discussed in the report.

Five number of marble deposits have been selected in the Buner district, nine number of granites deposits in the Mansehra district and two numbers of serpentinite deposits in Swat district and one in Nowshera district, have been selected for in-situ block quarrying.

10.1 Bampokha Deposit

The area is located on Survey of Pakistan toposheet No.43B/6 at latitude; 34° 30'. 34" N and Longitude 72° .17' 30" E. The

Bampokha village is linked by a 30km metalled road towards west of Daggar Town, the headquarter of Buner district.

A dirt road of about 1km runs up to the quarry site that lies southeast of the Bampokha village. Bampokha is located at a distance of about 120 km northeast of Peshawar, and about 65km southeast of Saidu Sharif. The area is also accessible from Mardan through Rustam road. The marble deposit extends for more than 2km and is one of the largest marble deposit of the country.

- There is little or very limited flow of perennial water. Water is being supplied to the area by means of tube wells and dug wells, provided by the Worker Welfare Board.
- Electricity power line of 11 K.V exends to the Bampokha village and the quarry site.
- The area is well populated and has skilled workers in the trade. But majority of the skilled workers is derived from Swabi district.

144 Nos. of marble processing units are installed in the Buner district. So majority of the raw material in the form of lumps and blocks is being transported to the locally established processing units. About 30 to 40% is supplied to the processing units located in Peshawar, Lahore, Islamabad and Karachi.

0.2 **Nansar Deposit:** The area falls on Survey of Pakistan toposheet No. 43B/6 at latitude 43° 29′ 30″ N and longitude 70° 15′ 45″E. The deposit is located at a distance of about 2km, west of Bampokha village and at a distance of 1 km northeast of Nansar

village. The marbalized zone extends in the northsouth direction for about 3 km and is well exposed in Gurguri Ghundai along the western side of Nansar – Jowar road.

The Nansar village is connected by a metalled road of about 20km, west of Dagger town. The area is accessible from Swat by a metalled road of about 68 km and from Mardan through Rustam by 65 km metalled road.

Present requirements of water is met through tube wells and dug wells. Tube wells has been sunk by the workers Welfare Board. Dug wells are 90'–100' deep. Perennial flow of water exists in the area.

Power line is available in the area. The area is well populated and there is long tradition of marble mining in the area so there is no problem of skilled and unskilled worker or manpower. At least one family member is engaged in marble extraction activities. Skilled labours of other areas like Swabi and Mardan are also engaged in the marble mining.

10.3 **Bazargai Deposit:** The Bazargai marble deposit is located at a distance of about 2km, southeast of Bazargai village, which lies on main Swat–Daggar road at a distance of about 30km from Dagger town. The area is located on survey of Pakistan toposheet No.43B/6 on latitude 34° 32'.20" N and Longitude 72° 19' 15" E.

The deposit is reached by a 2km of winding uphill dirt track from the main metalled road. The fork from the metalled road is 2 km from the Bazargai village on way to Swat. The approach road would be

difficult to pass in wet weather and needs to be improved. Water has to be supplied from the dug wells and tube wells. The physiogrpahic setting of the area promises the existence of substantial ground water resources. Ground water level in the valley is reported at about 20 meters.

The area is served by Wapda grid lines but the quarry area is not facilitated by the non-extension of electricity lines. However, the power supply will not be difficult.

Peoples in the area are chronically short of work. Most of them are working on marble extraction. Therefore there is no short of skilled and unskilled labours in the area.

0.4 **Tursak Deposit:** The Tursak marble deposit lies at a distance of about 2km, southeast of Tursak village, which falls towards west of Dagger Town at a distance of about 20km on Dagger – Swat road. The area falls on latitude 34°.06'.30"N and longitude 72°.22'.25"E. The road is metalled from Dagger to Tursak village while the fork road of 2km from Tursak village to the marble deposit is dirt and of narrow gauge. The marbalized zone is not a single body but composed of several bodies of variable dimensions, stretched in northeast direction for about 1.5kms. The thickness of the marbalized bodies varies from 200 meters to 250 meters. The area is accessible from Peshawar via Mardan – Rustum road at a distance of about 125 km. The area is famous for the finest quality black marble deposits.

Water is not available at sufficient amount as there is no perennial flow in the nearby area. The main source of water supply is through dug wells and some through tube wells. The ground water level lies at a depth of about 25 meters.

Wapda Power gid is extended upto the main population of Tursak village. Mining area lacks electricity facilities. The nearby area is densely populated and there is no shortage of skilled and unskilled workers.

10.5 **Yakh Dara Deposit:** The Yakh Dara deposit is located at a distance of 64 kilometers northeast of Mardan and about 26 kilometers northeast of Dagger, in Buner district.

The metalled road from Dagger ends 18 kilometers short of Yakh Dara at Amnawar. Beyond that there is 7 km of narrow dirt road partly of riverine trackless stretch. Thus accessibitliy is poor.

- Perennial water is available in the stream in the vicinity of marble deposit and can meet all the requirements of Yakh Darra quarries if they are developed at a larger stage to produce dimension blocks. At present water from dug wells is used which is available in the area.

- No power is available at the quarry site.
- The area is sufficiently populated and providing the manpower of skilled and unskilled workers.

10.6 Mansehra Granite Deposits

The vast deposits of Mansehra granites spread over an area of about 3450 Sq.Km. About 15 Nos. of licenses/leases have been granted to the private parties. All these licenses/leases are located to the west, north-west and southwest of Mansehra. Production from these areas is nominal because of non-operational activities due to lack of technical knowhow and financial problems. The infra-structure facilities of the important deposits, capable of providing standard size sound blocks are placed below.

10.7 **Shergarh Granite Deposit:** This is located on survey of Pakistan toposheet No.43B/15 and lies in the southern vicinity of Shergarh village. It is connected by a metalled road of about 57 km from Mansehra city. It is black to greenish black, medium grained, massive and homogenous. Due to open spaced fractures/joints, it is suitable for extraction of large size blocks.

- The area contains sufficient amount of water from perennial sources of streams and springs.
- There exist no problems of Wapda grid power and skilled/unskilled labours.

10.8 **Hari Maira Deposit:** This is located on Survey of Pakistan toposheet No.43B/15, north of Shergarh village at a distance of about 6km from Shergargh village, on the main Darband–Oghi road. The granite is of black colour, medium grained, hard and massive. Blocks of standard geometrical size can be obtained from this deposit.

Onhar river flows in the vicinity of the deposit so perennial water is abundant in the area.

The area is connected by Wapda Power lines.

The area is well populated and there is no shortage of manpower in the area.

).9 **Bandi Parao Deposit:** The granite deposit is located on Survey of Pakistan toposheet No. 43B/15 and lies on the main Oghi–Darband metalled road about 8 km southeast of Shergarh village.

The granite is black to greenish black, medium grained, hard massive and homogeneous throughout its extent.

- Water is sufficiently available from springs and perennial streams.
- Electric power supply has been extended to the Chakli, Jiggi Tarli and Kalo de basti villages, located in the vicinity of the granite deposit.
- Skilled and unskilled manpower is available in the area.

0.10 **Darband Granite:** The granite deposit lies on topographic sheet No.43B/15. It is located in Charan village, about 1km south of Darband Town district Mansehra. The granite is dark grey to black in colour, medium grained, hard homogenous, slightly weathered at the outer surface but the weathering effect is not very deep.

Darband is linked by a metalled road of about 67 km from Mansehra. The deposit is connected by a fair, track of about 1km, workable in all weather.

There exist no shortage or problems of water, electricity power and manpower in the area.

10.11 **Chore Kalan Deposit:** The deposit is located on Survey of Pakistan toposheet No.43B/15. The area falls at a distance of about 6km dirt road, 15km short of Batagram, on Oghi – Batagram road. The area lies at a distance of about 30 km northeast of Mansehra. Towards west the area is bounded by the black mountains of Kala Daka tribal area. The granite is dark gray to black, medium grained, having widely spaced fractures/joints and therefore large blocks of the required dimension can be extracted.

Water sources are plenty both from the springs and from the perennial flow in the deposit area. Wapda power line is extended to the nearby villages and not to the deposit area. Workforce is easily available.

10.12 **Mandahar Deposit:** Mandahar granite is located on Survey of Pakistan toposheet No.43F/9, at a distance of about 6km partially metalled road to the north of Balakot. Balakot is a famous locality of the Hazara division and is linked by a metalled road from Mansehra. The granite is light gray, medium grained, compact and sound. There exists no problems in the availability of water, power and manpower in the area.

10.13 **Safaida Deposit:** The deposit is located towards northeast of Mansehra, near Susal Gali, on the main Mansehra – Oghi metalled road.

Water requirements of the area can be fulfilled from the abundant flow of perennial water and also from the springs sprouted in the area.

Electricity lines extends to the deposit area and there stands no shortage of manpower requirements for running of mining operations.

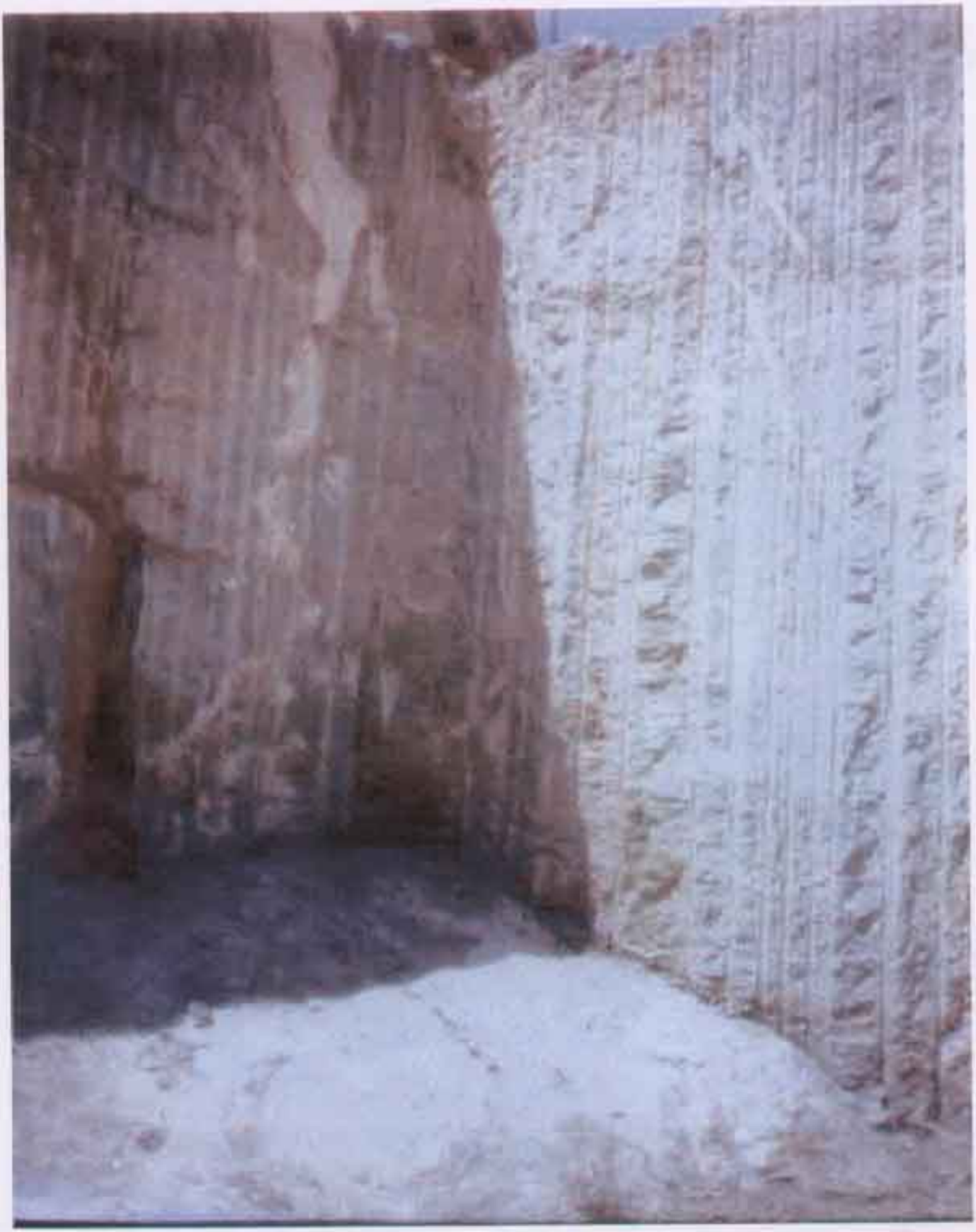
10.14 **Mohar Deposit:** Located on Survey of Pakistan toposheet No.43B/15. The granite deposit is located at a distance of about 6kms, west of Darband town. The 6kms road is partially metalled.

Onhar river flows in the vicinity of the deposit area. Water is also available from the springs. Power grid lines are extended upto Mohar village. Skilled and unskilled work force is available to meet the requirements of the project.

10.15 **Lassan Thakral Deposit:** This lies on Survey of Pakistan toposheet No.43B/3. It is connected by a metalled road of about 15km, southeast of Mansehra. The deposit is light gray to darkish gray, thick bedded and massive.

- Work force, water and electricity is available in the area.

10.16 **Shamozai Granite Deposit:**The deposit lies on survey of Pakistan toposheet No.43B/5, and falls to the north–northwest of Mingora at



Green Granite Quarry at Shamozai, Swat

a distance of 17km across the river Swat near Khazana village of Shamozai area.

The area is composed of massive amphibolites which are light green to dark green in colour, medium to coarse grained, mostly massive and having a gradational contact with the banded amphibolite, towards the north. These deposits makes the extreme south western portion of the Kohistan Island – Arc sequence and are located very near to MMT. Due to which the rocks of area are shattered and the extraction of larger blocks has been stopped for two years due to fractures.

- Road conditions are good. A metalled road exists from Mingora to Khazana village. A fair weather dirt road of about 3km runs up to the deposit area.
- Skilled and unskilled workforce is available easily.
- Presently, a foreign mining company is engaged in the developmental activities of the quarry and for extraction of required geometrical size of granite blocks.

10.17 **Serpentinites Deposits:**Vast deposits of serpentinites/ultramafic rocks occur in Kohistan, Swat, Malakand, Mohmand Agency and Chitral district along the suture zones. Two localities in the Swat district have been identified, on the bases of having production capability of large size blocks and comparatively easy accessibility. These deposits are located near Shangla and Malamjaba areas.

Shangla Serpentinites: The Shangla serpentinite deposit is located on the main Mingora – Besham road at a distance of about 34 km

northeast of Mingora and at a distance of 3 km east of Shangla. The road is metalled and the area is located on the toposheet No.43B/9.

- Wapda grid line is extended to the area.
- The area is well populated and working force is abundantly available. The ultramafic body is located in the Shangla blue schist mélange zone of main Indus suture mélange group.

The serpentinite are green to black, fine to medium grained and homogenous. It breaks with a hackly fracture rather than grainy fracture.

Friable serpentinite also occur but in subordinate proportion. It is similar in color to massive serpentinite but retains non of the textural features of the igneous rocks. The serpentinite were formed by the alteration of ultramafic rocks.

Malam Jaba Serpentinite Deposit: It is located on Survey of Pakistan Toposheet No.43B/9. It is present at a distance of 30km, by a winding metalled road from Mingora.

The serpentinite is dark green to black in colour, fine to medium grained, and mostly massive. Widely spaced joints and fractures exist. So large size blocks of required dimension can be obtained.

- Water is plenty and can be easily obtained from the nearby perennial streams and springs.
- Electric power lines are extended upto Mala Jaba, along the road side.
- The local people are very short of work. Manpower is sufficiently available.

11. TARGET AREAS FOR SELECTION OF SITES FOR IN-SITU BLOCKS QUARRYING

Very few sound and massive deposits exist in the known decorative stones deposits of NWFP. All other deposits are thin layered and/or highly fractured, jointed and unsuitable for extraction of sizeable blocks or there are some good deposits, which are located in very remote areas which may not be feasible for economic point of view. So the installation of any sophisticated block cutting units on these locations would, therefore, be the total loss of investment and energy.

The sites chosen for block cutting are in marble granite and serpentinite deposits. These are thick bedded to massive, free of fractures and joints or comparatively less jointed and fractures and are uniform in colour and texture. These are suitable for cutting of channels and quarry faces.

The study resulted in selecting 5 marble deposits, 9 granite deposits and 2 serpentinite deposits, for in-situe block cutting. The selected marble deposits are located in Buner district, granite deposits in Mansehra district and serpentinite deposits in Swat district. These deposits are listed below:

11.1 Marble

- Bampokha Deposit: Creamy white, whitish grey and grey, fine to medium grained, thick bedded, hard and compact having pleasing appearance, taking good polish and having good physical properties. This is the most famous and huge marble

deposit of the country. Due to open spaced, fractures and joints, the larger blocks of the size 1.5m x 1.2m x 1m can easily be extracted.

- Bazar Gai Deposit: White to whitish grey, medium to coarse grained and saccharoidal. Large blocks of standard size can be extracted.

- Tursak Deposit: Dark grey to black, fine to medium bedded, hard and compact. Big blocks can be extracted easily.

- Yakhdara Deposit: White in colour, fine to medium grained, thick bedded, having capability of extraction of standard size geometrical blocks.

- Nansar deposit gray to dark gray in colour, fine to medium grained, medium to thick bedded, having open spaced joints and fractures. The marble has attractive colour, pleasing appearance and property of taking polish.

- Nowshera Kandar: The marble is pink with streaks and patches of white, grey, red and brown colours. It is equigranular, compact, hard and contains calcite and dolomite. The bedding is thick to massive. Joints/fractures are widely spaced. Block of big size can be obtained.

..2 **Granite**

- Lassan Takral Deposit: Located at a distance of about 20 km. south-west of Mansehra. Light coloured, medium to coarse

grained compact, hard, fractures are oftenly open spaced, geometrical blocks cam be extracted easily.

- Mohar Granite: Located to the west of Mansehra at a distance of 23km. from Mansehra. Its light coloured, medium to coarse grained, homogenous in texture, hard and compact. No overburden on the outer surface of the deposit. Weathered at the outer surface. For development of quarry, weathered zones will have to be removed.

- Shergarh Granite: It is black to greenish black, medium to coarse grained, thick to massive and homogenous. Joints/fractures are open spaced, favourable for extraction of large size blocks.

- Hari Maira Granite: This deposit is dark grey to black in colour, medium grained, hard, and massive. Large blocks of standard size can be obtained.

- Bandi Parao Granite: The granite body is black to greenish black, medium grained, hard and massive. It is homogenous throughout its extent.

- Darband Granite: This deposit is dark grey to black in colour, thick bedded to massive, hard and homogenous. Slightly weathered but the weathering effect is not very deep.

- Chore Kalan Granite: The granite is dark to black, medium grained, hard, massive and having open spaced joints and fractures. Large blocks of required dimension can be obtained.

- Mandahar Granite: Generally, the granite is light grey, medium grained, compact and sound. Fractures and joints are wide spaced. The deposit is favourable for extraction of big size blocks.

- Safaida Granite: This body is light grey to dark grey in colour. It is medium to coarse grained, compact and sound. Large size blocks can be extracted.

11.3 Serpentinites/Ultramafic

Two localities have been selected for extraction of large size blocks. These areas are located in Swat and Shangla districts.

- *Shangla Serpentinite*: This deposit is dark green in colour, fine to medium grained, mostly massive, sound and compact. Large size blocks can be extracted from this deposit.

- *Malamjaba Serpentinite*: The serpentinite is pale green to dark green in colour, fine to medium grained, jointed and fractured. The joints/fractures are open spaced, therefore big size square block can be obtained.

12. BLOCK CUTTING/QUARRYING & DEVELOPMENT OF MODEL QUARRY

12.1 Justification

The difficult, tiresome and often impossible task of cutting marble and granite by manual labour in old days was followed by the use of explosives and dynamite. Blasting by dynamite resulted in extracting irregular blocks with cracks and uncontrolled dimension. This also resulted in the wastage of the sufficient material.

New quarrying methods were required to produce blocks of regular dimensions and desired sizes. All stone processing industry in industrialized countries have adopted the new block cutting technology to produce and extract standard size blocks. This has virtually left no market for irregular and substandard blocks.

The in-situ block cutting technology for extraction of dimension stone has not been in operations in Pakistan. Growing demand for dimension stones necessitated more mechanization and application of advance technology in their extraction, transport and processing. If one such project goes into operation in NWFP, it would set the modern trend in stone industry in the country.

The block cutting technology would:

a) eliminate the losses caused by the present mining practice.
b) Produce large sized, formed and regular blocks in the quarries.
c) enhance the depth of mineable deposits, thus increasing present reserve estimates manifold;
d) ensure regular production of the dimension stones for long term contracts, and would
e) setup the trend to gradually modernize the processing plants.

Several countries, namely, Brazil, Zimbabwe, Uruguay, China and India have timely planned and installed modern block cutting facilities with very beneficial results.

In India, the new port of Manglore is used mainly for the export of dimension stones.

12.2 Block Dimension

The main objective of the block cutting technology is the direct production of standard and regular dimension stone blocks at the quarry site. These blocks are large, measuring a meter or more each side, about 4 to 8 cubic meters, weighing from 10 to more than 15 tones and are cut in different sizes.

The blocks and slabs of the following dimensions are generally in demand.

- Favourable size of granite block is 3m x 1.5m x 1.8m
- Other common block sizes are:
- 3.5m x 2.5m x 1.5m
- 3m x 2m x 1m
- 2.5m x 1.2m x 1m
- 1.5m x 1.2m x 1m
- Small slabs of marble are:
- 61cm x 56cm x 5cm
- 75cm x 56cm x 7.5cm
- The thickness of marble slabs is as little as 2–3cm

Thickness for granite slabs has reached to 2cm but the demand is still for thinner slabs.

13. BLOCK SQUARING BY CONVENTIONAL METHOD

In the world including Pakistan many techniques are being used for the extraction of standard size geometrical blocks from dimensional stones.

They are:

- Non – Blasting Techniques
- Blasting Techniques

In quarrying the selection the selection of method is very important. It should guaratee:

Safety
Efficiency
Economy

In selection of mining method , the following factors should be studied carefully.

(i) Machinery
(ii) Physical Properties of Rock
(iii) Capital Available
(iv) Location of Quarry Site
(v) Production Level
(vi) Market Demand
(vii) Quality of the Stone

Dimensional Blocks Extraction Techniques

Non-Blasting Techniques

- Dimensional Wire Cutting

- Chain Cutting
- Tripartite Wedge
- Swelling Material Extraction
- Water Jet Cutting
- Flame Jet Cutting
- Slot Drilling Technique

Blasting Techniques

- Line Drilling
- Cushion Blasting
- Smooth Blasting
- Pre-Splitting

1. NON-BLASTING TECHNIQUES

Advantages of Non-Blasting Techniques

- Handling of the machinery is easily and can be applied to low profile rock.
- Waste production is very low
- High productivity and safety
- No dust and vibration problems
- Better quality of standard square block which is most suitable for gang saw cutting and higher yield of slabs.
- No limitation of depth of the cut
- Save the time due to higher rate of cutting

Disadvantage of Non-Blasting Techniques

- Expensive method due to use of diamond wire
- A regular geometric quarry is required (plain surface)
- Noise nuisance
- Not suitable in loose and crack strata
- This method can be used to limited extent
- Availability of water is essential
- High cutting cost is involved in this method

2. BLASTING TECHNIQUES

Advantages of Blasting Techniques

- Low initial cost is involved as compared to other techniques
- Rapid production may be obtained
- This method can be applied to any strata
- The machinery and explosives are normally available in the local market at the appropriate rate
- The best and suitable for low quality and fractured rocks

Disadvantages of Blasting Techniques

- Safety problems
- If this method is not properly used, it can produce micro and macro cracks in the rock strata which can badly effect the quality of blocks. It also damages the back rock and causes production of sub-size material in the

form of boulders, kandas and chowkas and thus causes damage to the deposit.

- Expertise and precision in drilling and blasting is required

Factors Effecting The Blasting Techniques Explosives

- Various types of explosives may be used for different rock strata.
- Measured quantity of explosives may be used in different rock types.
- Charging method
- Method of initiation
- Drilling
- Direction of holes must be kept according to nature of strata
- Spacing between the holes (From 0.30 m to 0.7m)
- Holes burden between 1.50m to 3.60m
- Depth of holes may be 1.20m to 6m

Shear Factor

Quantity of explosive per unit shear area

- Shear area per hole = Spacing x depth of the hole
- Charge per hole = Shear area x shear factor (Kq. 1Sq.m)

For the extraction of dimensional stones blocks, the following essential points may consider.

- The extensive trial blasts may be conducted especially in Buner area for creating awareness and expertise and refining of the process is required.

14. MARKETING STUDY

Various types of dimension stones are mined in NWFP and the adjacent areas of FATA. This include marble, granite and light to dark green serpentinite. The total production of these dimension stones, from 2000-2001 to 2005-2006 is given below:

(In Tonnes)

Category of Dimension Stones	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006
Marble	388722	405441	460202	235475	571331	375586
Granite	4242	4820	2827	2871	4913	2374
Serpentinite	1018	2483	2131	1155	2173	385
Slate Stone	119498	161142	324266	120166	220733	45809

Source: Licensing Division, DGMM

The production and demand may enhance many folds by the Implementation of in-situ block cutting technology at the quarry site followed by the improvements in the processing units.

The tiles and other products of marble, granite and serpentinite are most widely used in the country. The production of granite and serpentinite as seen from the above table is very low. It may enhance many folds by the installation of in-situ block cutting technology.

In recent years, ceramic tiles, brick tiles and synthetic tiles are being used as substitute for natural tiles, They have split the market demand. Yet, for the same prices or even higher, preference would go to stone tiles.

Inspite of great demand of dimension stones in domestic and international markets, position of the cutting and finishing industries

is precarious. Many factories in NWFP have closed down due to inappropriate machinery and equipment and problems of labours, power and transport or simple mismanagement. Notwithstanding the demand, the export of marble from Pakistan have not been as good as required. The factories in the country, especially in Karachi are not able to cope with the demand of dimension stone articles particularly from middle east, Japan and USA.

One of the principal factor responsible for low profitable dimension stone business in the country is the wastage of material during the quarrying and further during the processing of the stones. Since all dimension stones in the country is quarried through dynamite blasts, so most stones contain minor or bigger cracks and do not come-up to the internationally required size, and are not accepted in the world market. So, inspite of great demand for high quality standard blocks, only a small portion is catered to. The export would increase with the production of standard size blocks.

Wastage of material during the processing of the dimension stone is also very important. According to present study almost 30% of the marble is wasted in the process of making marble tiles and slabs from the lumps or boulders mined here. Pieces and blocks of various sizes ranging from 25 cubic decimeter to a maximum of 2 cubic meters are mined by blasting. Large pieces are cut into slabs and processed into tiles. The wastage is mostly caused due to cracks resulting from extraction by dynamite blasting and due to small boulders extracted by the miners, which may eventually be discarded. Most of the blocks, extracted are, of irregular dimension and size.

15. GEO-TECHNICAL CHARACTERISTICS OF MARBLE

Geo-technical properties of various marble deposits were determined by conducting the required tests. Geo-technical tests of some of the marble deposits of Buner area were conducted by the University of Engineering & Technology, Peshawar, while some data was collected from the geological survey of Pakistan.

The modulus of rapture of good marble is generally around 1800 Psi. Good marble should have very low porosity or water absorption (o.1. to 0.7%) for withstanding rain and moisture.

The hardness, specific gravity, compressive strength, modulus of rapture and other properties conform favourably with the standard specification for marble.

The geo-technical properties of some of the important marble deposits are given in the table-1.

Locality	color	Shear Strength (Psi)	Tensile Strength (Psi)	Compressive Strength (Psi)	Specific gravity	Water Observation	Modulus of rapture
Bampokha	White	720	482	4099	2.69	0.142	1658
Nanser	Black	730	500	4176	2.69	0.47	1800
Tursak	Black	740	530	4226	2.7	0.74	1950
Bazargai	White	695	456	3982	2.71	0.68	1500
Yakhdara	White	720	490	4100	2.69	0.50	1500
Mirdara	Gray	710	498	4026	2.70	0.64	1600
Matwani	White	743	521	4211	2.69	0.59	1900
Barkilli	Whitish Gray	725	500	4225	2.71	0.153	2000

Table-1: Showing the geo-technical properties of Marble from Bunair.

Note: Data taken and tests conducting by NWFP University of Engineering & Technology and Geological Survey of Pakistan.

Laboratory Studies/Chemical Analysis

Chemical analysis of some of the marble deposits show that they meet the standard specifications required for good marble. Chemical analysis of some of the important marble deposits are given in table-2.

S. No.	Locality	Calcite	Ore	Qtz	Dust	Dolomite	Muscovite	Clay	Minerals
1	Yakhdara	98%	1%	-	-	0.5%	1%	Traces	Traces
2	Mirdara	98%	1%	-	Traces	-	-	-	-
3	Mitwani	96%	1%	1.9%	Traces	1%	-	-	-
4	Tursak	83%	3%	4.5%	-	-	3%	6%	-
5	Bazargai	92%	1%	-	-	1%	4%	2%	-
6	Nanser	92%	2.9%	1%	2%	-	2%	-	-
7	Bampokha	99%	traces	-	-	-	-	-	-

Table:2 Average chemical composition of marble of Buner district.

16. ESTIMATION OF RESOURCES OF DIMENSION STONES

Dimension stones are spread over vast area of NWFP. More than 25% of the total area of NWFP comprises various types of dimension stones. But all the dimension stones area is not mineable because

- They are either friable or thin bedded.
- These are non homogenous in texture and Not uniform in colour.
- These are intensely weathered.
- These are highly/closely fractured or jointed And not suitable for extraction of even small Size blocks.
- These are sheared or tectonized and availability of required size blocks is impossible.
- Or these occur in very rugged terrains and Inaccessible areas.

Keeping in view the above factors, the workable areas are left in small proportions as compared with their total occurrence. Therefore in estimating the reserves of these resources, the mineable area for marble, granite and serpentinites/ultramafics has been considered upto 5%, 2% and 2% respectively. The average depth has been taken up 20m for marble, 30m for granite and 10m for serpentinites/ultramafics. The total area has been measured/calculated from the maps in approximation because the actual measurements of these resources is not possible by the conventional means and methods.

In this way the tentative reserve estimates for:

- Marble is 4.209 billions tonnes (Table:3)
- Granite is 45.189 billions tonnes (Table:4)
- Serpentinite/ultramafics is 1.2 billion tones (Table:5)

Table-3 **Resource Estimation of Marble Occurrences of NWFP**

Marble Localities	Area (Km^2)	Mineable Resources @ 5% of Surface area (Km^2)	Resource Estimates @ 20m depth (average)	
			Volume (m^3) @ 20m depth (in millions m^3)	Tonnage (in millions tones)
Nowshera	4	0.2	4	10.80
Swabi	60	3.00	60	162.00
Buner	725	36.25	725	1957.50
Swat	230	11.5	230	621.00
DiR	50	2.5	50	135.00
Malakand	80	4.00	80	216.00
Chitral	380	19.00	380	1026.00
Hazara	30	1.5	30	81.00
Total	**1559**	**77.95**	**1559**	**4209.30**

Say 4.209 billions tonnes

Table-4 **Resource Estimation of Granite Occurrences of NWFP**

Granite Block	Area (Km^2)	Mineable Resources @ 2% of Surface area (Km^2)	Resource Estimates @ 30m depth (average)		
			Volume (m^3) @ 30m depth (in millions m^3)	Tonnage (in millions tones)	Tonnage (in billions tones)
Chitral Block	2670	53.40	1602	4806.00	4.806
Kohistan Island Arc Block	20000	40.00	12000	36000.00	36.00
Indian Mass	2435	48.70	1461	4383.00	4.383
Total	**25105**	**142.10**	**15063**	**45189.00**	**45.189**

Say 45 billions tonnes

Table-5 **Resource Estimation of Serpentinites/Ultramafics NWFP**

Serpentinite/ Ultramafics Localities	Area (Km^2)	Mineable Resources @ 2% of Surface area (Km^2)	Resource Estimates @ 10m depth (average)	
			Volume (m^3) @ 10m depth (in millions m^3)	Tonnage (in millions tones)
Chitral	265	5.3	53.00	159.00
Swat	220	4.4	44.00	132.00
Malakand	300	6.0	60.00	180.00
Hazara	1250	25.0	250.00	750.00
Total	**2035**	**40.7**	**407**	**1221.00**

Say 1.2 billions tonnes

17. CONCLUSIONS & RECOMMENDATIONS

Conclusions

NWFP contains some of the finest quality marbles in the world, particularly those of the Buner district. Best workable granite deposits are found in the Mansehra district, Kohistan district, Swat district, Dir district and Chitral district. These are of various shades and grades. Workable and good quality deposits of serpentinites/ultramafics are located along the Main Mantle Thrust, in Jijal area of Kohistan, Shangla and Malamjaba areas of Swat and Tora Tigga area of Dir district.

The dimension stones deposits are spread over extensive and large areas of northern parts of NWFP. Unfortunately, most of these deposits are either highly fractured, or thin bedded. Most sound deposits of marble are found in Bampokha, Nansar, Torsak, Bazargai and Yakha Darra areas of Buner district.

Some of the marbles deposits in Chitral district are also of good quality. But due to remote locations and inaccessibility from the main areas of utilization, and the large costs of transportation in supply of the blocks and slabs to Peshawar, Lahore and Karachi, the marble become less economical and beneficial.

Five sites are selected for marble quarrying in Buner district, nine locations of granite in Mansehra district, one site of granite in Shamozai area of Swat district and two sites are found viable for serpentinites in Shangla and Malam Jabba areas of Swat district.

Dimension stones from the above mentioned areas have ready market as is evident from their extraction and supply.

The dimension stones from the other areas were not found suitable for in-situ block cutting. Either they are less attractive, cracked and shattered or located in remote and rugged areas.

Recommendations

- Search should be made for more sites in the remote areas and the deposits should be re-examined and studied after the accessibility and approach to the deposits by the construction of new roads.
- All other deposits, which may not produce big blocks should be worked to produce small but regular blocks. They should be worked by soft explosives and mechanical means but never by blasting. Foreign market does exist for small blocks of specially beautiful stones as those of Buner area.
- Investigations should be made for the search of granite and ultramafic dimension stones, such as peridotites, hertzburgite, pyroxinites, hornblendites and other basic rocks.
- Technical assistance should be received through the services of experienced quarry specialists. It would be advisable to hire the services of a quarry specialist for a period of at least 6 to 12 months or even more, to open, develop and operate the quarries.
- Qualified technical staff should be attached with the quarry specialist to assist him and learn the technique, technology, and trade.

- A few geologists and mining engineers should be sent-on-job training in Italy for practical management and operations of quarries.

- All possible technical help and advice should be freely given to the local investors in the area or all other prospective areas. Leases for dimension stones mining and quarrying should be freely granted.

- Recommendations should be made for allowing generous loan facilities for dimension stones mining enterprises.

- As the stone mining would mostly benefit the underdeveloped areas of the province, Custom and other duties and taxes may not be levied on importing quarrying and related equipments and on export of products.

- The interest rates on loans for buying the imported block quarrying machinery should be lowered as the machines are not produced locally and will be used to earn foreign exchange.

- Publicity will also be required in and outside the country to get the investors acquainted with the new industry and to attract local and foreign investors and buyers. This could be achieved by publishing newspaper reports and through arranging workshops and seminars on the subject.

- DGMM should contact competent Pakistani and multinational companies to help them market the stones and products.

MINING CONCESSIONS IN PESHAWAR DIVISION

Name of Mineral **Marble** District **Charsadda & Nawshera**

S.No.	Name & address of the Concession-air/File No	Locality	Total area granted	Toposheet No	Coordinate/G.R Northing - Easting	Valid up to	Present Status
	1	2	3	4	5	6	7
1	Mr. Mohammad Sharif MDW/PR/ML-Marble (38)/86.	Tangi	195.39 acres	38 N/11	12 26 080-34 69 480 Y 12 26 080-34 70 920 12 25 620-34 70 920 12 25 260-34 69 120	10/12/2015	Mining in operation
2	M/S. Al-Haaj Madnyat MDW/PR/ML-Marble (47)/93.	Furlandai	59.42 acres	43 B/4	11 93 300-34 15 070 Y 11 93 000-34 14 400 11 93 360-34 14 220 11 93 670-34 14 840	2/7/2001 Applied for renewal	Mining in operation
3	Haji Mohammad Yaqoob MDW/PR/ML-Marble (77)/93.	Gandab	215.71 acres	43 C/1	11 62 000-34 21 520 Y 11 62 060-34 20 000 11 62 370-34 18 360 11 62 840-34 17 230 11 62 480-34 19 510 11 62 600-34 19 620 11 62 570-34 19 945 11 62 420-34 19 940 11 62 160-34 21 540		
4	Mohammad Saeed MDW/PR/ML-Marble (56)/2002.	Pirsabaq	26.03 acres	43 B/4	11 92 820-34 08 220 11 92 400-34 08 220 11 92 400-34 07 920 11 92 820-34 07 920	19/2/2007	Mining in operation

	1	2	3	4	5	6	7
5	Mr. Khairullah MDW/PR/ML- Marble (52)/2000.	Kandar	25.00 acres	38 N/16	11 93 110-34 03 939.46 Y 11 93 110-34 03 639.46 11 92 710-34 03 639.46 11 92 710-34 03 939.46	9/8/2005 Process for Cancellation	Mining stopped
6	M/S.Khan Khel Mining MDW/PR/ML- Marble (54)/2000.	Kandar	25.00 acres	38 N/16	11 93 110-34 03 939.46 Y 11 93 110-34 04 239.46 11 93 510-34 04 239.46 11 93 510-34 03 939.46	Cancelled on 16/7/2003	Mining stopped

MINING CONCESSIONS IN PESHAWAR DIVISION

Name of Mineral **Serpentine**

District **Charsadda & Nawshera**

S.No.	Name & address of the Concession-air/File No	Locality	Total area granted	Toposheet No	Coordinate/G.R Northing - Easting	Valid up to	Present Status
	1	2	3	4	5	6	7
1	Mr. Mohammad Saeed MDW/PR/PL-Serpentine (1)/2001.	Qila charsadda	499.744acres	38 N/11	11 33 152-30 81 000 M 11 34 100-30 81 000 11 34 785-30 82 200 11 34 000-30 82 590 11 33 152-3082 590		

MINING CONCESSIONS IN MARDAN DIVISION

District **Mardan**

Name of Mineral **Marble**

S.No.	Name & address of the Concession-air/File No	Locality	Total area granted	oposheet No	Coordinate/G.R Northing - Easting	Valid up to	Present Status
	1	2	3	4	5	6	7
1	Mr. Mohd:Zaib Khan MDW/MR/PL-Marble (389)/97	Zairat	499.924 acres	43 B/3	11 34 700-31 40 460 Y 11 36 655-31 40 460 11 36 655-31 41 435 11 34 460-31 41 435	25/09/2004	Mining in operation
2	Mr. Abdul Akber Khan MDW/MR/PL-Marble (183)/86.	Plodheri	1021.21 acres	43 B/3	12 38 220-31 21 320 Y 12 39 100-31 20 500 12 38 300-31 22 750 12 36 100-31 22 100 12 35 270-31 20 820 12 37 380-31 20 470	Under appeal	
3	Haii Ali Rehman MDW/MR/PL-Marble (406)/99.	Shamozai	23.698 acres	43 B/3	12 36 000-31 14 000 Y 12 36 370-31 14 000 12 36 370-31 14 620	7/12/2002 Renewal is pending	Mining stopped
4	Mr.Arif Alam MDW/MR/PL-Marble (407)/99.	Babozai	367.57 acres	43 B/3	11 38 410-31 28 435 Y 11 38 000-31 30 000 11 37 000-31 30 000 11 37 000-31 29 000	5/7/2003 Process for renewal	Mining in operation
5	Mr.Arif Alam MDW/MR/PL-Marble (422)/2000.	Kohibernol	336.776 acres	43 B/3	12 51 000-34 15 370 Y 12 51 000-34 17 000 12 50 000-34 17 000 12 50 000-34 15 370	30/10/2003 Process for renewal	Mining in operation

	1	2	3	4	5	6	7
6	Mr. Ferzand Hussain Shah MDW/MR/PL- Marble (403)/99.	Petwa Malandri	492.975 acres	43 B/3	11 34 285-31 43 200 Y 11 35 615-31 43 200 11 35 615-31 44 200 11 34 615-31 44 700 11 34 285-31 44 700	Process for convertion to ML	
7	Mr.Javed Iqbal Qasmi MDW/MR/PL- Marble (446)/2002.	Shamozai	143.491 acres	43 B/3	12 46 650-34 05 600 Y 12 45 000-34 06 200 12 46 450-34 06 800 12 46 000-34 06 200	15/08/2004	Mining in operation
8	Mr. Mohd: Asif Khan MDW/MR/PL- Marble (430)/2001.	Beroch	498.534 acres	43 B/7	12 42 000-34 20 500 12 41 530-34 21 600 12 42 000-34 22 050 12 421 620-34 22 475 12 40 180-34 21 000 12 41 000-34 20 570	18/9/2001 Renewal Under process	Mining in operation
9	Mr. Mohd: Asif Khan MDW/MR/ML- Marble (189)/2003.	Babozai	375.774 acres	43 B/3	12 42 000-34 20 500 Y 12 41 530-34 21 600 12 42 000-34 22 050 12 41 620-34 42 475 12 40 180-34 21 000 12 41 000-34 20 570	11/3/2004	Mining in operation
10	Mr. Mohd: Asif Khan MDW/MR/PL- Marble (439)/2002.	-do-	267.615 acres	43 B/3	12 41 000-34 20 570 Y 12 40 180-34 21 000 12 39 220-34 21 000 12 39 940-34 19 460	12/3/2004 Applied for renewal	Mining in operation
11	Sayed Waras Khan MDW/MR/ML- Marble (185)/2002.	Bara Bangla	285.989 acres	43 B/3	11 34 725-31 41 550 Y 11 34 725-31 42 900 11 33 700-31 42 900 11 33 700-31 41 550	7/6/2002 Applied for renewal	Mining in operation

	1	2	3	4	5	6	7
12	Mr. Tajul Hussain MDW/MR/ML- Marble (457)/2003.	Plodheri	72.820 acres	43 B/3	12 32 530-34 12 570 Y 12 32 530-34 13 300 12 32 000-34 13 300 12 32 000-34 12 700	1/10/2004	Mining in operation
13	Mr. Sameeullah Khan MDW/MR/PL- Marble (436)/2002.	China	284.727 acres	43 B/7	11 29 375-31 33 700 Y 11 29 250-31 35 225 11 28 650-31 35 225 11 28 875-31 34 300 11 27 730-31 33 550	5/5/2004	Mining in operation
14	Haji Ali Rehman MDW/MR/ML- Marble (179)/2001.	Shamozai	299.238 acres	43 B/3	12 36 000-34 14 000 Y 12 36 245-34 15 640 12 35 410-34 15 800 12 35 140-34 14 100	21/11/2011	Mining in operation
15	M/S.Nansar Mining Co: MDW/MR/ML- Marble (87)/2003.	Sangao	499.449 acres	43 B/2	12 48 800-34 20 000 Y 12 48 800-34 23 210 12 46 800-34 23 210 12 46 800-34 22 000	25/5/2008	Mining in operation
16	M/S.Nansar Mining Co: MDW/MR/ML- Marble (186)/2002.	-do-	500.00 acres	43 B/2	12 46 920-34 21 750 Y 12 46 920-34 23 000 12 44 890-34 23 000 12 45 080-34 21 750	24/5/2008	Mining in operation
17	Sahibzada Engineering Co: MDW/MR/PL- Marble (440)/2000.	Karamar	498.164 acres	43 B/3	11 25 720-31 39 900 Y 11 25 720-31 41 700 11 25 000-31 41 700 11 25 000-31 41 100 11 24 400-31 41 100 11 24 400-31 39 900	7/7/2004	Mining in operation

	1	2	3	4	5	6	7
18	Mr. Ali Rehman MDW/MR/ML- Marble (138)/91.	Shamozai	299.111 acres	43 B/3	12 37 750-34 16 350 Y 12 38 100-34 16 100 12 37 630-34 17 230 12 37 630-34 17 560 12 38 290-34 17 580 12 38 290-34 18 045 12 37 320-34 18 045 12 36 800-34 17 850 12 36 750-34 17 300	16/12/2004 Process for renewal	Mining in operation
19	Mr. Ali Rehman MDW/MR/ML- Marble (137)/91.	-do-	299.72 acres	43 B/3	12 38 760-34 17 140 Y 12 38 920-34 16 550 12 39 310-34 16 550 12 38 820-34 18 310 12 38 350-34 18 310 12 38 350-34 17 480 12 37 630-34 17 480 12 37 630-34 17 200 12 38 460-34 16 510 12 38 460-34 17 140	5/3/2007	Mining in operation
20	Mr.Abbas Ali Shah MDW/MR/ML- Marble (156)/96.	Babozai	24.93 acres	43 B/3	12 38 810-34 16 780 Y 12 38 500-34 16 780 12 38 500-34 16 440 12 38 900-34 16 440	25/6/2005 Applied for renewal	Mining in operation
21	Mr. Abdul Akber Khan MDW/MR/ML- Marble (162)/96.	Palodheri	475.765 acres	43 B/3	12 33 000-34 16 100 Y 12 33 580-34 16 100 12 36 880-34 19 480 12 36 380-34 19 980 12 35 050-34 18 610 12 35 230-34 18 430 12 33 880-34 17 000 12 33 250-34 17 000	12/11/2006	Mining in operation

	1	2	3	4	5	6	7
22	Mr. Abdul Akber Khan MDW/MR/ML- Marble (166)/99.	Palodheri	90.00 acres	43 B/3	12 36 530.00-34 17 650.00 Y 12 36 834.92-34 17 943.83 12 36 079.66-34 18 630.33 12 35 769.19-34 18 342.37	22/9/2008	Mining in operation
23	Mr. Abdul Akber Khan MDW/MR/ML- Marble (116)/87.	-do-	413.81 acres	43 B/3	12 32 254-36 16 410 Y 12 33 810-34 15 740 12 33 090-34 17 240 12 32 210-34 17 460 12 31 260-34 15 820	9/10/2005	Mining in operation
24	Mr.Arif Alam Khan MDW/MR/ML- Marble (168)/99.	Shamozai	217.654 acres	43 B/3	12 36 000-34 15 800 Y 12 36 820-34 16 680 12 37 520-34 16 100 12 37 750-34 16 350 12 36 750-34 17 300 12 36 000-34 16 700	16/12/2004	Mining in operation
25	Mr.Bahadar Sher Khan MDW/MR/ML- Marble (175)/2000.	Shakartangi	299.741 acres	43 B/3	12 32 200-34 14 000 Y 12 33 330-34 15 320 12 32 585-34 15 540 12 31 420-34 14 420 12 31 470-34 14 000	11/10/2005 Applied for assignment	Mining in operation
26	Mr. Ferzand Hussain Shah MDW/MR/ML- Marble (172)/2000.	Salim Abad	299.645 acres	43 B/3	11 31 550-31 39 250 Y 11 32 490-31 39 150 11 32 800-31 40 600 11 31 550-31 40 075	28/6/2005	Mining in operation
27	Mr. Habibullah Khan MDW/MR/ML- Marble (181)/2002.	Badam	493.22 acres	43 B/7	12 38 150-34 23 705 Y 12 40 400-34 23 705 12 40 400-34 25 200 12 39 450-34 25 000	3/3/2005	Mining in operation

	1	2	3	4	5	6	7
28	Mr.Irshad Khan MDW/MR/ML- Marble (145)/91.	Plodheri	115.33 acres	43 B/3	12 37 050-34 19 430 Y 12 36 780-34 19 140 12 37 320-34 18 650 12 37 790-34 19 120 12 36 980-34 19 930 12 36 740-34 19 700	23/9/2001 Process for renewal	Mining in operation
29	Mr.Mohd: Zaib Khan MDW/MR/ML- Marble (176)/2000.	Bazart	499.924 acres	43 B/7	11 34 700-31 40 460 Y 11 36 655-31 40 460 11 36 655-31 41 435 11 34 460-31 41 435	26/9/99 Process for renewal	Mining in operation
30	Mr. Mohd: Aslam Khan MDW/MR/ML- Marble (111)/87.	Shamozai	152.204 acres	43 B/3	12 34 900.000-34 15 800.000 Y 12 35 180.000-34 16 330.000 12 34 766.826-34 17 307.085 12 34 177.047-34 16 622.597	2/5/2008	Mining in operation
31	Mr. Mohd: Ayaz Khan MDW/MR/ML- Marble (152/95.	Matta	243.274 acres	43 B/3	12 32 220-34 13 580 Y 12 34 300-34 13 580 12 34 300-34 13 210 12 36 000-34 13 210 12 36 000-34 16 220	8/12/2004	Mining in operation
32	Mr. Mohd: Taforr Khan MDW/MR/ML- Marble (169/99.	Shamozai	217.654 acres	43 B/3	12 35 500.00-34 16 440.00 Y 12 36 500.00-34 17 600.00 12 35 815.00-34 18 263.00 12 34 766.82-34 17 307.85	3/5/2003 Process for renewal	Mining in operation
33	Mr. Raham Ghafoor Khan MDW/MR/ML- Marble (141)/91.	Babozai	85.90 acres	43 B/3	12 40 560-34 20 090 Y 12 41 130-34 19 490 12 41 500-34 19 830 12 40 930-34 20 430	27/6/2007	Mining in operation

	1	2	3	4	5	6	7
34	Mr. Raham Ghafoor Khan MDW/MR/ML- Marble (142)/91.	Babozai	499.32 acres	43 B/3	12 44 000-34 20 000 Y 12 44 585-34 21 160 12 43 115-34 22 000 12 42 240-34 21 000	13/4/2007	Mining in operation
35	Mr. Raham Ghafoor Khan MDW/MR/ML- Marble (182)/2002.	-do-	155.888 acres	43 B/3	12 42 240-34 21 000 Y 12 42 650-34 21 430 12 42 900-34 22 000 12 42 000-34 22 000 12 41 630-34 21 530	30/3/2005	Mining in operation
36	Mst. Shaheen Begum MDW/MR/ML- Marble (157)/95.	Plodheri	277.975 acres	43 B/3	12 36 834.92-34 17 943.83 Y 12 38 325.00-34 19 023.00 12 38 630.00-34 19 025.00 12 38 700.00-34 19 550.00 12 38 540.00-34 19 805.00 12 37 320.00-34 19 900.00 12 36 730.00-34 18 620.00 12 36 989.84-34 19 368.16 12 36 880.00-34 19 462.32 12 36 079.66-34 18 630.33	22/9/2005	Mining in operation
37	Mst. Shaheen Begum MDW/MR/ML- Marble (161)/96.	Pirsado	499.834 acres	43 B/7	12 41 755-34 23 410 Y 12 41 755-34 25 000 12 40 475-34 25 000 12 40 475-34 22 810	17/7/2007	Mining in operation
38	Mst. Shaheen Begum MDW/MR/ML- Marble (165)/99.	Plodheri	167.00 acres	43 B/3	12 36 235-34 18 820 Y 12 36 880-34 19 480 12 36 380-34 19 980 12 35 050-34 18 610 12 32 230-34 18 430 12 36 205-34 19 405	12/11/2006	Mining in operation

	1	2	3	4	5	6	7
39	Syed Shah Jehan MDW/MR/ML- Marble (170)/99.	Shamozai	143.00 acres	43 B/3	12 33 920-34 15 000 Y 12 34 400-34 15 390 12 33 730-34 16 030 12 33 520-34 15 953 12 33 350-34 16 100 12 33 030-34 15 860	3/5/2008	Mining in operation
40	Mr. Ferman Khan MDW/MR/ML- Marble (180)/2001.	Plodheri	417.635 acres	43 B/3	11 30 000-31 27 120 Y 11 29 120-31 28 200 11 28 185-31 27 455 11 29 080-31 26 345	6/10/2004 Process for renewal, 2009	Mining in operation
41	Mr. Ferman Khan MDW/MR/ML- Marble (135)/90.	-do-	247.56 acres	43 B/3	12 38 515.00-34 19 910.00 Y 12 37 712.39-34 20 712.39 12 37 000.00-34 19 950.00 12 37 800.00-34 19 120.00	22/9/2005	Mining in operation
42	Mr. Ziaullah Khan MDW/MR/ML- Marble (163)/97.	Shamozai	133.48 acres	43 B/3	12 36 300-34 15 970 Y 12 36 920-34 15 420 12 37 440-34 16 000 12 36 820-34 16 850	4/3/2002 Process for renewal	Mining in operation
43	M/S. Spinkai Mining Co: MDW/MR/ML- Marble (173)/2000.	-do-	147.861 acres	43 B/3	12 34 400.000-34 15 400.000 Y 12 34 900.000-34 15 800.000 12 34 177.047-34 16 622.547 12 33 720.000-34 16 040.000	4/5/2008	Mining in operation
44	Mr. Sameeullah MDW/MR/PL- Marble (434)/2001.		154.366 acres	43 B/3	11 28 185-31 27 445 Y 11 27 360-31 27 050 11 27 650-31 26 400 11 28 530-31 27 000	2/8/2004	Mining in operation

	1	2	3	4	5	6	7
45	Mr. Sameeullah MDW/MR/PL- Marble (458)/2003.		492.138acres	43 B/3	12 41 755-34 23 180 Y 12 43 000-34 24 600 12 43 000-34 26 000 12 42 000-34 26 000 12 42 000-34 25 000 12 41 755-34 25 000	22/10/2004	Mining in operation
46	Mr. Sameeullah MDW/MR/PL- Marble (456)/2003.		491.430 acres	43 B/7	11 37 000-41 42 500 Y 11 37 080-41 43 800 11 36 800-41 44 750 11 36 050-41 45 000 11 36 050-41 43 000	30/10/2004	Mining in operation
47	M/S.Sahibzada Engineer Co MDW/MR/PL- Marble (445)/2000.		500.635 acres	43 B/7	11 30 000-31 39 550 Y 11 30 800-31 40 000 11 30 800-31 41 250 11 29 060-31 41 250 11 29 060-31 40 350 11 30 000-31 40 350	14/10/2004	Mining in operation
48	Mr. Mohammad Shoaib MDW/MR/PL- Marble (462)/2003.		207.131 acres	43 B/3	11 30 000-31 20 990 Y 11 30 000-31 20 580 11 31 000-31 20 580 11 31 000-31 21 650 11 30 350-31 21 650 11 30 350-31 20 990	31/12/2004	Mining in operation
49	Mr. Mohammad Ayaz MDW/MR/ML- Marble (152)/93.	Matta	243.374 acres	43 B/3	12 34 120-34 15 480 Y 12 32 560-34 13 480 12 32 560-34 12 600 12 34 120-34 12 850	8/12/2004 Applied for renewal	Mining in operation

	1	2	3	4	5	6	7
50	M/S. Ali Haidar & Co: MDW/MR/PL- Marble (460)/2003.		430.129 acres	43 B/3	11 31 240-31 29 450 Y 11 32 120-31 29 660 11 32 120-31 30 460 11 29 450-31 30 465 11 29 450-31 30 000 11 30 850-31 30 000	2/12/2004	Mining in operation
51	M/S.Waisal & Company MDW/MR/PL- Marble (450)/2003.		97.623 acres	43 B/3	12 31 400-34 14 450 Y 12 31 400-34 15 080 12 30 650-34 15 080 12 30 650-34 14 450	26/3/2004	Mining in operation
52	Mr. Jehan Zeb Khan MDW/MR/ML- Marble (177)/2000.	Badam	409.37 acres	43 B/3	12 38 515.00-34 19 910.00 Y 12 37 712.39-34 20 712.39 12 37 500.00-34 20 460.00 12 38 260.00-34 19 660.00	22/9/2006	Mining in operation
53	Mr. Gul Haidar MDW/MR/PL- Marble (442)/2002.		216.944 acres	43 B/3	12 40 000-34 17 700 Y 12 39 600-34 18 600 12 40 000-34 19 000 12 29 000-34 19 500 12 39 350-34 17 550	1/2/2004	Mining in operation
54	Mr.Abbul Akber Khan MDW/MR/ML- Marble (167)/99.	Plodheri	166.91 acres	43 B/3	12 39 080-34 20 250 Y 12 38 200-34 21 160 12 37 730-34 20 730 12 38 645-34 19 805	22/9/2008	Mining in operation

Name of Mineral **Marble**

District **Swabi**

S.No.	Name & address of the Concession-air/File No	Locality	Total area granted	oposheet No	Coordinate/G.R Northing - Easting	Valid up to	Present Status
	1	2	3	4	5	6	7
1	Mr. Abdul Samad Khan MDW/MR/ML-Marble (140)/91.	Ghundo Tarako	13.634 acres	43 B/8	12 16 700-34 95 040 Y 12 16 360-34 45 150 12 16 300-34 44 980 12 16 600-34 44 860	17/5/2006	Mining in operation
2	Mr. Gul Zamin Khan MDW/MR/ML-Marble (158)/99.	Salim Khan	78.34 acres	43 B/8	12 09 770-34 50 150 Y 12 11 000-34 49 490 12 11 000-34 49 670 12 10 420-34 49 940 12 10 530-34 50 250 12 09 880-34 50 580	24/9/2004 Applied for renewal	Mining in operation
3	Mr. Riaz Hussain MDW/MR/ML-Marble (150)/93.	Ghundo Tarako	22.50 acres	43 B/8	12 17 695.00-34 44 018.36 Y 12 18 138.00-34 44 756.00 12 18 015.93-34 44 818.19 12 17 761.70-34 44 365.35 12 17 767.43-34 44 345.34 12 17 596.70-34 44 087.19	31/12/2004 Renewal in process	Mining in operation
4	Mr. Riaz Hussain MDW/MR/ML-Marble (82)/77.	-do-	22.50 acres	43 B/8	12 17 596.70-34 44 087.19 Y 12 17 767.43-34 44 345.34 12 17 761.70-34 44 365.35 12 18 015.93-34 44 818.19 12 17 900.00-34 44 860.00 12 17 480.00-34 44 140.20	1/1/2001 Process for 2006	Mining in operation

	1	2	3	4	5	6	7
5	M/S. Abaseen Mining Co: MDW/MR/ML-Marble (112)/87.	Ghundo Tarako	2.4836 acres	43 B/8	12 18 107.160-34 44 337.360 Y 12 18 208.457-34 44 276.505 12 18 261.099-34 44 365.600 12 18 165.099-34 44 423.280	20/1/2009	Mining in operation
6	M/S.Bakhat Jamal & Co: MDW/MR/ML-Marble(125)/87.	-do-	5.98 acres	43 B/8	12 11 100.00-34 44 150.00 Y 12 17 975.55-34 44 241.75 12 18 023.25-34 44 300.44 12 18 048.49-34 44 555.901 12 18 102.32-34 44 330.27 12 18 107.16-34 44 337.36 12 18 176.5-34 44 294.15 12 18 000.00-34 44 090.00	10/12/01 Renewal in process	Mining in operation
7	M/S. Char Bagh Marble MDW/MR/ML-Marble(89)/79.	-do-	8.93 acres	43 B/8	12 18 045.800-34 44 357.200 Y 12 18 102.323-34 44 330.267 12 18 165.099-34 44 423.280 12 18 261.099-34 44 365.600 12 18 367.210-34 44 540.720 12 18 224.000-34 44 626.397	29/8/2004	Mining in operation
8	M/S. Khan Khel Mining Co: MDW/MR/ML-Marble(115)/87.	-do-	9.73 acres	43 B/8	12 17 820.00-34 44 225.000 Y 12 17 925.85-34 44 161.039 12 17 97553-34 44 241.075 12 18 023.29-34 44 300.044 12 18 045.80-34 44 357.020 12 18 121.29-34 44 471.020 12 18 013.26-34 44 535.000	17/7/2008	Mining in operation
9	M/S. M.S Pak Building MDW/MR/ML-Marble(60)/69.	-do-	18.5888 acres	43 B/8	12 17 298.00-34 44 756.00 Y 12 17 352.50-34 44 695.00 12 17 131.71-34 44 485.71 12 16 805.08-34 44 580.00 12 17 120.00-34 44 481.20	22/10/2004	Mining in operation

	1	2	3	4	5	6	7
10	M/S. M.S Pak Building MDW/MR/ML-Marble(59)/69.	Ghundo Tarako	15.10 acres	43 B/8	12 18 420.00-34 45 460.00 Y 12 17 942.50-34 44 900.00 12 18 334.78-34 44 752.42 12 18 660.63-34 45 286.67	18/4/2005	Mining in operation
11	M/S.Tarako Mining Co: MDW/MR/ML-Marble(120)/87.	-do-	74.7 acres	43 B/8	12 17 352.50-34 44 695.00 Y 12 17 331.71-34 44 485.71 12 16 805.00-34 44 580.00 12 17 120.50-34 44 812.00 12 16 730.00-34 44 970.00 12 16 568.889-34 44 670.0 12 17 471.25-34 44 150.00 12 17 730.00-34 44 600.00	18/4/2005	Mining in operation
12	Mr. Haroon Jan Baryalai MDW/MR/ML-Marble(188)/2003.	-do-		43 B/8	12 36 180-34 18 920 Y 12 36 100-34 19 230 12 35 850-34 18 760 12 35 940-34 18 660	13/11/2006	Mining in operation

MINING CONCESSIONS IN MALAKAND DIVISION

Name of Mineral **Marble** District **Buner**

S.No.	Name & address of the Concession-air/File No	Locality	Total area granted	Toposheet No	Coordinate/G.R Northing - Easting	Valid up to	Present Status
	1	2	3	4	5	6	7
1	Mr. Ahmed Jan, MDW/BNR/ML-Marble (90)/95	Tursak	220.227 acres	43 B/6	12 55 620-34 38 910Y 12 55 620-34 40 780 12 55 050-34 40 780 12 55 050-34 38 910	cancelled	
2	M/s.Indus Marble (pvt) Ltd. MDW/HQ/PL-Marble (246)/84	-do-	487.98 acres	43 B/6	12 55 000-34 35 590 Y 12 55 000-34 36 730 12 53 320-34 38 000 12 52 000-34 37 285 12 53 395-34 37 285 12 53 140-34 36 490 12 53 625-34 35 590		
3	Mr. Said Ghafoor Shah, MDW/BNR/PL-Marble (229)/99	-do-	275.206 acres	43 B/6,7	12 91 290-34 37 200 Y 12 51 290-34 39 000 12 50 550-34 39 000 12 50 550-34 37 000		
4	M/S. Iftico International, MDW/SWT/ML-Marble (37)/92.	-do-	743.689 acres	43 B/6	12 56 080-34 37 090 Y 12 57 380-34 39 000 12 56 000-34 39 000 12 56 000-34 38 000 12 55 000-34 38 000 12 55 000-34 39 380 12 54 000-34 39 000 12 54 640-34 37 380	13/12/2000 Renewal under process	Mining in operation

	1	2	3	4	5	6	7
5	Mr. Abdul Ghaffar, MDW/HQ/BNR//ML-Marble (94)/67.	Tursak	290.08 acres	34 B/7	12 50 980-34 37 180 Y 12 50 090-34 36 940 12 48 678-34 35 260 12 54 100-34 34 920		
6	M/S. G.B Mining Co: MDW//BNR//PL-Marble (276)/2001.	Barzargai	142.84 acres	43 B/6	12 57 000-34 33 950 Y 12 57 000-34 34 520 12 55 350-34 334 520 12 55 350-34 34 252		
7	Mr Mukaram Khan, MDW//BNR//PL-Marble (213)/99.	-do-	142.704 acres	43 B/6	12 55 370-34 32 720 Y 12 54 295-34 32 565 12 54 295-34 32 000 12 55 370-34 32 000	14/3/2002 Renewal under process	Mining in operation
8	Mr. Ihsanullah khan, MDW//SWT/ML-Marble (181)/90.	-do-	280.25 acres	43 B/6	12 54 650-34 34 370 Y 12 54 080-34 33 720 12 54 080-34 32 520 12 55 150-34 33 030 12 54 800-34 33 970 12 55 340-34 34 100 12 55 340-34 34 250	24/4/2004 assigned on 21.11.01	Mining in operation
9	Spark Hill Marble Co: MDW//BNR//ML-Marble (111)/96.	-do-	65.166 acres	43 B/6	12 55 565-34 33 385 Y 12 55 910-34 33 530 12 55 270-34 34 090 12 55 035-34 34 030	24/4/2004	Mining in operation
10	Mr. Shamshi Khan, MDW//BNR//ML-Marble (79)/95.	-do-	121.756 acres	43 B/6	12 56 210-34 32 830 Y 12 56 210-34 33 700 12 55 380-34 33 230 12 55 380-34 32 730	24/4/2004	Mining in operation

	1	2	3	4	5	6	7
11	M/S. Bampokha Mining, Corporation MDW//SWT/ML-Marble (75)/84.	Bampokha	502.84 acres	43 B/6,7	12 49 630-34 29 520 Y 12 51 380-34 30 640 12 51 680-34 30 640 12 49 330-34 30 900 12 49 330-34 29 960	19/3/2028	Mining in operation
12	AL- Abbas Mining (pvt)Ltd: MDW//SWT/ML-Marble (129)/88.	-do-	313.06 acres	43 B/7	12 49 630-34 29 520 Y 12 50 750-34 29 730 12 50 750-34 30 760 12 50 370-34 30 800 12 50 370-34 30 000 12 50 180-34 30 000 12 50 180-34 30 830 12 49 330-34 30 900 12 49 330-34 29 960	14/1/2002 Renewal under process	Mining in operation
13	M/S Sahibzadgan Mining Co: MDW//BNR/ML-Marble (41)/92.	-do-	22.42 acres	43 B/7	12 50 345-34 30 025 Y 12 50 345-34 30 790 12 50 205-34 30 810 12 50 205-34 30 025	14/6/2006	Mining in operation
14	Mr. Sherafsar, MDW//SWT/ML-Marble (131)/88.	Bampokha	263.90 acres	43 B/6	12 51 370-34 32 000 Y 12 51 660-34 31 080 12 52 220-34 31 060 12 52 460-34 32 240 12 52 160-34 32 600 12 51 730-34 32 600 12 51 730-34 31 960	9/3/2028	Mining in operation
15	M/S. Rock Man marble, Processor Ltd: MDW//SWT/ML-Marble (171)/90.	-do-	384.07 acres	43 B/6	12 51 370-34 32 000 Y 12 49 570-34 32 420 12 49 570-34 31 290 12 51 660-34 31 080	24/11/2002 Renewal under process	Mining in operation

	1	2	3	4	5	6	7
16	Mr. Khan Said , MDW/BNR/PL-Marble (260)/2000.	Jowar	330.619 acres	43 B/6	12 58 000-34 26 800 Y 12 58 000-34 29 340 12 57 370-34 29 340 12 57 370-34 26 800	Cancelled	
17	MR. Abdullah, MDW/BNR/PL-Marble (129)/94.	-do-	140.49 acres	43 B/6	12 57 320-34 31 000 Y 12 57 320-34 30 000 12 58 000-34 30 000 12 58 000-34 31 000	12/3/04	Mining in operation
18	Mr. Mohd: Arshad khan, MDW/BNR/PL-Marble (216)/97.	Ali Sher	111.590 acres	43 B/6	12 47 550-34 34 160 Y 12 46 690-34 34 420 12 46 000-34 33 600 12 46 460-34 33 540	9/8/2003 Renewal under process	Mining in operation
19	Mr. Ali Rehman, MDW/BNR/PL-Marble (280)/2001.	-do-	108.316 acres	43 B/6	12 49 070-34 34 910 Y 12 50 710-34 36 000 12 50 380-34 36 420		
20	Mr. Gul Zada, MDW/BNR/PL-Marble (122)/94.	Tursak	759.61 acres	43 B/6	12 49 670-34 35 200 Y 12 49 670-34 33 830 12 51 570-34 33 640 12 51 570-34 36 140		
21	United Mining Industary, MDW/BNR/PL-Marble (226)/98.	-do-	196.280 acres	43 B/6	12 54 000-34 34 000 Y 12 55 000-34 34 820 12 55 000-34 35 870 12 54 000-34 34 850	6/4/2003 Renewal under process	Mining in operation
22	M/S.Iftico International, MDW//SWT/ML-Marble (69)/93.	-do-	102.349 acres	43 B/6	12 52 510-34 39 010 Y 12 52 510-34 39 140 12 52 610-34 39 140 12 52 610-34 39 420 12 51 370-34 39 420 12 51 370-34 39 010		

	1	2	3	4	5	6	7
23	Mr. Mohd: Arshad Khan, MDW//SWT/ML-Marble (88)/.95	Tursak	185/08 acres	43 B/6	12 49 440-34 33 900 Y 12 49 570-34 33 590 12 49 590-34 35 110 12 49 040-34 34 730	8/8/2003 Renewal under process	Mining in operation
24	Mr. Shad Mohammad, MDW//SWT/ML-Marble (202)/90.	-do-	185.00 acres	43 B/6	12 52 343.37-34 37 840.00 Y 12 51 868.64-34 38 246.21 12 51 948.70-34 38 747.83 12 51 330.00-34 38 680.00 12 51 330.00-34 37 250.00 12 51 840.00-34 37 250.00 12 51 840.00-34 37 840.00	8/8/2005 Renewal under process	Mining in operation
25	Mr. Abdul Samad, MDW/BNR/ML-Marble (1008)/96.	Topdara	867.167 acres	43 B/10	12 58 430-34 52 880 Y 12 58 730-34 52 260 12 60 750-34 52 450 12 61 780-34 54 000 12 60 000-34 55 100		
26	Mr. Abdul Samad, MDW/BNR/PL-Marble (96)/93.	-do-	347.91 acres	43 B/10	12 58 450-34 52 880 Y 12 58 730-34 52 260 12 60 150-34 52 450 12 61 180-34 54 000 12 60 000-34 55 100		
27	Salar Mining Corporation, MDW/BNR/PL-Marble (236)/99.	-do-	337.50 acres	43 B/6,10	12 60 790-34 51 350 Y 12 60 790-34 50 000 12 62 000-34 50 000 12 62 000-34 51 350	7/8/2003	Mining in operation

	1	2	3	4	5	6	7
28	Mr. Syed Islam, MDW/BNR/PL-Marble (13)/91.	Batai	177.88 acres	43 B/10	12 59 130-34 66 470 Y 12 59 000-34 66 070 12 58 580-34 67 530 12 58 580-34 67 250 12 58 370-34 67 250 12 58 370-34 66 070	20/9/2006	Mining in operation
29	M/s.Al-Abbas Mining, MDW/BNR/ML-Marble (31)/92.	Amnawar	520.661 acres	43 B/10	12 58 680-34 57 750 Y 12 56 000-34 58 220 12 56 000-34 59 220 12 53 480-34 58 670		
30	Mr. Zaristan, MDW/BNR/ML-Marble (51)/93.	-do-	299.27 acres	43 B/10	12 55 000-34 57 000 Y 12 54 770-34 57 910 12 53 450-34 57 550 12 53 660-34 56 500	14/9/2000 Renewal under process	Mining in operation
31	M/s.S.M Mining . MDW/BNR/ML-Marble (124)/99.	-do-	299.27 acres	43 B/10	11 48 235-31 59 475 11 48 235-31 60 500 11 47 610-31 60 825 11 47 075-31 60 545 11 47 280-31 59 540		
32	M/S. East & West, MDW/BNR/ML-Marble (14)/91.	Yakhdara Kandao	1251.99 acres	43 B/10	12 56 000-34 62 520 Y 12 60 000-34 63 700 12 54 100-34 65 000 12 54 100-34 63 730 12 52 090-34 63 730 12 52 090-34 62 520		

	1	2	3	4	5	6	7
33	M/S. Ehsan and Saleem, Mining Corporation MDW/BNR/ML-Marble (85)/95.	-do-	1220.88 acres	43 B/10	11 48 486.53-31 66 128.63 11 48 486.53-31 67 207.63 11 46 749.16-31 68 390.35 11 46 749.16-31 67 235.06 11 44 911.22-31 67 235.06 11 44 911.22-31 66 128.63		
34	Sesmag Enterprises, MDW/SWT/ML-Marble (203)/90.	Yakhdara Kandao	1363.39 acres	43 B/10	12 56 280-34 62 445 Y 12 53 160-34 62 445 12 53 160-34 60 330 12 56 280-34 60 330	1/1/2001 Renewal under process	Mining in operation
35	Syed Islam, MDW/SWT/ML-Marble (46)/93.	Gumbat	1465.86 acres	43 B/10	12 71 000-34 62 850 Y 12 71 000-34 66 370 12 68 050-34 64 140 12 68 050-34 62 850	24/5/2004	
36	Mr. Inam-ur-Rehman, MDW/BNR/PL-Marble (247)/2000.	Hisar	259.876 acres	43 B/10	12 59 360-34 53 600 Y 12 58 000-34 55 000 12 58 000-34 53 500 12 58 540-34 53 190		
37	Mr. Mohd:Ail Jan Khan, MDW/BNR/ML-Marble (111)/97.	Kot	153.894 acres	43 B/10	12 95 000-34 50 350 Y 12 75 000-34 52 000 12 71 000-34 52 000 12 71 000-34 50 480 12 72 950-34 49 350 12 72 950-34 50 350		
38	M/S. Paramount Mining Co: MDW/BNR/ML-Marble (281)/2001.	Kuz Shubnal	259.09 acres	43 B/10	12 63 550-34 60 150 Y 12 63 550-34 60 740 12 60 000-34 61 590 12 60 000-34 60 830		

	1	2	3	4	5	6	7
39	M/S. Iftico International, MDW/SWT/PL- Marble (414)/86.	Gujar	778.387 acres	43 B/10	12 61 480-34 63 610 Y 12 61 480-34 62 790 12 63 550-34 60 790 12 63 550-34 63 610		
40	Mr. Said Ali Shah, MDW/BNR/PL- Marble (257)/2000.	Parshala	384.29 acres	43 B/10	12 57 000-34 59 320 Y 12 57 000-34 60 250 12 55 000-34 60 250 12 55 000-34 59 320		
41	Maj: (Rtd) Mukhtar Ahmed, MDW/BNR/PL- Marble (16)/91.	Rajkand	241.42 acres	43 B/10	12 58 080-34 72 850 Y 12 58 590-34 71 000 12 58 900-34 72 850		
42	Mr. Alam Zeb Khan, MDW/SWT/PL- Marble (716)/90.	Bagra	238.727 acres	43 B/10	12 62 900-34 68 000 Y 12 61 470-34 68 000 12 61 470-34 66 000 12 62 900-34 66 000		
43	G.B Mining Co: MDW/BNR/PL- Marble (275)/2000.	Budhal	242.79 acres	43 B/10,11	12 54 000-34 65 760 Y 12 54 000-34 66 490 12 52 670-34 66 710 12 52 380-34 65 880		
44	M/S. Khadukhel Marble Co: MDW/BNR/ML- Marble (62)/80.	Matwanai	98.14 acres	43 B/11	12 49 750-34 63 500 Y 12 50 700-34 63 500 12 50 700-34 64 500 12 49 750-34 64 000		
45	Syed Islam, MDW/BNR/PL- Marble (171)/95.	Ganshal	731.56 acres	43 B/10	11 61 310-31 63 845 11 62 202-31 63 845 11 62 202-31 66 410 11 60 395-31 66 410 11 60 395-31 65 675 11 51 310-31 65 675		

	1	2	3	4	5	6	7
46	Mst. Hamida Qazi, MDW/BNR/PL-Marble (194)/96.	Giro china	327.149 acres	43 B/10	12 65 000-34 53 420 Y 12 66 000-34 52 630 12 66 000-34 53 570 12 64 610-34 52 820 12 64 610-34 52 820		
47	Syed Abbas Ali Shah, MDW/BNR/ML-Marble (97)/96.	Kalan Chinglai	508.45 acres	43 B/11	12 31 000-34 55 160 Y 12 31 000-34 57 170 12 29 830-34 57 170 12 29 830-34 56 720 12 29 760-34 56 720 12 29 760-34 55 160		
48	Mr. Ali Quds Pasha Gilani, MDW/BNR/PL-Marble (249)/2000.	Budal	392.56 acres	43 B/11	12 51 000-34 66 000 Y 12 51 000-34 68 000 12 50 000-34 68 000 12 51 000-34 66 000		
49	Mr.Dost Mohammad, MDW/BNR/PL-Marble (250)/2000.	Maghdarra	497.938 acres	43 B/8	12 14 260-34 50 000 Y 12 14 000-34 49 000 12 16 670-34 49 000 12 16 670-34 50 000		
50	Mr.Dur Majlis Khan, MDW/BNR/PL-Marble (230)/99.	Giro china	378.099 acres	43 B/10	12 64 350-34 54 000 Y 12 63 440-34 56 000 12 63 000-34 56 000 12 63 000-34 54 000		
51	Mr. Mastaqeem Khan, MDW/BNR/PL-Marble (239)/99.	Swawai	42.148 acres	43 B/11	12 27 750-34 56 010 Y 12 28 350-34 56 010 12 28 350-34 56 350 12 27 750-34 56 350	15/3/2003 Renewal under process	Mining in operatoin

	1	2	3	4	5	6	7
52	Mr. Mastaqeem Khan, MDW/BNR/PL- Marble (32)/2002.	Swawai	122.227 acres	43 B/11	12 28 350-34 56 310 Y 12 28 350-34 57 000 12 28 350-34 56 350 12 27 750-34 56 350		
53	M/S.Frontier Marble Industry, MDW/SWT/ML- Marble (137)/88.	-do-	1209.74 acres	43 B/7,11	12 25 440-34 56 240 Y 12 25 440-34 55 570 12 26 280-34 54 515 12 26 120-34 54 130 12 26 400-34 54 130 12 26 400-34 52 050 12 27 460-34 52 050 12 27 520-34 55 860 12 27 740-34 55 860 12 27 740-34 56 240		
54	M/S.Millat Mineral, Processor (pvt) Ltd MDW/BNR/ML- Marble (99)/96.	Bagh	11.74 acres	43 B/7	11 22 883.298-31 52 000.00 Y 11 22 000.000-31 52 300.00 11 21 878.034-31 52 300.00 11 21 710.000-31 52 634.498 11 21 783.611-31 52 678.053 11 21 883.800-31 52 531.000 11 21 945.000-31 52 495.000 11 22 883.298-31 52 555.000		
55	M/S.United Mining, Corporation Ltd: MDW/SWT/ML- Marble (197)/90.	-do-	29.85 acres	43 B/7	12 26 889.00-34 47 835.08 Y 12 26 589.56-34 47 857.01 12 26 319.56-34 47 343.71 12 26 000.00-34 47 460.69 12 26 000.00-34 47 410.00 12 26 415.19-34 47 211.97 12 26 695.75-34 47 787.20 12 26 895.00-34 47 569.01		

	1	2	3	4	5	6	7
56	Mr. Abdul sadiq, MDW/SWT/ML-Marble (175)/90.	Bagh	186.431 acres	43 B/7	11 12 334.560-31 53 829.608 Y 11 21 639.616-31 53 765,600 11 22 115.104-31 52 915.208 11 22 243.120-31 52 549.448 11 21 895.648-31 52 613.456 11 21 895.648-31 52 549.448 11 22 604.308-31 52 540.304 11 22 604.308-31 52 915.208 11 22 846.000-31 52 915.208		
57	Assigned to Abdul Sadiq, by Amir Ghawas M/L MDW/SWT/ML-Marble (175)/90.	-do-	145.931 acres	43 B/7	12 27 400-34 49 070 Y 12 26 640-34 49 000 12 27 160-34 48 070 12 27 960-34 48 070		
58	M/S. Classic Mines, MDW/BNR/ML-Marble (96)/98.	-do-	1149.332 acres	43 B/7	11 22 883.298-31 51 022.676 Y 11 22 883.298-31 52 000.000 11 22 000.000-31 52 300.000 11 21 878.034-31 52 300.000 11 21 710.000-31 52 634.498 11 21 793.611-31 52 678.053 11 21 867.630-31 52 867.612 11 21 884.800-31 52 683.300 11 22 293.100-31 52 887.700 11 22 142.700-31 52 915 200 11 22 115.200-31 52 915.600 11 21 170.000-31 54 579.692 11 21 968.898-31 54 579.692 11 21 968.898-31 55 594.676 11 21 054.498-31 55 594.676 11 21 054.498-31 51 022.676		

	1	2	3	4	5	6	7
59	Mr.Dayar Khan, MDW/BNR/PL- Marble (88)/93.	Batu Tangai Tangdarra	38.84 acres	43 B/7	12 47 620-34 36 290 Y 12 47 620-34 36 690 12 47 150-34 36 690 12 47 150-34 36 290		
60	M/S.Al- Abbas Mining Ltd: MDW/BNR/PL- Marble (155)/95.	Kuhai	59.941 acres	43 B/7	11 42 661.67-31 35 953.08 Y 11 42 387.35-31 36 355.42 11 42 387.35-31 37 214.96 11 42 286.76-31 37 214.96 11 42 286.76-31 36 392.00 11 41 043.18-31 36 392.08 11 41 043.18-31 36 318.84 11 42 250.19-31 36 318.84 11 42 634.24-31 35 825.07	7/12/2002 Renewal under process	Mining in operation
61	Mr. Jahan Zeb, MDW/BNR/PL- Marble (189)/95.	Jangdara	284.886 acres	43 B/7	12 46 000-34 36 430 Y 12 47 410-34 37 150 12 46 640-34 38 000 12 46 000-34 38 000		
62	Syed Delawar Shah, MDW/SWT/ML- Marble (103)/87.	Badraga	217.954 acres	43 B/10,11	12 53 150-34 67 870 Y 12 52 170-34 65 240 12 52 000-34 64 320 12 53 250-34 64 220		
63	Mohd: Arshad Khan, MDW/SWT/PL- Marble (559)/89.	Jabagai	326.18 acres	43 B/7	12 41 880-34 46 470 Y 12 42 530-34 45 810 12 43 750-34 47 000 12 43 100-34 41 660		
64	Dr.Roshan Hilal, MDW/BNR/PL- Marble (101)/93.	Kalal	734.700 acres	43 B/6	12 74 410-34 48 450 Y 12 74 410-34 50 000 12 73 000-34 50 000 12 73 000-34 49 260 12 71 760-34 48 520		

	1	2	3	4	5	6	7
65	Mr. Barodin, MDW/BNR/PL- Marble (187)/95.	Batu Kandao	347.479 acres	43 B/6	11 40 880-31 42 300 Y 11 42 530-31 42 300 11 42 530-31 42 800 12 43 450-31 42 955 12 43 450-31 42 700 11 42 000-31 42 800 11 40 880-31 42 800		
66	M/S.Saeed Mining Co: MDW/BNR/PL- Marble (80)/95.	Barjo Kani	209.46 acres	43 B/7	12 44 430-34 45 950 Y 12 43 770-34 46 860 12 43 330-34 46 490 12 43 400-34 46 240 12 43 250-34 45 860 12 43 270-34 45 090		
67	Mr. Nooer Dad, MDW/BNR/PL- Marble (97)/93.	Bishpur	406.435 acres	43 B/7	11 41 601-31 51 937 Y 11 40 348-31 51 937 11 40 348-31 51 114 11 40 869-31 51 114 11 40 869-31 50 254 11 41 583-31 50 254		
68	M/S.Dir Granite (pvt) Ltd: MDW/BNR/PL- Marble (19)/95.	Babji Kandao	963.000 acres	43 B/7	12 43 400-34 48 500 Y 12 43 400-34 50 100 12 42 360-34 50 250 12 42 360-34 48 050 12 40 450-34 48 050 12 39 680-34 47 000 12 40 000-34 47 000		
69	Mr.Saeed Jehan and Sahibzada Lateef-ur-Rahman, MDW/SWT/ML- Marble (159)/89.	Pira abai	112.555 acres	43 B/6	12 55 541.67-34 45 280 Y 12 55 005.00-34 46 460 12 54 515.00-34 46 460 12 55 108.34-34 45 280		

	1	2	3	4	5	6	7
70	To be auctioned for M/L,	Tango	265.419 acres	43 B/6	12 56 740.000-34 47 800.000 Y 12 56 740.000-34 48 670.000 12 55 010.000-34 48 420.436 12 55 010.000-34 47 806.313		
71	Zain Mining Corporation, MDW/SWT/PL-Marble (103)/85.	Liganrail/ Preja	328.01 acres	43 B/6	12 60 920-34 28 940 Y 12 60 920-34 27 470 12 63 000-34 27 470 12 63 000-34 28 940		
72	M/S. Iftico International, MDW/SWT/PL-Marble (740)/90.	Tursak	192.08 acres	43 B/6	12 56 080-34 37 090 Y 12 57 380-34 39 000 12 55 780-34 37 380 12 54 640-34 37 380 12 54 000-34 39 000 12 54 440-34 37 330		
73	Mr.Amir Ghani, MDW/SWT/ML-Marble (5)/91.	Nanser	417.87 acres	43 B/3	12 50 000-34 24 900 Y 12 49 000-34 24 900 12 49 000-34 25 650 12 48 000-34 25 000 12 48 000-34 24 000 12 49 950-34 24 000		
74	Mr.Taj Mohammad Khan, MDW/SWT/ML-Marble (96)/91.	-do-	277.27 acres	43 B/3,7	12 47 700-34 26 230 Y 12 48 580-34 26 870 12 47 840-34 27 870 12 46 960-34 27 230		
75	Mr. Biladar, MDW/SWT/PL-Marble (751)/91.	-do-	30.02 acres	43 B/3	12 47 900-34 24 970 Y 12 48 800-34 25 560 12 47 900-34 25 310		

	1	2	3	4	5	6	7
76	Mr.Rehmat Ali, MDW/BNR/ML- Marble (102)/96.	Nanser	94 109 acres	43 B/3	12 47 450-34 24 640 Y 12 47 150-34 25 050 12 46 800-34 25 050 12 46 800-34 24 270 12 47 150-34 24 150		
77	Nanser Mining Co: MDW/BNR/ML- Marble (198)/90.	-do-	333.502 acres	43 B/3,7	12 51 000-34 26 450 Y 12 52 630-34 28 650 12 52 110-34 29 000 12 50 550-34 26 780		
78	Mr. Shahzada Asfand Yar, MDW/BNR/ML- Marble (21)/92.	-do-	404.958 acres	43 B/3,7	12 45 990-34 25 000 Y 12 45 990-34 27 000 12 45 010-34 27 000 12 45 010-34 25 000		
79	Mr. Fazal Wadood, MDW/BNR/PL- Marble (3)/91.	-do-	584.25 acres	43 B/6,7	12 50 000-34 26 540 Y 12 51 000-34 26 460 12 53 500-34 28 330 12 52 300-34 28 980 12 50 650-34 26 730 12 50 000-34 26 750		

Name of Mineral **Marble** District **Shangla**

S.No.	Name & address of the Concession-air/File No	Locality	Total area granted	Toposheet No	Coordinate/G.R Northing - Easting	Valid up to	Present Status
	1	2	3	4	5	6	7
1	Mr. Amanullah Khan, MDW/SNA/PL-Marble (28)/2000.	Dalai	410.020 acres	43 B/9	13 07 000-34 69 000 Y 13 07 000-34 70 350 13 05 530-34 70 350 13 05 530-34 69 000	8/5/2003	Mining in operation
2	M/s. Khattak Sons, MDW/SNA/PL-Marble (59)/2002.	Khet	347.727 acres	43 B/13	13 04 000-34 83 000 13 04 000-34 83 990 13 02 300-34 83 990 13 02 300-34 83 000		
3	Mr. Mohammad Akbar, MDW/SNA/PL-Marble (60)/2003.	Derai	438.22 acres	43 B/13	12 86 900-34 75 990 Y 12 86 100-34 77 000 12 84 400-34 77 000 12 84 400-34 75 990	19/6/2004	Mining in operation
4	Choudary Mohammad Aslam, MDW/SNA/PL-Marble (33)/2000.	Babai	409.752 acres	43 B/13	13 02 000-34 80 520 13 02 000-34 82 000 13 00 720-34 82 000 13 00 600-34 80 520		
5	Mr. Usman Ghani, MDW/SNA/PL-Marble (30)/2000.	Dandai	419.421 acres	43 B/13	12 86 000-34 77 000 Y 12 84 400-34 77 000 12 84 400-34 76 000 12 86 860-34 76 000		Cancelled
6	Mr. Tahir Mahmood, MDW/SNA/PL-Marble (20)/99.	Matta	472.23 acres	43 B/9	12 96 180-34 72 120 Y 12 96 650-34 73 480 12 95 150-34 74 000 12 94 680-34 72 140		Processed for Rejection

	1	2	3	4	5	6	7
7	M/s.M . Z . I Mining Co: MDW/SNA/PL-Marble (26)/99.	Akotangai	252.066 acres	43 B/9	12 93 390-34 63 000 12 93 840-34 62 000 12 59 070-34 62 000 12 94 600-34 63 000	Cancelled	
8	Mst. Rukhsana Javed, MDW/SNA/PL-Marble (37)/2000.	Shahtut	330.37 acres	43 B/9	13 02 000-34 64 700 13 02 000-34 66 000 13 00 770-34 66 000 13 00 770-34 64 700	12/6/2002 Renewal under process	Mining in operation
9	Mr. Shahid Ali, MDW/SNA/PL-Marble (43)/2001.	Dakan	489.66 acres	43 B/9	12 87 990-34 72 200 Y 12 87 990-34 73 700 12 86 410-34 73 700 12 86 410-34 72 200		
10	Mr.Arshad Javed, MDW/SNA/PL-Marble (46)/2001.	Kuz Jaosar	498.49 acres	43 B/9	12 97 000-34 70 950 12 96 510-34 71 780 12 94 100-34 70 770 12 94 640-34 70 000	Cancelled	
11	Haji Easa Jan, MDW/SNA/PL-Marble (42)/2001.	Borai Banda	500	43 B/9	12 93 000-34 86 800 Y 12 93 000-34 71 000 12 91 900-34 71 000 12 91 900-34 68 800		
12	Mr. Afzal Khan MDW/SNA/PL-Marble (51)/2000.	Kaulun	207.00 acres	43 B/9	12 87 180-34 70 660 Y 12 87 180-34 72 190 12 86 410-34 72 190 12 86 410-34 71 110	3/9/2002 Renewal under process	Mining in operation
13	Mr. Bakht Nazar, MDW/SNA/PL-Marble (35)/2000.	Hussain Kandao	496.98 acres	43 B/9	12 94 670-34 72 640 Y 12 95 140-34 74 000 12 93 530-34 74 500 12 93 050-34 73 190		

	1	2	3	4	5	6	7
13	Mr. Humayun Shah, MDW/SNA/PL-Marble (98)/2001.	Karshat	454.545 acres	43 B/9	13 11 730-34 68 000 Y 13 11 730-34 69 000 13 09 530-34 69 000 13 09 530-3469 000	16/4/2003	Mining in operation
14	Mr. Bakht Nazar, MDW/SNA/PL-Marble (34)/2000.	Mayarosar Banda	495.55 acres	43 B/9	12 95 500-34 71 500 Y 12 95 500-34 72 340 12 93 450-34 73 000 12 93 450-34 71 500	Cancelled	
15	Mr.Mohd: Humayun Shah, MDW/SNA/PL-Marble (31)/2000.	Nainsuk	454.545 acres	43 B/9	13 11 700-34 69 000 13 11 700-34 70 000 13 09 500-34 70 000 13 09 500-34 69 000	25/9/2003	Mining in operation
16	Mr. Zardad, MDW/SNA/PL-Marble (29)/2000.	Barlewanai	471.849 acres	43 B/9	13 04 500-34 69 150 13 04 500-34 71 000 13 03 050-34 71 000 13 03 050-34 64 700		
17	Mr. Javed Khan. MDW/SNA/PL-Marble (50)/2001.	Lewanai	459.42 acres	43 B/9	12 03 040-34 69 910 Y 12 03 040-34 71 000 12 01 000-34 71 000 12 01 000-34 69 910	Cancelled	
18	Mr. Intikhab Alam, MDW/SNA/PL-Marble (32)/2000.	Lachut Banda	495.86 acres	43 B/9	13 08 530-34 68 500 Y 13 08 530-34 70 100 13 07 030-34 70 100 13 07 030-34 68 500		
19	Mr. Mirza Jan, MDW/SNA/PL-Marble (2)/96.	Zarai	1662.035 acres	43 B/9	12 95 560-34 67 000 Y 12 98 000-34 68 000 12 96 910-34 70 860 12 94 500-34 69 910		

	1	2	3	4	5	6	7
20	Mr. Zardad, MDW/SNA/PL-Marble (13)/98.	Pagorai	669.421 acres	43 B/9	13 03 000-34 69 380 Y 12 03 000-34 71 000 13 01 000-34 71 000 13 01 000-34 69 380	27/3/2001 withdrawal under process	
21	Mr. Bacha Zada, MDW/SNA/PL-Marble (39)/2000.	Dalai	495.02 acres	43 B/9	12 08 000-34 70 360 Y 12 08 000-34 71 330 12 05 530-34 71 330 12 05 530-34 70 360	Cancelled	
22	Syed Mubarak Shah, MDW/SNA/PL-Marble (8)/97.	Karshat	1100.82 acres	43 B/9 34 A/12,16	13 13 350-34 69 800 Y 13 13 450-34 73 000 13 11 735-34 73 000 13 11 735-34 69 800	12/10/2000 Mining in operation Renewal under process	
23	Mr.Ghafoor Khan, MDW/SNA/PL-Marble (18)/98.	Pagorai	495.867 acres	43 B/9	13 00 980-34 69 000 Y 13 00 980-34 71 500 13 00 020-34 71 500 13 00 020-34 69 000		
24	Mr Sharif Khan, MDW/SNA/PL-Marble (57)/2001.	Manga Banda	498.73 acres	43 B/13,14	12 84 390-34 75 900 Y 12 84 390-34 76 900 12 82 000-34 76 330 12 82 000-34 75 310	13/9/2003	Mining in operation

Name of Mineral **Serpentine** District **Shangla**

S.No.	Name & address of the Concession-air/File No	Locality	Total area granted	Toposheet No	Coordinate/G.R Northing - Easting	Valid up to	Present Status
	1	2	3	4	5	6	7
1	Mr.Zahideen Khan, MDW/SNA/PL-Serpentine (10)/99.	Babi Banda	337.355 acres	43 B/13	12 99 600-34 82 110 Y 13 01 420-34 83 150 12 98 280-34 83 150		
2	M/s.Yasir Mining Co: MDW/SNA/ML-Serpentine (18)/2001.	Punial	335.44 acres	43 B/13	12 99 940-34 79 650 Y 12 99 940-34 81 040 12 99 020-34 81 040 12 98 610-34 79 520		
3	Mr. Sadiq Hussain , MDW/SNA/ML-Serpentine (7)/2002.	Nagha	195.34 acres	43 B/9	13 00 220-34 60 690 Y 13 00 000-34 62 210 12 99 450-34 62 000 12 99 450-34 60 690		
4	Mr.Anwar Behzad, MDW/SNA/PL-Serpentine (17)/2001.	Upal	123.76 acres	43 B/13	12 95 410-34 79 850 Y 12 95 410-34 79 320 12 96 180-34 79 320 12 96 450-34 80 160		
5	Mr. Inam-ur-Rehman, MDW/SNA/PL-Serpentine (13)/2000.	Kuz Machar	376.549 acres	43 B/9	13 03 000-34 61 000 Y 13 03 000-34 62 000 13 01 650-34 62 000 13 01 650-34 60 300	2/5/2002 Renewal under process	Mining in operation
6	M/s.Universal Minieral(pvt) Ltd: MDW/SNA/PL-Serpentine (14)/2001.	Lilunai	497.843 acres	43 B/9	11 94 300-31 67 800 M 11 94 965-31 66 880 11 96 300-31 67 680 11 95 710-34 68 850	4/10/2003 Renewal under process	Mining in operation

	1	2	3	4	5	6	7
7	Pir Fazali Hakim, MDW/SNA/PL-Serpentine (19)/2001.	Khawar Kili	451.63 acres	43 B/9	13 10 240-34 65 580 Y 13 09 710-34 66 540 13 08 160-34 65 200 13 08 680-34 64 250	29/4/2004 Renewal under process	Mining in operation
8	Pir Fazali Hakim, MDW/SNA/PL-Serpentine (20)/2001.	Besharam	250.64 acres	43 B/9	13 06 900-34 63 220 Y 13 06 090-34 64 350 13 05 350-34 64 000 13 06 000-34 62 830	29/4/2003 Renewal under process	Mining in operation
9	Mr.Khan Bahadar, MDW/SNA/PL-Serpentine (250)/2002.	Kotkai	89.696 acres	43 B/9	11 88 030-31 65 490 M 11 88 205-31 65 410 11 88 205-31 65 656 11 89 000-31 65 950 11 89 000-31 66 270 11 88 030-31 65 950		
10	Mr.Khan Bahadar, MDW/SNA/PL-Serpentine (24)/2002.	Shakiwar	158.147 acres	43 B/9	11 86 800-31 64 000 Y 11 86 800-31 63 000 11 87 350-31 63 000 11 87 530-31 64 000		
11	Mr.Khan Bahadar, MDW/SNA/PL-Serpentine (25)/2002.	Kotkai	174.82 acres	43 B/9	11 87 220-31 65 410 M 11 88 205-31 65 410 11 88 205-31 65 665 11 89 000-31 65 950 11 89 000-31 66 270 11 87 220-31 65 700		

	1	2	3	4	5	6	7
12	M/s.Zeb Minerals, MDW/SNA/PL- Serpentine (58)/91.	Shalmanai	359.87 acres	43 B/9	12 96 340-34 59 870 Y 12 96 130-34 60 640 12 96 920-34 61 000 12 96 600-34 62 000 12 95 470-34 61 450 12 95 800-34 59 760		
13	Mr. Tahir Mahmood, MDW/SNA/PL- Serpentine (8)/97.	Bar Kotkai	291.322 acres	43 B/9	12 99 410-34 60 720 Y 12 99 410-34 61 720 12 98 000-34 61 720 12 98 000-34 60 720		
14	Haji Wazir Mohammad, MDW/SNA/PL- Serpentine (26)/2002.	Matta	498.45 acres	43 B/9,13	12 97 000-34 74 000 Y 12 97 000-34 74 990 12 96 540-34 74 990 12 96 540-34 76 000 12 95 660-34 76 000 12 95 550-34 73 870		
15	Mr.Mohammad Zaman, MDW/SNA/PL- Serpentine (16)/2001.	Alpurai	288.168 acres	43 B/9	11 91 465-33 67 390 M 11 90 850-33 67 850 11 89 945-33 66 860 11 89 340-33 66 710 11 89 490-33 66 380 11 90 550-33 66 620	19/8/2002 Renewal under process	Mining in operation
16	M/s.Khattak Sons (pvt) Ltd: MDW/SNA/PL- Serpentine (23)/2002.	Alpurai	393.98 acres	43 B/9	13 01 340-34 63 330 Y 13 00 890-34 64 650 12 99 390-34 64 000 13 00 000-34 63 000		

Name of Mineral **Serpentine** District **Swat**

S.No.	Name & address of the Concession-air/File No	Locality	Total area granted	Toposheet No	Coordinate/G.R Northing - Easting	Valid up to	Present Status
	1	2	3	4	5	6	7
1	M/s.M.Z.I Mining Co: MDW/SWT/PL-Serpentine (91)/2002.	Malam	96.301 acres	43 B/9	12 91 650-34 55 330 Y 12 91 650-34 56 300 12 91 000-34 56 220 12 90 900-34 55 665 12 91 230-34 55 715		
2	M/s.Bampokha Mining Corp: MDW/SWT/PL-Serpentine (79)/2001.	Malam	25.57 acres	43 B/9	12 91 300-34 55 320 Y 12 91 330-34 55 560 12 91 220-34 55 700 12 90 930-34 55 660 12 90 930-34 55 380	22/4/2004	Mining in operation
3	Mr. Arshad Khan, MDW/SWT/PL-Serpentine (85)/2001.	Dand	491.83 acres	43 B/9	12 88 120-34 55 000 Y 12 88 120-34 56 120 12 85 850-34 55 950 12 85 850-34 55 000	19/2/2004	Mining in operation
4	M/s. M - Z - I Mining Co: MDW/SWT/PL-Serpentine (78)/2001.	Nao	452.65 acres	43 B/9	12 84 000-34 55 000 Y 12 82 390-34 65 470 12 82 310-34 54 830 12 83 610-34 54 000		
5	M/s. M - Z - I Mining Co: MDW/SWT/PL-Serpentine (83)/2001.	ilanai	432.27 acres	43 B/9	12 94 620-34 52 250 Y 12 94 620-34 54 000 12 93 300-34 53 670 12 93 300-34 52 250		

	1	2	3	4	5	6	7
6	M/s. M - Z - I Mining Co: MDW/SWT/PL-Serpentine (82)/2001.	Kakot	496.28 acres	43 B/9	12 97 430-34 55 740 Y 12 96 410-34 57 400 12 95 160-34 56 590 12 96 500-34 55 250		
7	Mr. Shahid Ali, MDW/SWT/PL-Serpentine (77)/2001.	Spinobo	392.638 acres	43 B/9	11 82 340-31 60 960 M 11 81 100-31 60 960 11 81 100-31 59 475 11 82 000-31 59 475		
8	Haji Mohammad Rasool, MDW/SWT/PL-Serpentine (74)/2001.	Lewanai	495.86 acres	43 B/9	12 84 800-34 54 000 Y 12 84 800-34 57 000 12 84 000-34 57 000 12 84 000-34 54 000		
9	Mr. Gul Asfandyar Amir Zeb, MDW/SWT/PL-Serpentine (92)/2003.	Sapargai	103.161 acres	43 B/9	12 88 660-34 56 580 Y 12 88 660-34 56 900 12 88 080-34 56 900 12 87 580-34 57 000 12 87 190-34 56 820 12 87 190-34 56 580	20/4/2004 Renewal under process	Mining in operation
10	Mr. Arshad Khan, MDW/SWT/PL-Serpentine (95)/2003.	Dand	324.566 acres	43 B/9	12 88 810-34 56 180 Y 12 88 950-34 56 890 12 88 670-34 56 890 12 88 670-34 56 570 12 87 180-34 56 570 12 87 180-34 56 890 12 68 990-34 56 890 12 86 990-34 57 000 12 86 480-34 57 000 12 86 290-34 56 000	18/8/2004	Mining in operation

Name of Mineral **Marble**

District **Swat**

S.No.	Name & address of the Concession-air/File No	Locality	Total area granted	Toposheet No	Coordinate/G.R Northing - Easting	Valid up to	Present Status
	1	2	3	4	5	6	7
1	M/s.M-Z-I Mining Co: MDW/SWT/PL-Marble (859)/2000.	Kakot	482.737 acres	43 B/9	12 96 820-34 56 310 Y 12 96 260-34 57 880 12 94 730-34 57 000 12 96 000-34 55 730		
2	Mr.Mehronesh Khan, MDW/SWT/PL-Marble (173)/2001.	Zangi	426.18 acres	43 B/9	12 94 880-34 49 950 Y 12 95 370-34 51 800 12 94 010-33 51 800 12 94 010-34 49 950		
3	M/s. M-Z-I Mining Co: MDW/SWT/PL-Marble (862)/2001.	Soko Kandao	379.214 acres	43 B/9	12 92 990-34 56 880 Y 12 92 990-34 58 520 12 91 660-34 58 000 12 91 660-34 56 880		
4	Mr.Mohammad Ismail, MDW/SWT/PL-Marble (861)/2001.	Lodia	178.537 acres	43 B/9	12 94 620-34 54 000 12 94 620-34 55 300 12 93 830-34 55 300 12 93 830-34 54 720 12 93 960-34 54 300		
5	M/s. M-Z-I Mining Co: MDW/SWT/PL-Marble (878)/2001.	Achro Kandao	84.71 acres	43 B/9	12 93 500-34 58 520 y 12 93 000-34 58 520 12 93 000-34 56 880		
6	Mr.Ahmed Ali, MDW/SWT/PL-Marble (885)/2001.	Mattai	415.227 acres	43 B/9	12 97 840-34 54 450 Y 12 96 420-34 54 450 12 95 320-34 53 820 12 97 000-34 53 000		

	1	2	3	4	5	6	7
7	Mr. Saeed-ur-Rehman, MDW/SWT/PL-Marble (879)/2001.	Chamtalai	436.95 acres	43 B/9	12 03 690-34 52 000 Y 12 02 410-34 52 790 12 01 000-34 52 400 12 03 220-34 51 000		
8	Mr.Mohammad Ismail, MDW/SWT/PL-Marble (867)/2001.	Khadarzo Patai	484.21 acres	43 B/9	12 95 000-34 51 810 Y 12 95 000-34 53 650 12 93 320-34 52 760 12 93 320-34 51 810		
9	Mr. Bacha Zada, MDW/SWT/PL-Marble (860)/2002.	Zangai	451.818 acres	43 B/8,9	12 95 000-34 50 330 Y 12 94 650-34 49 000 12 96 000-34 49 190 12 96 390-34 51 390		
10	Mr.Khursheed Ali, MDW/SWT/PL-Marble (878)/2002.	Tuwa	484.917 acres	43 B/9	12 98 650-34 52 000 Y 12 97 760-34 52 520 12 96 400-34 51 390 12 96 160-34 50 000		
11	Mr. Amir Khitab Afarin MDW/SWT/PL-Marble (870)/2001.	Kuh	454.54 acres	43 B/9	12 89 000-34 56 900 Y 12 89 000-34 58 000 12 87 000-34 58 000 12 87 000-34 56 900		
12	M/s.M-Z-I Mining Co: MDW/SWT/PL-Marble (863)/2001.	Asharai	484.845 acres	43 B/9	12 96 000-34 55 730 Y 12 94 730-34 57 000 12 94 010-34 57 000 12 94 010-34 55 310 12 95 000-34 55 310		

	1	2	3	4	5	6	7
13	M/s.A . I Mining Co: MDW/SWT/PL-Marble (895)/2003.	Shagai	130.49 acres	43 B/9	12 92 080-34 54 000 Y 12 91 600-34 53 760 12 91 020-34 53 760 12 91 340-34 53 000 12 91 860-34 53 000		
14	Mr. Usman Ghani, MDW/SWT/PL-Marble (893)/2003.	Sabar shah	245.94 acres	43 B/9	12 90 740-34 50 280 Y 12 91 000-34 51 610 12 89 670-34 51 000 12 89 670-34 50 280		
15	Mr.Habibullah Khan, MDW/SWT/PL-Marble (877)/2001.	Shagai Banda	492.38 acres	43 B/1	12 91 000-34 19 210 Y 12 90 000-34 19 540 12 88 870-34 18 000 12 90 260-34 17 450		
16	Haji Mohammad Rasool, MDW/SWT/PL-Marble (892)/2003.	Rangela	339.48 acres	43 B/1	12 82 630-34 19 230 Y 12 82 000-34 20 570 12 81 380-34 20 570 12 81 320-34 18 670		
17	M/s.M.Z.I Mining Co; MDW/SWT/PL-Marble (872)/2001.	Lanai	498.23 acres	43 B/9	12 94 010-34 57 000 Y 12 94 730-34 57 000 12 96 260-34 57 880 12 96 000-34 58 800 12 94 010-34 57 950		
18	M/s.M.Z.I Mining Co; MDW/SWT/PL-Marble (876)/2001.	Lanai	258.326 acres	43 B/9	12 94 620-34 53 460 Y 12 94 620-34 53 980 12 93 950-34 54 286 12 93 420-34 54 000 12 93 320-34 52 770		

	1	2	3	4	5	6	7
19	Mr.Habibullah Khan, MDW/SWT/PL- Marble (877)/2001.	Shahai Banda	458.83 acres	43 B/1	12 90 670-34 19 300 Y 12 90 000-34 19 550 12 88 780-34 17 770 12 90 000-34 17 200		

Name of Mineral **Granite**

District **Swat**

S.No.	Name & address of the Concession-air/File No	Locality	Total area granted	Toposheet No	Coordinate/G.R Northing - Easting	Valid up to	Present Status
	1	2	3	4	5	6	7
1	M/s.M-Z-I Mining Co: MDW/SWT/PL-Granite (101)/99.	Sara shah	961.93 acres	43 B/9	12 87 500-34 51 170 Y 12 87 250-34 53 000 12 85 000-34 53 560 12 84 400-34 52 000		
2	Mr. Ahmed Khitab, MDW/SWT/PL-Granite (109)/2001.	Sorai	356.59 acres	43 B/1,5	12 84 000-34 24 680 Y 12 84 000-34 26 000 12 82 410-34 26 000 12 82 180-34 25 340		
3	Mr. Ahmed Khitab, MDW/SWT/PL-Granite (103)/2000.	Malam	138.342 acres	43 B/9	12 91 600-34 53 800 Y 12 92 840-34 54 460 12 92 840-34 54 670 12 91 600-34 54 670	2/11/2000 Renewal under process	Mining in operation
4	Mr.Nasir Afzal, MDW/SWT/PL-Granite (9)/2000.	Shawar	389.307 acres	43 B/13	12 93 550-34 98 350 Y 12 93 000-34 99 700 12 92 220-34 99 200 12 92 400-34 97 250		
5	M/s. M . Z . I Mining Co: MDW/SWT/PL-Granite (101)/99.	Sara shah	479.535 acres	43 B/9	12 87 250-34 53 000 Y 12 85 000-34 53 560 12 84 750-34 52 910 12 87 410-34 51 790		
6	M/s. Dir Granite (pvt) Ltd: MDW/SWT/PL-Granite (17)/95.	Barikot	97.408 acres	43 B/2	11 63 000.0-31 28 585 M 11 63 246.5-31 28 355 11 64 000.0-31 29 000 11 63 660.0-31 29 315		

Name of Mineral **Marble**

District **Dir**

S.No.	Name & address of the Concession-air/File No	Locality	Total area granted	Toposheet No	Coordinate/G.R Northing - Easting	Valid up to	Present Status
	1	2	3	4	5	6	7
1	Mr.Fakhri Alam, MDW/DR/PL-Marble (69)/98.	Mocho	413.22 acres	38 N/14	12 78 000-33 88 000 Y 12 78 000-33 89 000 12 76 000-33 89 000 12 76 000-33 88 000		
2	Mr. Nisar Ahmed, MDW/DR/PL-Marble (72)/2001.	Kalo Monrai	251.03 acres	38 N/14	12 77 430-34 94 540 Y 12 76 000-34 94 540 12 76 000-34 93 540 12 77 000-34 93 540		
3	Mr. Hafiz ullah, MDW/DR/PL-Marble (27)/89.	Kalo Monrai	334.71 acres	38 N/14	12 75 580-34 94 900 Y 12 76 000-34 94 620 12 76 000-34 93 000 12 77 000-34 93 000 12 77 000-34 94 000		
4	Mr.Fakhri Alam, MDW/DR/PL-Marble (68)/99.	Shashi Khan	277.79 acres	38 N/14	12 76 370-33 83 000 Y 12 76 370-33 84 000 12 75 740-34 84 420 12 75 330-33 84 420 12 75 330-33 83 000		
5	Mr. Zakir ullah khan, MDW/DR/PL-Marble (39)/92.	Mian Bran Gola, Degan Banda	576.57 acres	38 N/14	12 70 000-33 91 690 Y 12 70 000-33 93 000 12 67 190-33 93 000 12 69 000-33 91 480		

	1	2	3	4	5	6	7
6	Mr. Mjohammad Yjousaf, MDW/DR/PL-Marble (41)/92.	Shamsi khan	373.50 acres	38 N/14	12 77 270-33 84 550 Y 12 77 920-33 85 830 12 75 760-33 85 340 12 75 760-33 84 550		
7	Mr. Mjohammad Yjousaf, MDW/DR/PL-Marble (53)/95.	Shamsi khan	373.34 acres	38 N/14	11 67 945-30 94 840 Y 11 68 485-30 96 000 11 66 575-30 95 590 11 66 575-30 94 840		
8	Mr. Fazal Karim, MDW/DR/PL-Marble (55)/2001.	Tangi	459.26 acres	38 N/14	12 70 000-34 92 470 Y 12 70 000-34 93 400 12 68 450-34 93 910 12 67 720-34 92 650		
9	Mr. Zakir Ullah khan, MDW/DR/PL-Marble (63)/96.	Tiruna	1578.91 acres	38 N/14	11 60 373-30 95 244 M 11 61 288-30 97 072 11 59 459-30 97 987 11 58 160-30 96 615 11 58 360-30 94 785		
10	Shahzada Iqbal Baig, MDW/DR/PL-Marble (62)/95.	Usakai	135.30 acres	38 N/14	11 67 888.8-31 06 216.8 M 11 67 688.8-31 07 131.2 11 66 930.0-31 07 131.2 11 67 250.0-31 06 216.8		
11	Haji Mohammad Zeb Khan, MDW/DR/PL-Marble (60)/95.	Amlok	826.45 acres	38 N/14	11 66 774.502-30 97 073.071 11 66 774.502-30 98 901.871 11 64 945.702-30 98 901.871 11 64 945.702-30 97 073.071		

	1	2	3	4	5	6	7
12	Dr. Zakir Ullah Khan, MDW/DR/PL- Marble (64)/96.	Manki Kili	660.17 acres	38 N/14	11 61 690-30 90 672 M 11 61 690-30 92 153 11 59 459-30 91 153 11 59 459-30 90 672		
13	M/s.Sarhad Development Authority, MDW/DR/ML- Marble (3)/93.	Maiar Daggan Banda	1549.59 acres	38 N/14	12 73 000-33 89 000 12 73 000-33 91 000 12 68 000-33 91 000 12 68 000-33 90 000		
14	Mr. Mardan Ali, MDW/DR/PL- Marble (44)/94.	Chakdara	153.409 acres	43 B/2	12 68 240-34 02 050 Y 12 68 000-34 03 400 12 67 760-34 03 400 12 67 380-34 02 050		
15	M/s.G .B Mining Co: MDW/DR/PL- Marble (73)/2002.	Sampai	497.54 acres	43 B/1	12 88 280-34 14 800 Y 12 87 750-34 15 550 12 86 530-34 13 490 12 87 520-34 13 000		

Name of Mineral **Granite** District **Dir**

S.No.	Name & address of the Concession-air/File No	Locality	Total area granted	Toposheet No	Coordinate/G.R Northing - Easting	Valid up to	Present Status
	1	2	3	4	5	6	7
1	Mr. Sharif Khan, MDW/DR/PL-Granite (90)/2000.	Shakar Tangi	258.264 acres	38 N/13	12 98 000-33 83 000 12 98 000-33 84 250 12 97 000-33 84 250 12 97 000-33 83 000		
2	M/s.Sadiq Granite, MDW/DR/PL-Granite (76)/2000.	Bagh	433.884 acres	38 N/13	13 10 000-33 83 180 Y 13 09 000-33 84 650 13 08 000-33 84 000 13 09 000-33 82 550		
3	M/s.Sadiq Granite, MDW/DR/PL-Granite (77)/2000.	Takatak	929.752 acres	38 N/13	13 00 000-33 79 700 Y 12 98 000-33 81 000 12 97 000-33 80 000 12 98 000-33 78 000		
4	Mr. Abid Hussain, MDW/DR/PL-Granite (79)/2000.	Nawagai	533.057 acres	38 N/13	12 94 000-33 97 000 Y 12 94 000-33 99 000 12 92 710-33 99 000 12 92 710-33 97 000		
5	Mr. Abid Hussain, MDW/DR/PL-Granite (85)/2000.	Kuhnader	392.562 acres	38 N/13	12 92 950-33 85 000 Y 12 92 000-33 85 000 12 92 000-33 83 000 12 92 950-33 83 000		
6	Mr. Mohammad Ijaz, MDW/DR/PL-Granite (88)/2000.	Bahrun	403.51 acres	38 N/13	12 96 000-33 94 780 Y 12 96 000-33 95 480 12 94 140-33 94 400 12 94 140-33 93 000		

	1	2	3	4	5	6	7
7	Mr. Abid Hussain, MDW/DR/PL-Granite (80)/2000.	Sherkhanai	498.646 acres	38 N/13	12 98 000-33 82 230 Y 12 97 270-33 83 000 12 96 000-33 81 700 12 96 000-33 80 250		
8	M/s. Sadaq Granite, MDW/DR/PL-Granite (78)/2000.	Kandar	472.727 acres	38 N/13	12 89 430-33 80 000 Y 12 89 430-33 81 600 12 89 430-33 81 600 12 88 000-33 80 000		
9	M/s.Descon Engineer (pvt)Ltd: MDW/DR/PL-Granite (12)/94.	Sugiar	386.776 acres	38 N/13	12 65 000-33 83 000 12 66 000-33 83 000 12 66 000-33 84 600 12 65 000-33 84 600 12 64 660-33 84 000		
10	M/s.Descon Engineer (pvt)Ltd: MDW/DR/PL-Granite (11)/94.	Mian Barangol	460.289 acres	38 N/13	12 66 590-33 91 000 12 68 000-33 91 000 12 68 000-33 92 260 12 66 590-33 92 900		
11	Mr. Fakhri Alam, MDW/DR/PL-Granite (68)/97.	Shamshi	277.79 acres	38 N/13	12 76 370-33 83 000 Y 12 76 370-33 84 000 12 75 740-33 84 420 12 75 330-33 84 420 12 75 330-33 83 000		
12	M/s.G . B Mining Co: MDW/DR/PL-Granite (98)/2001.	Derakai Kili	655.88 acres	43 B/1	12 89 900-34 17 000 Y 12 88 580-34 17 360 12 87 250-34 15 550 12 88 280-34 14 800		

	1	2	3	4	5	6	7
13	Mr. Inayat Khan, MDW/DR/PL-Granite (14)/94.	Khagram	994.506 acres	34 B/1	11 89 970-31 10 785 M 11 89 970-31 10 420 11 91 280-31 10 000 11 91 810-31 10 400 11 92 165-31 10 400 11 92 375-31 10 150 11 92 860-31 10 400 11 94 205-31 10 150 11 95 120-31 10 150 11 96 950-31 10 910 11 96 950-31 11 590 11 95 120-31 10 785		

Name of Mineral **Marble**

District **Malakand Agency**

S.No.	Name & address of the Concession-air/File No	Locality	Total area granted	Toposheet No	Coordinate/G.R Northing - Easting	Valid up to	Present Status
	1	2	3	4	5	6	7
1	Mr. Tahmid Gul, MDW/MLA/PL-Marble (124)/2000.	Digar kandao	495.867 acres	38 N/14	12 52 000-33 80 000 Y 12 52 000-33 82 400 12 51 000-33 82 400 12 51 000-33 80 000		
2	Mr.Falak Naz, MDW/MLA/ML-Marble (18)/90.	Hur Malo Kandao	801.22 acres	38 N/14	12 64 000-33 76 220 12 64 470-33 78 320 12 63 420-33 79 080 12 62 000-33 77 000		
3	Haji Hidayatullah Khan MDW/MLA/PL-Marble (131)/2002.	Hur Malo Kandao	169.903 acres	38 N/14	11 55 250-30 87 437 M 11 55 950-33 89 360 11 55 380-30 89 757		
4	Mr. Bakht Nazar, MDW/MLA/PL-Marble (128)/2001.	Mainaga	495.867 acres	38 N/14	12 61 000-33 77 300 Y 12 61 000-33 78 500 12 59 000-33 78 500 12 59 000-33 77 300		
5	M/s.Rocks Peckers MDW/MLA/PL-Marble (11)/95.	Malakand	483.869 acres	38 N/14	11 50 270-31 03 785 M 11 50 270-31 04 435 11 51 010-31 04 435 11 51 010-31 05 302 11 49 400-31 05 302 11 49 400-31 03 785		

	1	2	3	4	5	6	7
6	Mr. Fazal Rehman, MDW/MLA/PL-Marble (97)/94.	Bartangai	550.24 acres	38 N/14	11 53 330-30 87 930 M 11 53 330-30 88 780 11 52 750-30 88 780 11 52 750-30 90 400 11 51 680-30 90 100 11 52 370-30 87 930		
7	Mr.Sharif -ur -Rehman MDW/MLA/PL-Marble (110)/97.	Barwal Shagai	1047.11 acres	38 N/14	12 59 000-33 80 090 12 63 520-33 81 450 12 63 000-33 82 880 12 60-180-33 81 220 12 59 000-33 81 580		
8	Mr. Sadullah Khan, MDW/MLA/PL-Marble (101)/95.	Narai Tangai	965.702 acres	38 N/14	12 63 220-33 79 000 Y 12 64 500-33 80 850 12 60 700-33 79 570 12 60 700-33 78 000		

Name of Mineral **Granite** District **Malakand Agency**

S.No.	Name & address of the Concession-air/File No	Locality	Total area granted	Toposheet No	Coordinate/G.R Northing - Easting	Valid up to	Present Status
	1	2	3	4	5	6	7
1	M/s.Dir Granite (pvt) Ltd: MDW/MLA/PL-Granite (14)/95.	Malakand	56.9 acres	38 N/15	12 58 510-33 95 000 12 58 000-33 95 000 12 58 000-33 94 460 12 58 510-33 94 460		
2	Haji Inayat Khan MDW/MLA/PL-Granite (12)/95.	Kolangai	411.901 acres	38 N/15	13 65 880-30 80 180 Y 13 66 440-30 80 820 13 64 410-30 82 180 13 64 000-30 81 440		

Name of Mineral **Marble** District **Chitral**

S.No.	Name & address of the Concession-air/File No	Locality	Total area granted	Toposheet No	Coordinate/G.R Northing - Easting	Valid up to	Present Status
	1	2	3	4	5	6	7
1	Haji Mohammad Khan, MDW/CL/PL-Marble (105)/2000.	Nasir	475.20 acres	42 D	14 68 600-35 36 300 Y 14 69 600-35 38 300 14 70 600-35 38 300 14 69 900-35 36 300	8/5/2003	Mining in operation
2	Haji Mohammad Khan, MDW/CL/PL-Marble (109)/2000.	Istacn	490.702 acres	42 D	11 91 300-34 56 500 Y 11 90 100-34 58 800 11 89 400-34 58 400 11 90 600-34 55 800	23/5/2003 Cancellation under Process	
3	Haji Mohammad Khan, MDW/CL/PL-Marble (93)/2000.	Patigal	271.17 acres	38 M/14	13 93 500-33 88 000 Y 13 95 250-33 88 750 13 93 500-33 88 750	27/4/2002 Cancellation under Process	
4	Mr. Mohammad Rafi, MDW/CL/PL-Marble (97)/2000.	Chinar	370.867 acres	38 M	14 26 600-33 68 800 Y 14 27 300-33 67 500 14 28 100-33 69 000 14 28 100-33 70 000	9/9/2002 Cancellation under Process	
5	Shehzadi Tamara, MDW/CL/ML-Marble (16)/2002.	Kalas	85.227 acres	38 M/14 1"=1Mile	13 97 000-33 91 000 13 97 000-33 91 550 13 96 2550-33 91 550 13 96 250-33 91 000	20/12/2005	Mining in operation
6	Mr. Fathur Rehman, MDW/CL/ML-Marble (17)/2002.	Gahirat	499.586 acres	38 M/14	13 88 290-33 73 500 13 86 850-33 75 250 13 86 000-33 74 600 13 87 450-33 72 850	26/7/2002 Renewal under process	Mining in operation

	1	2	3	4	5	6	7
7	Mr. Mohammad Shafa, MDW/CL/ML- Marble (15)/2002.	Sanogar	269.757 acres	42 D 1:250,000	14 65 075-34 31 150 Y 14 65 975-34 33 100 14 65 425-34 33 400 14 64 550-34 31 400	15/6/2001 Renewal under process	Mining in operation
8	M/s.Kamal and Sons, MDW/CL/ML- Marble (3)/88.	Harat	1084.35 acres	38 M/14	13 91 650-33 75 310 13 89 800-33 73 525 13 90 700-33 73 525 13 90 700-33 72 925 13 91 650-33 73 175	14/11/2008	Mining in operation
9	Maulana Abdul Akber Chitrali, MDW/CL/ML- Marble (14)/2000.						
10	Mr. Razeetubillah, MDW/CL/PL- Marble (111)/2001.						
11	Mr.Zafar Ahmad, MDW/CL/PL- Marble (116)/2002.	Mirkhani/ Ashreat	500.227 acres	38 M/11,15	13 65 000-33 71 650 13 65 000-33 73 530 13 63 580-33 73 530 13 63 580-33 72 000	2/7/2004	Mining in operation
12	Mr. Shaukat Hussain, MDW/CL/PL- Marble (117)/2002.	Gazguru	499.090 acres	38 M/10	13 90 000-33 62 000 13 90 000-33 62 990 13 87 560-33 62 990 13 87 560-33 62 000	26/2/2004	Mining in operation

	1	2	3	4	5	6	7
13	Mr. Sha Tam Khan, MDW/CL/ML-Marble (5)/91.	Gahirat	221.65 acres	38 M/14 1"=1Mile	13 90 580-33 73 820 13 90 070-33 72 510 13 90 000-33 72 000 13 90 720-33 72 000 13 90 770-33 73 510	7/2/2007	Mining in operation
14	Haji Abdul jalil, MDW/CL/ML-Marble (11)/96.	Aun	2014.31 acres	38 M/14	13 97 000-33 74 000 13 97 000-33 75 610 13 91 720-33 73 870 13 91 700-33 72 910 13 90 720-33 72 640 13 90 720-33 72 000	24/7/2005	Mining in operation
15	Haji Mohammad Usman, MDW/CL/ML-Marble (62)/97.	Gahirat	68.59 acres	38 M/14 1"=1Mile	13 90 780-33 73 520 13 90 760-33 72 900 13 91 000-33 73 000 13 91 000-33 74 710 13 89 840-33 73 520	4/11/2007 Renewal under process	Mining in operation
16	Haji Mohammad Usman, MDW/CL/ML-Marble (18)/2002.	-do-	275.227 acres	38 M/14 1"=1Mile	13 91 000-33 73 000 13 91 470-33 73 000 13 91 470-33 74 000 13 92 250-33 75 860 13 91 000-33 74 680	21/8/2006	Mining in operation
17	M/s. Mineral International, MDW/CL/ML-Marble (12)/97.	Shalak	1329.67 acres	38 M/14	13 97 760-33 90 000 14 00 480-33 94 150 13 99 000-33 94 650 13 97 000-33 91 480		

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	1	2	3	4	5	6	7
18	Mr. Mohammad Riaz Khan,	Bumboret	305.971 acres	38 M/10 1"=1Mile	13 91 440-33 58 320 13 91 440-33 58 320 13 92 300-33 59 250 13 91 390-33 60 000 13 90 540-33 59 150		
19	Mr. Ahmad Ali Khan	Lawi	498.55 acres	38 M/10 1"=1Mile	13 84 000-33 81 000 Y 13 84 000-33 79 670 13 85 900-33 79 250 13 85 900-33 80 460		
20	Mr. Zia-ud- Din,	Bamboret	87.129 acres	38 M/10 1"=1Mile	13 94 000-33 65 000 Y 13 94 000-33 64 570 13 94 380-33 64 200 13 94 850-33 65 000		
21	Mr.Sardar Jan,	Dizg	403.92 acres	42 D S=250,000	14 93 300-34 59 300 Y 14 94 000-34 58 600 14 94 500-34 61 200 14 93 900-34 61 700		
22	Mr.Sharif Khan,	Bamboret	389.638 acres	38 M/10 1"=1Mile	13 89 000-33 59 560 Y 13 90 000-33 60 700 13 89 460-33 61 870 13 88 450-33 60 800		
23	M/s.Hills Top Mineral International,	Jingerat Kuh	459.338 acres	38 M/10 1"=1Mile	13 78 560-33 67 740 Y 13 79 250-33 67 490 13 80 260-33 68 000 13 80 260-33 69 000 13 78 560-33 69 000		

	1	2	3	4	5	6	7
24	Mr.Mohammad Riaz Khan	Birir	432.024 acres	38 M/10 1"=1Mile	13 85 660-33 65 000 13 87 000-33 64 000 13 87 570-33 64 710 13 87 000-33 65 310 13 87 000-33 66 000		
25	Mr.Mohammad Khan,	Sheri	146.694 acres	38 M/14	13 97 000-33 75 000 13 97 000-33 74 150 13 98 000-33 74 430 13 98 000-33 75 000		

Name of Mineral **Serpentine** District **Chitral**

S.No.	Name & address of the Concession-air/File No	Locality	Total area granted	Toposheet No	Coordinate/G.R Northing - Easting	Valid up to	Present Status
	1	2	3	4	5	6	7
1	M/s.Pakistan Mining & Exploration Chitral, MDW/CL/ML-Serpentine (1)/96.	Shishi	756.76 acres	38 M/14	12 63 300-30 88 000 M 12 64 650-30 90 150 12 63 000-30 90 350 12 62 350-30 87 750	7/8/2006	Mining in operation
2	Lt: Col: Sardar Mohd: Khan, MDW/CL/ML-Serpentine (11)/2002.	Urtsun	300.867 acres	38 M/11	13 69 550-33 67 990 Y 13 68 440-33 67 990 13 67 660-33 67 000 13 68 270-33 66 360	14/4/2003 Cancellation under process	Mining stopped

MINING CONCESSIONS IN HAZARA DIVISION

Name of Mineral **Marble** District **Haripur & Abbottabad**

S.No.	Name & address of the Concession-air/File No	Locality	Total area granted	Toposheet No	Coordinate/G.R Northing - Easting	Valid up to	Present Status
	1	2	3	4	5	6	7
1	M/S. Hamed and Co: MDW/AD/PL-Marble (86)/2000.	Suraj Gali	27.753 acres	43 C/13	11 73 850-34 96 010 Y 11 73 540-34 96 340 11 73 145-34 96 110 11 73 180-34 96 010	19/8/2003	Mining in operation
2	Mr. Mohd: Masud Abassi MDW/AD/PL-Marble (88)/2001.	Batnawa	316.363 acres	43 G/5	11 92 000-35 39 000 Y 11 92 560-35 40 160 11 91 720-35 40 850 11 91 000-35 39 530	1/5/2003	Mining in operation
3	M/S.Mohd: Zai Trading Co: MDW/AD/PL-Marble (87)/2001.	Suraj Gali	50.00 acres	43 C/13	11 74 240.00-34 96 000.00 Y 11 73 909.28-34 96 567.22 11 73 430.00-34 96 500.00 11 73 860.00-34 96 000.000	9/1/2003 Renewal under process	Mining in operation
4	Mr.Mohammad Anwar, MDW/HQ/AD/PL-Marble (79)/99.	Amgam	204.214 acres	43 F/4 43 B/16	12 12 860-35 03 480 Y 12 13 820-35 03 480 12 14 500-35 04 130 12 14 000-35 05 000 12 13 850-35 04 450	26/5/2002 Renewal under process	Mining in operation
5	Khattak Sons, MDW/AD/PL-Marble (95)/2002.	Diwal	497.669 acres	43 F/4 43 F/8	11 98 550-35 29 540 Y 11 98 550-35 30 990 11 98 000-35 31 400 11 97 000-35 30 830 11 97 000-35 29 640		

	1	2	3	4	5	6	7
6	Mr. Pir Khan, MDW/AD/PL- Marble (90)/2001.	Dheri	500.00 acres	43 F/8	12 05 000-35 30 160 Y 12 05 000-35 33 000 12 04 000-35 32 000 12 04 000-35 30 000		
7	M/s.Kara Kurram Mines, MDW/AD/PL- Marble (104)/2002.	Tabori	423.55 acres	43 G/1	11 84 000-35 21 800 Y 11 83 000-35 23 250 11 82 000-35 23 000 11 82 000-35 21 800		
8	Mr. Mohammad Shafi, MDW/AD/PL- Marble (111)/2003.	Sando Gali	291.19 acres	43 f/4	12 15 410-35 12 400 Y 12 15 000-35 13 380 12 14 100-35 12 650 12 14 100-35 11 650		
9	M/s.shinwari Minng, MDW/AD/PL- Marble (99)/2002.	Dotar	500.00 acres	43 F/8	12 20 900-35 29 000 Y 12 10 210-35 29 000 12 10 210-35 31 000 12 20 900-35 31 000		
10	M/s.shinwari Minng, MDW/AD/PL- Marble (100)/2002.	Dotar	499.183 acres	43 F/8	12 12 000-35 29 000 Y 12 12 000-35 30 365 12 10 230-35 30 365 12 10 230-35 29 000		

District Batagram

Name of Mineral **Marble**

S.No.	Name & address of the Concession-air/File No	Locality	Total area granted	Toposheet No	Coordinate/G.R Northing - Easting	Valid up to	Present Status
	1	2	3	4	5	6	7
1	Mr. Qamrul Haq MDW/MA/PL-Marble (86)/97	Thakot	883.53 acres	43 B/1	13 87 750-34 93 450 Y 13 87 750-34 96 330 13 86 260-34 96 330 13 86 260-34 93 450	Cancelled	
2	M/S. Hazara Mining Co: MDW/MA/ML-Marble (15)/94.	Zurbutial	146.978 acres	43 B/13	12 90 455-34 96 160 Y 12 90 455-34 94 775 12 90 780-34 94 775 12 91 000-34 95 170 12 91 000-34 96 160		

Name of Mineral **Granite**

District **Mansehra**

S.No.	Name & address of the Concession-air/File No	Locality	Total area granted	Toposheet No	Coordinate/G.R Northing - Easting	Valid up to	Present Status
	1	2	3	4	5	6	7
1	Mr. Abdul Samad Khan MDW/MN/PL-Granite (207)/2003	Gorvar	732.404 acres	43 B/13	12 85 000-34 90 000 Y 12 86 200-34 90 000 12 87 750-34 92 600 12 86 650-34 93 000	5/2/2004	Mining in operation
2	Haji Inyat Khan MDW/MN/PL-Granite (135)/95.	Mandao	457.737 acres	43 F/3	12 35 640-35 09 940 Y 12 36 350-35 11 150 12 35 260-35 11 770 12 34 180-35 09 940	16/9/97 Renewal under process	Mining in operation
3	Haji Inyat Khan MDW/MN/PL-Granite (187)/2001.	Fullers	986.653 acres	43 F/3	12 33 300-35 04 100 Y 12 34 190-35 07 000 12 34 190-35 09 120 12 31 600-35 04 100	14/3/2002 Renewal under process	Mining in operation
4	M/S. Hamid and Co: MDW/MN/PL-Granite (190)/2001.	Kan Gali	690.743 acres	43 B/15	12 46 000-34 99 010 Y 12 46 000-35 01 000 12 44 320-35 01 000 12 44 320-34 99 010	18/7/2003 Renewal under process	Mining in operation
5	Mr. Mohd: Afzal khan MDW/MN/PL-Granite (196)/2001.	Dabrai	979.934 acres	43 B/14 43 F/2	12 83 000-34 99 000 Y 12 83 000-35 00 610 12 80 000-35 00 610 12 80 000-34 99 000	4/12/2002 Renewal under process	Mining in operation
6	Mr. Mohd: Hanif khan MDW/MN/PL-Granite (178)/2000.	Badi Maira	271.570 acres	43 F/3	12 34 240-35 09 250 Y 12 34 240-35 10 310 12 33 000-35 10 310 12 33 000-35 09 250	22/12/2001 Renewal under process	Mining in operation

	1	2	3	4	5	6	7
7	Mr. Raja Habib-ur-Rehman MDW/MN/PL- Granite (194)/2001.	Doga	419.421 acres	43 B/15	12 40 450-35 00 000 Y 12 40 450-35 01 400 12 39 000-35 01 400 12 39 000-35 00 000	3/7/2002 Renewal under process	Mining in operation
8	M/S. Continental Mineral MDW/MA/ML- Granite (25)/97.	Chor Kala	711.29 acres	43 B/15	12 50 000-35 02 000 Y 12 50 000-35 02 630 12 39 000-35 01 400 12 39 000-35 00 000	31/8/2012	Mining in operation
9	M/S. Hazara Mines MDW/MA/ML- Granite (16)/93.	Jiggi Utla	413.223 acres	43 B/15	12 50 000-34 93 000 Y 12 50 000-34 95 000 Y 12 49 025-34 95 000 12 49 025-34 93 000	22/8/2010	Mining in operation
10	Mr. Khaleequzaman MDW/MA/ML- Granite (30)/98.	Shergarh	1109.35 acres	43 F/3	11 43 000.00-32 02 228.80 M 11 43 000.00-32 02 804.90 11 39 891.00-32 05 474.90 11 38 565.00-32 03 655.30 11 40 256.80-32 02 228.30	30/11/2002	Mining in operation
11	M/S. Leepak Mining Co: MDW/MA/ML- Granite (204)/2002.	Mandhar	992.15 acres	43 F/6	12 69 680-35 32 000 Y 12 72 500-35 32 500 12 72 000-35 34 000 12 69 680-35 34 000	19/9/2019	Mining in operation
12	M/S. Resourse Mining Ind: MDW/MA/ML- Granite (2)/89.	Banda	1495.372 acres	43 B/15	12 45 000-35 09 090 Y 12 48 740-35 09 550 12 49 300-35 11 080 12 50 000-35 11 080 12 50 000-35 11 530 12 48 730-35 11 530 12 46 000-35 11 330	31/3/2009	Mining in operation

	1	2	3	4	5	6	7
13	M/S Super Stone mining and Mineral Corporation MDW/MA/ML-Granite (20)/95.	Sufaida	638.74 acres	43 F/3	12 48 600-35 04 000 Y 12 50 000-35 06 000 12 48 830-35 07 000 12 47 350-35 05 300	Suspended due Court Case	
14	M/S. Thar Mineral Processing Interpreters MDW/MA/ML-Granite (24)/97.	Banda	1000.00 acres	43 B/15	12 73 540-35 17 620 Y 12 73 540-35 15 000 12 74 400-35 15 000 12 75 101-35 15 680 12 75 101-35 18 720 12 74 000-35 18 270 12 74 000-35 17 620	21/8/2020	Mining in operation
15	M/S.Rajor (pvt) Ltd: MDW/MN/PL-Granite (200)/2001.	Bai Maira	1461.61 acres	43 B/15	12 38 620-34 89 000 Y 12 38 620-34 90 630 12 34 280-34 98 630 12 34 280-34 89 000	16/1/2003 Renewal under process	Mining in operation
16	Mr. Sardar Ishtiaq Khan MDW/HQ/MA/ML-Granite (28)/97.	Banja	1354.34 acres	43 B/15	12 51 120-34 97 000 Y 12 52 000-35 00 000 12 49 750-35 00 000 12 49 000-34 97 000		
17	Mr.Mohammad Khalid, MDW/MN/PL-Granite (181)/2000.	Kanei	712.809 acres	43 B/13	12 91 300-34 98 500 Y 12 91 300-35 00 000 12 89 000-35 00 000 12 89 000-34 98 500		
18	M/s.Northern Mining Co: MDW/MA/ML-Granite (38)/2002.	Bhatli	1784.917 acres	43 B/15	12 44 100-34 93 480 Y 12 46 510-34 96 560 12 41 000-34 95 000 12 44 280-34 92 290 12 44 720-34 93 000	19/9/2019	Mining in operation

	1	2	3	4	5	6	7
19	M/s.Mohd: Zai Trading Co: MDW/MA/ML- Granite (22)/95.	Baffa	439.461 acres	43 F/3	11 41 171-32 21 580 M 11 42 180-32 21 580 11 43 000-32 20 655 11 43 000-32 22 345 11 41 171-32 22 345		
20	M/s.Port land Pakistan(pvt)Ltd MDW/MA/ML- Granite (31)/98.	Kalu Basti	1485.54 acres	43 B/15	12 39 140-34 95 000 Y 12 39 000-34 96 000 12 41 000-34 96 690 12 37 000-34 98 000 12 36 000-34 96 000		
21	M/s.Supper Stone, MDW/MA/PL- Granite (128)/94.	Mohar	1423.7862 acres	43 F/3 43 B/15	12 31 320-35 00 975 Y 12 31 000-34 99 000 12 33 000-34 98 000 12 33 000-35 03 230 12 32 025-35 03 350 12 32 025-35 00 975		
22	Mr. Amjad Ali, MDW/MA/PL- Granite (137)/95.	Sihaki Bala	892.45 acres	43 B/15	12 29 000-35 91 430 Y 12 28 000-35 94 000 12 26 300-35 94 000 12 26 300-35 93 000 12 28 000-35 91 430		
23	Mr. Umar Farooq Qazi, MDW/MA/PL- Granite (180)/2000.	Bai	978.5373 acres	43 B/15	11 27 000-31 93 000 M 11 27 000-31 95 200 11 24 800-31 95 200 11 25 600-31 93 000		

	1	2	3	4	5	6	7
24	Mr.Waqas Ahmed, MDW/MA/PL- Granite (125)/2000.	Bagla	498.606 acres	43 B/15	12 45 650-34 96 720 Y 12 55 850-34 98 490 12 44 290-34 98 450 12 44 000-34 97 000		
25	Syed Talmiz-ul-Hassan, MDW/MA/PL- Granite (191)/2001.	Sangi	992.56 acres	43 B/15	12 40 350-35 93 160 Y 12 41 950-35 94 200 12 40 950-35 95 000 12 40 950-35 96 680 12 39 050-35 96 000		
26	Syed Sardar Ali Shah, MDW/MA/PL- Granite (201)/2001.	Pabal Utla	408.574 acres	43 B/15	12 51 140-34 91 000 Y 12 51 140-34 92 750 12 50 010-34 92 750 12 50 010-34 91 000		

Name of Mineral **Marble**

District **Mansehra**

S.No.	Name & address of the Concession-air/File No	Locality	Total area granted	Toposheet No	Coordinate/G.R Northing - Easting	Valid up to	Present Status
	1	2	3	4	5	6	7
1	M/S. Kunhar Mining MDW/MA/ML-Marble (14)/93.	Lambipatti	230.826 acres	43 F/6	12 83 190-35 53 510 Y 12 83 190-35 52 710 12 83 430-35 52 540 12 83 430-35 51 770 12 83 950-35 51 770 12 83 950-35 53 510	30/11/2023	Mining in operation
2	M/S. Mohd: Zai Trading Co: MDW/MA/ML-Marble (18)/99.	Mahandri	617.05 acres	43 F/10	12 81 090-35 66 000 Y 12 79 000-35 66 000 12 79 000-35 64 328 12 81 090-35 64 812		
3	M/S. Khattak Sons (pvt) Ltd: MDW/MA/PL-Marble (103)/2002.	-do-	497.93 acres	43 F/10	12 81 000-35 58 430 Y 12 83 000-35 58 100 12 83 000-35 59 470 12 81 000-35 59 470		
4	Syed Mudasir Shah, MDW/MA/PL-Marble (106)/2003.	Doga Malky	495.86 acres	43 F/2	12 83 000-35 21 000 Y 12 85 000-35 21 000 12 85 000-35 22 200 12 83 000-35 22 200		
5	M/s.Kunhar Mining Co: MDW/MA/PL-Marble (101)/2002.	Dogi Blakot	456.611 acres	43 F/10	13 09 000-35 77 000 Y 13 09 000-35 78 210 13 07 000-35 77 000 13 07 000-35 76 000		

Name of Mineral **Garnet Granulite** District **Kohistan**

S.No.	Name & address of the Concession-air/File No	Locality	Total area granted	Toposheet No	Coordinate/G.R Northing - Easting	Valid up to	Present Status
	1	2	3	4	5	6	7
1	Mr. Mohd: Anwar Khan MDW/KN/PL- Garnet Granulite (11)/2000.	Gloz Banda	251.60 acres	43 A/16	12 10 000-31 94 000 M 12 11 000-31 94 835 12 10 100-31 95 570 12 09 210-31 95 000 12 10 000-31 95 000	29/11/2002 Renewal under process	Mining in operation
2	M/S. Mish Pak Processing Ltd: MDW/KN/PL- Garnet Granulite (12)/2003.	-do-	89.946 acres	43 A/16	12 10 320-31 96 000 M 12 11 000-31 98 800 12 10 660-31 97 000 12 10 000-31 96 000	8/7/2004	Mining in operation
3	M/S.Golden Falcon, MDW/KN/PL- Garnet Granulite (4)/99.	Gloz Banda	993.36 acres	43 A/16	12 12 000-31 98 000 M 12 10 050-31 95 600 12 11 000-31 94 800 12 13 000-31 97 000		
4	M/s. Silver Stones, MDW/KN/PL- Garnet Granulite (3)/96.	Palas	440.626 acres	43 A/16 34 E/4	12 13 400-32 01 000 M 12 11 610-32 00 000 12 12 570-31 99 000 12 11 910-31 98 410 12 12 540-31 98 400		

Name of Mineral **Marble** District **kohistan**

S.No.	Name & address of the Concession-air/File No	Locality	Total area granted	Toposheet No	Coordinate/G.R Northing - Easting	Valid up to	Present Status
	1	2	3	4	5	6	7
1	Mr. Mohd: Anwar Khan MDW/KN/PL- Marble (7)/2000.	Zur Butial	167.095 acres	43 B/13	13 05 000-34 87 210 Y 13 05 000-34 88 000 13 04 020-34 88 000 13 04 020-34 87 140		

Name of Mineral **Granite** District **Kohistan**

S.No.	Name & address of the Concession-air/File No	Locality	Total area granted	Toposheet No	Coordinate/G.R Northing - Easting	Valid up to	Present Status
	1	2	3	4	5	6	7
1	Mr. Amir Wali Khan, MDW/KN/ PL-Granite (38)/2001.	Gaya Duber	999.664 acres	43 A/16	12 21 000-31 89 000 M 12 21 000-31 90 340 12 18 390-31 90 760 12 18 390-31 89 000		
2	Mr. Amir Wali Khan, MDW/KN/ PL-Granite (33)/2002.	Sanagai	310.735 acres	43 A/16	12 16 000-31 91 500 M 12 16 000-31 93 000 12 15 050-31 93 000 12 15 400-31 91 300		
3	Sardar Ishtiaq Ahmend, MDW/KN/ PL-Granite (30)/97.	Duber	654.28 acres	43 A/16	12 14 785-31 89 400 M 12 14 120-31 91 000 12 14 120-31 92 520 12 12 730-31 92 170 12 13 845-31 90 000 12 14 010-31 90 000 12 14 010-31 89 400	8/7/2004	Mining in operation
4	Mr. Mohd: Naeem Khan, MDW/KN/ PL-Granite (34)/2001.	Shitgal	300.66 acres	43 A/16	12 12 100.44-31 89 796.82 M 12 12 764.94-31 90 273.32 12 12 095.29-31 91 674.71 12 11 466.50-31 91 221.41		
5	Malik Parvez, MDW/KN/ PL-Granite (35)/2001.	Ganbir	1345.59 acres	43 A/16	12 10 210-30 96 860 M 12 12 720-30 99 000 12 11 000-31 00 000 12 09 000-30 98 000		

	1	2	3	4	5	6	7
6	M/s.Hazara Mineral Rocks, MDW/KN/ ML-Granite (2)/99.	Duber	654.28 acres	43 A/16	12 14 785-31 89 400 M 12 14 120-31 91 000 12 14 120-31 92 520 12 12 730-31 92 170 12 13 845-31 90 000 12 14 010-31 90 000 12 14 010-31 99 400		
7	M/s.Shalozan Mines & Stone Processing, MDW/KN/ PL-Granite (32)/2000.	Sanagai	499.301 acres	43 A/16	12 15 230-31 89 000 M 12 15 230-31 90 600 12 15 410-31 90 600 12 15 000-31 93 000 12 14 215-31 92 560		
8	Mr. Amir Wali Khan, MDW/KN/ PL-Granite (31)/97.	Duber	1717.62 acres	43 A/16	12 19 340-31 89 640 M 12 19 340-31 92 200 12 18 000-31 92 200 12 15 355-31 91 200 12 15 410-31 90 800 12 17 280-31 90 870 12 16 660-31 89 640		

MINING CONCESSIONS IN KOHAT DIVISION

Name of Mineral **Marble** District **Kohat**

S.No.	Name & address of the Concession-air/File No	Locality	Total area granted	Toposheet No	Coordinate/G.R Northing - Easting	Valid up to	Present Status
	1	2	3	4	5	6	7
1	Mr. Gul Badshah, MDW/KT/PL-Marble (66)/2003.	Daud Khel	492.974 acres	38 O/7,11	10 25 000-30 67 000 M 10 25 800-30 68 900 10 24 200-30 68 900 10 24 500-30 68 000 10 24 200-30 67 000		
2	Mr. Sinab Khan, MDW/KT/PL-Marble (61)/2003.	Chanda Fateh Khan	497.41 acres	38 O/7	11 16 000-33 32 700 Y 11 13 000-33 32 700 11 13 470-33 34 500 11 12 000-33 34 000		
3	Mr. Ghafoor Khan, MDW/KT/PL-Marble (54)/2003.	Manduri	495.867 acres	38 O/7	11 18 700-33 40 700 Y 11 18 700-33 39 000 11 19 900-33 39 000 11 19 900-33 41 300		
4	Mr. Gul Mast Khan, MDW/KT/PL-Marble (51)/2001.	Manduri	496.357 acres	38 O/7	10 26 000-30 56 375 M 10 26 200-30 58 000 10 26 750-30 59 890 10 26 500-30 59 950 10 25 475-30 58 300 10 25 600-30 56 375		
5	Mr. Sinab Khan, MDW/KT/PL-Marble (62)/2003.	Chanda Fateh Khan	497.41 acres	38 O/7	11 12 000-33 34 500 11 13 475-33 34 500 11 13 200-33 36 300 11 12 200-33 36 300		

	1	2	3	4	5	6	7
6	M/s.Frontier Mineral MDW/KT/PL- Marble (50)/2001.	Manduri	423.032 acres	38 O/7	10 23 255.00-30 55 285 M 10 24 262.74-30 55 620 10 24 262.74-30 56 000 10 23 845.00-30 56 000 10 23 940.00-30 59 000 10 23 660.00-30 59 000		
7	Mr. Gul Mast Khan MDW/KT/PL- Marble (52)/2001.	Manduri	495.00 acres	38 O/7	10 25 540-30 56 570 M 10 25 380-30 59 510 10 24 890-30 59 510 10 24 590-30 56 920		
8	Mr.Ghafoor Khan, MDW/KT/PL- Marble (49)/2000.	Manduri	499.152 acres	38 O/7	10 23 880-30 56 000 M 10 24 270-30 56 000 10 24 620-30 60 000 10 24 000-30 60 000		
9	Mr. Jehangir Khan, MDW/KT/PL- Marble (58)/2002.	Hoti Khel	497.57 acres	38 O/3	11 16 000-33 25 500Y 11 16 830-33 25 530 11 15 950-33 30 000 11 15 410-33 30 000		
10	Mr. Jehangir Khan, MDW/KT/PL- Marble (60)/2002.	Hoti Khel	498.409 acres	38 O/3	11 14 400-33 26 620 Y 11 15 335-33 26 620 11 15 335-33 29 200 11 14 400-33 29 200		

Name of Mineral **Marble** District **Karak**

S.No.	Name & address of the Concession-air/File No	Locality	Total area granted	Toposheet No	Coordinate/G.R Northing - Easting	Valid up to	Present Status
	1	2	3	4	5	6	7
1	Mr. Said-u- Rehman MDW/KT/PL-Marble (53)/2001.	Mami Khel	321.236 acres	38 O/3	10 12 100-30 37 700 M 10 12 100-30 39 000 10 11 500-30 39 000 10 10 700-30 37 700		
2	Mr. Mohammad khalid, MDW/KT/PL-Marble (56)/2002.	Sher Ali Banda	207.64 acres	38 O/3	11 20 000-33 37 850 11 20 000-33 38 990 11 19 000-33 38 990 11 19 000-33 38 120		

MINING CONCESSIONS IN D.I KHAN DIVISION

District **Kohat**

Name of Mineral **Limestone**

S.No.	Name & address of the Concession-air/File No	Locality	Total area granted	Toposheet No	Coordinate/G.R Northing - Easting	Valid up to	Present Status
	1	2	3	4	5	6	7
1	Mr. Farid ullah Khan, MDW/DN/ML-Limestone (79)/95.	Siyduwali/ Tirgarh	166.170 acres	38 P/4	9 67 802.59-33 18 227.98 Y 9 68 635.67-33 17 677.82 9 68 760.00-33 18 000.00 9 69 180.00-33 18 000.00 9 69 778.52-33 18 251.38 9 68 048.81-33 18 775.13		
2	Mr. Akhter Nawaz, MDW/DN/ML-Limestone (100)/95.	Siyduwali/ Tirgarh	144.793 acres	38 P/4	9 70 000-33 12 760 Y 9 70 000-33 13 000 9 68 440-33 13 000 9 68 440-33 12 120 9 68 950-33 12 120 9 68 950-33 12 760		
3	Haji Khan Zaman, MDW/DN/PL-Limestone (68)/87.	Dhakki	104.68 acres	38 P/4	9 69 000-32 20 100 9 69 920-32 22 000 9 69 380-32 22 000		
4	Haji Khan Zaman, MDW/DN/PL-Limestone (67)/87.	Kotla Lodihan	893.82 acres	38 P/4	9 69 100-33 14 100 9 71 000-33 14 000 9 71 000-33 16 000 9 70 000-33 16 000 9 70 000-33 16 900 9 69 380-33 16 700 9 69 100-33 16 230		

	1	2	3	4	5	6	7
5	Mst.Kursheed Tabassum, MDW/DN/PL-Limestone (84)/95.	Kafir Kot	115.726 acres	38 P/6,7	9 18 633.92-30 56 116.37 M 9 18 862.35-30 55 614.17 9 19 200.68-30 55 714.75 9 18 282.98-30 55 284.99 9 19 609.18-30 56 337.43		
6	Haji Khan Zaman, MDW/DN/PL-Limestone (62)/86.	Saiyduwali	429.14 acres	38 P/4	9 69 000-33 15 000 9 67 680-33 15 000 9 67 680-33 13 000 9 68 440-33 13 000 9 68 440-33 14 000 9 69 000-33 14 000		
7	Mr. Mohd: Amin Shah, MDW/DN/PL-Limestone (90)/89.	Saiyduwali	465.701 acres	38 P/4	9 68 340-33 12 050 9 68 340-33 12 900 9 67 590-33 12 900 9 67 590-33 14 400 9 67 230-33 14 000 9 67 230-33 12 510 9 67 630-33 12 510 9 67 630-33 08 530 9 67 900-33 08 530 9 67 900-33 12 050		
8	M/s.Sitara Mining Co: MDW/DN/ML-Limestone (135)/2000.	Kotlalodhi	100.00 acres	38 P/4	9 68 920-33 16 090 Y 9 69 160-33 16 730 9 68 400-33 16 730 9 68 180-33 16 090		
9	Haji Zaro Jan MDW/DN/ML-Limestone (133)/2000.	Dahkki	100.00 acres	38 P/4	9 69 850-33 19 640 9 70 110-33 20 150 9 69 180-33 20 150 9 68 880-33 19 640	8/10/2005	Mining in operation

	1	2	3	4	5	6	7
10	M/s. Samiullah, MDW/DN/ML-Limestone (132)/2000.	Kot Lalodihan	100.00 acres	38 P/4	9 70 000-33 17 000 Y 9 70 000-33 17 890 9 69 455-33 17 890 9 69 455-33 17 000	12/10/2005	Mining in operation
11	M/s. Zia-Ullah & Co: MDW/DN/ML-Limestone (131)/2000.	Kot Lalodihan	77.272 acres	38 P/4	9 69 470-33 17 000 Y 9 69 417-33 17 850 9 68 830-33 17 850 9 69 230-33 17 000	8/10/2005	Mining in operation
12	M/s. Khyber Mining Co: MDW/DN/ML-Limestone (134)/2000.	Kot Lalodihan	97.675 acres	38 P/4	9 69 135-33 16 740 Y 9 69 235-33 17 000 9 68 880-33 17 860 9 68 450-33 16 740		

18. REFERENCES

Asrarullah. 1960. on certain marble deposits of Peshawar Division Geological Survey of Pakistan report (un-published).

Asrarullah. 1962. Some decorative building stones of West Pakistan, natural resources Karachi, Vol-I, No.8.PP 21-34.

Ahmad.M.1965. Marble in Pakistan. Geol.Surv.Pak. Vol.71 GSP.

Asrarullah & Hussain, A.1984. Marble deposits of NWFP, Pakistan.

Baig.M.S., Snee. L.W & Lafortune, R.J.1989. Timing of pre-Hemalayan Oregenic events in the north west Himalya. 40Ar/39Ar constraints, Kashmir Journal of geology, 687. 29-39.

Baig. M.S.1990. Structure and geochronology of pre-Himalayan and Himalyan oregenic event, in the north west Himalya, Pakistan with special reference to the Besham area, PhD thesis, Oregon state University.

Coalson, A-I. 1936. Marble of NWFP Rees, Geol.Surv India. Vol-71.

Dipietro.J.A.1990.Stratigraphy, structure and metamorphism near Saidu Sharif, lower Swat Pakistan, Journal of Metamorphic Geological. 9, 481-495.

Dipietro, J.A, Pogue, K.R., Lawrence, R.D.Baig, M.S., Hussain.A. & Ahmad.I. 1993. Stratigraphy south of the main mantle thrust, lower

Swat, Pakistan. In Himalayan tectonics (eds Tre lear, P.J. & Searle, M.P). Geological Society of London special publication No.74, 207-220.

Dipietro. J.A., Pogue K.r.Hussain.A. and Ahmad.I.1999. Geologic map of the Indus syntaxes and surrounding area. Geologic society of America special paper 328.

Epstein.A.G., Epstein, J.B. & Harris, L.D.1977. Contour colour alteration on index to orogenic metamorphism. United States Geological Survey Professional paper 915.

Feroz, D. & Rafique, M. 1993. Strength properties of various building stones of NWFP, Rees., Geol. Bull. University of Peshawar Vol. 26, PP 119-126. Gansser A.1964. Geology of the Himalaya, Inter Science publishers, London.

Gansser A. 1980. The significance of the Himalyaan suture zone, tectono physics, 62, 37-52.

Kazmi A.H., Lawrence. R.D.Dawood. H., Snee. L.W & Hussain.S. 1984. Geology of the Indus suture zone in the Mingora-Shangla area of Swat.N. Pakitan, Geological. Bull.Univ. of Peshawar, 17, 127-144.

Kempe. D.R.C & Jan M.Q. 1980. The Peshawar plain alkaline igneous province, north west Pakistan. Geol. Bull. University of Peshawar.

Khan. K.F. 1996. A geography of Pakistan Environment. People and economy.

Khan. K.F.& Bishap, E.1973 Marble industry of NWFP 13 (report un-published) prepared for Sarhad Development Authority (SDA), NWFP, Pakistan.

Kidwai, A.H. & Imam, S.A.1959. Marble of Nowshera, Peshawar Division, Geological Survey of Pakistan (un-published).

Martin. N.R., Siddique, S.F.A & King, B.H. 1962. A geological reconnaissance of the region between the lower Swat and Indus Rivers of Pakistan. Geological bulletin, Punjab University, 211-14.

Pogue, K.R., Ward Law, B.R., Harrish, A.G. & Hussain , A.1992. Paleozoic and Mesozoic stratigraphy of the Peshawar Basin, Pakistan: Correlation and implications. Geological society of America. Bulletin. 104-915-927.

Naeem .M(2000) Preliminary geological and structural evaluation of marble deposits (Bampokha Bunair), NWFP.

Shams, F.A. 1963. Reactims in and around a calcureous xeno lith lying within the granite-geiss of Manglour. Swat State, West Paksitan. Geological Bulletin, Punjab Univ. 3. 7-18.

Tahir Khali R.A.K. 1979.a. Geology of Kohsitan and adjoining Eurasian Indo-Pakistan continents, Pakistan. Geological bulletin. University of Peshawar 11. 1-30

Engr. Siddique Akber. 2005. Block Squaring by conventional method

72° E

Wasam

Brep

Mastuj

NORTHERN AREAS

IshPeru

Darah Pass

Shoghor

Sor Laspur

Shandur Pass

36° N

Ughuthi

Gilgit

Chitral

N

Drosh

Kalam

Kalkot

Dasu

Lowari Pass

KOHISTAN

Dir

Khwazakhela

Besham

Mingora

Batgram

Bajaur

Saidu

Buner

Malakand

Mansehra

JAMMU AND KASHMIR

Ghallagay

Mardan

Abbottabad

Swabi

Peshawar

Nowshera

HariPur

Parachinar

Islamabad

Kohat

LEGEND

Capital

Provincial Capital

International Boundary

Provincial Boundary

District Boundary

Road

District

Town / Village

Int. Airport

Dom. Airport

Karak

Miran Shah

Bannu

Indus Highway

Gandi

Lakki

Wana

Tank

32° N

0 50 100 150 Km

D.I. Khan

72° E

GEOLOGICAL SURVEY AND EVALUATION OF MARBLE AND GRANITE RESOURCES IN N.W.F.P.

DIRECTOR GENERAL MINES AND MINERALS

LOCATION MAP OF NWFP

Reproduced from Atlas of Pakistan

DATE: Oct, 2004

CONTR. NO. LOCATION MAP/NWFP

MAP OF N.W.F.P SHOWING DISTRIBUTION OF DIMENSION STONE LEASES

GEOLOGICAL SURVEY & EVALUATION OF MARBLE AND GRANITE RESOURCES NWFP. Fig. 3

PRELIMINARY GEOLOGICAL MAP OF THE HAZARA DIVISION SHOWING MARBLE & GRANITE DEPOSITS

CHITRAL

GILGIT AGENCY

KASHMIR

SWAT

MUZAFFARABAD

HASANABDAL

ISLAMABAD

ATTOCK

SCALE
1 : 250,000

LEGEND

INDIAN PLATE
- ALLUVIUM
- MURREE FORMATION
- ABBOTTABAD FORMATION
- PARIAL FORMATION
- TANAWAL FORMATION
- HAZARA FORMATION
- SALKHALA FORMATION
- MANSEHRA GRANITES
- GALIAT LIME STONE
- KAGHAN FORMATION
- SHARDA GROUP ROCK
- EPIDOTE-GARNET AMPHIBOLITES
- BESHAM GRANITES

KOHISTAN ISLAND ARC
- KUMELA AMPHIBOLITE
- CHILAS COMPLEX
- GRANITIC ROCK
- ULTRAMAFIC OF JIJAL & BADUSAR
- VOLCANIC (RALIAN DIR GROUP)
- GARNET GRANULITE
- MARBLE LEASES
- GRANITE LEASES

QUATERNARY
MIOCENE
CARBONIFEROUS TO TRIASSIC
ORDOVICIAN DEVONIAN
PRE CAMBRIAN
CRETACEOUS & TERTIARY

GEOLOGICAL SURVEY & EVALUATION OF MARBLE & GRANITE RESOURCES IN N.W.F.P. DIRECTORATE GENERAL MINES & MINERALS