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Ministry of Physical Planning and Works
Department of Roads

Road Network Development Project

EHS Report No. 33

ENVIRONMENTAL, HEALTH AND SAFETY MONITORING OF THE HILE – BASANTAPUR-KHANDBARI ROAD REHABILITATION

August 2007

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1. ENVIRONMENTAL SITUATION OF HILE-BASANTAPUR SECTION

1.1 Background

The Hile-Basantapur road was opened to traffic some 15 years ago. It has a mixed gravel and earth surface. The 22+066 km length is being upgraded to a standard DBST feeder road. The following contractors are mobilised in this road sector:

RNDP/LCB 1	Lama Construction	0+000 to 5+000;
RNDP/LCB 2	Lama Construction	5+000 to 10+000;
RNDP/LCB 3	Prakash/Bokhim	10+000 to 16+000;
RNDP/LCB 4	Hirachan/Bokhim	16+000 to 22+066.

Contracts were awarded in early 2005, and were mobilised by June of that year.

The project's environmental baseline study was conducted in September 2004, before the mobilisation of the contractors. At that time, the overall environmental conditions were described as looking fairly good, with no major environmental issues observed (please refer to EHS Report No. 4).

The first environmental monitoring study was conducted on 29 July 2005, the second on 28-29 November 2005, the third on 26 and 29 June 2006, the fourth on 24 and 25 January 2007, and the fifth (**this**) on 7 August 2007. At the time of this monitoring visit, the Package 1 and 2 have been completed and the contractor had fully demobilised. Also since it was a bandh day called upon by the Khumbuwan State-a local political party (?), there was no one to accompany the Environmental Consultant except a porter carrying his luggage. The bandh however provided a good opportunity for the Consultant to have a walkover survey of 22.06 km all the way to Basantapur.

1.2 Key issues

The following main points were noted.

- 1 The first 10 kilometres of the road (Package 1 and 2 of Lama Construction) has been completed. Road signs (at least six types noted) have been appropriately placed. Painted delineating posts have been erected appropriately.
- 2 The base and sub-base laid by Package 3 (10+000 to 16+000) of Prakash/Bokhim; and Package 4 (16+000 + 22+066) of Hirachan/Bokhim have been deteriorated at many places.
- 3 The camps abandoned by the contractors are okay.
- 4 Full width pavement along with covered drains in almost all the bazaars has greatly enhanced the quality of local environment.
- 5 Spoil disposal is mostly of a high standard, and debris has been placed in appropriate locations.
- 6 Bio-engineering works are of a promising quality; however need a little repairing during the DLP.
- 7 Minor slip failures were seen both in bioengineering and non bioengineering sites-- each numbering three.

- 8 Slope cutting grades had been reduced from 3:1 to 3:2 to avoid the creation of unsustainable grades in weak residual soils.
- 9 Retaining walls had been backfilled properly to ensure that they make the intended contribution to slope stability.
- 10 No rehabilitation works of any kind (whether as per our earlier suggestion and/or of their own) has been done in Lama's main quarry at km 3+780 except a 1m x 5m gabion wall constructed right at the road edge. The same is true for the Bokhim quarry at 19+200. Except this the overall environmental conditions of this road sector look fairly good.

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1.3 Summary of environmental issues for Hile-Basantapur section

General progress. As said earlier, the first 10 km section of the road is complete, and the contractor has demobilised, whereas the rest 12.06 km pavements has not been finished despite the extension of the contract period. Hopefully, it will be accomplished immediately after this monsoon.

The road passes through three major small bazaars (Jorpati, Sindhuwa and Chitre) and the rest through terraced crop fields, and a small portion through an utis plantation. Despite cutting down of trees on the roadside slopes, and staking them right on the road side and on to drains, no major environmental issues were observed. There is no disruption of kulo (irrigation leats) and drinking water pipes. Those we pointed out earlier, have all been relocated.

Quarrying activities. No quarrying from the road side slopes were seen at the moment. However, rehabilitation of the approved quarry of Lama Construction from private land at 3+780 for sub base, and at 19+200 by Prakash/Hirachan/Bokhim from community land has not been done. Both of these quarries have negative environmental effects on the road and surrounding land. The one at 3+780 is distinctly visible from the far distance as if it is a big land slide.

Tipping sites. As earlier reported, the tipping sites on either side of the road at km 19+300, +350 and +400 are well located and are showing no major sign of environmental damage down the valley. However, the need of a check dam that we had proposed earlier has so far not been placed (see EHS Report No 21 and 28).

Damage from side tipping. Our earlier report has pointed out that a surplus material from side tipping at 8+750 be lifted back, the slope corrected and trimmed and brush-layering be done. A sketch has also been provided for this. If not complied, the withholding of 20% of the contractor's payments was also recommended as an inducement to ensure that the site is rehabilitated properly, and this practice must be continued by the consultant. At this visit, some works as per our recommendations were found to be done, and there is no major risk of debris flowing down the valley.

Traffic safety. In compare to the highly increased traffic speed after the completion of DBST, the precautions for traffic safety is virtually non existent. The impacts the few road signs so far placed are yet to be seen.

Contractors' camps. The Lama's abandoned Camp Site is more or less okay except the plastics, rubbers and a few galvanised sheets scattered elsewhere. The patch of bitumen spilled over 10mx5m area on the opposite of the Camp Site is to be cleared. The Camp at Siduwa left by Bokhim is okay.

1.4 Bio-engineering and slope stabilisation

Cut slope angles. The design grade for cut slopes is 3:1 (v:h), or 71°, which is too steep for many of the weak residual soils found along this road section. During the design we advocated using 1.5:1 or 3:2 (v:h), or 56°, which is much more appropriate but unfortunately was not adopted. Slopes of this grade can be stabilised in these materials, but a steeper angle will always lead to a failure within a few years. In some cases, a small breast wall, often of only 1.0 to 1.5 metres in height, can help to reduce cut volumes.

Back-filling behind walls. There are not many retaining structures on the mountain side, but in most cases where they have been built, The back-filling have been done at retaining structures on the mountain side at km 3+620 and 18+000 which we had discussed in detail with the contractor and consultant staff please see also EHS No 21 and 28).

Bio-engineering works. Since the grass planting and brush layering had been started in late June 2005--exactly the right time, and that all plantation work was finished before the end of July, the survival rate of the plants are good. However, few repairing works are needed. The Bio-engineering Consultant will work it out in details immediately after his recruitment which is soon expected.

Slope trimming. Most slopes have been trimmed satisfactorily, though in some locations there are convex slopes, with excessively steep lower portions.

Grass planting. The great majority of the grass used is Phurke, planted as rooted slips, and this is fine. Setaria has been used in a few places (we saw it at 0+880), but this should be discontinued on roadside slopes, and used only in off-road locations on private farmland or community forests. Stem cuttings of dhus have also been used along the crest of cut slopes, and there has been extensive use of rooted nigalo cuttings along the base of slopes. There is no need in most cases for the use of alternating diagonal grass lines, and longer lines in a single direction would have a better appearance. The phurke is being obtained from community-managed forests, and seems to be sustainable.

Brush layering. An example of the use of this technique was examined on the valley side fill slope at km 3+900. It used ghurmis and ashare, and as it had been done early, the cuttings were already shooting. The standard of brush layering was good; diagonal grass lines in between were not appropriate (contour lines would have been better), but were not really necessary in this location anyway.

1.5 Environmental enhancement

Full width pavement along with covered drains in Jorpati, Sindhuwa, Chitre and Basantapur has greatly enhanced the quality of local environment. A football ground

constructed by Hirachan/Bokhim at Basantapur levelling the approved tipping site at around 19 km is a very commendable job. The contractor has also been reported to construct an earthen side drains on this ground. This is a good example of a potential environmental hazard being turned to good use.

Bio-engineering works especially at 13+490 though looks ruined at this stage, but among the few survived bamboo will ultimately be able to retain soil.

A drinking water pipe at 14+040 has now been relocated, and there is no other problem reported so far.

2. ENVIRONMENTAL SITUATION OF BASANTAPUR-SABHA KHOLA SECTION

2.1 Background

The earthen road of the Basantapur-Mudhe-Chainpur section is open some 17 years ago by the DoR using the government's own funds over a period of some years. It was supposed to follow the alignment of the first part of the access road to the proposed Arun III Hydroelectric Power Project, but deviates slightly from this in a number of places. The Arun Valley Hydropower Company used this road up to Piluwa Khola (chainage 37+) for constructing a 3 MW Piluwa Khola Hydropower Station. The traffic up to Km 37 is open only during the dry season. However from there onwards to Chainpur (km 50) public transportation of four wheel grade has already started their service during the dry period since the last winter.

The Basantapur-Mudhe section needs special mentioning here owing to its environmental sensitivity. For most of its length, the road skirts along the edge of the Milke Danda - Tinjure Danda forest. This is of mixed oak and rhododendron, and remains as one of the best forests of its type in the Himalayas. It is therefore of high international importance, and is recognised as such, having been proposed as a protected area on several occasions. The forest is renowned for its varieties of Rhododendrons, which has attracted visitors from far distance during March-April when they bloom. Declaring it as a Rhododendron Conservation Area is under consideration from the Forest Ministry, and it could happen at any time. The road is therefore within the buffer zone of this area of outstanding environmental value. For this reason, it runs through an area where the environment must be treated with a great deal of sensitivity. Any thing that might disturb the forest must carefully be analysed and if found be controlled. Earlier, we had reported that there were no major environmental issues observed during the first walkover survey for the baseline study on 24-25 September 2004, nor again when it was visited on 27-28 June 2006.

Of the 75.5 km of the road, the first 13 km will have a DBST; from there onward to km 50 +000 the road will have an OTTA Seal, the rest 25.5 km up to Sabha Khola the road will be earthen.

Contracts were awarded in November 2006, and the expected date of completion of all the contract packages is May 2008.

From Basantapur to Sabhakhola Section there is one ICB and 16 LCB Packages which are as follows:

Package	Contractors	Sector Chainage
<i>From Basantapur (0+000) to Chainpur (50+000)</i>		
RNDP/ICB	Gorkha/CWE/Bokhim & Sons JV	0+000 to 13+000
RNDP/LCB/MK 1	Lama Builders/ Bajraguru/Kankai JV	13+000 to 17+000
RNDP/LCB/MK 2	MK Nirman Sewa	17+000 to 22+900
RNDP/LCB/MK 3	Tamang/ Himdung/Lohani/Gauri Parvati JV	22+900 to 27+300
RNDP/LCB/MK 4	Lama Construction/ Nagarjun JV	27+300 to 31+700
RNDP/LCB/MK 5	Super Sherpa/Waiba/Pushpanjali JV	31+700 to 36+100
RNDP/LCB/MK 6	BT/Elite JV	36+100 to 40+500
RNDP/LCB/MK 7	Nepal Adarsha/ Golden Good JV	40+500 to 44+400
RNDP/LCB/MK 8	Kalika Construction Co. Ltd.	44+400 to 47+900

RNDP/LCB/MK 9 Jayee Construction/Contech/PS JV 47+900 to 50+000

From Chainpur (50+000) to Sabha Khola (75+508)

RNDP/LCB/MK 10 Tamang/**Koshi and Neupane**/Gitanjali and Gajurmukhi/Lokbir and Betali JV 50+000 to 54+250

RNDP/LCB/MK 11 Lama Construction/Bhairabh/Trishuli JV 54+250 to 58+750

RNDP/LCB/MK 12 Amar/Mahalaxmi/Shankar Mali JV 58+750 to 62+950

RNDP/LCB/MK 13 Sapana/Jagat/Thodung JV 62+950 to 66+950

RNDP/LCB/MK 14 Hirachan/Bokhim/Mahadev/Khimti/Mainachuli JV 66+950 to 70+200

RNDP/LCB/MK 15 Gaura Construction/Atlas Engineering/Apex JV 70+200 to 73+200

RNDP/LCB/MK 16 Swachhanda/Pacific/Oasis/Shree Rautaha/Diwa JV 73+200 to 75+508

The Environmental Consultant was accompanied to the sites by a number of personnel which are as follows:

Messers G. Mahato (ARE) and S. Shrestha (IOW)	Basantapur-Mudhe Section
Mr Arjun Basnet (Contractor's Supervisor)	MK 1
Ram Nath Thapa (Contractor's Supervisor)	MK 2
Kamal Timilsina (Contractor's Site Manager)	MK 3
Pragati Nepal (Contractor's Overseer)	MK 5
Laxmi Sunda Haku Duwal (Contractor's Engineer)	MK 6
Sahadev Gautam (Contractor's Overseer)	MK 7
Sudhir Century (Contractor's sub-overseer)	MK 8
Prem Thapa (Contractor's Site-In charge)	MK 9
Purusottam Shrestha (Contractor's Engineer)	MK 10
Vijaya Karki (Contractor's Site Manager)	MK 11

For Packages MK 12 to MK 16 the following staff had accompanied to the site: Sameer Dhakal Consultant's RE, Rohit Acharya (ARE), Shailendra Malla (IOW), Deependra Sharma (IOW) along with the Constructors' staff (Hem Raj Guvaju of MK 12; Chitra Bahadur Thapa and Chandra Kanta Chaudhary of MK 13; Sisir Kandanwa and Arjun KC of MK 14; Bishwa Nath Sharma and Durga Upreti of MK 15; and Dharma Raj Dahal of MK 16).

2.2 Key issues

The following main points were noted.

- 11 In the ICB Package, structures are being constructed only up to 9+200 at a very low pace. Stone quarrying in MS is frequently evident. The possibility of forest destruction all along this road is high during full mobilisation, and must therefore be monitored regularly.
- 12 The cut slopes are too steep to sustain the weak residual soils almost all the way from Basantapur to Sabha Khola.
- 13 Except a few contract packages, the tipping sites have not been designated. Packages 12 to 16 had no choice at present than to tip the spoils at RoW, which could be back-hoed and taken to the safe site once the track is open for the tippers. A toe-wall should have been constructed by MK 8 before tipping the excavated soil at 44+400 to +500 on to the stream below.
- 14 Quarrying of stones (and also sands in few cases) from mountain slopes is underway all along the road.
- 15 Plantation for bio-engineering works have rightly been started, however at many places the grass slips have failed to establish, and hence need re-plantation following the next monsoon. The tree seedlings being planted at 42+200 of MK 7 were too weak to survive. Those seedlings were possibly not hardened in the nursery before being taken to the plantation sites.
- 16 Few slip failures in bioengineering and non bioengineering sites need repairing.
- 17 There is still a major lapse on personal safety of the workers in all the packages.
- 18 The living conditions of the labourer camps are less satisfactory.

2.3 Summary of environmental issues for Basantapur-Sabha Khola section

General progress. At the time of this monitoring visit the physical progress for all the contract packages is:

Basantapur-Mudhe. Structural works have been done only up to 9+200. Five out of 13 km drain; 2000 out of 4400 cubic meter of gabion wall; and 30% of bioengineering works have been completed.

There are only two maintenance gangs (each having five persons) employed just to keep the track open. Since the work is not in full swing in this rainy season, there are very few to report on environmental matters. Nonetheless, the slip failures especially at 1+330 to 350, 6+000 to 500, the stone quarrying by the contractor almost through out the mountain side of the road should be rehabilitated.

On the day of site visit, the Environmental Consultant was accompanied by Mr Mahato—the Consultant's Site Engineer and Mr Sudan Shrestha—the IOW.

Mudhe-Sabha Khola. This road section starts at Mudhe (13+000) at an altitude of about 8000 feet ascending down to Piluwa Khola basin (3000 feet) at 37+000, and keeps on ascending up to Baneshwor (Km 53+) at an altitude of about 6500 feet via Chainpur Dhoka (about 6000 feet) at Km 50. From Baneshwor the road descends all the way to Sabha Khola (Km 75.5) about the same altitude of Piluwa. Sixteen contract packages are involved for this sector. One separate contract for constructing the Piluwa Bridge has been awarded to Kalika Construction Co. Ltd. which is also involved in Package No 8 of Piluwa Khola to Chainpur section of this road.

At this stage, all the contractors had been involved in structural and bioengineering works simultaneously wherever the site is clear for the latter. The progress for structures varies from 30 to 50 percent and so does the bioengineering. However, MK 6 has completed 100 percent gabion and 80 percent of bioengineering works. By the end of September 2007 all contractors expect to complete the structural works.

Quarrying activities. Stone quarrying was observed almost through out the mountain slopes of this 62.5 km road sector. They are mostly reported to be used for structural works. Other quarries are dug out from 13+660 for MK 1; 18+070, 18+780, 18+920, 19+000, 20+200, 20+780 for MK 2; 25+350 for MK 3; 29+000 and 29+890 for MK4; and 34+550 for MK 5 and Piluwa Khola (37+..) for MK 6, 42+100 for MK 7; 44+710 to 750 for MK 8. The MK 9 and 10 are negotiating with Rural Access Programme to give them access at Chainpur-Nundhaki Road for collecting stones. The MK 11 has its stone quarry at 57+140; MK 12 and are collecting stones from all along the road sides.; MK 14 from 69+530 to 570; MK 15 and 16 from 73+450 and from Sabha Khola. In addition, the MK 1 is seeking to extract stones at chainage 7+000 of Basantapur-Mudhe section and MK 2 from Bihibare some 8 km of the road head at 20+300 of Mudhe-Piluwa Khola section.

Tipping sites. The contractors have not designated any appropriate sites for tipping the spoils generated during excavation. Most of them however reported that there will be a cut and fill balance, and whatever little spoils left will be tipped on private lands after proper agreement with the land owners. The few that have located such tipping sites are: MK 3 has at 24+100 and 25+400 for tipping a maximum of 11000 cubic meter of earth; MK 5 proposed at 32+250 at a government land; MK 9 at 48+720.

The area as such has a plenty of terraced fields some of them left fallow, and hence

could be used as for tipping spoil.

Damage from side tipping. Since no major earth work has started at the moment the damage from side tipping has not been evident. At many sites of MK 12 to 16 bamboo check dams have been constructed at RoW before tipping the debris.

Hanging rock. A big hanging rock from a stone quarry at 29+890 of MK 4 must be removed immediately.

Traffic safety. At this stage, except a few tractors no other vehicles were moving on the road, hence there is no major risk of traffic accident to happen. But, once the monsoon stops, this number will swell up. Precautionary measures must be taken during that time to control vehicular accident.

Contractors' camps. The contractors' have established their camps on respectively on their packages. As the work progress is still low, there is nothing more to report on environmental issues related to it, except the scattered gabion wires.

Labourer camps. At present the few labourers present in the site are mostly involved in quarrying, excavating drains, bioengineering and structural works. There is a mixture of both local as well as outsiders. The latter have been placed mostly on rented houses with a few on tarpaulin tents. The living conditions are not as immaculate as expected.

Crusher plants. MK 4 is establishing a crusher plant at 30+070 at the mountain side of the road which is okay. Fencing it and posting a watchman is necessary so as to keep outsiders away. For other packages, crusher plants will be established at Piluwa Khola which is an appropriate place.

2.3 Bio-engineering and slope stabilisation

Cut slope angles. The existing grade for cut slopes for almost all the packages is too steep for many of the weak residual soils found along this road section. When asked about it all of the contractors' representatives replied that the locals did not allow them to correct the slope angle.

This is one issue that needs to be resolved--the sooner the better. Since, the locals have already been compensated with their land, and the right-of-way now belongs to the DoR, there is no question that the locals should interrupt road construction based on appropriate engineering design.

Bio-engineering works. Since the grass planting and brush layering had already been started in June 2006--exactly the right time, and that the contractors are in hurry to finish all plantation work before the end of this monsoon, the survival rate of the plants--especially the brush layers of Vitex, Jathropha and Asare are good. However, the mortality rate of grass slips planted on the vertical slopes are high and hence need to be replaced following the next monsoon. The Bio-engineering Consultant will work it out in details immediately after his recruitment which is soon expected.

2.3 Worker health and safety

No labour gangs were seen with the proper basic safety clothing. The most chronic lapse of precautionary measure was seen in almost all those places where the labourers are excavating the drains and foundations of gabion and masonry walls with stones and boulders hanging just on top of their head having no helmet on it. As usual, the

contractors' representatives blamed the labourers for not using them despite their repeated requests.

3. DETAILED ENVIRONMENTAL, HEALTH AND SAFETY ISSUES MONITORED

1) 3.1 Hile-Basantapur road

Identified benefit	Baseline extent and severity (quantified indicators)	Checked extent and severity (THIS VISIT)	Enhancement measures	Responsibility for compliance	Timing of compliance schedule	Monitoring check schedule	Response for check report
Hile-Basantapur road: Part 1: Benefits and their enhancement							
Production of vegetables for "export" from the areas served by the road.	At least six loading sites affecting 300 m of road length before project.	At around 6+500 to 7+500 the fallow land, which was initially thought to be of that of the government, is being cultivated with vegetables.	Improve the paving in areas regularly used for vegetable collection. Road upgrading might have encouraged the locals to cultivate their fallow land.	Consultants/DoR to include in detailed design DoR to approve. Site engineering staff are to apply	By the end of implementation.	-	Checked and reported by consultant Environmental Specialist.
Upgrading of roadsides through bazaar areas, particularly Sindhuwa and Basantapur.	At least 900 m of six roadside bazaar lacking pavement and drainage before project.	Road widened and drains installed at all the three bazaars.	Provision of drainage and pavements, and paved widened street-selling areas.	RNDP Consultants to include in detailed design. Site engineering staff are to apply.	By the end of implementation.	-	Checked and reported by consultant Environmental Specialist.
Existing roadside slopes to be strengthened and vegetation cover improved.	At least 3 MS sites affecting a total road length of 400 m requiring strengthening and vegetation improvement before project.	Bioengineering works have been done satisfactorily. However some repairs are necessary.	Bio-engineering and other appropriate slope protection and stabilisation measures to be used wherever weaknesses occur. Grasses not grazed by cattle to be selected.	RNDP Consultants have included in detailed design. Site engineering staff are to apply.	Works to be completed during DLP.	-	Checked and reported by consultant Environmental Specialist.
Existing off-road drains (not side drains) to be strengthened and discharge areas improved.	In three sites (9+725, 13+445, 15+990) active gullies threaten road and need strengthening	In almost all the bazaar areas the outlet of the off-road drains have been taken far away in order to protect their houses and bari land.	The Project Engineers have identified problems and appropriate drainage systems have been used wherever weaknesses occur.	Site engineering staff are to apply.	By the end of implementation.	-	Checked and reported by consultant Environmental Specialist.

Identified hazard	Baseline extent and severity (quantified indicators)	Checked extent and severity (quantified indicators)	Mitigation measures	Responsibility for compliance	Timing of compliance schedule	Monitoring check schedule	Responsibility for check reports
Hile-Basantapur road: Part 2: Hazards and their mitigation							
Quarrying of stone from roadside slopes, by both local people, DoR and contractors gives rise to erosion, slope instability or other environmental damage, or risk of it happening.	Seven sites have been identified where informal quarrying is affecting the road before project, extending to a total of 1300 m ² .	Previous unauthorised quarrying has been stopped. No rehabilitation work of any kind for the project quarries at 3+780 and 19+200 has been done yet.	The general plan already given in the Monitoring report (EHS Report No 21 and 28) to be followed.	The contractors are to be responsible for compliance during DLP.	Immediate	-	Checked and reported by consultant Environmental Specialist.
Existing side-slope failures and active valley side gullies threaten the road and surrounding land.	No existing side slope failures were noticed during walkover survey on 24-25 September 2004.	No side slope failures have been noticed. A few old ones have been treated with bio-engineering.	Bio-engineering and other appropriate slope protection and stabilisation measures have been used to rehabilitate problem sites.	The Contractors have responsibly complied.	-	-	Checked and reported by consultant Environmental Specialist.
Tipping sites for excess spoil lead to instability of roadside land.	Not applicable.	Suitable sites for tipping have been identified and used.	Appropriate mitigation measures have been followed.	The Contractors have responsibly complied.	-	-	Checked and reported by consultant Environmental Specialist.
Increased danger to road users, especially bus passengers, from faster traffic speeds.	Data not available.	The traffic volume and speed have increased considerably at least up to Siduwa Bazaar. Adequate warning signs, safety barriers and traffic calming measures (e.g. speed bumps in bazaars) have not been placed.	Adequate warning signs, safety barriers and traffic calming measures (e.g. speed bumps in bazaars) must be placed.	The contractors are to be responsible for compliance during DLP.	Immediate	-	Checked and reported by consultant Environmental Specialist.
Increased danger to road users, especially pedestrians, from greater volumes of traffic.	No deaths or injuries reported among pedestrians for the last several years.	Same as above.	Provision of bus stops and off-road parking sites in appropriate locations (mainly roadhead points).	The contractors are to be responsible for compliance during DLP.	Immediate	-	Checked and reported by consultant Environmental Specialist.
Dust nuisance during the construction period.	All households interviewed reported an uncomfortable level of dust coming into their shops and houses from moving traffic, and wind. They mostly sprinkle water in bazaar areas. Quantification of the dust problem was not possible.	No dust nuisance observed at this time of the year.	Not applicable at present; however once the contractors' vehicle numbers increase for the construction of other packages begins beyond Basantapur, appropriate mitigation measures must be taken.	Contractor.	During all dry weather until a sealed surface is in place from 12+000 to beyond.	To be checked every four months throughout project implementation.	Checked and reported by consultant Environmental Specialist.
Noise pollution during the construction period.	No unacceptable traffic noise was reported by the local roadside residents during walkover survey.	No noise pollution at present.	However once the contractors' vehicle numbers increase for the construction of other packages begins beyond Basantapur, they should be	Contractor.	Throughout construction period.	To be checked every four months throughout project implementation.	Checked and reported by consultant Environmental Specialist.

3.2 Basantapur - Mude Sanishchare road

Identified benefit	Baseline extent and severity (quantified indicators)	Checked extent and severity (quantified indicators)	Enhancement measures	Responsibility for compliance	Timing of compliance schedule	Monitoring check schedule	Responsibility for checking reporting
Basantapur - Mude Sanishchare road: Part 1: Benefits and their enhancement							
Upgrading of roadsides through bazaar areas, specifically Deurali and Mude.	At least 200 m of two roadside bazaars lacking pavement and drainage before project.	No change from the baseline.	Provision of drainage and pavements, and paved widened street-selling areas.	Consultants/DoR have included in detailed design. Site engineering staff are to apply.	By the end of implementation. Works to be completed as per schedule.	To be checked every six months throughout project implementation.	Checked and reported by consultant Environment Specialist.
Existing roadside slopes to be strengthened and vegetation cover improved.	Numerous slope issues require strengthening and vegetation improvement: see bio-engineering schedules.	About 30% of bioengineering works, and 50% of gabion walls completed. Generally, the plants have established well.	Bio-engineering and other appropriate slope protection and stabilisation measures to be used wherever weaknesses occur.	Consultants/DoR have included in detailed design. Site engineering staff are to apply.	By the end of implementation. Works to be completed as per schedule.	To be checked annually following monsoon rains, throughout project implementation.	Checked and reported by consultant Environment Specialist.
Existing off-road drains (not side drains) to be strengthened and discharge areas improved.	An active gully at 0+800 threatens the road and needs particular strengthening; others may be found.	Situation unchanged from the baseline.	Appropriate slope drainage systems to be used wherever weaknesses occur.	Consultants/DoR have included in detailed design. Site engineering staff are to apply.	By the end of implementation. Works to be completed as per schedule.	To be checked annually following monsoon rains, throughout project implementation.	Checked and reported by consultant Environment Specialist.

3.2 Mude Sanishchare-Chainpur-Sabha Khola road

Identified benefit	Baseline extent and severity (quantified indicators)	Checked extent and severity (quantified indicators)	Enhancement measures	Responsibility for compliance	Timing of compliance schedule	Monitoring check schedule	Responsibility for checking and reporting
Mude Sanishchare-Chainpur-Sabha Khola road: Part 1: Benefits and their enhancement							
Upgrading of bazaar areas close to the road, specifically Mamling, Chainpur Dhoka, Khatri gaon, Baneshwor, Kharang bazaar, Luwakot, Gahate.	All bazaars have earthen surfaces, which can be alternately dusty and muddy.	Situation unchanged from the baseline.	Provision of drainage and pavements, and paved widened street-selling areas.	Consultants/DoR have included in detailed design. Site engineering staff are to apply.	By the end of implementation. Works to be completed as per schedule.	To be checked every six months throughout project implementation.	Checked and reported by consultant Environment Specialist.
Existing slopes to be strengthened and vegetation cover improved.	Numerous slope issues require strengthening and vegetation improvement: see bio-engineering schedules.	Bioengineering works are rightly in progress at all the 16 packages. However qualities of work at different sites vary. Replantation is necessary (also refer to the text)	Bio-engineering and other appropriate slope protection and stabilisation measures to be used wherever weaknesses occur.	Consultants/DoR have included in detailed design. Site engineering staff are to apply.	By the end of implementation. Works to be completed as per schedule.	To be checked annually following monsoon rains, throughout project implementation.	Checked and reported by consultant Environment Specialist.
Existing gullies and natural drainage systems to be improved and strengthened in discharge areas.	Numerous active gullies threaten farm land near the alignment: see bio-engineering schedules.	Gully protection measures are being applied, and the drain outlets seem not threatening the farm land near the alignment.	Appropriate slope drainage systems to be used wherever weaknesses occur.	Consultants/DoR have included in detailed design. Site engineering staff are to apply.	By the end of implementation. Works to be completed as per schedule.	To be checked annually following monsoon rains, throughout project implementation.	Checked and reported by consultant Environment Specialist.

4. PROPOSED NEXT MONITORING VISIT

Since most technical matters appeared to be either under control or well understood by site staff at the time of this monitoring visit in August 2007, it is proposed that a follow-up visit should be made in November 2007, when the road construction work is in full swing at this time of the year. This will involve a repeat of the EHS monitoring reported here. However, a half-day Seminar on Environmental, Health and Safety will be conducted at mid-September 2007 for those site staff of Packages No 7, 8, 9, 10, 11, 12, 13, 14, 15 and 16. The participants for the Seminar should include one technical and one managerial staff from each Contract Package, and Consultants' RE, ARE and IOW. This means that there will be a maximum of 20 people from the Contractors' side and three each from the respective RE's office, thus totalling to 26. However, those who have already participated in this Seminar while they were deputed elsewhere in RNDP need not sit this time.

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