

**Details of Petrographical studies of borehole core samples and one surface sample of Murara-Devendrapura Block (G-3),
District-Niwari, Madhya Pradesh**

Sl. No.	Sample Number & Location	Texture	Mineral Composition			Description
			Major >5%	Minor <5%->1%	Accessory <1%	
1	MDP-01 Surface sample-	It is a greenish grey coloured weathered rock showing porphyritic texture.	Plagioclase Actinolite- Tremolite Opakes Biotite	Sericite Chlorite	Ferruginous matter Apatite	Plagioclase occurs as medium to moderately coarse subhedral phenocrysts and as well as very fine lath shaped grains in groundmass showing intense sericitisation. Actinolite-tremolite occurs as medium subhedral prismatic pseudomorphic patches comprising very fine acicular aggregates and often associating chloritic patches. Opakes are present as very fine disseminated grains. Biotite and chlorite are present as very fine flakes in groundmass. Reddish ferruginous patches and fillings are common in the specimen. Apatite is noted as very fine subhedral prismatic grains in accessories. <u>The specimen is a weathered and altered porphyritic andesite.</u>
2	MDP-02 (BH. MMDB-06 at 48.50m depth)	It is a medium to coarse grained rock showing hypidiomorphic granular texture.	Plagioclase Microcline/ Orthoclase Quartz Epidote	Chlorite	Calcite Sphene Kaolinite	Plagioclase occurs as medium to coarse subhedral prismatic grains altering to epidote. Microcline/orthoclase are present as medium to moderately coarse subhedral grains showing perthitic exsolutions in areas. Quartz occurs as medium to fine anhedral grains, often clustering in pockets. Very fine to fine quartz veins have intruded, at places. Epidote occurs as very fine to fine granular aggregates, developing after plagioclase alterations. Chlorite is present as patches and patchy fillings,



Sl. No.	Sample Number & Location	Texture	Mineral Composition			Description
			Major >5%	Minor <5%->1%	Accessory <1%	
						often associating epidote and sphene with it. Calcite has intruded as very fine fillings. Dirty kaolinite particles are seen developing after microcline alterations in areas. The specimen is a <u>granodiorite</u> .
3	MDP-03 (BH. MMDB-06 at 100.40m depth)	It is a fine to very fine grained structurally disturbed rock.	Quartz Sericite Chlorite	Epidote Calcite Opaques	Feldspar Kaolinite	Quartz occurs as fine subhedral to anhedral and elongated grains showing granular texture. Sub-parallel and criss-cross micro-fracture/ micro-faults are common in the specimen. Intense granulation is noted in the specimen, causing very fine granular aggregates of quartz in the granulated zones, where recrystallization of quartz is observed in areas. Thin to moderately thick secondary criss-cross veins/ veinlets of quartz have seen intruded within the specimen. Quartzo-feldspathic veins are also noted, where feldspar is altering to kaolinite. Sericite and chlorite are present as very fine aggregates and segregated patches along the granulated zones. Epidote is noted as very fine grains and granular aggregates in association with chlorite and sericite. Calcite occurs as patchy fillings. Opaques occur as patches, anhedral grains and fillings. The specimen is a <u>granulated vein quartz</u> .
4	MDP-04 (BH. MMDB-07 at 122.00m depth)	It is a greenish grey coloured medium grained altered rock.	Sericite Quartz Epidote	Calcite Chlorite Sphene	Opaques Apatite	Sericite occurs as medium to moderately coarse pseudomorphic patches, often associating very fine granular aggregates of epidote and are possibly developing after feldspar (plagioclase?) alterations. Quartz occurs as fine to medium anhedral grains,

Sl. No.	Sample Number & Location	Texture	Mineral Composition			Description
			Major >5%	Minor <5%->1%	Accessory <1%	
						often seen segregating in clustered pockets. Very thin to thin quartz veins have seen intruded. Epidote is present as fine subhedral aggregates in segregated patches, often associating chlorite flakes/ patches and sphene wedges. Calcite has intruded as patchy fillings in areas. Chlorite is mostly seen associated with epidote patches. Sphene occurs as fine wedges and anhedral patches. Opaques are noted as very fine to fine subhedral to anhedral grains. Apatite is found present as very fine subrounded and prismatic grains in accessories. The specimen is an altered rock (granodiorite).
5	MDP-05 (BH. MMDB-08 at 67.70m depth)	It is a whitish grey coloured altered rock.	Sericite Quartz	Chlorite	Opaques Ferruginous matter	The specimen is mostly made up of very fine flaky aggregates of sericite. Quartz occurs as medium to moderately coarse anhedral grains floating over sericitic matrix. Chlorite is present as very fine fillings and as flaky aggregates, often segregating into patches within sericitic matrix. Opaques occur as very fine specks. Irregular fractures are noted within the specimen and are often filled by reddish ferruginous fillings. The specimen is a sericitised rock.
6	MDP-06 (BH. MMDB-08 at 88.00m depth)	It is a medium grained rock showing granular texture and greenish fillings.	Quartz	Chlorite Calcite Sericite Opaques	Ferruginous matter	Quartz occurs as medium to fine subhedral to anhedral and elongated grains showing compact contacts. Moderately coarse patches are also noted, showing undulose extinction. Granulation is observed in areas. Micro-faults/ micro fractures are

Sl. No.	Sample Number & Location	Texture	Mineral Composition			Description
			Major >5%	Minor <5%->1%	Accessory <1%	
						seen present in the specimen, along which chlorite, calcite and sericite have intruded as patchy fillings. Opaques occur as fine anhedral grains, patches and as patchy fillings. Reddish ferruginous fillings are observed in areas. The specimen is a <u>partially granulated vein quartz</u> .
7	MDP-07 (BH. MMDB-09 at 21.50m depth)	It is a medium to fine grained rock showing hypidiomorphic granular texture.	Plagioclase Quartz Sericite Hornblende	Biotite Chlorite Opaques Sphene	Epidote Apatite Zircon	Plagioclase occurs as medium to fine subhedral prismatic and turbid patchy grains showing intense sericitization. Quartz occurs as fine to medium anhedral grains. Sericite is present as cloudy and patchy pseudomorphs developing after plagioclase alterations. Hornblende occurs as medium to fine subhedral prismatic grains, being replaced by biotite and chlorite. Biotite is seen present as fine flakes and flaky segregations in pockets, replacing hornblende in areas. Chlorite is found present as patchy pseudomorphs replacing hornblende and also seen present as fine flakes. Opaque occur as fine to very fine euhedral to anhedral grains and patches. Sphene occurs as very fine to fine wedges and anhedral patches. Epidote is noted as very fine granular aggregates in pockets, mostly developing after plagioclase alterations. Apatite occurs as very fine hexagonal grains in accessories. Zircon is found present as very fine slender prismatic grains and as inclusions within biotite. The specimen is an <u>altered granodiorite</u> .

Sl. No.	Sample Number & Location	Texture	Mineral Composition			Description
			Major >5%	Minor <5%->1%	Accessory <1%	
8	MDP-08 (BH. MMDB-10 at 54.00m depth)	It is a greenish grey coloured weathered and altered rock.	Sericite Epidote Quartz Chlorite	Ferruginous matter	Opagues Apatite	Sericite occurs as very fine micro-crystalline flakes and flaky aggregates, often segregating into cloudy patches. Epidote occurs as very fine granular aggregates, disseminated throughout the specimen. Quartz is present as very fine anhedral grains in the assemblage. It also seen intruded as thin to moderately thick veins and veinlets, comprising fine anhedral grains. Chlorite occurs as fine to very fine disseminated flakes and patches. Reddish hairline ferruginous fillings are common in the specimen. Opagues occur as very fine anhedral grains and specks. Apatite is noted as very fine hexagonal grains in accessories. The specimen is a <u>saussuritised rock.</u>
9	MDP-09 (BH. MMDB-10 at 73.20m depth)	It is a light yellowish green coloured very fine grained massive rock.	Sericite/ Pyrophyllite	Quartz	Opagues Chlorite	The specimen is entirely made up of very fine flaky to micro-crystalline aggregates of sericite/pyrophyllite showing radiating fan like texture in areas. Quartz is noted as very fine anhedral grains in the assemblage. Opagues occur as very fine specks, anhedral grains and patches. Chlorite is seen present as very fine to fine patches in pockets. The specimen is a <u>sericite/ pyrophyllite rich rock.</u>
10	MDP-10 (BH. MMDB-10 at 82.85m depth)	It is a dark greenish grey coloured very fine grained massive rock.	Chlorite Sericite	Opagues Quartz	Epidote	The specimen is made up of very fine micro-crystalline aggregates of chlorite showing crude alignment in areas. Sericite occurs as medium to fine pseudomorphic patches and fillings comprising very fine flaky aggregates. Opagues occur as very fine disseminated grains, anhedral patches and as



ANNEXURE- VI-A/6

Sl. No.	Sample Number & Location	Texture	Mineral Composition			Description
			Major >5%	Minor <5%->1%	Accessory <1%	
						hairline fillings. Quartz is seen present as fine anhedral grains and as patchy relicts. Epidote is noted as very fine grains in accessories. The specimen is a <u>chloritised rock/ chlorite vein.</u>