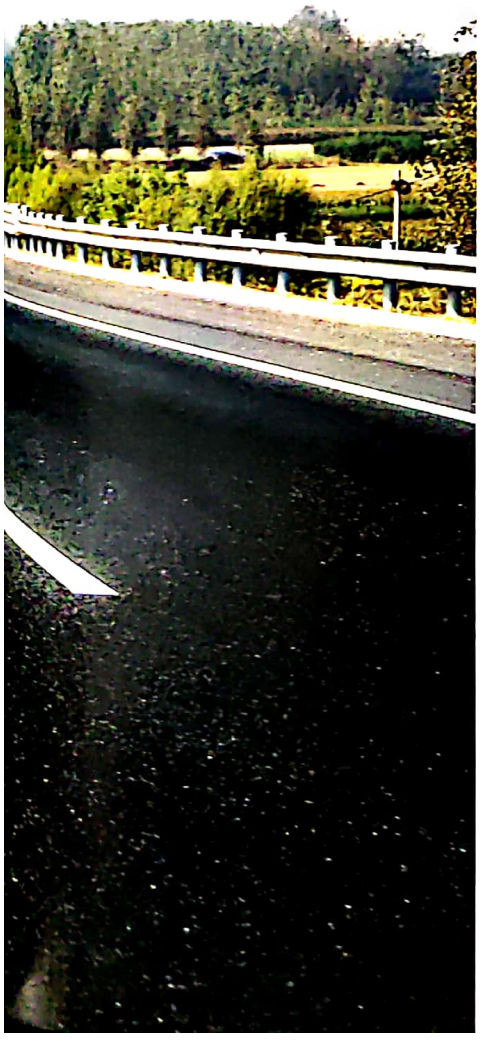
10
CHAPTER
ROAD INFRASTRUCTURE & COMMUNICATION DEVELOPMENT



INTRODUCTION

Bhagirathi Eco Sensitive Zone total area of 4179.95 Sq km from Gaumukh to Uttarkashi is a region in the upper Himalayas which shares its border with China. There are a total of 89 villages situated in the rough terrain of the Higher Himalayas. A total of 16 villages with a population of more than 7000 still lack road connectivity forcing the population to migrate to the urban settlement in search of better services. In addition, the Gangotri Dham is located in the BESZ, is one of the most important place of pilgrimage attracting the pilgrims from all over the world. The poor road infrastructure on this side of the Indo-China border, demand for upgradation of the same in view of the national security concerns. The area of BESZ is severely prone to natural disasters like floods, cloud bursts, avalanches, landslides etc. Every year roads, bridges, buildings etc are damaged or washed away by different disasters and therefore need establishment in a very time bound manner. The floods of the year 2012-13 had a very severe impact on the road infrastructure and the area is yet to rehabilitate to its original shape. This plan has been prepared keeping in view the basic infrastructure services to the villagers of the area, upgradation of border infrastructure in view of national security and basic infrastructure to the Char Dham pilgrims.

There are five agencies of State Government as well as Central Government, who are presently stabilizing, upgrading and maintaining the road infrastructure in the area and they are as follows:

1. P.W.D. Division Bhatwari – Construction and maintenance of state highways, village roads, different types of bridges (motor bridges and bridle bridges), government buildings etc.

2. Border Roads Organization- Establishment, upgradation and maintenance of NH-34 from Uttarkashi to Gangotri, Bhaironghati to Jadong , Naga and other border roads etc.
3. P.M.G.S.Y Division - Construction and maintenance of 13 village roads, motor bridges.
4. P.W.D. (World Bank Division)- Restoration works by construction of different types of bridges (motor and bridle bridge).
5. P.W.D. (ADB Division)- Restoration of roads and upgradation of state highways.

OBJECTIVE

Road connectivity is the first step for the development of any civilization. As described above sixteen villages having a population of 9000 are still unconnected with motor road. People of these villages are travelling on an average of 8 to 10 Km long distance on foot. Pilang and Jodav are 22 km far away from a road head. Modern heavy defense equipments have to transport up to border, the object and vision of the departments associated with road infrastructure development are as under:

- To establish and upgrade national highways in view of providing better services for Char Dham yatra pilgrims
- To establish and upgrade the road infrastructure in the border area for national security concern
- To establish and provide road connectivity to the villagers, with an objective to stop their migration
- To upgrade the road infrastructure so as to facilitate the pilgrims with smooth and safe transport
- To restore the infrastructure damages due to nature calamities
- To maintain the existing road infrastructure including their annual repair

As per the Guideline of Eco-Sensitive Zone Gazette Notification following provisions in new roads, re-construction of road and other repair/maintenance works are included in proposed Zonal Master Plan.

Clause No. 2 - Zonal Master Plan for Eco Sensitive Zone

Conditions of Gazette notification	Provisions Incorporated in ZMP
(2.12) - No change of land use from green uses such as horticulture area, agriculture area, tea garden, parks and other likes places to non green use shall be permitted in the Zonal Master Plan, except the strictly limited conversion of such lands may be permitted to meet the local needs including civic amenities and other infrastructure development in large public interest and complying with their mitigation option and subject to finalization of zonal master plan.	(2.12) - The alignment of roads and bridges shall be chosen in such a manner to avoid and minimize the damage to agricultural area, tea garden, parks and other and like places and environment .In construction and development activities forest conservation act 1980 shall be followed accordingly. The compliance provisions have been incorporated in the guidelines for construction of roads.
(2.14) - There shall be no consequential reduction in Green area such as forest area, agricultural area etc subject to the provisions commented in Clause (12) and the Forest Conservation Act 1980 (69 of 1980) as applicable.	(2.14) – The alignment of roads and bridges shall be chosen in such a manner to avoid Green area such as dense forest and agricultural area. In construction and developmental activities Forest Conservation Act 1980 shall be followed. The measures regarding conservation of green area shall be followed accordingly.
2.16- Development and Protection – (i) Zonal master plan shall indicate the area on hill slopes where development shall not be permitted.	The alignment of road shall be chosen in such a manner to avoid steep & unstable slope. Necessary guide lines have been incorporated in the Zonal Master Plan .

Conditions of Gazette notification	Provisions Incorporated in ZMP
(ii) No development shall be undertaken in area having a steep slope or area which falls in fault or hazard zones or areas falling on the spring lines and first order streams or slopes with a high degree of erosion as identified by the State Government on the basis of available scientific evidence and in exceptional cases infrastructural works for the benefit of community may be undertaken with proper study of Environmental impacts and taking appropriate mitigation measures arising out of such development in consultation with line Ministries of the Central Government including public consultation.	The developmental activities shall be undertaken after geological investigation and environmental study. Proper care shall be taken with the help of geologist in fixing the alignment to avoid areas which appear susceptible to erosion or areas which have unstable slopes. In case of steep slope, the provisions of IS 14496 (Part 2) 1998 shall be followed. The mitigation measures as per forest conservation act 1980, IRC specifications, Beuro of Indian Standards Code No 14494 part 2 (1998), **(Annexure-58)** and environmental impact assessment as stated "Guide lines for construction of road "in this this chapter shall be followed.
(iii) No development on existing steep hill slopes or slopes with a high degree of erosion shall be permitted.	The alignments shall be chosen in such manners which impose minimum impact on environment. Those areas shall be avoided which have a tendency of erosion. But in unavoidable circumstances modern techniques of slope stabilization like breast wall gabion walls, reinforced soil and soil nailing shall be applied to mitigate all adverse effect of construction. The developmental activities shall be undertaken on the hill slopes as specified by IS Code No 14496 (Part II) 1998 Indian Standard for Preparation of Land Slide Hazard Zonation Maps in Mountainous Terrains Guidelines at the time of executing the project.
(v) The places in the Eco Sensitive Zone where cutting of hills causes ecological damages and slope instability in adjacent areas, such cuttings shall be undertaken with proper study of the Environmental Impact and taking appropriate mitigation measures in consultation with the Ministries of the Central Government including Public Consultation.	All possible measures shall be taken to avoid ecological damages or slope instability using modern techniques of slope stabilization like breast wall gabion walls, reinforced soil and soil nailing. In addition suggestion of planting of local grasses or other species to avoid growth of exotic species in such area would be undertaken at the time of executing the project. The developmental activities shall be undertaken on the hill slopes as specified by IS Code NO 14496 (Part II) 1998 Indian Standard for Preparation of Land Slide Hazard Zonation Maps in Mountainous Terrains Guidelines at the time of executing the project. Such types of guide lines have been incorporate in Zonal Maters Plan.
2.19 – Hill Roads (i) For construction of any road including untarred road in the Eco-sensitive Zone (including the extension or widening of existing roads) subject to inclusion in the Zonal Master Plan.	A list of 16 unconnected villages has been enclosed with this Zonal Master Plan. Which shows the length required to connect these villages .
(ii) Provision shall be made for treatment of hill slope and cost of such protection measures should be included in the cost estimate of the proposed road.	Generally, alignments of new roads shall be selected in such a way to avoid areas having steep slope or having tendency of land slide. As per new circular of EinC PWD Uttarakhand the hill road shall be constructed in part cutting and part filling and the alignment should be chosen in such a way to minimize or avoid the H.P bends. In unavoidable circumstances R/wall and breast wall shall be constructed using geo grids or plum concrete.

Conditions of Gazette notification	Provisions Incorporated In ZMP
(iii) The debris shall not be dumped down the khud or slopes but shall be subsumed in the construction of roads and the provision shall also be made for disposal of unused debris in appropriate manner at suitable and identified location so as not to affect the ecology of the area adversely and the debris shall be treated and landscaped using bio-engineering and other appropriate techniques and the cost of such measures shall be included in the cost estimate of the proposed road.	Approx. 30 to 40 percent of debris generated from hill cutting is being consumed in road construction work, such as retaining walls, gabion walls, stone ballast etc. Nowadays PWD is using soil stabilizer where the local waste material is being used with certain admixture which are called soil stabilizer as per mix design for the sub base and base coat of road pavement. Debris from hill cutting are being dumped in safe dumping zone. Dumping zone are provided in such a place which are stable for muck disposal additional fund required, which is being included in the cost of work. The dumping zones are located on forest land transfer cases with their coordinates. **(Annexure 59 & 60)** Such type of document had been provided to ESZ monitoring committee at the time of their visit in the area.
(iv) All roads shall be provided with adequate number of road side drains and these drains shall be kept free from blockage for run off disposals and this run off from road side drainage shall be connected with the natural drainage system of the area.	Road side drains and cross drainage shall be provided as per geology of the site. As per new circular of EinC PWD Uttarakhand, the drain shall be lined with local stones received from local cutting of hills. So there is no seepage and erosion. These drainage shall be kept open for disposals of run off.
(v) Alignment shall be selected so as to minimize loss of vegetal cover.	Alignments of roads shall be selected in such a way to minimize the loss of vegetal cover.
(vi) Appropriate design standards shall be followed while designing the roads including mass balancing of cut and fill and avoidance of unnecessary cutting.	The road construction shall be done as per IRC specifications, and for steep slope consideration IS 14496 part 2 (1998) shall be followed. As per new circular of EinC PWD Uttarakhand, **(Annexure-61).** the hill road shall be constructed in part cutting and part filling. Such types of guide lines have been incorporated in Zonal Master Plan. Approx. 30 to 40 percent of debris generated from hill cutting shall be consumed in road construction work such as retaining walls, gabion walls, stone ballast etc.
(vii) Notice shall be given about all fault Zones and land slide Zone along the roads indicating the beginning and end of such area.	The alignments of roads shall be finalized after detailed geological investigation. The suggestions of geologist shall be incorporated in the alignment.

PRESENT STATUS

(A) Existing Infrastructure

S.No	Name of Road	Class of Road	Length (km)
P.W.D.			
1	Uttarkashi Ghansali Motor Road	State Highway	18.00
2	N.I.M Motor Road	Village Road	2.00
3	Mustiksaur Motor Road	-do-	7.00

S.No	Name of Road	Class of Road	Length (km)
4	Tekhala Mahidanda Motor Road	-do-	12.760
5	Pata link Motor Road	-do-	1.00
6	Sangrali Motor Road	-do-	1.00
7	Uttron Motor Road	-do-	6.00
8	Seku Motor Road	-do-	0.700
9	Ganeshpur Motor Road	-do-	0.40
10	Bonga Bhailura Motor Road		3.828
11	Bhatwari,Pahi, Dwari, Gorshali, Jakhol Motor Road	-do-	17.00
12	Maneri Jamak Motor Road	-do-	1.25
13	Sainj Motor Road	-do-	0.75
14	Charethi Raithal Nateen Motor Road	-do-	13.00
15	Bhatwari Barsu Motor Road	-do-	11.25
16	Raithal mini Stadium Motor Road	-do-	2.50
17	Dawri Raithal Motor Road	-do-	3.00
18	Bandrani Motor Road	-do-	0.90
19	Dawari Holticulture Motor Road	-do-	1.00
20	Bhelatippri Saura Motor Road	-do-	5.25
21	Malla Silla Motor Road	-do-	4.71
22	Harshil Mukhwa Jangla Motor Road	-do-	5.85
23	Pyara Jhalla Motor Road	-do-	1.00
24	P.W.D Store and Office Motor Road	-do-	0.600
25	Saura Sari Motor Road	-do-	2.00
Border Roads Organization			
1	Bhaironghati Nelong	Border Road	23.60
2	Naga- Nilapani	-do-	9.80
3	Nelong-Naga	-do-	8.10
4	Naga- Sonam	-do-	11.20
5	Naga- Jadung	-do-	5.33
6	Harsil-Kiarkoti-Lamkhaga Pass-Gainder thatch-Nithal-Thatch	-do-	42.00
7	Mehdi-Tsangchockla	-do-	10.00
8	Sumla-Thangla	-do-	12.00
9	Uttarkashi to Gangotri (N H 34)	National Highway	100.00

(B) List of unconnected villages in BESZ

(i) Villages for which road has been sanctioned but not yet constructed

Sl. No	Name of Village	Sanctioned length (km)	Code	Population	Sanctioned cost (Rs. in Lakhs)	Extra cost required for cartage of material (Rs in Lakhs)
1	Bagori	2.00 km	040712	567	208.00	304.24
2	Hinna	3.00 km	040769	735	149.75	219.04
3	Kankradi	1.50 km	040798	468	18.90	27.65
4	Nirakot	8.00 km	040792	83	100.80	147.80
5	Silyan	8.00 km	040791	186	100.80	147.80
6	Maneri	18 km+80m	040740	1271	191.96	280.78
7	Kamar	9.95 km	040744	463	666.96	975.56
8	Syawa	6.00 km	040745	475	369.41	540.34
9	Salang	4.75 km	040750	432	303.56	444.02
10	Silla	9.60 km	040753	492	618.33	904.43
	Total :	**70.8 km + 80m**		**5172**	**2728.47**	**3991.30**

(ii) Villages for which road has not been sanctioned yet.

Sl. No	Name of village	Proposed length from nearest motor road	Approximate cost in lakhs	Code	Population	Proposed road for connectivity
1	Dansra	6.00 km	312.00	040759	187	Extension of Sangamchatti Gajoli road.
2	Pilang	22.00 km	1144.00	040754	349	Extension of Malla Silla Motor Road.
3	Jodaw	22.00	1144.00	040755	132	Extension of Malla Silla Motor Road.
4	Kaneth	5.00 km	260	040739	06	Construction of motor road from Maneri.
5	Bhangeli	2.30 km	154.00	040718	541	Construction of motor road from Gangnani.
6	Salu	4.00 km	208.00	040746	263	Construction of motor road from Syawa.
	Total :	**61.30 km**	**3222.00**		**1478**	

FUTURE SCENARIO

Following are the works proposed for establishment of road infrastructure development.

PWD Bhatwari

1. Construction of link road from Heena to village Heena.
2. Construction of Malla Suparga Motor Road.

3. Construction of approach motor road from Mathali Tok in village Raithal to Choriya in Bhatwari Block of district Uttarkashi.
4. Construction of Jaspur Silyan Nirakot Motor Road from Bhaldiyana Lambgaun Uttarkashi Motor Road.
5. Extention of Mukhwa Jangla Motor Road from Harshil.
6. Construction of Kishan pur Motor Road via Kankradi from Mustik Saur Kuroli Motor Road.
7. Construction of Bhatwari to Kyark bridle road.
8. Construction of bridle bridge over Siya gad between village Harshil and Jhala.
9. Construction of Motor Road from Bonga to Kiyan Gaon
10. Construction of Motor Road from Bonga to Gandhiyal Dhar

PMGSY Uttarkashi

1. Gyansu-Sald-Uprikot Motor Road km.-14 to Nismor Motor Road
2. Mahidanda Motor Road to Bagiyalgaon Motor Road
3. Malla-Sari Motor Road to Silla Motor Road
4. Jamak-Bayana Motor Road to Syaba Motor Road
5. Jamak to Kamar Motor Road
6. Thirang to Salang Motor Road
7. Bhankoli to Agora Motor Road
8. Gyansu-Gyanza Motor Road (Stage-2)
9. Silla Motor Road to Pilang Motor Road
10. Gangnani to Bhangeli Motor Road (Stage-1)
11. Jamak to Bayana Motor Road at X-Sec-2/22-23 (Bridge)
12. Jamak-Bayana Motor Road to Syaba Motor Road at X-Sec-2/13-14 (Bridge)
13. Gajoli to Naugoan Bhankoli Motor Road at X-Sec-3/18-19 (Bridge)
14. Thirang to Salang Motor Road at X-Sec-0/14-16(Bridge)
15. Malla Sari Silla to Pilang Motor Road at X-Sec-1/14-1/6 (Bridges)

P.W.D (W.B) Uttarksahi

1. Sada Bridge
2. Harsil Bridge
3. Pilang Jodaw 01 36 m Span
4. Pilang Jodaw 02 120 m Span
5. Korigaad Bridge
6. Tambakhani Bridge

Border Road Organization

1. Bhaironghati-Nelong