DIVERSION OF 2.7013 HA. OF FOREST LAND FOR CONSTRUCTION OF GOVERNMENT DEGREE COLLEGE DEHRA IN DISTRICT KANGRA (H.P.)	
FILE NO.	: **FP/HP/Others/50166/2020**
DATE OF PROPOSAL	: **27.09.2020**

SOIL CONSERVATION PLAN FOR CONSTRUCTION OF GDC DEHRA

Dehra (District, Kangra)-Physical Features

1.1. Area & Location:

The College campus is proposed at Geo coordinates 31.898399°N latitude and 76.223435°E longitude Mohal Barwara Mauza Paisa Tehsil Dehra, Dist. Kangra, Himachal Pradesh, 2.7013 Hectare of forest land. Tract is hilly, covered by Shivalik Range. The elevation varies from 514meters to 528 meters above MSL.

1.2. Configuration of the area:

It varies from almost flat land bordering Beas River to the broken and precipitous slopes inhigher reaches.

1.3. Altitude:

The altitude varies from 514 meters to 528 meters above MSL.

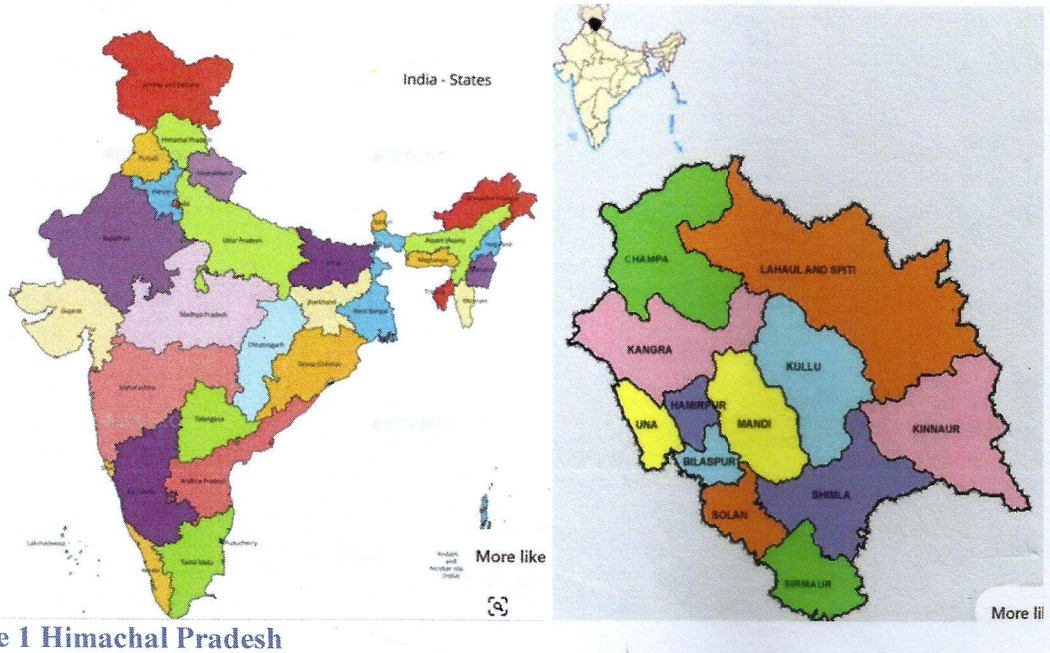


Figure 1 Himachal Pradesh

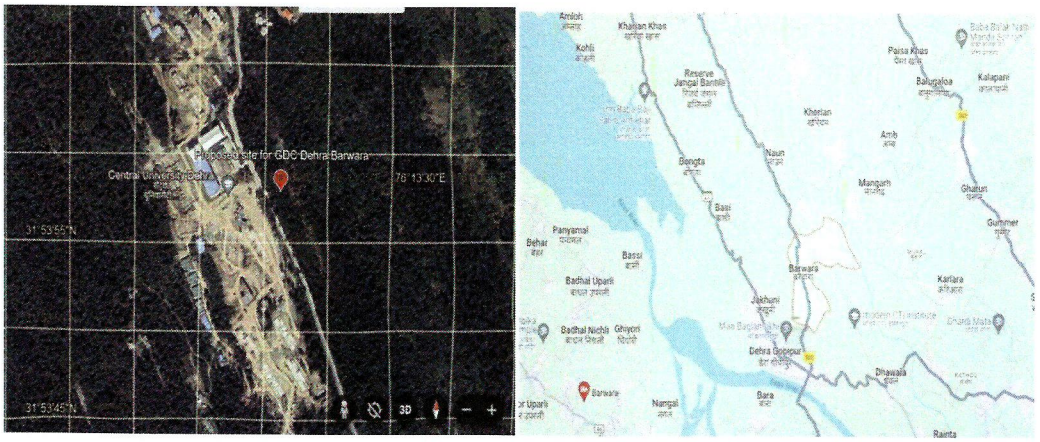


Figure 2 location of the Site

1.4. Ridges and watersheds

The area situated on the range of the Bankhandi hills of middle Shiwaliks. The proposed site is situated at water divide extended from Bankhandi to river Beas.

1.5. Rivers and streams.

Proposed site is situated in the catchment area of Beas River.

1.6. Geology and Rock

The geological formation is represented by the Shiwalik beds of the sub–Himalayan Series. The area situated on the range of the Bankhandi hills of middle Shiwalik . It is composed of alternating strata of a blue, sand stone.

1.7. Soil

The composition of the vegetation is determined by the depth of soil and the softness of rocks permitting penetration of roots. The sandstone formations in most parts become soft during

1.8. Climate

Dehra falls in sub-humid sub-tropical zone. The winter prevails from November to March, spring in April and May, summer from June to September and transition season from October to November. The minimum temperature in the winter goes to 4°C and rises to maximum 38°C in summer. The damage by frost is confined to mainly December-January.

1.9. Rainfall

There are two seasons of rainfall during the year, one from December to March, associated with the passage of western disturbances and the other which is the main one, extending from mid June till middle of September, caused by the south west monsoons. Some rain is also received in the post monsoon month of October. A major portion of precipitation (74%) is received during monsoon period from June to September. July and August are the wettest months. Main drought periods are from May to June and October to mid December. Drought in May and June is generally acute.

1.10. Temperature

It is not a typical "Hilly & Chilly" type of climate in Dehra, as it is closer to the plains.During winter, the climate is cold but pleasant. During summer the temperature is hot and temperature does sometimes cross the 44°C Celsius mark in summers.

1.11. General:

The proposed construction site is situated the middle the Shiwalik hills of the outer Himalayas. These hills are mostly composed of sand stone and conglomerates. Proposed site is mostly composed of with sand stone which have least probability of land sliding and soil erosion. In spite, of the least probabilities of land slide and soil erosion, we intended to take precautionary measure

to protect the soil in situ. Second, we will initiate the various measures to protect soil moisture in the proposed construction site. Adequate management strategy has been prescribed in the plan to check soil, erosion from rainfall. The management practices are prescribed here after.

2. SOIL&MOISTURE CONSERVATION PLAN

The preservation of soil and water resources holds immense significance as an integral objective of forest management in hilly regions. The extensive loss of vegetative cover caused by human interference and developmental works, such as opening of educational institutions etc. These sudden transformations have far-reaching consequences on agriculture, wildlife, and local forests. Therefore, a Soil & Moisture Conservation plan is essential for proposed site of construction, it becomes indispensable for several compelling reasons:

2.1. Top Soil Management:

Top soil will be properly conserved at earmarked construction site with adequate measures. It will be used for growing plants along the fringes of the green belt around the college.

Steps to be taken to avoid soil erosion

- Afforestation by planting trees will help a lot in improving stability of mild slope by preventing erosion.
- Construction of retaining walls as required.
- Construction of drain for drainage.
- Provision of good soil mixed with manure and subsequent irrigation for growth of grass for anchorage on slopes. Plantation mixed with indigenous and fast-growing plant species
- The degraded area will be reclaimed and rehabilitated with local species of plantation in a phased manner.
- A belt of trees with thick canopy will be created along the boundary and road.

2.2. Erosion Vulnerability:

Hilly areas are often characterized by steep slopes, fragile soils, and high rainfall. These conditions make them highly susceptible to soil erosion. While raising a building structure digging and dumping of soil in and along the selected site.

2.3. Ecological Sensitivity:

Hilly areas are home to diverse ecosystems, including forests, grasslands, and wild life habitats. Uncontrolled erosion during road construction can lead to the loss of topsoil, which is rich inorganic matter and essential nutrients. This loss can adversely impact vegetation growth, soil fertility, and overall ecological balance in the region.

2.4. Water Resource Protection:

Hilly areas often have numerous streams, rivers, and water bodies. During construction and cementation of the ground runoff may increase and that may affect the percolation of water in soil. Effective soil conservation measures are necessary to prevent sediment run off and protect water resources from contamination depletion. Water management plan rain water harvesting and sewerage control measures

2.5. Land slide Prevention:

Construction activities can de-stabilize the slopes, increasing the risk of landslides. Erosion weakens the stability of hill sides, and if not properly addressed, it can lead to slope failures, and potential loss of lives and infrastructure. Implementing soil conservation measures is essential to

minimize erosion and maintain slope stability.

2.6. Sustainable Development:

Hilly areas often have limited land availability, and the construction of buildings for educational purposes is crucial for socio-economic development and women empowerment in rural areas. However, these activities must be carried out with sustainably to minimize the negative impacts on the environment by Incorporating a soil conservation plan ensures the long-term viability of the infrastructure with preserving the ecological integrity of the hilly regions.

To address these concerns, a soil conservation plan for raising a college campus should include measures such as erosion control techniques, proper drainage systems, re-vegetation strategies, and slope stabilization methods. The plan should be tailored to the specific characteristics of the site, considering factors such as slope steepness, soil type, rain fall intensity, and the presence of sensitive ecosystems or protected areas.

Additionally, close coordination between road construction agencies, environmental authorities, and local communities is crucial to ensure the effective implementation and monitoring of the soil conservation plan. Regular inspections, proper maintenance, and adaptive management practices should be incorporated to address any potential erosion issues that may arise during or after construction.

This Soil & Moisture Conservation Plan will go a long way in providing effective vegetative cover to the hill slope sand thereby ensuring better conservation of soil and water. Besides Plantations, the areas which require soil conservation measures. Soil and water conservation measures keep the soil in good condition so as to accept rainfall, to provide good quality rooting environment and to avoid loss of top soil which ultimately will help in good land husbandry by improving ground water regime. This will also be useful for natural flora and fauna.

This plan encompasses the strategic implementation of mitigative measures and interventions proposed by project proponents and forest authorities. Its primary objective is to safeguard soil health, fertility, and productivity while preventing erosion and deterioration.

2.7. STRATEGIES

While constructing highways in mountainous regions, soil and moisture conservation plans are crucial to mitigate erosion, maintain slope stability, and minimize environmental impacts. Here are some key considerations for a soil and moisture conservation plan:

2.8. Site Assessment:

Conduct a thorough assessment of the project site to identify vulnerable areas prone to erosion, such as steep slopes, areas with shallow soils, or locations near water bodies.

2.9. Erosion Control Measures:

Implement erosion control measures, such as:

a) Mulching: Apply organic mulch to exposed soil surfaces to reduce erosion caused by rainfall.
b) Terracing: Construct terraces on steep slopes to minimize surface runoff and soil erosion.
c) Retaining Walls: Build retaining walls to prevent soil movement and retain moisture.

2.10. Slope Stabilization:

Implement measures to stabilize slopes and prevent landslides. These may include:

a. Retaining Walls: Construct retaining walls in areas with unstable slopes to prevent soil movement and slope failure.

b. Drainage Systems: Install adequate drainage system, including surface drain sand sub surface drains, to manage water runoff and prevent saturation of slopes.

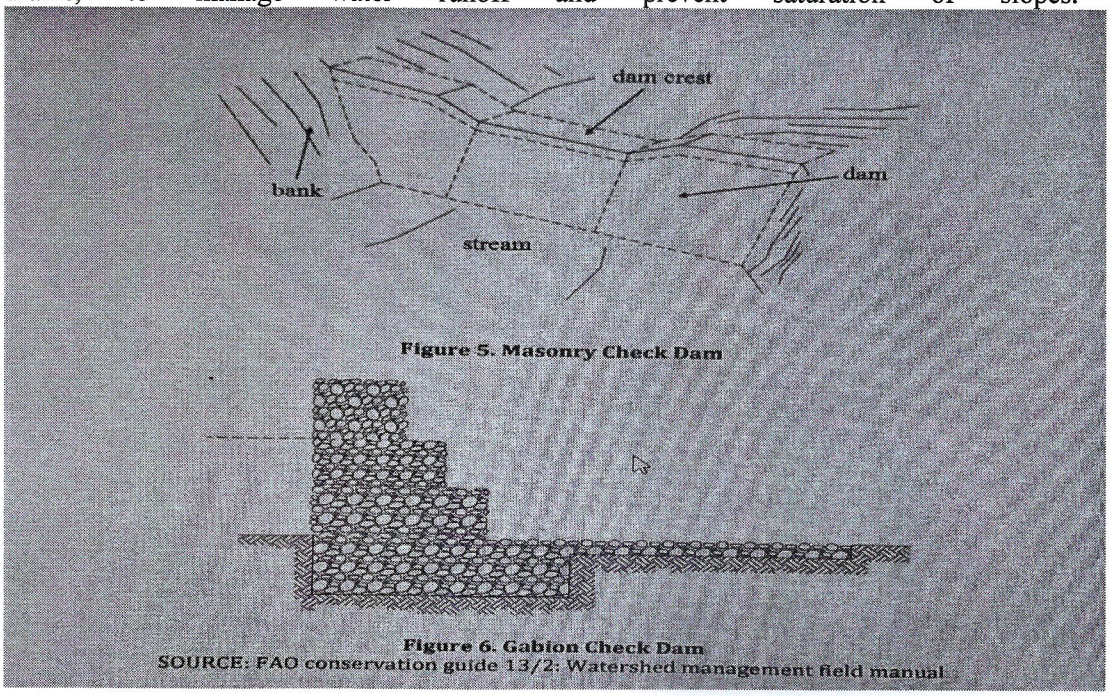


Figure 5. Masonry Check Dam

Figure 6. Gabion Check Dam
SOURCE: FAO conservation guide 13/2: Watershed management field manual

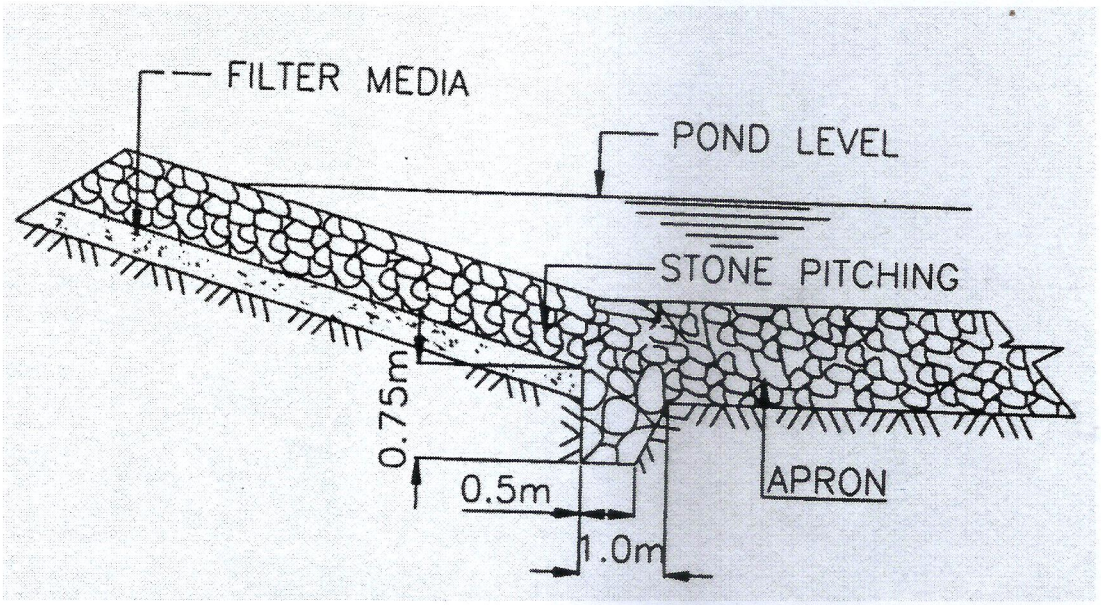


Figure 3 Retaining wall

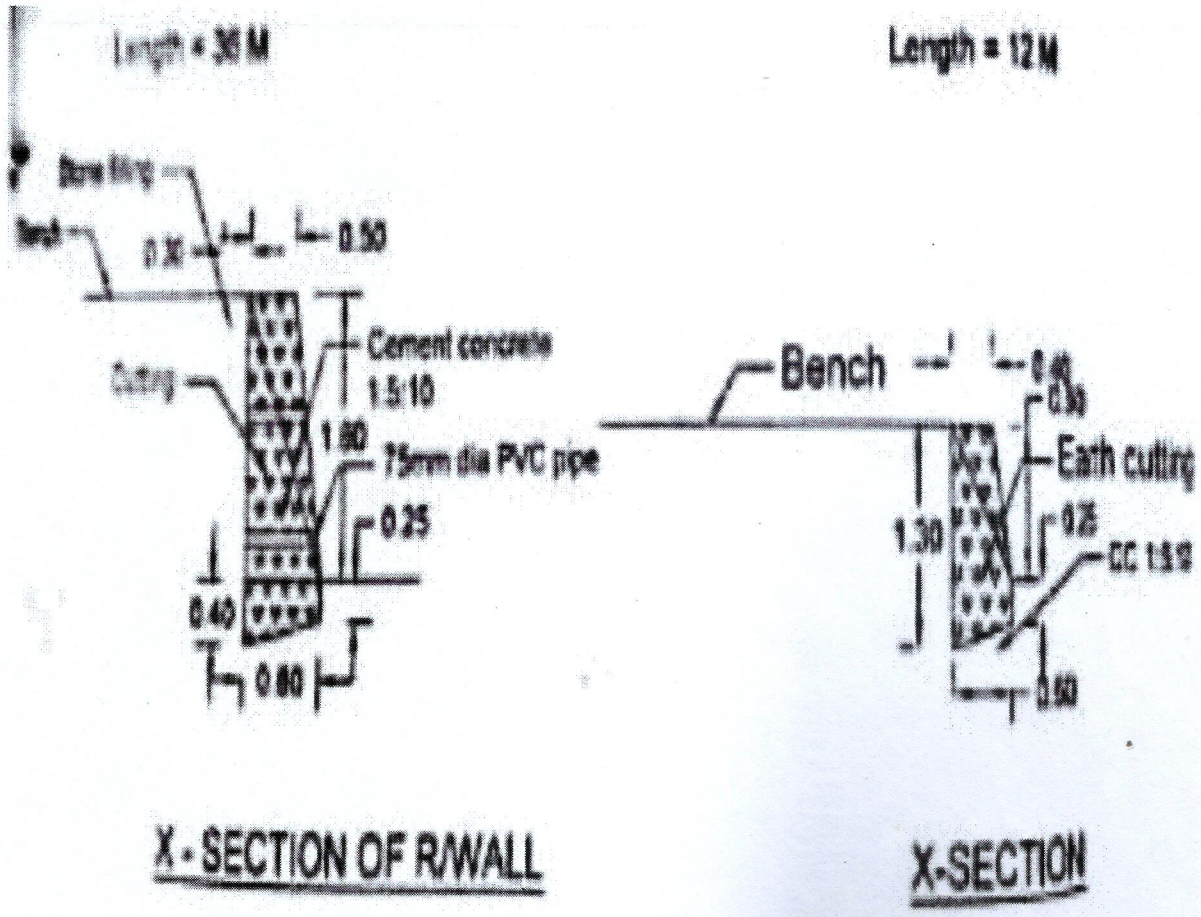
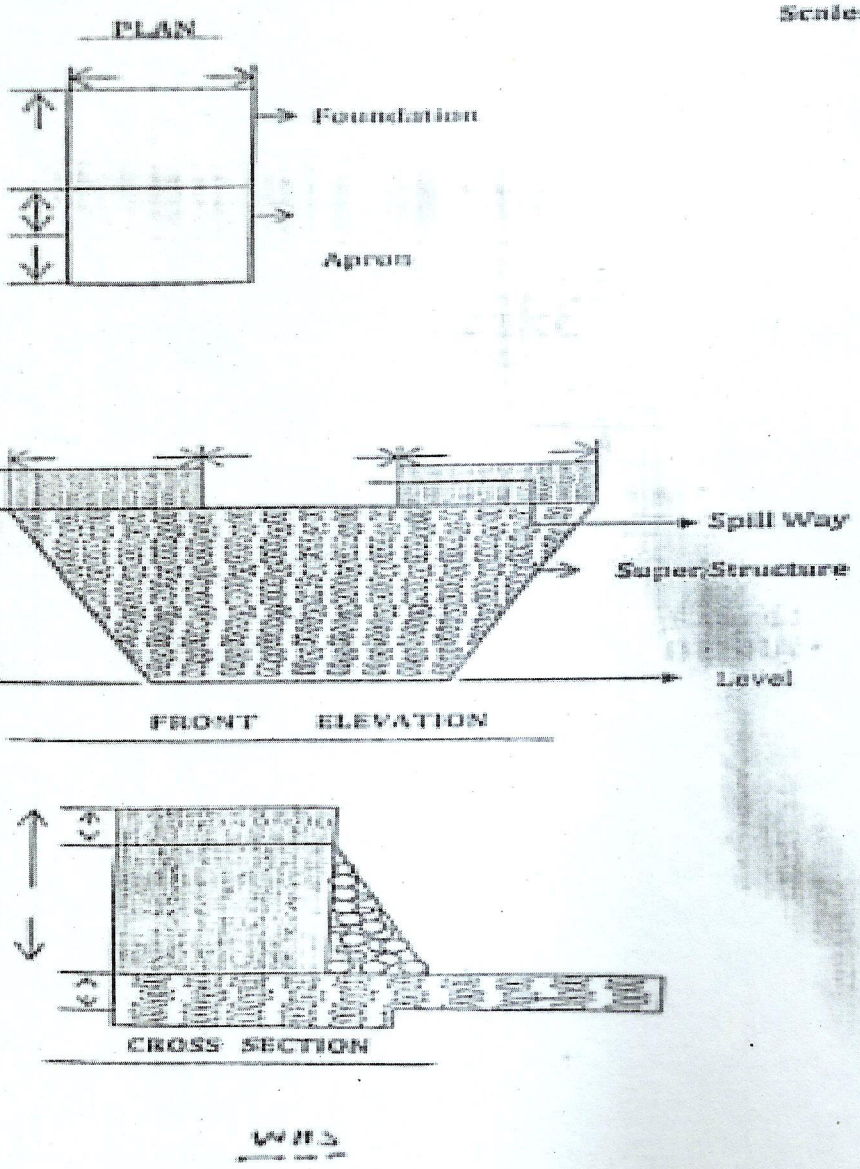


Figure 4 Dry Stone check Dam

Scale:- Not to scale



WHS

2.11. List of soil conservation Works

Sr. No.	Type of structure	No of structure	Amount per structure	Total Amount
1.	Retaining wall	02	@250000/-	500000/-
2.	Dry stone check dam	10	@20000/-	200000/-
3.	WHS	01	@500000/-	500000/-
			Total amount = 12,00,000	

2.12. Water Management:

Develop a water management plan to control and treat runoff from the highway construction site. Consider implementing techniques such as:

a) Construction of Water Harvesting Structures: Build check dams and ponds to capture rain water and increase ground water recharge.

b) Use of Permeable Surfaces: In corporate permeable pavements or gravel in parking areas and earthed playground pathways, botanical garden flower beds and open-air theater to allow water in filtration instead of runoff.

c) Reuse of water harvested from rain in botanical garden, flower beds and pouring excess in recharge holes etc.

2.13. Vegetation Restoration:

Undertakere-vegetationeffortstostabilizesoilandenhancemoistureretention:

a) Institution will take various initiates to minimum the possible loss to vegetation and also initiates plantation work within the campus.

b) Botanical garden: motivate the students for environmental conservation and also able to create awareness among students about their native flora and fauna.

c) Plantation: Conduct tree and vegetation plantation along the food path and highway passing through to minimize soil erosion and improve water absorption. Select native grasses, legumes, or other suitable vegetation those are adapted to the local climate, soil conditions, and construction timelines. Native species tend to establish quickly and have better erosion control properties.

d) Grass Seeding: Seed grasses on disturbed soil areas to provide temporary soil cover and stabilize slope.

2.14. Control:

Implement measures to prevent sediment from reaching water bodies:

a) Sediment Barriers: Install sediment barriers, such as silt fences or sediment ponds, to trap and filter sediment-laden runoff.

b) Construction Site Best Practices: Promote best practices, including proper waste management, sediment control during earth work, and regular site inspections.

2.15. Monitoring and Maintenance:

a) Regularly monitor the effectiveness of erosion control and stabilization measures.

b) Conduct inspections after rainfall events to identify and address any erosion or slope stability issues promptly.

c) Ensure regular maintenance of drainage systems to prevent clogging and ensure their proper functioning.

d) Regular check on the rainwater harvesting and their rational use their after.

Additionally, it is crucial to involve local communities, government agencies, and contractors in the implementation process. Public awareness campaigns can be conducted to educate stakeholders about the importance of soil and moisture conservation and their role in minimizing the environmental impacts of road construction.

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Distt Knagra (H.P.)

Principal
Govt. Degree College
Dehra Distt Kangra (H.P.)

Place : Dehra
Dated : 19 July, 2024.

Counter signed by

Sunny Verma (HPFS)
Divisinal forest Ofiicer
Dehra