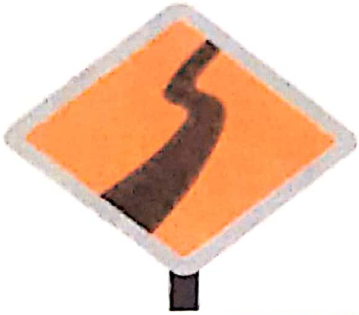
GOVERNMENT OF JAMMU AND KASHMIR

Government of Jammu & Kashmir

PRADHAN MANTRI GRAM SADAK YOJANA
PMGSY DIVISION DODA

Package No:- JK-04-640



PRADHAN MANTRI GRAM SADAK YOJANA

NAME OF THE SCHEME:- GATHA TO HANGA NOORI

PACKAGE NO:	**JK04-640**	
ESTIMATED COST :-	**618.64**	**LACS**
MAINTENANCE COST	~~199.42~~ 61.84	**LACS**
ROAD CONECTIVITY :-	**UPGRADATION**	
ROAD LENGTH :-	**7.00Kms**	
BLOCK :-	**BHADERWAH**	
DISTT.	**DODA**	

CHIEF ENGINEER
PMGSY JKRRDA
JAMMU

Introduction

.1 Objectives of Pradhan Mantri Gram Sadak Yojna (PMGSY)

Rural Road connectivity is a key component of rural development by promoting access to economic and social services and thereby generating increased agricultural incomes and productive employment opportunities. It is also a key ingredient in ensuring poverty reduction.

It was against this background of poor connectivity that the Prime Minister announced in 2000, a massive rural roads program. The Prime Minister's Rural Road Program (Pradhan Mantri Gram Sadak Yojana, PMGSY) set a target of:

- Achieving all-weather road access to every village/habitation with a population greater than 1000 by 2003
- Providing all-weather road access to all villages/habitations of population greater than 500 people [250 in case of hill States (North-Eastern states, Sikkim, Himachal Pradesh, Jammu & Kashmir and Uttaranchal), the desert areas and tribal areas] by the end of the Tenth Five Year Plan, i.e., 2007

.2 All Weather Road

The all weather road is one which negotiable during all weather with some interruptions, this means that at cross drainage structures the duration of overflow or interruptions at one stretch shall not exceed 12 hours for ODR & 24 hours for VR in hilly terrain. The total period in interruption during the year should not exceed 10 days for ODR & 15 days for VR.

.3 Core Network

The rural road network required for providing the 'basic access' to all villages/ habitations is termed as the Core Network. Basic access is defined as one all-weather road access from each village/ habitation to the nearby Market Centre or Rural Business Hub (RBH) and essential social and economic services.

A Core Network comprises of Through Routes and Link Routes. Through routes are the ones which collect traffic from several link roads or a long chain of habitations and lead it to a market centre or a higher category road, i.e. the District Roads or the State or National Highways. Link Routes are the roads connecting a single habitation or a group of habitations to Through Roads or District Roads leading to Market Centers. Link Routes generally have dead ends terminating on habitations, while Through Routes arise from the confluence of two or more Link Routes and emerge on to a major road or to a Market Centre.

The Core Network may not represent the most convenient or economic route for all purposes. However, since studies show 85-90% of rural trips are to market centres, the Core Network is likely to be a cost-effective conceptual frame work for investment and management purposes, particularly in the context of scarce resources.

The Sub-project road Gatha To Hanga Noori , is a link road having code L040 in Bhaderwah block of [illegible] District. This road directly connects the habitation of Gatha,Dalha ,Dhar, Hanga, Thamli and Noori with population 2008, 111, 321, 262, 85 and 212 respectively. Thus this link road serves the total population of

1.4 Geography

1.5 Climatic Condition

1.6 The Sub-Project Road

The road passes through Hilly terrain

Road is in both cutting and filling and passes through built up area. There is no hindrances in construction of road as all the hindrances has been cleared during construction of stage-Ist of this road

District:	Doda
Block:	Bhaderwah
Road Name:	Gatha To Hanga Noori
Road Code:	L040
Package No:	JK04-
Road Length:	7.00 Km
Start Point:	Gatha (latitude:and longitude :) Latitude-32.999294 Logitude-75.694359
End Point:	Noori. (latitude: and longitude :) Latitude-32.986864 Logitude-75.65458.

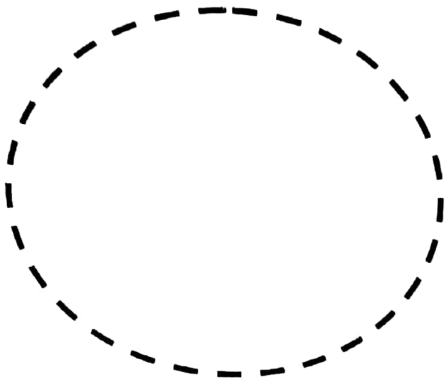
S.No.	Habitation benefited	Population benefited		Chainage	
		Direct	Indirect	From	To
1	Gatha	2008			
2	Dalha	111			
3	Dhar	321			
4	Hanga	262			
5	Noori	212			

Planning and Basic Design Consideration

Key maps

Figure-1

Figure-1 Section of Block Maps showing all existing connectivity like District/block HQ, new townships, National and State highway network, mandis, hospitals, colleges, schools etc.



2.2 Preliminary alignment investigation

(Insert a strip plan as indicated for the road under study. Width of track or road [illegible] important points should also be included. It should also indicate locations of utilities [illegible] poles etc. and other environment and safety hazard. safety A sample attached [illegible] methodology for preparation of the strip plan [illegible] standard.)

Figure-2 Strip plan showing land and alignment details

2.3 Site Photographs

4 Road Design Brief

[illegible] by the consultants in finalizing the drawings, provision of [illegible] issues, drainage issues, etc., approx distance from [illegible] have to be clearly spelt out in this table.)

Table 2.1 Road Design Brief (example attached)

Sl.	Location	Issue	Design Solutions
1	*Ch. 0.00km*	*The proposed road is connecting* Gatha, Hanga , Dhar, Dalha& NOORI *habitation The road starts from Gatha to Hanga Noori*	*All the hindrances are being cleared.*
2	*Ch.0.000 to 7.000km*	*side slopes are not adequate and gets eroded with rain and endanger the traffic movement and blocks the traffic.*	*Proper protection works like, 4mtr,3 mtr, & 1 mtr height retaining wall/ Edge wall to be provided.*
3	*Ch.3.775*	*The vented causeway provided for tarraning Hanga Nallah is not sufficient and gets blocked/flooded during the rainy season and also damages the road stretch on d/hill side.*	*6.00m span R.C.C Culvert has been proposed for proper tarraning of Hanga Nallah & for protection of road on d/hill side.*

2.5 Transect Walk Summary

TRANSIT WALK SUMMARY

Table 2.2 Transect Walk Summary (example attached)

Chainage	Existing Land Width*(avg)	Additional Land width Required		Type of Loss		Village	Remarks/Suggestions
		LHS	RHS	LHS	RHS		
0/000 to 0/500	5.00	3	3	Revenue land	land of Distt. Jail Complex	Gatha	Protection/CD Work Proposed as required
0/500 to 1/000	4.50	3	3	Army area	Army area	Gatha	Protection/CD Work Proposed as required
1/000 to 1/500	5.00	3	3	Revenue land	Revenue land	Chak Katoch	Protection/CD Work Proposed as required
1/500 to 2/000	4.00	0.50	0.50	Forest land	Forest land	Dhar	Protection/CD Work Proposed as required
2/000 to 3/000	5.00	3	3	Revenue land	Revenue land	Dalah	Protection/CD Work Proposed as required
3/000 to 4/000	4.00	3.50	3.50	Revenue land	Revenue land	Hanga	Protection/CD Work Proposed as required
4/000 to 5/000	4.00	3.50	3.50	Revenue land	Revenue land	Hanga	Protection/CD Work Proposed as required
5/000 to 5/500	4.00	3.50	3.50	Revenue land	Revenue land	Thamli	Protection/CD Work Proposed as required
5/500 to 5/1000	3.00	1.00	1.00	Forest land	Forest land	Noori	Protection/CD Work Proposed as required
5/1000 to 6/000	3.00	4.00	4.00	Revenue land	Revenue land	Noori	Protection/CD Work Proposed as required

(Insert the information on the People present for Transect walk, their no., represe tation of Minority community, women participants etc.)

1. Total No. of People present for the Transect walk :
   Male : 12 , Female: 03 , Total : 15
2. Demographic information where the Walk was conducted : On whole road
3. No. of Govt. Employees present : 08
4. No. of Contractors Employees : nill
5. No. of participants from Minority community :
   SC: 02 , ST: 03 , Women :02
6. Enclose a separate sheet with names, designation (if Govt. Employee, or Elected Representative) and Signatures of participants of transect walk

2.6 Checklist

(Tick the relevant)

Transect walk done	Yes ☐	No ☐
Transect walk summary table included	Yes ☐	No ☐
Photographs taken	Yes ☐	No ☐
Major changes in alignment perceived	Yes ☐	No ☐

RESOLUTION.

We, the members of village Gram panchayat Sarna/Hanga do solemnly affirm that our road viz. GATHA TO HANGA NOORI. has been proposed for up-gradation under DRRP-II of PMGSY programme. In this Connection a team of Engineers of PMGSY sub-Division Bhaderwah has Conducted Detailed survey of existing road for up-gradation purpose. and we the members of Gram panchayat have been provided full Information/knowledge regarding the same.

NO	NAME	SIGNATURE
1	Shokat Ali Mir Sarpanch Sarna	[signature]
	Drishta Devi	[signature] Dirshta Devi Panch Ward 5 A Pyt. Halqa Sarna
3	Kamla Devi — Kamla Devi Sarpanch Pyt. Halqa-Hanga	[signature] Kamla Devi Sarpanch Pyt. Halqa-Hanga
	Niaz Ahmed Member-Pyt sarna-c	[signature]
	Sarw...	[signature]
	Sher Singh	[signature]
	Devinder Kumar	[thumb impression]

Scanned with CamScanner

10, [illegible]

11, [illegible]

12 Kiran Kumar

13 [illegible] Singh.

14 Deepak

15, [illegible]

Vedparkash.

Hussain

TARIQ HUSSAIN
NAIB-Sarpanch

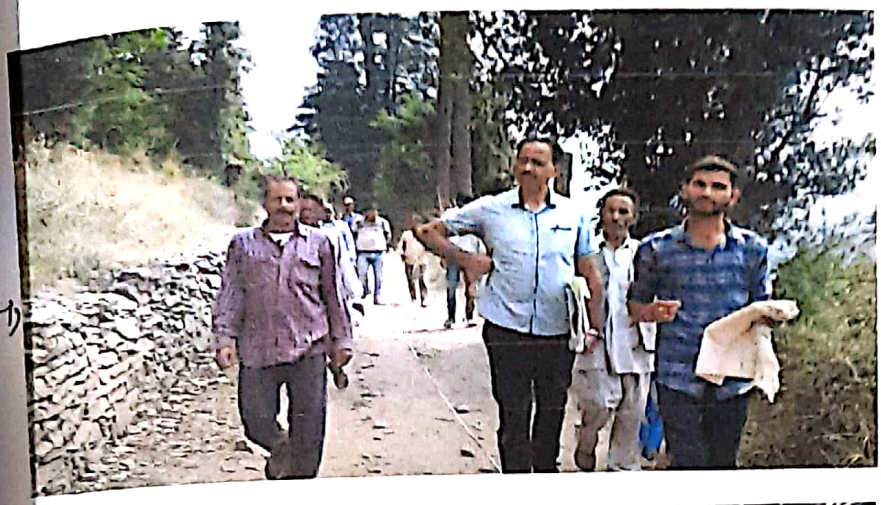
TRANSIT WALK/COMMUNITY PARTICIPATION PHOTOGRAPHS OF HANGA TO NOORI ROAD.

2)

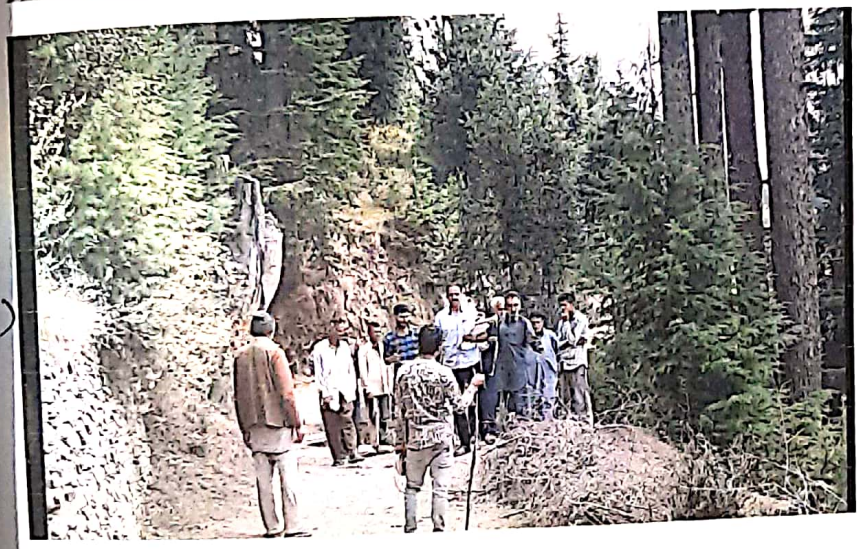
3)

TRANSIT WALK/COMMUNITY PARTICIPATION PHOTOGRAPHS OF HANGA TO NOORI ROAD.

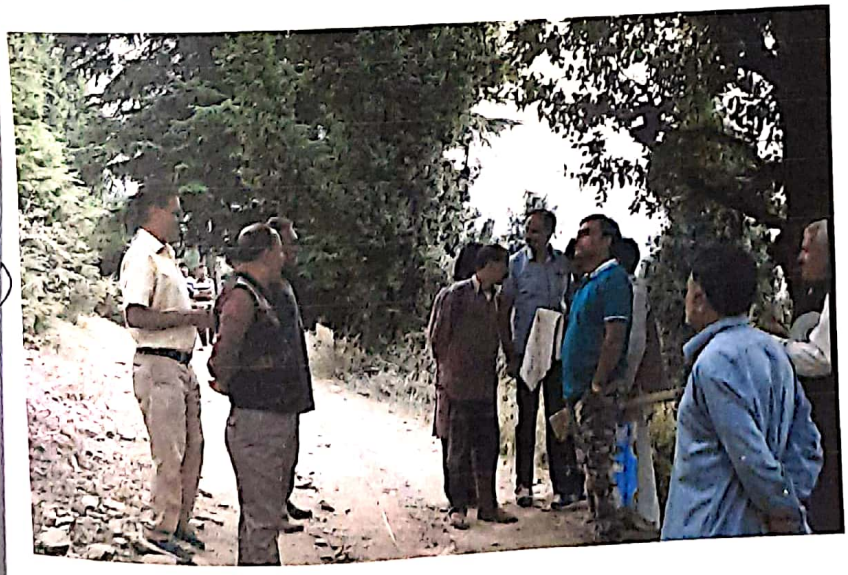
4)



5)



6)



Topographic Survey

3.1 General

Topographic survey true to ground realties have been done using precision instruments [illegible] total stations and [illegible] (x,y,z format) for developing digital terrain model [illegible] dumpy level for leveling survey)

The in-house standards, work procedures and quality plan prepared with reference to IRC: SP 19-2001, IRC: SP 20, IRC: SP 13 (in respect of surveys for rivers/streams) and current international practices have been followed during the above survey.

3.2 Traversing

Traverse has been done by total station having angular measurement accuracy of ± 1 sec.

(Insert a brief methodology of traverse survey)

3.3 Levelling

(Insert a brief methodology of leveling survey, accuracy adopted, nearest bench mark etc.)

3.4 Cross Section & Detailing

Cross sections were taken at 25 m interval and at closer interval in curved portion of the existing road. All physical features of the road were recorded.

3.5 Data Processing

All data from topographic survey recorded by total station were downloaded and final alignment, plan, profile were prepared and presented in AutoCAD Format.

3.6 [illegible] list of permanent reference pillars and TBMs including northing easting and levels)

3.7 Checklist

[illegible] the relevant box)

Reference pillars given	Yes ☐	No ☐
TBM with northing-easting given	Yes ☐	No ☐
Traverse survey carried out	Yes ☐	No ☐
Cross section and detailing carried out	Yes ☐	No ☐

4. Soil and Materials Survey

4.1 General

The soil and material investigations were done following the guidelines of IRC: SP: 20-2002 and IRC: SP: 72-2007 and other relevant IS codes. The potential sources of borrow areas for soil and quarry sites will be identified.

4.2 Soil sample collection and Testing

Soil samples will be collected along and around the road alignment at three (3) locations per km, from the adjoining borrow areas, as well as one sample is collected from the existing road. Soil Classification tests like grain size analysis and Atterberg's limit were conducted for all the samples collected. Standard Proctor test and the corresponding 4 day soaked CBR test were conducted either for a minimum of one test per km for soil samples of same group or more tests due to variation of soil type. The following tests were conducted as detailed below:

- Grain size analysis as per IS : 272 (Part 4) – 1985
- Atterberg's limit as per IS : 2720 (Part 5) – 1985
- Standard Proctor density test as per IS : 2720 (Part 7) – 1980
- 4 day soaked CBR test as per IS : 2720 (Part 16) – 1985

{The IRC Rural Roads Manual SP: 20 contain instructions on Soil Survey and materials for the road projects. Supplementary guidance on these subjects is given in Annexure 5.1 The identification of the soil type in the field and the quick determination of its properties, including CBR are the basic requirement for an economical pavement design. The grain-size (wet sieve) analysis leading to the soil classification is a simple test and must be carried out to have an idea of the CBR value with a reasonable level of accuracy; the nomograph given in Annexure 5.2 can be used. This would minimise the need for CBR determination in lab. The determination of CBR by a rigorous CBR apparatus on a large number of samples may not be possible unless properly planned, and hence the nomograph given in Annexure 5.2 may be used.}
{Insert the details of soil tests in Annexure-1}

4.3 Analysis of Test Results

The laboratory soaked CBR value ranges from ...3.0.....% to ...5.0.% {Insert range}. The soil laboratory test results will be summarized in Table 4.1 {Insert the summary of soil test results in table}

Table 4.1 CBR values for different stretches

S.No.	chainage	CBR (%)
1	1st Km	4.3
2	2nd Km	4.2
3	3rd km	4.5
4	4th Km	4.4
5	5th km	4.0
6	6th Km	4.5
7	7th Km	4.4

4.4 Coarse and Fine Aggregates

Information regarding the source of aggregate and sand will be gathered. The stone aggregates shall be procured from Prem Nagar where as the locally available sand shall be used. The source and the lead distance from the quarry to project site will be finalized in discussion with the PIU. The aggregates and sand where available and acceptable shall be used for bituminous work, concrete works, other pavement works.

Figure -3 Quarry Map {Insert the quarry map}

4.5 Sub-soil investigation for bridges

{Insert a brief write-up on methodology and location of sub soil investigation, codes followed and brief results thereof. Detailed bore logs, test results should given at the end of the report}

4.6 Checklist

{Tick the relevant box}

Borrow pit suitable	Yes ☐	No ☐
SSI for existing ground	Yes ☐	No ☐
Investigation for coarse/fine aggregate	Yes ☐	No ☐
Quarry map	Yes ☐	No ☐

5. Traffic Survey

5.1 General

{In addition to traffic counts on the project road, traffic counts must be taken on already completed or similar type of PMGSY road in the vicinity of the project road to provide a realistic count.} In the present scenario of new connectivity/upgradation road, 3 day, 24 hr traffic volume count has been conducted on the already completed or similar type of PMGSY road in the vicinity of the project road. The Classified Volume Count survey has been carried out in accordance with the requirements of the TOR and relevant codes (IRC: SP: 19-2001, IRC: SP: 20, IRC: SP: 72-2007).The surveys have been carried out by trained enumerators manually under the monitoring of Engineering Supervisor. {Insert description of traffic count locations. Explain why nearby road is similar to expected post construction situation of the project road. Insert map showing project road and similar road and locations of traffic counts.}

5.2 Traffic Data and Analysis

The traffic count done was classified into different vehicle category as given below:

- Motorized vehicle comprising of light commercial vehicle, medium commercial vehicle, heavy commercial vehicle, trucks, buses, agricultural tractors with trailers, car, jeep, two wheelers etc.
- Non- motorized vehicles comprising of cycle, rickshaw, cycle van, animal drawn vehicle etc.

The number of laden and un-laden commercial vehicles was recorded during the traffic counts. Traffic volume count for this project road was done during {insert season} season. The seasonal variation {insert seasonal variation} is based on local enquiry.

Average of 3 day traffic data is presented in Table 5.1.

Table 5.1 Average Daily Traffic at {Insert location} (both ways) {The table will be repeated for the number of locations surveyed. This must include counts taken on the similar road.}

Sl. No.	Type of Vehicle	Day-1	Day-2	Day-3	Average
1	Car, Jeep, Van	9	11	9	10
2	Auto Rickshaw	3	3	3	3
3	Scooters/Motorbikes	9	12	9	10
4	Bus / Trucks	4	4	4	4
5	Mini Bus/LCV	9	10	11	10
6	Tractors with trailer	4	4	4	4
7	Tractor without trailer				
8	Cycles	5	3	7	5
9	Cycle Rickshaw / Hand Cart				
10	Horse cart / Bullock Cart				
11	Pedestrian	20	25	25	23
	Total commercial vehicle per day (cvpd)	**63**	**70**	**72**	**69**
	Total motorised vehicle per day				
	Total non-motorised vehicle per day				

a) Traffic volume and mix do not vary along the road ☐
b) Traffic volume and mix vary along the road ☐
c) Traffic volume and mix will vary along the road in the future ☐
d) There is a potential for through traffic using the road ☐
e) % of loaded vehicles ☐

5.3 Traffic Growth Rate and forecast

{"Read – Delete": Depending on the case or combination of cases, the designers should select the location of traffic counts and apply different growth scenarios. In all cases as described in 5.2 above, except for (a), the designers will be required to provide more detail, e.g., explain reasons (e.g., traffic coming from ..side road at ..chainage etc), specify homogenous sections etc. Insert a proper assessment of the possible traffic growth (normal, generated and diverted) taking care of mining or other economic activities that might generate traffic. The Consultants should exercise good judgment to properly estimate future traffic specially taking care of diverted and generated traffic. The Consultants may, in case no data is available, use similar studies to estimate growth trend. Growth rates shall be shown separately for different types of vehicle where there are specific generators of traffic (eg mining activities). Where there are no specific generators of traffic growth, the consultant may adopt an average annual growth rate of 6% over the design life as set out in IRC: SP 72-2007.}

Table 5.2 Average Annual Daily Traffic at {Insert location} (both ways) {This table will be repeated for each homogeneous section of the road.}

Sl. No.	Type of Vehicle	ADT	AADT	Growth Rate
1	Car, Jeep, Van	10	3600	6%
2	Auto Rickshaw	3	1080	6%
3	Scooters/Motorbikes	10	3600	6%
4	Bus / Minibus	10	3600	6%
5	Trucks	4	1440	6%
6	Tractors with trailers	4	1440	6%
7	Tractors without trailers	-	-	
8	Cycles	5	1800	6%
9	Cycle Rickshaw / Hand Cart	-	-	
10	Horse cart / Bullock Cart	-	-	
11	Pedestrian	23	8280	6%
	Total commercial vehicle per day (cvpd)			
	Total motorised vehicle per day			
	Total non-motorised vehicle per day			

6. Hydrological Survey

6.1 General

Hydrological survey is necessary for design of adequate and safe Cross Drainage Structures so that the rain water can pass as per natural slope. Hydrological survey of the proposed road is based on the following observations:

- Rainfall Data
- Catchments Area
- Time of Concentration
- Existing Cross Drainage Structures

6.2 Rainfall Data

Rainfall Data as applicable for the project road were collected with maximum rainfall occurring in the months of {insert months}.

6.3 Catchment Area

The Catchments area is calculated by gathering local information and topographical survey data as it was not possible to calculate from topographical sheets due to their unavailability.

6.4 Time of Concentration

Time of concentration (tc) in hours is calculated from the formula of $(0.87 \times L^3/H)^{0.385}$, where L is distance from the critical point to the structure site in km and H is the difference in elevation between the critical point and the structure site in meters.

6.5 Existing Cross Drainage Structures

There are {Insert the number of c/d structures} number of cross drainage structures along the existing project road as listed below:

{Insert the data in the table below}

Table-6.1 List and condition of existing culverts

Sl.	Chainage (km)	Description of Existing Structure		
		Type	Span/ Dia. (m)	Condition
1	0/835	Hpc	1000	Damaged
2	0/945	Hpc	1000	Damaged
3	1/53	Hpc	1000	Good
4	1/958	Hpc	1000	Damaged
5	2/750	Hpc	1000	Good
6	2/860	Hpc	1000	Good
7	3/125	Hpc	1000	Damaged
8	3/215	Hpc	1000	Damaged
9	3/775	Vented causeway		Damaged
10	6/335	5m span R.C.C		Damaged

7. Adopted Geometric Design Standards

7.1 General

The geometric design standards for this project conform to PMGSY guidelines and the guidelines as stated in IRC-SP 20:2002. Recommended design standards vis-à-vis the standards followed for this road are described below. {Consultant shall refer to latest guidelines with respect to the Expenditure Committee guidelines, "Review of Geometric Design Standards for Rural Roads in Hilli Areas (meeting at Mussoorie 29-30 November 2007) and Review of Geometric Design Standards for Rural Roads in Plains}

7.2 Terrain

The classification of terrain was selected from plain/rolling/hilly/steep classification for which following criteria will be applicable. {Delete cases not applicable}

Terrain classification	Cross slope of the country	
Plain	0-10%	More than 1 in 10
Rolling	10-25%	1 in 10 to 1 in 4
Mountainous	25-60%	1 in 4 to 1 in 1.67
Steep	Greater than 60%	Less than 1 in 1.67

7.3 Design Speed

The proposed design speed along this project road will be selected from the following table: {Delete cases not applicable}

Road classification	Plain terrain		Rolling terrain		Mountainous terrain		Steep terrain	
	Ruling	Min.	Ruling	Min.	Ruling	Min.	Ruling	Min.
Rural Roads (ODR and VR)	50	40	40	35	25	20	25	20

7.4 Right of Way (ROW) {Delete cases not applicable}

The requirement of ROW for this road is as follows (as specified in IRC-SP 20:2002):

Road classification	Plain and Rolling Terrain				Mountainous and Steep Terrain			
	Open Area		Built-up Area		Open Area		Built-up Area	
	Normal	Range	Normal	Range	Normal	Range	Normal	Range
Rural roads (ODR and VR)	15	15-25	15	15-20	12	12	12	9

7.5 Roadway Width

Roadway width for this road is given below: {Delete cases not applicable}

Terrain Classification	Roadway Width (m)
Mountainous and Steep	6.0

7.6 Carriageway Width

The width of carriageway for this project road is 3.75m. Carriageway width may be restricted to 3.0m, where traffic intensity is less than 100 motorised vehicles per day and where the traffic is not likely to increase due to situation, like dead end, low habitation and difficult terrain condition.

7.7 Shoulders {Delete cases not applicable}

It is proposed to have {1.875 m and 1.5 m} wide shoulder as the case may be on both sides of which at least 0.820m is hard shoulder where required.

7.8 Roadway width at cross-drainage structures {Delete cases not applicable}

The roadway width at culvert locations for this road is {7.5 m in plain terrain and 6.0m in mountainous terrain}. Roadway width at bridges will be {4.25m on link routes and 5.5m in through routes in plain-area and 4.25m in hilly areas}.

7.9 Sight Distance

The safe stopping sight distance is applicable in the geometric design. The sight distance values for this road as per IRC recommendations are presented below:

Design Speed (km/hr)	Safe Stopping Sight Distance (m)
20	20
30	30
40	45
50	60

7.10 Radius of Horizontal Curve

According to IRC recommendations/standards, the minimum radius of horizontal curve for this project road is given below:

Terrain Category	Radius of Horizontal Curve (m)	
	Ruling Minimum	Absolute Minimum
Mountain	90	60

To minimize extra land arrangement, minimum radius used is 20 m and design speed in these curves are also restricted to 20 km/hr.

7.11 Camber & Super elevation {Delete cases not applicable}

A camber adopted on this road section is given below. The maximum super elevation is 5.0% for this project road.

Surface type	Camber (%)	
	Low rainfall (Annual rainfall <1000mm)	High rainfall (Annual rainfall >1000mm)
Earth road	4.0	5.0
WBM Gravel road	3.5	4.0
Thin bituminous road	3.0	3.5
Rigid Pavement	2.0	2.5

7.12 Vertical Alignment

The present road is in hilly terrain and vertical alignment has been designed well within ruling gradient.

Generally, minimum gradient of 0.3% for drainage purpose is considered for designing the vertical alignment of this road. Vertical curves are not required when grade change is less than 1%, however a minimum vertical curve is provided to avoid vertical kink.

7.13 Vertical Curves

For satisfactory appearance, the minimum length of vertical curve for different design speed is given in IRC-SP 20:2002. Vertical curves will be designed to provide the visibility at least corresponding to the safe stopping sight distance. Valley curves will be designed for headlight sight distance.

7.14 Side slope

Side slope for this rural road where embankment height is less than 3.0m is given in the table below. {Delete cases not applicable}

Condition	Slope (H:V)
Embankment in silty/sandy/gravel soil	2:1
Embankment in clay or clayey silt or inundated condition	2.5:1 to 3:1
Cutting in silty/sandy/gravelly soil	1:1 to 0.5:1
Cutting in disintegrated rock or conglomerate	0.5:1 to 0.25:1
Cutting in soft rock like shale	0.25:1 to 0.125:1
Cutting in medium rock like sandstone, phyllite	0.083:1 to 0.0625:1
Cutting in hard rock like quartzite, granite	Near vertical

7.15 Extra Widening of Pavement

The Extra Widening of Pavement at Curve as per IRC guideline is given below:

Radius of Curve (m)	Upto 20	21 - 60	Above 60
Extra Widening for 6.0 m wide single lane carriageway,for hilly terrain (m)	0.72	0.48	Nil

8. Alignment Design

8.1 General

The basic aim of highway design is to identify technically sound, environment-friendly and economically feasible highway alignment. The ensuing sections deals with obligatory points, which control highway alignment, design of cross-section, highway geometric design & methodology, design of miscellaneous items.

The main components included in the highway design are:

- Cross-sectional elements
- Embankment
- Horizontal alignment
- Vertical profile
- Junctions and/or Interchanges
- Road furniture
- Miscellaneous items

8.2 Horizontal alignment

(Insert a table (example given below) on the physical features of the existing alignment and possible geometric improvement required)

Table 8.1 – Features of Horizontal Alignment (Example)

Chainage		Length	Description	Reason for deviation from existing alignment, if necessary
From (km)	To (km)	(m)		
0/150	0/175	75	Hair pin bend	For improvement of L-Gradient
0/190	0/200	25	Hair pin bend	-DO-
0/400	0/425	50	Hair pin bend	-DO-

Checklist

(Tick the relevant box)

a) Centre line of the existing and proposed horizontal alignment coincide ☐

b) Centre line of the existing and proposed horizontal alignment deviate at certain sections ☐

(Where the proposed horizontal alignment deviates from the centreline of the existing alignment, and where the clearance of the proposed horizontal alignment from existing road side features (eg. trees, temples, ponds, etc) is very tight, the horizontal alignment plan shall be drawn at large scale (1:500 or 1:250).)

{Insert a table (example given below) on the various geometric improvement carried out and their details}

Table 8.2 – Horizontal Curve details
(Example)

Curve No.	IP Chainage	Radius	Ls	Speed	S.E.	Def Angle			Lc	L_{min}	Hand of Curve
		(m)	(m)	(Kmph)		D	M	S	(m)	(m)	

See next page

8.3 Vertical alignment

{Insert a table (example given below) on the various vertical geometric improvement carried out and their details}

Table 8.3 – Vertical Curve Details (Example)

Sl. NO.	Chainage (m)	Level of pvi	Length of curve	Type of curve	Grade in (%)	Grade out (%)	Grade difference (%)	Chainage		Level	
								St. of Curve	End of Curve	St. of Curve	End of Curve
1											
2											
3											

8.4 Design of Junctions

The proposed alignment intersects cross roads and forms junctions. The locations of junctions are given below:

{Insert location of important junctions, type and any major intersection improvement proposed }

Table 8.4 – List intersections, type and proposed modifications

Sl.	Type of intersection	Location (km)	Exiting condition	Proposed modification

9. Pavement Design

9.1 General

Considering the subgrade strength , projected traffic and the design life, the pavement design for low volume PMGSY roads was carried out as per guidelines of IRC: SP: 72 – 2007, or IRC SP:77 "Design of Gravel Road" and IRC SP:62-2004 "Cement Concrete roads".

9.2 Pavement Design Approach

9.2.1 Design Life

A design life of 10 years was considered for the purpose of pavement design of flexible and granular pavements.

9.2.2 Design Traffic

The average annual daily traffic (AADT) for the opening year as well as the total commercial vehicle per day (CVPD) was presented in Table 5.2.

9.2.3 Determination of ESAL applications

Only commercial vehicles with a gross laden weight of 3 tonnes or more are considered. The design traffic was considered in terms of cumulative number of standard axles to be carried during the design life of the road. The numbers of commercial vehicles of different axle loads are converted to number of standard axle repetitions by a multiplier called the Vehicle Damage Factor (VDF). An indicative VDF value was considered as the traffic volume of rural road does not warrant axle load survey.

For calculating the VDF, the following categories of vehicles was considered as suggested in paragraph 3.4.4 of IRC: SP: 72 – 2007.

- Laden heavy/medium commercial vehicles
- Un-laden /partially loaded heavy/medium commercial vehicles
- Over loaded heavy/medium commercial vehicles

Indicative VDF values considered 10% of laden MCV and 10% laden HCV as overloaded & given below:

Vehicle type	Laden	Un-laden /Partially laden
HCV	2.86	0.31
MCV	0.34	0.02

Lane distribution factor (L) for Single lane road = 1.0 Cumulative ESAL application = To x 4811 x L, where To = ESAL application per day. The Cumulative ESAL application for the project road as per paragraph 3.5 of IRC: SP: 72 – 2007 is presented in Annexure (insert Annexure number)

9.2.4 Subgrade CBR

The subgrade CBR range of (3-4) was considered and the traffic falls in the category.

9.3 Design Alternatives

Design alternatives considered

Chainage		Design alternatives considered							
		Pavement		Shoulder				Specify design alternative selected	Justification
From	To	Flexible	Rigid	Earthen full width	Hard Full width	Hard shoulder 0.875 m each side	Soil stabilization and use of locally available marginal materials.		
		☐	☐	☐	☐	☐	☐		

9.4 Pavement composition

Flexible Pavement

The designed pavement thickness and composition was calculated by referring Figure 4 (Pavement design catalogue) of IRC: SP: 72 – 2007. The ratio between heavy commercial vehicles and medium commercial vehicles as given in Chapter 5 should be maintained as far as possible.

The pavement layers provided are given below:

Top Layer	BM&Premix Carpet with Type B Seal Coat	70mm
Base Layer	WBM Grading III	75mm
Sub – Base Layer	Granular Sub-base Grading I	300mm
Total thickness		445mm

Top layer of WBM will be treated with bituminous surface. {If the pavement thickness varies over the entire length of the road section a table showing different thickness adopted should be given.}

Rigid Pavement

{Insert cc pavement design wherever provided if not delete}

9.5 Embankment Design

{Insert embankment design for high embankments (above 6m) especially at bridge approaches. Related soil investigations need to be done for borrow earth and existing ground}

10. Design of Cross Drainage Works

10.1 General

On the basis of hydrological survey, new cross drainage structures are recommended for the project road as listed below. {[illegible] the Expenditure Committee guideline [illegible] Review [illegible] Design Standards for Rural Roads in Hill Areas (meeting at Mussoorie, 29-30 [illegible] 2007) and [illegible] Design Standards for Rural Roads in Plains}

10.2 Hydrological Design

The existing structures in poor condition that are proposed for replacement as listed below. Agricultural conduits, which basically act as balancers, have also been provided as listed below.

10.3 Design Feature

Design Standards for culverts has been prepared based on standard codes and guidelines of IRC: SP: 20: 2002 and similar type of ongoing projects. General features of the designed cross drainage structures are given below:

For hume pipe culvert, minimum road width has been taken as {6.0} m,

Width of culvert : {6.0} m with parapet.

Width of Bridge: m with parapet.

10.4 Justification for retaining/widening and replacement of culverts

{Insert the design considerations developed after the transect walk}

10.5 Hydraulic calculation for Culvert

The design discharge was calculated by the rational method considering peak runoff from catchment using the formula,

Q = 0.028 x P x A xIc

Where P = Coefficient of Run Off for the catchments characteristics, A = Catchments Area in Hectares & Ic = Rainfall Intensity

Small bridge-site length of which exceeds 15 m to be jointly visited by STA and S.E. Design – as per SP-20 & SP-13 and relevant IRC Codes for Bridges.

Causeways and submersible bridges – Design to be done as per SP-20 and SP-82:2005.

{Insert detailed hydraulic calculation of all replaced and proposed new culverts and attached as Annexure 2 of this report}

{Insert list of c/d works proposed/upgraded, type, location, span/dia in a tabular form. This should connect to the [illegible] taken [illegible]}

Sl. No.	Chainage	Type of Culvert	Span/dia
1	0/25	HPC	1000mm dia
2	0/250	HPC	1000mm dia
3	0/830	HPC	1000mm dia
4	0/950	HPC	1000mm dia
5	1/300	HPC	1000mm dia
6	1/960	HPC	1000mm dia
7	2/255	HPC	1000mm dia
8	3/212	HPC	1000mm dia
9	3/775	R.C.C CULVERT	6m span
10	4/150	HPC	1000mm dia
11	4/350	HPC	1000mm dia
12	4/500	HPC	1000mm dia
13	5/250	HPC	1000mm dia
14	5/150	R.C.C CULVERT	3m span
15	5/645	R.C.C CULVERT	6m span
16	6/250	HPC	1000mm dia
17	6/550	HPC	1000mm dia
18	6/750	HPC	1000mm dia

Total no of new culverts proposed:

1. HPC (1000mm dia) = 15 no
2. R.C.C (6m span) = 2 no
3. R.C.C (3m span) = 1 no

TOTAL = 18 Nos

DETAILS OF CD & PROTECTION WORKS

Name of road : Gatha to Hanga Noori

	CHAINAGE FROM	TO	TYPE	SIDE
0.	0/375	0/400	R/Wall	LHS
1.	0/600	0/650	R/Wall	RHS
2.	0/650	0/875	R/Wall	RHS
3.	1/035	1/075	B/Wall	LHS
4.	1/775	1/800	B/Wall	LHS
5.	1/900	1/925	B/Wall	LHS
6.	1/925	1/975	R/Wall	RHS
7.	2/100	2/135	B/Wall	LHS
8.	2/475	2/510	R/Wall	RHS
9.	3/700	3/715	R/Wall	RHS
10.	3/825	3/875	B/Wall	RHS
11.	3/860	3/925	R/Wall	LHS
12.	3/925	3/955	R/Wall	LHS
13.	4/0	4/85	R/Wall	RHS
14.	4/165	4/200	R/Wall	RHS
15.	4/250	4/275	R/Wall	LHS
16.	6/290	6/305	R/Wall	LHS
17.				
18.				

J.E

A.E.E.

Executive Engineer
PMGSY Division
Doda

11. Protective Works & Drainage

11.1 General

[illegible]

11.2 Road side drain

As the insufficient drainage of surface water leads to rapid damage of road, road side drain as shown in drawing volume has been provided particularly on the location of habitation areas. Sketch for a standard roadside drain should be made available.

11.3 Protective Works

Necessary protection works consisting of closed {Insert type of pilling} piling and {Insert ballah suggested} ballah piling have been provided near pond and water bodies falling within the proposed alignment. Table 11.1 gives the chainage-wise protection works adopted.

{Insert list of protection works proposed/upgraded, type, location in a tabular form. This should connect to the decisions taken during transect walk}

12. Land Requirement

12.1 General

The existing road is generally an earthen track with some portions of metalled stretches to be treated as GSB in sub grade preperation. The project road is a upgradation road. The existing Right of Way (ROW) is varying from 5m to 10m. {Insert information on ROW available}

12.2 Proposed ROW

The width of carriageway has been considered as 3.75 m in accordance with the IRC-SP 20: 2002. The total roadway width is limited to 6.0m with 0.825m earthen shoulder on either side of carriage way. The proposed ROW generally varies from 5m – 10m depending upon the embankment height and the proposed ROW is even less than 10 m in some stretches of habitation area and in areas having tree plantation.

12.3 Additional Land

Local administration and local panchayat need to apprise the villagers about requirement of minor areas in places for development of the road. Villagers are generally highly enthusiastic during site visits for selection of the road. Table 12.1 provides the chainage-wise additional land required.

{Insert a table showing the additional land required for developing the PMGSY road}

13. Utility shifting/relocation

13.1 Existing utilities

{Insert list of existing utilities that require relocation along the project road with details in a tabular form. This should connect to the drawings. The existing utilities must be shown on the drawings. Utilities to be relocated must be highlighted and the new location shown on the drawings}

13.2 PUBLIC HEALTH ENGINEERING DEPARTMENT

13.3 {Insert rules pertaining to shifting of utilities}

13.3 {Insert rules pertaining to shifting of utilities}

13.4 {Provide an estimate with breakdown of costs for relocation of utilities}

Table 13.1 Estimated Cost for Relocation of Utilities

Sl. No.	Utility Type	Qty	Estimated Rate	Estimated Cost
1	PHE PIPE LINES	1000rmt	375/m	3.75LACS
2	ELECTRIC POLE LINE	875rmt	725/m	6.34 LACS
TOTAL ESTIMATE				**10.09lacs**

14. Traffic Management and Road Safety Measures

14.1 Road Furniture

(Read and delete. Delete write-up on road furniture that have not been proposed)

Road Furniture details include:

- Road markings
- Cautionary, mandatory and information signs
- KM stones and 200m stones
- Delineators and object markers
- Guard posts, crash barriers and speed breakers
- Median & footpath barriers

14.1.1 Road Markings

Road markings perform the important function of guiding and controlling traffic on a highway. The markings serve as psychological barriers and signify the delineation of traffic paths and their lateral clearance from traffic hazards for safe movement of traffic. Road markings are therefore essential to ensure smooth and orderly flow of traffic and to promote road safety. The Code of Practice for Road Markings, IRC: 35-1997 has been used in the study as the design basis. Schedules of Road Markings are included in contract drawings.

14.1.2 Cautionary, Mandatory and Informatory Signs

Cautionary, mandatory and informatory signs are provided depending on the situation and function they perform in accordance with the IRC: 67-2001 guidelines for Road Signs.

Overhead signs are proposed in accordance with IRC: 67-2001.

14.1.3 Kilometer Stone and Hectometer Stone

The details of kilometre stones are in accordance with IRC: 8-1980 guidelines. Both ordinary and fifth kilometre stones are provided as per the schedule. Kilometre stones are located on both the side of the road.

The details of 200m stones conform to IRC: 26-1967. 200m stones are located on the same side of the road as the kilometre stones. The inscription on the stones shall be the numerals 2,4,6 and 8 marked in an ascending order in the direction of increasing kilometerage away from the starting station. Table 14.1 gives the details of Km. stone.5th km. stone and boundary pillars provided. (Insert figures in the table below and the should be shown on the drawings also)

Table 14.1

Details of Km. stone.5th km. stone and boundary pillars

S.NO	Name of Road	Chainage (km)	5th, Km. stone (nos.)	Km. stone (nos.)	200m stone (nos.)	Boundary stone (nos.)
1.	Gatha To Hanga Noori	00-7000	1	7	36	280

14.1.4 Delineators and Object Markers

Roadway delineators are intended to mark the edges of the roadway to guide drivers on the alignment ahead. Object markers are used to indicate hazards and obstructions within the vehicle flow path, for example, channelising islands close to the intersections.

Delineators and object markers are provided in accordance with the provisions of IRC: 79-1981. They are driving aids and should not be regarded as substitutes for warning signs, road markings or barriers.

14.1.5 Guard Posts, Crash Barriers and Speed Breakers

Guard posts are proposed on embankments of height more than 1.5m and bridge approaches. The spacing of guard post shall be 10.0m c/c in these areas. Typical Guard post consists of pre-cast (M20) CC post of size 200mm x 200mm and a height of 600mm above ground level. They are encased in M15 cement concrete to a depth of 450mm below ground level. Guard posts are painted with alternate black and white reflective paint of 150mm wide bands. Table 14.2 gives the details of guard posts, crash barrier and speed breakers. A layout of a typical speed breaker is given below. {Insert figures in the table below and this should be shown in the drawings also}

Table 14.2

Details of guard posts, crash barrier and speed breakers

Sl.	Name of Road	Chainage (km)	Guard post (nos.)	Crash Barrier (m)	Speed breakers (nos)
1.	Gatha to Hanga Noori	0-7000		200	0

14.2 Temporary traffic control

The road under consideration has to be widened alongwith the bridges and culvert. The list below provides the c/d structures to be widened/reconstructed and temporary traffic control measures to be implemented.

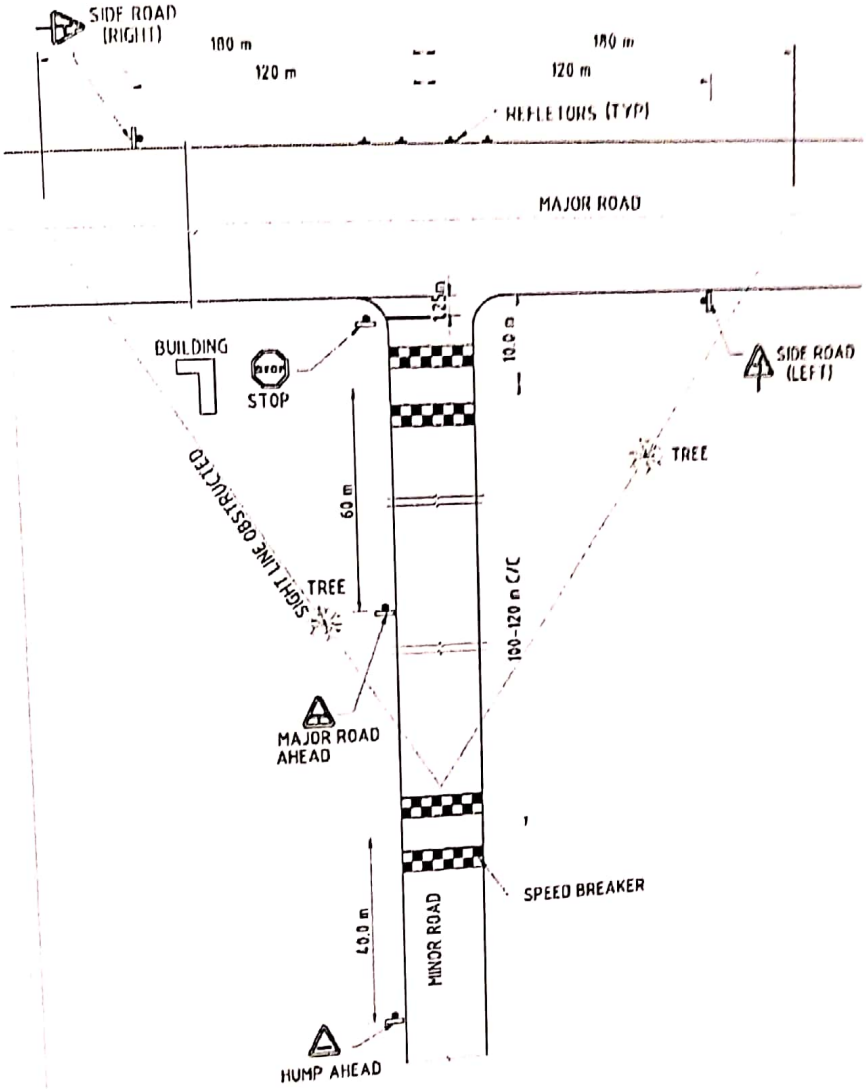
Table 14.3 gives the section-wise details of temporary traffic control measures to be adopted.

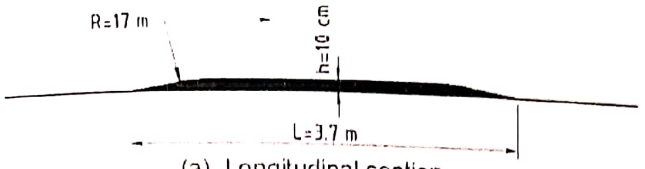
{Insert table showing section/chainages where temporary traffic control measures will be required and type of control like diversion etc.}

Table 14.3

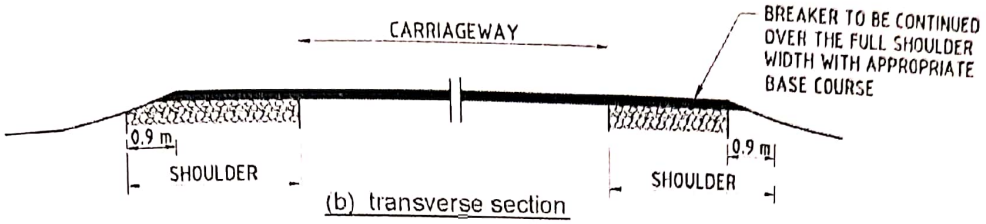
Details of temporary traffic control measures to be adopted

Sl.	Name of Road	Chainage (km)	Temporary traffic control measures to be adopted			
		4	2	3	9	



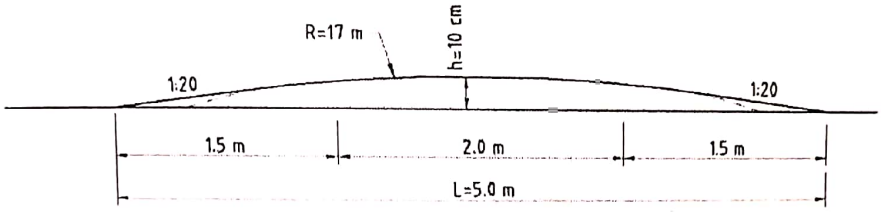


(a) Longitudinal section



(b) transverse section

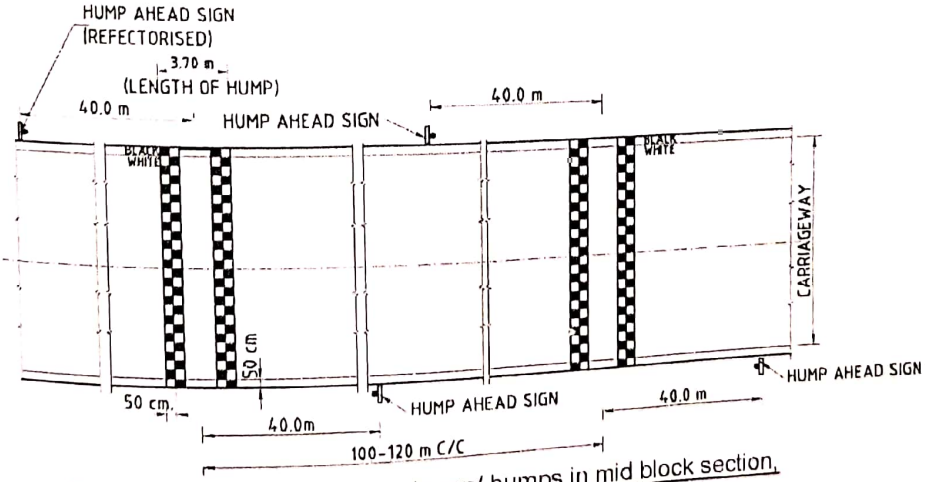
Recommended specification for rounded hump type breaker for general traffic at preferred crossing speed 25 km/h



(a) Longitudinal section

(b) Transverse section is same as given in fig. 1

Recommended specification for hump type of speed breaker heavy truck & bus traffic at preferred crossing speed 25 km/h



Recommended placement of hump/ humps in mid block section, hump marking in chequered pattern and sign board locations

14.3 Checklist for Road Safety Measures

Road Safety Checklist

- A [illegible]
- B [illegible] shoulder of sub-base quality [illegible]
- C Shoulder side slopes are not be steeper than 2H:1V unless stone pitching of the slope is provided.
- D Speed breakers as per NRRDA circular comply with the requirements of IRC 99-1988 for general traffic.
- E Speed breakers placed at the threshold of a habitation and at regular intervals (150 – 200 m) through the habitation.
- F Within densely populated habitations, a cement concrete (CC) pavement or V shaped side drain is constructed to the full width of the available roadway.
- G Within habitations, wherever deep side drains are constructed either within or adjacent to the roadway, is covered by slabs laid level with the adjacent pavement and capable of being manually removed.
- H In habitations where child playing areas border the road, a low profile wall, raised kerb or similar form of boundary marking (depending on the site conditions), is constructed to create a physical boundary and act as a deterrent to the random movement of a child onto the road.
- I On roads where, because of the lack of dry land in the general area, the shoulder will be continually occupied and only intermittently available for traffic, speed breakers are installed at regular intervals, not more than 300 m apart, for the entire length of the road.
- J The drawings show all obstructions in the proposed road shoulder with a note that the obstruction is to be removed.
- K If a shoulder obstruction cannot be removed, hazard markers are installed to mark the Obstruction.
- L Hazard markers are installed at all pipe culvert headwalls.
- M Hazard markers are installed at each end of all box culverts, river crossing causeways and similar CD structures.
- N Hazard markers are installed at any discontinuity in the shoulder.
- O Directional sight boards are installed on all sharp curves and bends.
- P Speed breakers are provided at sharp curves and bends where the curve design speed is less than 40 km/h in plain and rolling terrain, and less than 25 km/h in mountainous and steep terrain.
- Q Speed breakers are provided and directional sight boards installed at sites where reverse horizontal curves are closely spaced and speed reduction is required.
- R At a main road intersection, signs and pavement markings for STOP control on the PMGSY village road are installed, side road warning signs on the main road and intersection warning signs on the village road are installed, and speed breakers on the PMGSY village road are provided as given in the figures (refer IRC 99-1988).

This DPR may be subjected to a road safety audit by an independent third party. The recommendations of the road safety audit as approved by PIU shall be incorporated in the final DPR.)

Road safety issues identified during the design were and the mitigation measures are included in all designs and shown on the DPR drawings. Details of the issues and measures are: [illegible]

15. Specification

15.1 General

The "Specification for Rural Roads" published by IRC on behalf of the Ministry of Rural Development, Govt. of India has been followed.

15.2 Construction Equipment

Construction by manual means and simple tools has been considered for the project as per the guideline of NRRDA. For handling of bulk materials like spreading of aggregates in sub-base & base courses by mix-in-place method, use of motor grader & tractor-towed rotavator has been allowed in line with the schedule of rate for PMGSY work. Compaction of all items shall be done by ordinary smooth wheeled roller if the thickness of the compacted layer does not exceed 100 mm. It is also considered that, hot mix plant of medium type & capacity with separate dryer arrangement for aggregate shall be used for bituminous surfacing work that can be easily shifted. A self-propelled or towed bitumen pressure sprayer shall be used for spraying the materials in narrow strips with a pressure hand sprayer. Now the vibratory rollers are also being used for rapid progress.

For structural works, concrete shall be mixed in a mechanical mixer fitted with water measuring device.

The excavation shall be done manually or mechanically using suitable medium size excavators.

15.3 Construction Methods

15.3.1 Preparation for Earthwork

After setting out existing ground shall be scarified to a minimum depth of 300mm and leveled manually and compacted with ordinary roller to receive the first layer of earthwork. In filling area, existing embankment will be generally widened on both sides as per the alignment plan. Continuous horizontal bench, each at least 300 mm wide, shall be cut on the existing slopes for bonding with the fresh embankment/ subgrade material as per Cl 301.7.

15.3.2 Embankment work

Material from borrow pits will be used for embankment construction as well as the approved material deposited at site from roadway cutting and excavation of drain & foundation may be used. Layer of the earth shall be laid in not more than 25 cm (loose) thick layers & compacted each layer of the soil up to 30 cm below the subgrade level at OMC to meet 97% of Standard Proctor Density.

Material for embankment and sub-grade shall satisfy the requirements of Table 300-1 and 300-2 as per the Specification for Rural Roads.

15.3.3 Sub-grade

Material from borrow pits will be used for construction of top 30 cm as sub-grade. Soil in these sections is quite good for road construction. Top 30 cm upto the subgrade level and shoulder at OMC to meet 100 % of Standard Proctor Density by proper control of moisture and by required compaction with a smooth wheeled roller.

15.3.4 Sub-base

Sub base material in the form of stone aggregates and sand as available in the area to be used in GSB Grade-I layer.

15.3.5 Base

Stone aggregates will be used in base course. 53 mm to 22.4 mm (Grading 3) size has been proposed for the top layer.

15.3.6 Shoulder

Earthen shoulder shall be constructed in layers and compacted to 100% of Proctor's Density. First layer of shoulder shall be laid after the sub–base layer is laid. Thereafter earth layer shall be laid with base layer of pavement and compacted.

15.3.7 Surfacing

Slow setting bitumen emulsion will be applied as primer on water bound layer. Emulsion shall be sprayed on surface with pressure distributor. Rapid setting bituminous emulsion shall be used for Tack coat.

Premixed carpet and mixed with equivalent viscosity grade bitumen shall be laid as surfacing course. 6 mm thick Type B seal coat is considered for sealing of the premixed carpet.

15.3.8 Structural Works

Following grades of concrete are proposed for Structural works and comply with MORD and IRC specifications:

- Concrete in superstructure of slab culvert – M-{Insert grade} (RCC)
- Concrete in abutment cap, dirt wall of slab culverts – M-{Insert grade} (RCC)
- Concretework in abutment, return wall, headwall - M-{Insert grade} (RCC)
- Concrete below abutment, return wall, headwall – M-{Insert grade} (RCC)

{Insert any other new specification adopted like hard shoulders and rigid pavement }

16. Environmental Issues

16.1 Alignment

The proposed road has planned to be designed considering the impact on environment. Proposed road alignment follows existing pathway to the maximum extent so that huge land acquisition is not necessary for construction of the project road. Proposed road, when completed, will be an addition to the aesthetics of this rural area.

16.2 Environmental Sensitive Area (National Park, Wild Life Sanctuary, Protected /Reserve Forest, Wet land etc.)

The alignment will be finalise avoiding the environmental sensitive area such as National Park, Wild Life Sanctuary, Protected /Reserve Forest, Wet land etc. It is also necessary to maintain the minimum distance of 500 m of the project road from environmental sensitive area.

16.3 Construction Camp

Construction camps will be established away from forest area/water body. The minimum facilities such as water supply, sanitation, storm water drainage, solid waste management and first aid box will be provided during the construction period of the project. Necessary provision for rehabilitation or restoration after the completion of construction phase will be done.

16.4 Permit / Clearance required prior to commending of civil work

- No objection Certificate- This will be taken by PIU from SPCB.
- Forest Department- If the project road passing thorough forest land and acquisition of the same is involved and it will be taken by PIU from Forest Department
- Consent to establish (CFE) and Consent to Operate (CFO) - This is required for Plant Hot Mix Plant, WMM Plant, Batching Plant required for the project and the same will be taken by the Contractor from SPCB.
- Lease from Mines & Geology- This will be taken by the Contractor for new Stone Quarry required for the project.

16.5 Borrow area

The filling soil will have to be procured from borrow pit. Borrow area will be so excavated that the lands can reused as agricultural field. The depth of borrow pit shall not exceed 450 mm (150 mm top soil included). The top soil shall be stripped and stacked and shall be spread back on the land. As far as possible the borrow pits shall not be dug close to the road embankment. The Redevelopment of borrow area will be done before closure of the same and it will be as per agreement between landowner and the Contractor.

16.6 Erosion Control

Turfing of the embankment slopes and earthen shoulder to prevent erosion of slopes of the embankment, rain cuts and erosion of shoulder is being suggested.

16.7 Drainage

Suitable cross drainage structures have been provided on the basis of hydrological survey of the area. So, there will be no obstruction to the natural drainage of the area. Road side drainage is also duly considered in a manner so that surface water is led to the low points and is drained through the CD structures.

16.8 Use of Material

Cut back bitumen is not proposed in the project to avoid contamination with Kerosene. Bitumen emulsion is proposed for primer coat and tack coat.

{Insert details of actual environmental issues and their location and what treatments are proposed to mitigate them like reinstatement of borrow areas, erosion control, filling of ponds, vegetation and tree removal, forest areas, wildlife, antiquities, historic and religious sites, etc }

17. Analysis of Rates

17.1 General

Rates for various item of works of the project have been derived from the "Schedule of Rates APRIL 2012 for Road works, Culvert works & Carriage etc. JKSR2012 and "Addendum & Corrigendum to Schedule of Rates" effective from JAN 2013. However in general the basic rates of material have been taken from source by conducting market survey and also compared with jksor2008 Prepared by Design directorate of jammu. The rates of different items have been worked out inclusive of all labour charges, hire charges of Tools & Plants, Machineries and all other cost estimates for the item of work, overhead and contractor's profit @ 12.5% and 1% cess on these.

17.2 Basic Rate of Material

The basic rates for stone materials & river bed materials have been taken from Geological and Minning deptt of J&K Govt..

For bituminous materials, basic rate at (location) for equivalent viscosity grade bitumen and for emulsion the basic rate of (location) has been considered as suggested in from {Insert document from which the rates were taken}.

Basic rate of other materials like coarse & fine sand, are as per the latest from Geological and Minning deptt of J&K Govt.and for cement from supplier of cement on whole sale rate .

Basic rate of steel materials at Rail head of SAIL has been considered in analysis .

17.3 Lead for Materials

For stone aggregates and sand, lead from source to work site is calculated from the district map and block level map of core network and finalizing the same in discussion with PIU. The supply of different materials to worksite is by road. Lead for bituminous & steel materials are similarly obtained using SOR.

{Insert the analysis of rates for which rates are not provided in the SOR}.

Cost Estimate

General

Cost Estimate of project has been arrived on the following basis

- Selection of Items of work
- Estimation of item wise quantities
- Analysis of Rates

Estimation of Quantities

All the relevant road and structure work Items will be identified as per survey, design and drawings. Following major item of works considered are given below:

- Site clearance, dismantling and earthwork
- Pavement works (GSB, WBM, Bituminous layers)
- Cross drainage structure works
- Drainage and protective works
- Utility relocation
- Road safety and furniture
- Maintenance works

Quantity of earthwork will be derived from the proposed cross section drawings. Volume of cut and fill will be obtained directly using the design package software. Quantity derived from software will be manually verified. There are same stretches of the road in cut section. The details are provided chain age wise in Table-18.1 of total cut and fill volume. The soil obtained from roadway excavation shall be used for construction of embankment and shall be paid as per item no.4. All other quantities will be computed from the drawings of finished road, miscellaneous drawings & drawings of CD Structures.

{Insert Table of cut and fill volume in Annexure 3}

Abstract of Cost

Unit rates will be derived by using the "Schedule of Rates for Road Works, Culvert works and Carriage etc. {Insert name of SRRDA}". The abstract of Cost estimate is given in the Table below.

{Insert the details of cost in Format F6 & Format F7}

Maintenance

Cost of Annual Maintenance for five years after completion of project will be estimated as per the PMGSY Guidelines. Different activities of ordinary repairs are done as and when.

{Insert total Cost of 5 year Routine Maintenance Works in Format F6}

19. Construction Program

19.1 General

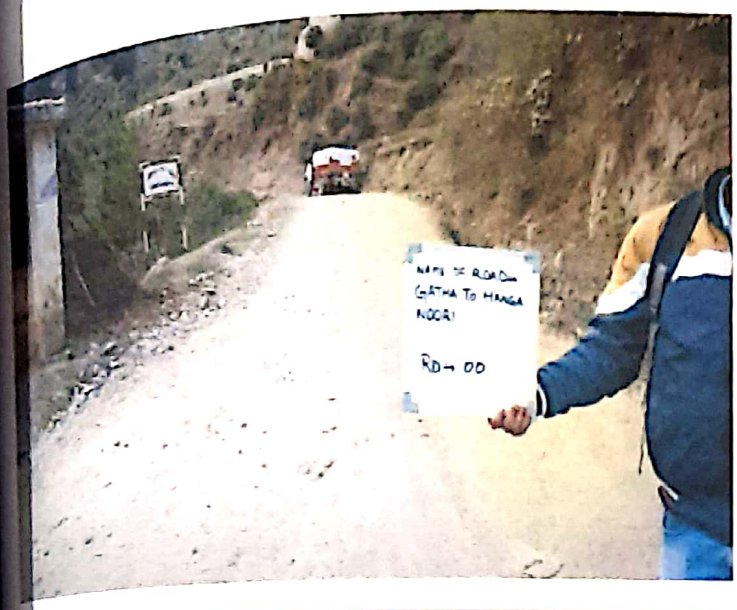
Assuming that the Construction of the Batch – {Name of Batch roads} roads will start from {Likely possible construction date} This is a high rainfall area and rainy season extends from March to May. However, the construction program is based for a total working period of 12 months, considering the program set out by MoRD. Generally, dry working season of about 8 months are required for construction of PMGSY roads. However, works will be affected for the monsoon during the month Dec to Feb.

It is anticipated that some activity like collection of materials, CD works etc. will continue in monsoon period also.

19.2 Realistic duration

{18 months}

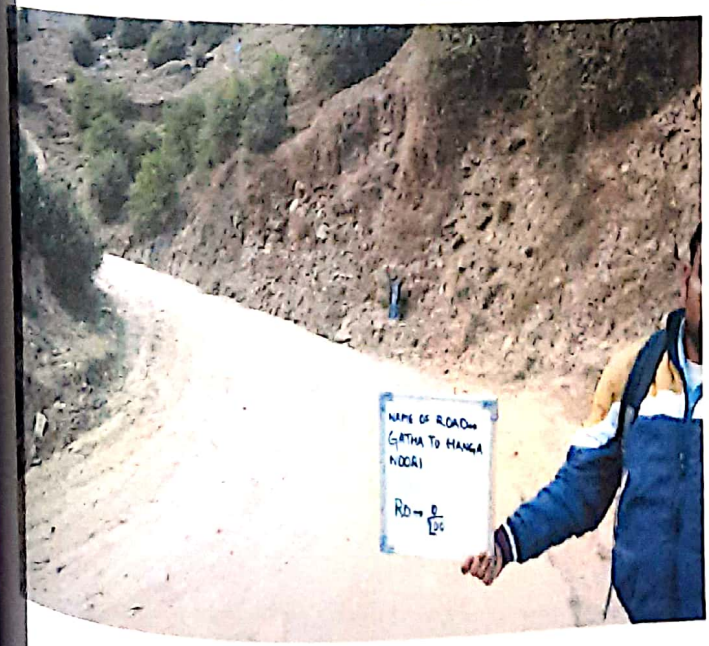
Name of ROAD ↔ GATHA TO HANGA NOORI



RD ↔ 00 (TAKE OFF)

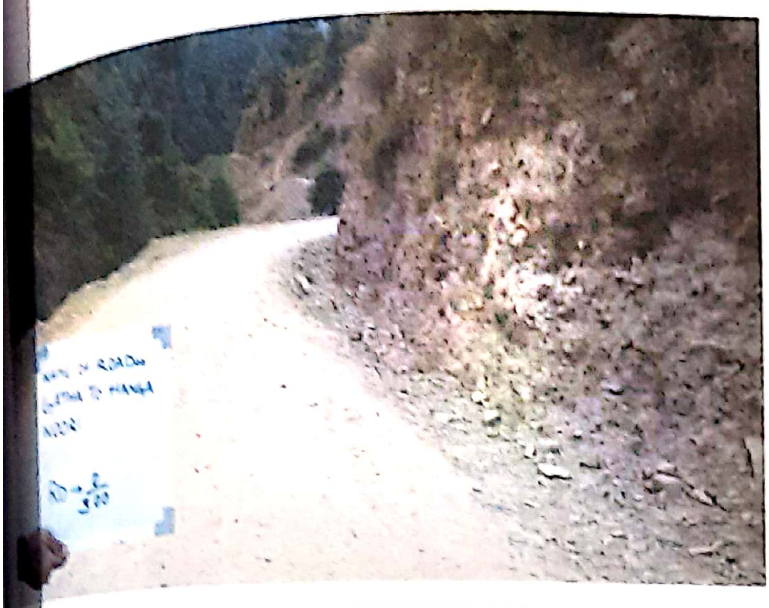
Latitude ↔ 32.999214
Longitude ↔ 75.694359
Elevation ↔ 1521.71m

RD ↔ 0/100



RD ↔ 0/200

GATHA TO HANGA NOORI ROAD



RD ↔ 0/300

RD ↔ 0/400

RD ↔ 0/500

R.Dr 6/900

R.Dr 7/00 (End Point

Latitude→32.986864

Longitude→75.65458

Elevation → 1868.19m.

ANNEXURE-7.1
FORMAT F-1
(See Para - 7.2)

PRADHAN MANTRI GRAM SADAK YOJANA (PMGSY)

SUMMARY SHEET

Name of the Block	Code	Total No. of Habitation	Unconnected habitations						
			>1000	500-999	250-499			<250	Total Eligible Habitation
					Total	Eligible			
Bhaderwah	L-023	2			1	1		—	2

Type of Proposal	No. of Roads	Total Length of Roads (km)	No. of new C.D. structures	Estimated Cost (Rs Lakhs)				No. of Unconnected Habitations connected / Connected habitations benefited
				Pavement from Format-F-5	C.D. Structure from Format - F-6	Total [(5)+(6)]	MISC.	
1	2	3	4	5	6	7		8
Upgradation								
Associated Through Route								
Upgradation	1	7.000	21.00	412.67	312.01	724.68	3.86	4
Other Upgradation				362.50	247.21	609.74	618.64	
Total	**1**	**7.000**	**21**	412.671	312.007	724.678	728.538	**4**
				5 YEAR MAINTAINENCES			85.72	
						G.T.	**814.26**	

D.P.R of U/G of an existing rural road is checked for Rs 728.538 lacs excl. maintenance

JE

FAYAZ AHMAD MIR
Associate Professor NIT Srinagar
Co-ordinator State Technical Agency
For PMGSY Kashmir (J & K)

PROFORMA - B

PRADHAN MANTRI GRAM SADAK YOJANA

Package Summary

Package No :- JK04-640 Name of the Road: Gatha to Hanga Noori State;- JAMMU & KASHMIR Block: Bhaderwah Distt:- DODA

S No	Name of the Block	Name of the Road	Type of Proposal	Proposed Length (in Km.)	Cost of E/W	Cost of E/W Pavement (Rs in lacs) (GSB, WBM, BM, Berm filling, BT, Carriages etc)	No of CD Works	Cost of CD Works	Cost of CD works, E/W & R/WALL/B/WALLS,PARAPATE,DRAIN	Miscellaneous (Rs. In lacs) (DPR, Survey, logo & main board)	Total Estimated Cost		Average Cost per km	
											Const	Maint	Const	Maint
-	Bhaderwah	Gatha to Hanga Noori	U	7.000		~~362.50~~ ~~413.38~~	~~18~~ ~~21~~	~~82.15~~ ~~84.33~~	~~165.29~~ ~~212.76~~	~~8.70~~ ~~3.86~~	~~714.33~~ 618.64	~~223.30~~ 199.48	102.05 ~~77.33~~	~~31.90~~ ~~28.48~~
Total Estimated cost of the Package : Rs.											~~714.33~~	~~223.30~~	~~102.05~~	31.90

~~937.63~~ Lakhs 818.06 Lac

N - New Connectivity U - Upgradation

Prepared by : Signature :
Name : Atta Mohd Sheikh
Designation : Assistant Executive Engineer
PMGSY Sub-Division Bhaderwah

Checked by : Signature
Name : SATBIR SINGH
Designation : Executive Engineer
PMGSY Division Doda

Scrutinized by : Signature :
Name :
Designation : Superintending Engineer
PMGSY Circle Batote

Signature
Name

Technical Scrutiny Done by :

Signature
Name :

Cordinator : STA
FAYAZ AHMAD MIR
Associate Professor NIT Srinagar
Co-ordinator State Technical Agency
For PMGSY Kashmir (J & K)

PROFORMA- C

PRADHANMANTRI GRAM SADAK YOJANA (PMGSY)

CHECK LIST FOR P.I.U. & S.T.A.

(For Individual Road Works)

To be filled by PIU

Location:- State :- JAMMU AND KASHMIR			Block:- Bhaderwah	District:- Doda
PACKAGE NO :- JK-04- 640				
Name of the Road :	From Gatha to Hanga Noori			
Length (Km):	Total: 7.000 Km	In Built up area :- 1.00kms	In Open Area :- 6.00km	
Estimated Cost	937.63 Lakhs	Average Cost	133.95 Lakhs	
Type of New Connectivity/Up gradation:-			U	

* If the proposed road is a New connectivity			NO	
- Is the road a part core network.			YES	
- If Yes, Through / Link Rout Number			L-040	
- Name of the unconnected Target Habitation(s)(to be cross checked -list of Habitations connected		NOORI		212
		GATHA, HANGA,		2999
- Population sub served by the proposed road				
- Does the Proposed Road lead up to the Habitation for which it is supposed to provide connectivity (In other words are you sure that the road is not being made partially ?)			Yes	

- Does the Proposed Road connect the unconnected Habitation to

(a). Another Habitation having All-						
(b). Directly to an All weather						
If (b), indicate the nature of road to which the proposed	✓	RR	MDR	SH	NH	
* If the proposal is for up gradation				Yes		
- Is the road a part of core net work				YES		
- Is it associated Through Route or not				NO		
- PCI Value						
- Age of the Road						

Is it certified that there are no other Unconnected Eligible Habitations in the district.

7. a) **Whether the Proposed Road** has the desired carriage way with, Roadway width and Road Land Width (RLW).			YES
b) **Indicate the actual widths** of the following for the Proposed road.		In the Built Up Area(m)	In the open Area (m)
a). Carriageway		3.75	3.75
b). Roadway		6.00	6.00
c). Road Land Width		10.00	10.00

CD Works

No. of Existing CD Works : 3 Nos. Hit

Do they require any improvement : No, the existing CDs are extremely damaged condition

specify the nature of improvement needs replacement.

removed

If Yes, their number & cost of : 12 Nos. 0.00

Type of CD	Their Nos	Total length of Bridge / Culvert	Cost in Rs.	Cost / Km (Rs)
1000mm 1Row	~~18~~ 15	45 37.50	~~85.37~~ 32.60	
RCC culvert 3MTR	1	3	~~6.92~~ 6.95	
RCC culvert 6MTR	2	12	~~41.90~~ 41.60	
Pucca scupper 6.0 mtr long	0		0.00	
Total cost of proposed CD works	**Total Nos.C.D** ~~21~~ 18 Nos		~~84.19~~ 82.15	~~12.03~~ 11.77

	Cost in Rs.	Cost / Km (Rs)
Protection Works R/,W,B/W,EDGE/W,CRATE/W PARAPETS	~~278.91~~ 169.89	24.27 ~~39.84~~
I. Road Logo, other Road Furniture etc.	~~2.86~~ 4.12	0.59 0.41
Carriage cost	~~45.96~~ ~~56.37~~	~~6.56~~ ~~8.05~~
Total Cost of the Project (Rs) Total	618.64 ~~763.58~~	~~88.37~~ ~~109.08~~

K. Five Year Routine Maintenance

Year	Cost In lakhs	% of Const. Cost.	Cost / Km
I	6.19 ~~8.57~~	1.0 /. 10.00%	1.22
II	9.28 12.86	1.5 15.00%	1.84
III	12.37 17.14	2.0 20.00%	2.45
IV	15.47 21.43	2.5 /. 25.00%	3.06
V	18.56 25.72	3.0 /. 30.00%	3.67
Total	61.84 ~~85.72~~	10 /. 100.00%	~~12.25~~ 8.83

11.	Whether the road has Geometric as per Rural Roads Manual **RRM** / Latest circular of NRRDA	**YES**
12.	Whether CD works / Protection works are provided as per **RRM** / Latest circular of NRRDA. Respective Codes	**YES**
13.	Whether the Cost estimates are as per standard data analysis and **S.S.R.**	**YES**
14.	Sources and Lead distances of Materials are as under	

Material	Source	Lead Distance in KM	Material	Source	Lead Distance in Km
Stone	Local	20.00	Cement	Jammu	200
Bitumen	Jammu	200	Hume pipi	Jammu	200
Aggregrate 40 mm to 63 mm	prem nagar	40	Sand	Prem nagar	40
Aggregrate 20 mm & down	prem nagar	40	GSB	Prem nagar	40

Certified that information provided is true

Prepared By Assistant Executive Engineer PMGSY Sub-Division Bhaderwah	Checked by Executive Engineer PMGSY Division Doda	Scrutinized by Superintending Engineer PMGSY Circle, Batote
Signture of Technical Scrutiny at STA		Signature of Co-Ordinator S.T.A

FAROOZ AHMAD MIR
Associate Professor ... Srinagar
Co-ordinator State Technical Agency
For PMGSY Kashmir (J & K)

To be filled by S.T.A.

Name of the STA: N.I.T. Srinagar J&K

Name of Road : GATHA to HANGA NOORI

15.	**Is the Proposed Road entered on the OMMS :** (Data entries to be verified by STA before clicking the proposal)	Yes / No
16.	**If the proposal is for new connectivity**	
	* Have you satisfied yourself that the proposed Road is a part of the Core Network	U/G
	* Is the unconnected habitation(s) part of list of unconnected Habitation as per CN – 6	Yes / No
	* Does the Proposal ensure full connectivity of the Target Habitation	Yes / No
	a). If No. the name of Unconnected Habitation up to which it is connected.	Yes / No
	b). Is such Unconnected Habitation eligible Under PMGSY	Yes / No
17.	**Are you satisfied with the following**	
	* Engineering Surveys (L section, X sectionust be verified)	Yes / No
	* Soil / Material Investigation (CBR, Density, LL,PI, Gradation to be verified)	Yes / No
	* Traffic Surveys / Estimation	Yes / No
	* Hydraulic Studies	Yes / No
	(catchment for structures with more than 2 vents to be verified from topo sheet. Location and requirement of all CD structures to be verified from L section.)	Yes / No
18.	In case, Traffic is projected beyond T 4 category are you satisfied with the reason given by the PIU	Yes / No
19.	In case, sub grade CBR is less than 3; has soil stabilisation etc. been proposed (if not , specific reason given by PIU)	Yes / No
20.	Is the design of the following elements as per Rural Roads Manual / Circulars of NRRDA:	
	* Alignment & Geometric	Yes / No
	* Location and type of CD works and side drains	Yes / No
	* Side drains	Yes / No
	* Integration for Cross and Longitudinal Drainage	Yes / No
	* Protection works	Yes / No
21.	Is the design of flexible pavement as per SP:72-2007 and design of Rigid pavement as per IRC SP:62-2004	Yes / No
22.	Does the Estimate conform to Standard rate analysis and SSR generated for the current Phase	Yes / No
23.	**Does the proposal have provision for**	
	* PMGSY Logo, Sign Boards & Information Boards	Yes / No
	* Km / Hm Stones	Yes / No
	* Guard Stones (where necessary)	Yes / No
	* Traffic Sign Boards (as necessary)	Yes / No

24. **Specific remarks, if any, by STA** (Specific remarks of STA about the overall project are neccesary on each DPR)

D.P.R is for U/G of an existing rural road from the CUPL incl. creating a carriageway width of 3.75m with necessary pavement strengthening & other measures like C.D's / P. work wherever reqd.

Certified that the Design and Estimation for the Proposed Road work are based on the data and SSR provided by PIU Engineers. The proposal after final Correction is entered on the OMMS. The Proposal may be considered for clearance.

Technical Scrutiny at STA Done By — Roj M S Mir & Roj F A Mir

Signature
Name
Date

Coordinator : S.T.A. — FAYAZ AHMAD MIR, Associate Professor NIT Srinagar, Coordinator State Technical Agency for PMGSY Kashmir (J & K)

Signature
Name
Date

PRADHAN MANTRI GRAM SADAK YOJANA (PMGSY-II)

CHECK LIST FOR PJV & PJA

(For Individual Road Works)

To be filled by PIU.

State: UT | District: JkK | DODA | Block: Bhaderwah.

Package No.: JK04-640

Name of the Road: From Gatha To Hanga Noori

Total Length (Km) - 7.00 | In Built up area - .60 Km | In Open Area - 6.06 Km

Category of upgradation proposal

A	B	C

If category 'C' road than Indiacte

Year of sanction under PMGSY: PJA | Year of completion | Design Traffic (CVPD/MSA)

Yes	NO

Whether road deteriorated due non maintenance

Estimated Cost Rs : =

Const. Part = 618.64 lacs

Maintenance Part = 199.42 lacs

Total = 818.06 lacs

Cost incl. Maintenance = 116.86 lacs.

Cost sharing pattern for this road Item	Normal Area Road Cost in lacs.	Special Area Average Cost per Km. Lakhs
Flexible Pavement 289.46 Lacs	30.93	
Rigid Pavement		
Others (CD Works, Protective works & Misc Items)		
Cost due to higher specification such as carriage way width, Higher Axle load , Hard shoulders, Shifting of Utilities		
Total Project Cost		
MoRD Share		
State Share		

Is the road a part of DRRP: Yes

If yes , Through Route/ MRL No.

Names of benefitted Growth points

T- RR-2	or	MRL-
Name of Habitation	Population	Overall Weightage
Gatha		
Hanga		
Noori		
Total weight	2999	

Weightage = 20
Road Score = 70
Utility value = 14

Priority value = Total weight/ Length of road

Is the Proposed Road lead up to the growth centre /hub or the road is connected partially?: Yes ✓ | No

Whether the proposed road leads to: MDR ✓ | SH | NH

Average PCI of the road to which proposed TR or MRL will be connected: 1.0

Average PCI value of proposed road

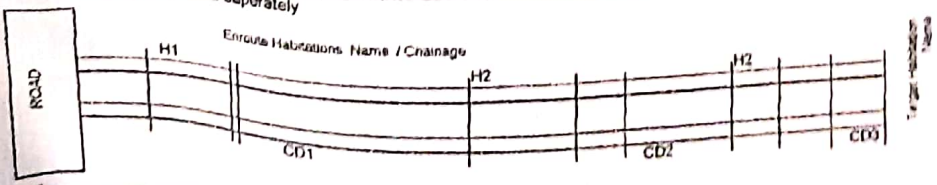
If PCI of MDR / SH / NH is 3 or below , whether the State's undertaking for simultaneouly upgrading it from State fund is avaible: Yes | No

Age of the proposed road: 9 yrs.

Cumulative maintenance expenditure in last three years(In lacs): Nil

Whether the Proposed Road has the desired carriage way / Roadway width and Road Land Width (RLW)	carriage way: yes / No ✓	NO	Roadway width: yes / No ✓	NO	Road land width: yes / No ✓	NO
Indicats the actual widths of the following for the proposed road	In the Built Up Area (m)				In the Open Area (m)	
i) Carriageway						
ii) Roadway						
iii) Road Land Width						

INDEX MAP (not to scale) : Attached saperately

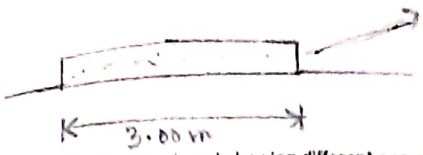


Cross Section details

a) Cross Section of The Existing road showing different component layers.

From KM-1st R.D-00 to KM-5th R.D-4000

G.S.B (thickness = 0.225 m)



Item	Thickness
GSB	0.225 m

b) Cross Section of The Proposed road showing different component layers
(Should be as per Actual Provisions of DPR)

BM
W.B.M (thickness = 0.075m) width = 3.75 m
G.S.B (Thickness = 0.225 m) width = 3.95 m

3.95 m
3.75 m
3.75 m

Item	Thickness
GSB	0.225 m
W.B.M	0.075 m
B.M	0.05 m
OGPC	0.02 m

10 Base year traffic volume

Month & Year of Traffic Volume Count =

Days	Motorised Traffic: Cars Jeep Vans Three Wheelers	Motorised two Wheelers	Light Commercial Vehicle Mini Bus / Pickup Van	Trucks L	Trucks U	Trucks OL	Agricultural Tractors Trailers L	Agricultural Tractors Trailers U	Agricultural Tractors Trailers OL	Buses L	Buses U	Buses OL	Non Motorised Traffic: Cycles	Cycle Rickshaws	Animal Drawn Vehicle SWC	Animal Drawn Vehicle Tonga
Day 1	23	16	5	6	9	0	9	6	0	6	5	0	5	4	0	0
Day 2	32	18	5	9	8	10	6	7	0	2	5	0	8	5	0	0
Day 3	24	16	5	6	7	0	8	6	0	1	6	0	8	9	0	0
Day 4																
Day5																
Day 6																
Day 7																
Average	26	17	5	7	8	0	8	6	0	3	5	0	7	6	0	0

7 day count required in case design is done with IRC 37:2001

Passenger car unit(PCU)

a Traffic Details in case deglsn is done as per SP IRC 72:2007

ADT in the year of Traffic Count =
Growth rate adopted (%) = 6% = 122
Design Life =
Number of Harvesting Seasons = 1
No. of Days in Each Harvesting Season (t) =
Value of (n) assumed =

Base Year Traffic AADT (T) = 109

Years

Cumulative ESAL =
Traffic Category = T4

b Traffic Details in case deglsn is done as per IRC 37-2001 /IRC 37 :2012

A= Initial traffic in the year of completion of construction in terms of the number of commericial vehicles per day
D= Lane distribution factor
F= Vehicle damage factor
n= Design life in years
r= growth rate adopted %
N= The cumulative number of standard axles to be catered for the design in terms of CVPD

11. Subgrade CBR (for Different Sections) =

Chainage	Km 1st RD 450	Km 4th RD 250	Km 6th RD 475	Km 7th RD 925	
Design CBR %	3.88	3.65	3.74	4.06	

A. Pavement Components Description of layer	Thickness in mm	Quantity	Rate Rs	Cost Rs	Cost in Rs.
Earth Work - In Excavation/ Cutting		60630	134.85 (Av.)	8176212	1162031
Earthwork- In Filling (Embankment)					
Subgrade (if provided seperately)/ Treated subgrade		4189.94	839	2515360.50	3621796
Shoulders (if not considered in the Earthwork)	300 mm				
Granular Sub base					
WMM / Aggregate MIx					
DBM Gr II	75 mm	2063.57	1310	2703276.70	3861828
DBM Gr III					
WMM (If designed by IRC 37)					
Bituminous Layers	@0.70-1.0kg/Sqm	27515.25	51.60	1420327.75	2044128
Prime Coat	@0.20-0.30kg/Sqm	27515.25	18.00	495274	713677
Tack Coat	20 mm	27515.25	161.00	4429955.25	6381137
DBM /SDBC/BC (SDBC / BC if designed by IRC 37)		27515.26	61.00	1678430.25	2417738
Seal Coat	50 mm	1375.76	7905	10875901.56	15663013
BM /DBM (If designed by IRC 37)				301.93 lacs	43.13 lacs
Surface Dressing					

Total cost of Flexible pavement

Cement Concrete Road

	IRCSP 62:2004	IRC 58
Design done with		

GSB	
WBM	
Dry lean concrete(DLC)	
Concrete for Pavement	

Total Cost of Concrete Pavement

B. C D Works

	Location - Chainage (Similar Type of CD's may be grouped together)	Type of CD & their Nos	Total Length of Culvert	Cost in Rs./ in lacs)
I	Existing CD (requiring repair)			
II	New proposed CD (including cpmplete replacement of existing CDs)	HPC 1000mm ϕ = 18 NOs RCC 6m = 2 NOS RCC 2m = 1 No.	18 NO'S 2 x 6 = 12 m 1 x 3 = 3 m	35.37 42.64 6.92
				84.33

Total Cost of CD works in lacs

C. Protection works

	Chainage From	Chainage To	Length(m)	Cost in Rs	Average cost / m
Retaining wall / S wall	0375	6305	1195	125.92 lacs	10537
Breast wall	1035	3875	800	52.72 lacs	6590
Toe wall			300	24.27 lacs	8090
Gabbion				207.73 lacs	
Pitching / turfing for slopes					

Total cost of protection works

D. Pucca Side Drains (If Provided)

Chainage From	Chainage To	Length(m)	Cost in Rs	Average cost / m
000	7000	1000	24.27	2427

Total cost of side drains works

E. Road Logo, other Road Furniture including Road safety signs

	Number	Cost in Rs	Average cost / km
Number of Boards	04	0.55	
Logo Board Signage		2.31	
		2.86	

Total cost of road furniture

F. Any other Provisions (Please Specify)

618.64

Total Cost of the Project (Rs)

The estimated as per provision of Operation Manual

Year	Cost in lakhs		
I	6.18	1.00	
II	9.28	1.50	
III	12.37	2.00	
IV	15.46	2.50	
V	18.55	3.00	
Renewal cost after 5 years	137.58		
Total Maintenance Cost	199.42		

Maintenance after renewal cost

I			
II			
III			
IV			
V			
Total MaiMananca Cost			
G/ Total of maintenance			

14 Whether the road has Geometrics as per Rural Roads Manual RRM / Latest Circulars of NRRDA — Yes ✓ / No

15 Whether C.D.works / Protection works are provided as per RRM / Latest Circulars of NRRDA/ Respective Codes of IRC — Yes ✓ / No

16 Does the Estimation Conform to Standard Rate Analysis and SSR generated for the current Phase — Yes / No ✓ — Year 2019

17. Sources and the Lead distances of Materials are as under

Material	Source	Lead Distance (Km)	Material	Source	Lead Distance
Earth			Cement	Jammu	200
Murrum			Emulsion	Jammu	200
Aggregate	Premnagar	40	Bitumen	Jammu	200
Sand	-do-	40	Steel	Jammu	200

Certified that information provided is true

Prepared By (Name) for

Checked By

Technical Scrutiny at STA done by

Counter Signatures of Co-ordinator STA :