

DEPARTMENT OF MINES, MINERALS & GEOLOGY

GOVERNMENT OF SIKKIM

GANGTOK



ANNUAL REPORT (2014-2015)

DEMAND NO. 25

DEPARTMENT OF MINES, MINERALS & GEOLOGY

GOVERNMENT OF SIKKIM

ANNUAL BUDGET 2014-15

An Annual Plan size of Rs. 171.60 lakhs was approved for the Department of Mines, Minerals & Geology for the financial year 2014-15.

Detail Breakup of the provision are as under:-

I. 2853-REVENUE SECTION

DIRECTION & ADMINISTRATION-

Rs. 121.602 Lakhs.

This sum was proposed to meet up expenditures on Departmental Overheads, payments of salaries and Medical Advances, Payment of Rents, Rates & Taxes, wages of M.R. Staff working in the office and purchase of Office Equipments and Stationeries.

Detail Break-up of expenditure, under the Head is indicated as under: -

		(Rs. in Lakhs)
I	SALARIES	73.00
II.	TRAVEL EXPENSES	0.00
III.	OFFICE EXPENSES	33.00
IV	RENT, RATES & TAXES	0.60
V.	MACHINERY & EQUIPMENT	15.00
VI.	RESEARCH & DEVELOPMENT	30.00
VII.	OTHER MINERALS EXPLORATION	20.00
TOTAL		171.60

RESEARCH & DEVELOPMENT-

RS. 30.00 Lakhs

This provision was earmarked with a view to take up detail geological studies and Contour Survey of various landslides, Geo-environmental Appraisals of important towns and road –sections along the National Highway 10 and the State Highways. The provision was utilized on payment of M R. employees. The following works are undertaken by the department

1. Contour Surveying and Mapping of Marchak Area in East Sikkim.
2. Geological Mapping of Marchak area in East Sikkim.
3. Contour Mapping of DAC, Gyalshing, West Sikkim.
4. Conducted Electrical Resistivity Survey of Rangpo SMC area.
5. Geo-Technical investigation of DAC, Kyongsa, West Sikkim.
6. Geo-technical investigation of Gerethang in West Sikkim.

MINERAL EXPLORATION-

Rs. 20.00 Lakhs

A sum of Rs. 20.00 Lakhs was earmarked under the Head and carried out the following plan programmes.

1. Geo-technical investigation of Singhik in North Sikkim.
2. Conducted chemical and bacteriological analysis of 80 water samples.
3. Conducted Mineral estimation of rock sample.
4. Purchase of chemicals, reagent and equipments required in geo-chemical laboratory.

ANNUAL REPORT – 2014-2015

INTRODUCTION:-

Mines, Minerals & Geology Department established in the year 1976 is engaged in following activities as per the allocation of business of Govt. of Sikkim.

1. Control and Conservation of entire Mining & Geological activities in the State.
2. Regulation & Development of Major Minerals according to National Mineral Conservation Policy.
3. Grant of prospecting licenses, mining leases for exploration and exploitation of various major minerals.
4. Levying & Collection of royalties on major minerals.
5. (i) Identification of unstable areas in collaboration with other concerned departments and suggestion of remedial measures thereof.
(ii) Chemical and bacteriological test of spring water samples.
(iii) To investigate and develop mineral water resource for public benefit.
(vi) To carry out Geo-technical studies & flood behavior of two major river system viz. Teesta and Rangit rivers of Sikkim.
6. Formulation of Policies connected with development and conservation of Mineral resources including minor mineral which is controlled by Forest Department.
7. Participation in joint ventures for mineral resources utilization in the State.
8. Training of Personnel.
9. Administrative Control of Department building.
10. Matters relating to Sikkim Mining Corporation and other mining activities in the state.
11. Public Service Statutory Rules of the services with which Department is concerned.

Sikkim being mountainous terrain with rugged topography, fragile eco-system, varied geological condition under thrust fault environment, active slope modification processes, drainage pattern, Geological and Geotechnical investigation is pre-requisite for any developmental activities. In addition to this, Sikkim receives heavy rainfall and constituent material behaves differently under saturated and unsaturated condition. A slight change in slope configuration due to developmental activities and as well as natural processes leads to degradation of slopes under threshold condition. Therefore developmental activities especially road construction, building and hydro-electric power projects, where large amount of earth works/excavation is involved, needs scientific approach, understanding of behavior and understanding of geo-environmental conditions of overlying slopes in addition to geotechnical investigation of specific site. Ongoing practice of dumping of spoils on hill slopes and river bed had lead to adverse consequences and if it is continued unabated, adverse effects are likely to be devastating. There is an urgent need to formulate clear policies for integrated and sustainable development especially in the rugged mountain terrain like Sikkim. After having worked in rugged mountainous terrain for over two decades on various aspects of geology, geo-techniques, the personnel's of the Department of Mines, Minerals & Geology have become equipped with enough experiences and understanding of mountain conditions and imperatives in implementing appropriate interventions/responses.

The Department of Mines, Minerals & Geology has carried out the following studies till date:-

1. Rock bolting on Left abutment of Pabong Bridge on Singtam-Tarku road section.
2. Studies on impact of glacial lake outbursts at Yume Samdong (Tenbewa glacier) in North Sikkim.
3. Geo-technical studies of Turung slide in parts of South Sikkim.
4. Geo-technical studies of 9th mile slide of East Sikkim.
5. Geo-technical studies of 'O' mile creep (Forest check Post near Ranipool) in parts of East Sikkim.
6. Geo-technical studies of 6th Mile slide Tadong, East Sikkim.
7. Geological studies of Phaledara dolomite deposits of Namchi, South Sikkim.
8. Geological studies of Lime stone occurrences in and around Mamley area in West Sikkim.
9. Dolomite investigation around Kholaghari, South Sikkim.

10. Contour surveying and mapping and geological studies of occurrence of building material along Rangpo Khola (between Rangpo-Rorathang).
11. Detail geo-technical studies of Barmeli Bridge at Borong in South Sikkim.
12. Microbiological assessment and portability of spring water from various sources.
13. Contour survey and feasibility studies of Subway at ridge-park area.
14. **The department issued stability report of housing and other civil construction site. The revenue earned through issue of such reports is Rs. 137.88 lakhs (from financial year 2003-04 to March 2015).**
15. The departmental officers are frequently updated with latest technologies connected with geological study. The G.I.S., G.P.S. system and geotechnical testing of rocks and soils are systematically introduced in the department as a capacity building measure.

For planning of any developmental projects in mountainous terrain, a clear understanding of slope configuration, amount of slope modification, spoils likely to be generated and identification of area for its disposal in a scientific and environmental friendly manner, is required. The Department has gained high degree of efficiency in contour surveying for geological, geotechnical and mining activities. The Department is fully equipped with latest survey equipments manned by a professional survey team. The Department is in a position to take care of all requirements of sister Departments and Central Govt. agencies in the State.

Sikkim is undergoing unprecedented development and the demand of construction materials mainly sand, aggregates, stones etc is increased by manifold. Its extraction, however, is still highly unscientific and haphazard way. This has lead not only to over exploitation threatening the overall stability of slopes, but also supply of poor quality materials. Since the use and management of natural resources is one of the important concern of integrated and sustainable mountain development, exacerbated change need must be based on thoroughly understood, workable and clearly defined policies. The Department of Mines, Minerals & Geology can play a major role in systematic mining (extraction) of minor minerals (sand, gravels & stones) and appropriate intervention for conservation & development of quarry sites with proper quality control in a geo-environment friendly manner.

Impact of climatic changes/global warming leading to depleting/retreat of glaciers, glacial lake outbursts in the Himalayan region is of a great concern. Scientists all over the world are worried about the consequences of such alarming situation. Sikkim Himalayas having numerous glaciers and glacial lakes which regulates the flow of two rivers. The future sustainability of hydro power projects is directly or indirectly depend on the glaciers. Besides Hydro Electric Projects, Industrial townships are growing in the river valleys. Hence glaciological studies and assessment of geo-environmental condition of glacial lakes in higher region needs urgent attention. Keeping in view of the facts, the Department had trained two officers of the Department on glaciology from Glaciological Division of Survey of India recently and planning to take up joint venture on glaciological studies with Geological Survey of India.

PROGRESS REPORT OF 2014-2015

A. SCHEMES

(I) DEPARTMENTAL WORKS

The department carried out:-

- 1. Stability studies carried out of 496 nos. of Public House Building sites and sites of other sisters departments.**
2. Analysis of mineral samples in the laboratory for estimation of mineral content.
3. Analysis of core samples of soil and rock in the laboratory for estimation of bearing capacity of soil and rock.
4. Analysis of water samples of various sources for determination of portability.
5. Framing and implementation of Sikkim Minor Minerals Concession Rules for the regulation of minor minerals (sand, stones) of the State.
6. Geotechnical investigation of Lower Lagyap Hydel Project for re-alignment of water channel.
7. Contour mapping & Geo-technical investigation of Marchak & its surrounding area for setting up Satellite Township, East Sikkim.
8. Geotechnical investigation of area for setting up 2nd & 3rd Battalion Head Quarter of IRB in South Sikkim.
9. Geological mapping and sample analysis for SiO₂ rich (Quartzitic) rocks for setting up glass ceramics industries area around Tharpu-Mangsari and surrounding area, West Sikkim.
10. Geo-technical investigation of Singhik in North Sikkim.
11. Conducted chemical and bacteriological analysis of 80 water samples.

12. Conducted Mineral estimation of rock sample.
13. Purchase of chemicals, reagent and equipments required in geo-chemical laboratory.
14. Contour Surveying and Mapping of Marchak Area in East Sikkim.
15. Geological Mapping of Marchak area in East Sikkim.
16. Contour Mapping of DAC, Gyalshing, West Sikkim.
17. Conducted Electrical Resistivity Survey of Rangpo SMC area.
18. Geo-Technical investigation of DAC, Kyongsa, West Sikkim.
19. Geo-technical investigation of Gerethang in West Sikkim.
20. Geo-engineering works at Tamatam, West Sikkim.

(II) CONSULTANCY AND OTHER WORKS CARRIED OUT BY THE DEPARTMENT 2014-2015

1. Geological and Geo-technical Investigation and Stability Zonation Mapping of Method and Suburbs. (Project Completed).
2. Surface geological mapping of Rolep Hydro Electric project, Rolep, East Sikkim.
3. Geo-technical investigation of land for construction of Butterfly Park- Rang Rang, North Sikkim.
4. Geological Geo- technical Mapping of land for proposed construction of Hotel cum Boutique at Pangthang, East Sikkim.
5. Geo-technical investigation for construction of Ramayan Village at Lower Tumin, East Sikkim.
6. Geotechnical Investigation of the area for erecting of Bhanjhakri statue at Jhakri Dunga, Uttarey, West Sikkim.
7. Geological and Geo-technical investigation of land proposed for construction of statue of Thekong Monsolong at Lingthim, North Sikkim.
8. Geo-physical investigation for Sub-surface characterization of lake deposits for rejuvenation of Uttarey lake in West Sikkim.

9. Geological, Geo-technical investigation of the area proposed for construction of Sky Walk at project at Bhaley Dhunga, South Sikkim.
10. Slope stability measured by Geo-engineering method and removal of detached boulder at Tamatam, West Sikkim.
11. Geological investigation of landslide at Topung village in West Sikkim and Tumlong village at North Sikkim.
12. Reopening of Sangmoo Cave which was blocked by 18th Sept 2011 earthquake.
13. Geological/Geo-technical investigation of land proposed for construction of Prayer Tower at Martam, East Sikkim.
14. Preparation of base line data covering 200 mts on both side of HRT, Adit and other activities of Madhya Bharat Power Corporation for judicious dealing of public complains, East Sikkim.
15. Ongoing development of Fossil Park at Mamley, South Sikkim in collaboration with Geological Survey of India and Tourism & Civil Aviation Department.
16. Pre-feasibility geological & geo-technical investigation of Sky Walk project, Bhaledunga, South Sikkim.
17. Contour Survey and detail geotechnical investigation of Sikkim University Complex at Yangang, South Sikkim.
18. Geo-technical investigation of proposed area for ITI Complex, Kewzing, South Sikkim.
19. Geo-technical investigation of area for setting up 2nd & 3rd Battalion Headquarter of IRB at Namley, South Sikkim.

THE FUTURE PLANS OF THE DEPARTMENT ARE AS FOLLOWS:

1. Geo-technical studies and stability zonation mapping of all townships in the state in phased manner.
2. Flood behavior studies of two major river system and its tributaries.
3. Reserve estimation of major and minor minerals deposits phase wise throughout the state including lime stone, dolomite and marble.
4. Geological and geo-technical studies of all vulnerable areas and landslide throughout the state mainly along new roads and road widen area.
5. Upgradation and modernization of geo-technical laboratory.
6. Microbiological and bacteriological analysis of various water sources in the state.
7. Study on various rock type available in the state, with regard to their utilization potential as dimension stone.
8. Central government has stressed for immediate framing and implementation of Minor Mineral Concession Rules under Mines, Minerals (Development and Regulation) Act 1957 as Sikkim being only state who has yet not framed the rules.
9. Detail geological studies/investigation along proposed HRT (Head Race tunnel) alignment of all the upcoming power projects in the State with emphasis on water resources to make comparative studies on change/impact on water resource and geo-environmental hazards in the area in future.
10. Geological/Geo-technical investigation and contour surveying of Rumtek to Adampool area, East Sikkim approx covering area of 1500 hect.
11. Geological/Geo-technical investigation and contour surveying of Ravangla to Kewzing area, South Sikkim.
12. Geological mapping and identification of vulnerable zone along North Sikkim Highway from Tashi View Point to Rangrang covering parts of East District and North District.
13. Geological/Geo-technical investigation and contour surveying of areas between Kaluk to Rinchenpong area, West Sikkim.
14. Geological investigation and identification of vulnerable zone along Melli to Jorethang road section in post road widening scenario.

15. Contour Surveying and Mapping of Township of North Sikkim.
16. Geological investigation of Graphite and Talc occurrences along Pelling to Yuksom, Tashiding to Dhupidara section in parts of West Sikkim.
17. Collection and Chemical/Bacteriological analysis of 100 water samples covering four districts of Sikkim.
18. Purchase/replacement of glass wares and chemicals worth Rs. 15,00,000.00 (Rupees Fifteen Lakhs).
19. Identification of high grade construction material deposits covering all districts of Sikkim.

Taking in account the importance of role of geology and geo-technical investigation for developmental activities, technical manpower strength mainly in the field of Geology & Geotechnical wing needs to be enhanced almost to double of the present day cadre strength in next 10 years.