

Government of Nepal Asian Development Bank

Ministry of Physical Planning and Works

Department of Roads

Road Network Development Project

EHS Report No. 29

**ENVIRONMENTAL, HEALTH AND SAFETY MONITORING OF
THE**

DOLALGHAT - CHAUTARA ROAD REHABILITATION

August 2007

1 ENVIRONMENTAL SITUATION

1.1 Background

The Dolalghat-Chautara road starts from the junction on the Arniko Highway at km 59+150 from Kathmandu. The junction is about 2 km north of the Indrawati bridge at Dolalghat. This is an old road opened to traffic some 30 years ago. It is a standard old-style feeder road, which has been sealed for the first 9 km and has a mixed gravel/earth/rock surface on the remaining section. Some portions of the road lack lined side drains. The road passes through degraded sal (*Shorea robusta*) forest to relatively good quality plantation forest of pine (*Pinus roxburghii*, *P. patula* and other exotic pine species) at around Pokhare, Irkhu and Melchour, and through mixed forest (with katus and chilaune, *Castanopsis* and *Schima*) on the ridge leading to Chautara bazaar.

The project's environmental baseline study was conducted on 9 October 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.

Contracts were awarded in early 2005, and were mobilised by June of that year. The first and the second environmental monitoring studies were conducted on June 2005, and June 2006 respectively, and the third (**this**) monitoring visit on 4 August 2007. At this time, the DBST has been completed (i.e from 0+000—the juncture at Arniko Highway to 23+700 at Chautara Bazaar), and bioengineering work has also been reported as complete. Following this, all the contract packages have fully been demobilized. On the day visited, the Consultant was accompanied to the site by Mr Saurabh Bajracharya, the DoR Engineer, who has been transferred in this sector from December 2006, and Mr Hari Shrestha-the Supervisor.

1.2 Key issues

Perhaps because the work has already finished; the contractors have already left; and the overall environmental conditions of the road look fair, there is not much to report at this stage. However a few issues are:

Side tipping. The prominent side tipping of spoils mostly through out the road length (which we had earlier reported) has now generally seen covered with plants-either planted or natural. Such natural grasses are only seasonal grasses which flourish in the monsoon and die thereafter leaving the tipped areas barren during the dry season. Bioengineering must therefore be done properly in these areas.

Drainage. Generally the drainage look good throughout the road length, one of the outlets at 400+000 near a hairpin bend the drain is over hanged and is now contributing to make a serious gully. Instead of leaving the outlet just at the road edge, it must be carried down up to the safe point of the valley immediately. Few other culverts and catch pits have been seen blocked. Serious among them are at 14+120, 15+000, 15+170. Mr Hari Shrestha reported that 12 out of 17 culverts have been blocked at Package No 3.

The covered drains in almost all the built-in areas are the environmental enhancement of this project.

Quarrying of stones and soil from mountain side slopes. Surprisingly, at the time of this monitoring visit, no quarrying of stones, red soils, etc. have been seen from the road side slopes either by the contractors or by the locals.

Forests and trees. Our earlier suspicion the quality of forests adjoining the road will be deteriorated that after its completion, was not true. The forests still look okay, and there is no major evident of illegal felling of trees. Perhaps this is due to whatever forests stretch along the road length are looked after by the local forest user committees. Also, the project has compensated private landowners for fodder and other trees, no dispute with the locals were found.

Slip failures. Minor slip failures were seen almost through out the road length blocking the drains. At this stage, these do not seem threatening to the road or other private properties. Two maintenance teams (3 to 4 persons in each team) of the contractors are also clearing them at chainages 3+150, 18+200.

Bioengineering. There is mixture of quality of bioengineering work. For instance, the brush-layering and grasses have established well at the packages starting from O+000. It is very good at 4+000. However the more we move towards Chautara, the numbers of cuttings as well as grass slips have sparsely survived. Although the bioengineering works has been reported as complete, and the nurseries abandoned, there is still a need to refill those areas where the mortality rate of the plants is high.

Property access. Both the personnel and the public access have been well laid at various points.

Delineating posts and Safety barriers. The delineating posts have been erected and painted well distinct colours. However, to a great surprise some of them have been broken; some uprooted and thrown elsewhere. The safety barrier at 10+000--a hairpin bend is well laid.

Traffic safety. Despite there is a very low traffic in this road (Daily bus from Chautara to Kathmandu is 18 and the same number other way plus the government and private vehicles estimated not exceeding 15 per day), accidents do happen. Very recently a passenger bus rolled down the hill while overtaking the other vehicle. The drivers and the local pedestrians are not used to the increased traffic speed in this road, warning signs for limiting the speed must therefore be posted at frequent intervals.

2 DETAILED ENVIRONMENTAL, HEALTH AND SAFETY ISSUES MONITORED

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	Responsibility for checking reports
Chautara road: Part 1: Benefits and their enhancement							
Upgrading of roadsides through bazaars, and Chautara bus station.	About 200 m drainage required at each of Sanga, Irkhu, Melchour bazaars; 1200 m ² of paving required at Chautara bus station, and 180 m ² at approach.	Covered drains and full width pavement have been done at bazaar areas. Sub-base laid at Chautara Bus Park.	Provision of drainage and pavements in the bazaar, and drainage and paving in the bus station.	Consultants/DoR have included in detailed design. Site engineering staff are to apply.	By the end of implementation, these provisions have been complied.	-	Checked and reported by consultant Environmental Specialist.
Condition of forests neighbouring the road continues to be enhanced throughout the project.	Approx. 3+ km of road runs through good quality forest before project and equal length of road runs through poor quality forest or scrubland before project.	Situation unchanged: no impact observed.	Liaison with the DFO. Strict contract clauses exclude any use of forests by contractor's personnel.	Contractors have responsibly abide by contract clauses. And the site engineering staff have applied contract provisions.	Throughout project.	-	Checked and reported by consultant Environmental Specialist.

Identified hazard	Baseline extent and severity (quantified indicators)	Checked extent and severity (THIS VISIT)	Mitigation measures	Responsibility for compliance	Timing of compliance schedule	Monitoring check schedule	Responsibility for reporting
Chautara road: Part 2: Hazards and their mitigation							
Quarrying of stone and red soil from roadside slopes, by DoR, local people and contractors not involved in road works.	Five quarrying sites (2+500, 9+600; 11+150 and 13+000; and 20+???) identified where quarrying is affecting the road before project.	No quarrying observed from road side slopes by any users at this stage.	Continue liaison with the DFO to stop quarrying from road side during the DLP.	DFO, supported by the DoR Project Manager and the Contractors' staff.	Throughout the DLP.	-	Checked and reported by consultant Environmental Specialist.
Quarrying of materials for project works gives rise to erosion, slope instability or other environmental damage, or a risk of it happening.	No pre-project contractor's quarrying sites and no induced erosion or instability.	Spoils have been dumped at 9+000	Take the spoils away to be tipped at designated site.	The Contractor is responsible for compliance during implementation.	Immediately.	-	Checked and approved by consultant Environmental Specialist.
Existing side-slope failures in both cut and fill slopes threaten the road and surrounding land.	Three slips at 2+200; 3+325-4+600; 4+600-5+000 respectively threaten road.	A number of side slips were observed throughout the road length.	The maintenance gangs are clearing these debris, however if inappropriate, bio-engineering and other appropriate slope protection and stabilisation measures to be used to rehabilitate problem sites.	The Contractor is responsible for compliance during implementation.	Works to be completed during the DLP	-	Checked and reported by consultant Environmental Specialist.
Bare fill slopes threaten erosion of the road edge and damage to surrounding land. Bare red soil areas between km 3+500 and 5+000 are especially problematic.	Bare fill slope sites extending to a total of approximately 1000 m ² with no significant erosion.	Bioengineering protection measures have been used in most of bare fill slopes. The mentioned problematic areas as mentioned in the baseline have been rehabilitated. However, replacement of the dead cuttings and grass slips is necessary at the onset of the next monsoon.	Bio-engineering protection measures to be used to rehabilitate all bare surfaces and areas of roadside erosion, as provided for in project designs.	The Contractor is responsible for compliance during implementation.	Not applicable	-	Checked and reported by consultant Environmental Specialist.
Tipping sites for excess spoil lead to instability of roadside land.	Not applicable.	The tipping site at 2+150 is ok and is causing neither roadside instability nor disturbing the private property.	Not applicable.	Not applicable.	Not applicable.	-	Checked and reported by consultant Environmental Specialist.
Improved road drainage leads to increased discharge at culvert and drain outfalls.	One culvert discharges into active gully at 4+450.	Improved road drains has certainly led to increased discharge whereas on contrary, a number of culverts have been blocked leading to overflow of water on to the paved surface (also refer to the text) and scouring the road edge at some places.	Simply open the blocked drains appropriately.	The Contractor is responsible for compliance during implementation.	Immediately	To be checked regularly and especially annually following monsoon rains throughout the DLP.	Checked and reported by consultant Environmental Specialist.
Increased danger to road users, pedestrians, vehicle passengers etc, from faster traffic speeds and greater traffic volumes.	14 injuries and 11 deaths reported among road users in the 5 years before the project.	After DBST the traffic speed had increased, and coupled with reckless driving the possibility of accidents has also increased.	Adequate warning signs, safety barriers and traffic calming measures (e.g. speed bumps in bazaars) are still necessary.	Despite reported that the Consultants/DoR have included these provisions in detailed design, no traffic calming measures have been placed in bazaars, it could still be done	Immediately	-	Checked and reported by consultant Environmental Specialist.

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