



## RAP3 Mugu-Humla Link Road Project, Nepal

PO 7626

# Technical Proposal: Implementation Phase

Department for International Development

March 2018

IMC Worldwide

# 1 Introduction

This proposal has been prepared in response to a request from DFID, received on 5<sup>th</sup> March 2018, to submit a revised technical and commercial proposal for the Implementation Phase of RAP3 Mugu Humla Link Road (MHLR) project. The design and preparation work for MHLR, including analysis of implementation options, survey and detailed design, has been carried out using funds from the RAP3 flexible fund. An Equipment Based Road Works (EBRW) Pilot under RAP3 will also feed into the MHLR Implementation Phase.

## 2 Objectives and Results

The main objective of the MHLR is to provide engineered fair weather earthen road access, including all associated stabilisation and drainage works, between Gamgadhi town in Chhayanath Rara Municipality (Mugu District) to Deuli village (Darma) in Chankheli Rural Municipality (Humla District) where it joins the RAP3 Sallisalla-Darma road. The total road length is now approximately 67km (not 65km as previously estimated), of which approximately 12km of track has been opened between Gamgadhi and Bama. The 4km section from Gamgadhi to the Mugu Karnali river crossing will be adopted under MHLR with improvement works in some locations. A few short sections of the remaining 8km may be adopted and improved, but in general the track will be abandoned and the land reinstated as the gap between the opened track and design standards is too great. Therefore, 63km will be new construction and 4km will be improved.

MHLR links into the main RAP3 LogFrame, contributing to the programme Outcome level indicators but with its own Output.

Contribution to **RAP3 Outcome level** indicators:

- 1 a) Number of people living along new road access catchment area (population in old VDCs through which the road passes), 9,921
- Targeted HH receiving minimum: 80 days per annum employment 1,297 (not targeted, all HH eligible)

The overall objective (Output) of MHLR is to provide a road connection between Gamgadhi and Darma. Because the road is in an area with very low population and a scarcity of locally available labour, heavy equipment will be used for most earthwork, quarrying and some transport activities. Labour will be used on structures. Unlike RAP3 Implementation, employment is treated as an input to this process rather than a specific output level target.

As on RAP3, the new construction **Output** can be further divided to reflect the works phases. These are 2m track opening, 4.5m track opening (full width)<sup>1</sup>, substantial completion which includes completion of structures and bio-engineering works, and finishing works which includes for outstanding work items, adjustments and additional features as recommended by the road safety and resilience audits carried out on substantially completed sections.

In order to minimise costs, in particular inflation of unit rates set by local government bodies, we have agreed to accelerate the works to ensure that substantial completion is achieved within two years rather than three.

Project implementation years run from September to August each year. Targets shown each year are cumulative. Brackets show where the target will have already been achieved in an earlier year.

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<sup>1</sup> Note in some places full width will be wider to accommodate structures, passing bays and curve widening. This additional widening will mostly be done during 4.5m track widening, but in some places where excavation may leave the side slopes vulnerable, excavation will be held until the RBG teams are available to work on the structures in that location.

Output	Overall Target	IY2 (31 August 2019)	IY3 (31 August 2020)
1 Km new road completed:	<b>67km</b>	<b>28km</b>	<b>67km</b>
a) 2.0m track opened	63km	<b>63km</b>	(63km)
b) 4.5m track opened, full width	63km	<b>39km</b>	<b>63km</b>
c) construction substantially complete	63km	28km	<b>63km</b>
d) adopted road section improvement complete	4km	<b>4km</b>	(4km)
e) finishing (post safety / resilience audit)	67km	0km	<b>63km</b>

## 3 Management and Financing Modalities

### 3.1 CONTRACT MANAGEMENT

The project will be solely funded and managed by DFID Nepal, though with appropriate consultation and coordination with central and local Government of Nepal (GON) bodies.

The Consultant (IMC Worldwide) will be responsible for overall project management including procurement and supplier management (including equipment contractors and locally sourced work force); setting out, supervision and monitoring of works; quality and safeguards management; progress and performance reporting; and all necessary training and capacity building necessary to execute the works in accordance with the contract, including the new requirements under the DFID Supply Partner Code of Conduct.

### 3.2 LIAISON WITH GON

The Government of Nepal is currently in a transition phase to its new Federal Structure.

At Central level, MOFALD has been absorbed into Ministry of Federal Affairs, Local Development and General Administration (MOFALDGA) and DOLIDAR into the Ministry of Physical Infrastructure and Transport (MOPIT).

At Province level, the road falls entirely within Province 6, recently named Karnali Province with its headquarters in Birendranagar (Surkhet). The Province level government has only recently been formed. They will be directly involved in the forestry management aspects of MHLR implementation.

At local level, MHLR passess through the Chhayanth Rara Municipality (Nagar Palika) on the Mugu side and Chankheli Rural Municipality (Gaun Palika) on the Humla side. Both municipalities and associated District Coordination Committees were consulted in drawing up this technical (and commercial) proposal.

In terms of local level management, two types of committees are formed for rural road projects, including RAP3:

- ❖ Local Road Users' Committee (LRUC): formed for each road in the district and responsible for road construction administration and the payment of wages. LRUCs are typically formed from representatives of each Road Building Group (RBG). Meetings are held monthly to manage their affairs and for payment collection and distribution. They also help in the distribution and

management of tools and small equipment among RBGs. The LRUC has no physical base, holding meetings along the road as suits its members. It operates within the bounds of a form of agreement with the project.

- ❖ Local Road Coordination Committee (LRCC): a local level committee of manageable size representing municipalities through which the MHLR passes. The committee will provide an essential mechanism for local stakeholder engagement in public meetings and audits and helping resolve grievances especially relating to land and alignment disputes.

### 3.3 PROJECT MANAGEMENT

The MHLR project will adapt the existing technical and management manuals of RAP3, making changes as necessary to reflect the different construction approach, introducing improvements as opportunities are identified and ensuring DFIDs updated Code of Conduct and Contract Terms and Conditions are fully integrated. The consultant is responsible for all aspects of the project's design, build and management including works and safeguards, supplier management, quality assurance, personnel management, financial management, performance management and risk management.

Planning and reporting will tie in with the GON calendar year. The project implementation years will run from September to August to reflect the standard construction season starting at the end of the monsoon season and with bio-engineering on completed structures at the start of the next monsoon season.

### 3.4 VALUE FOR MONEY

A number of significant changes have been made to the project's management and financing strategies that provide opportunities to introduce new Value for Money savings or added value, despite significant increases in the works cost estimate on the Humla side. The most significant of these relate to the change from joint GON funding to DFID sole funding arrangements and the reduction in works implementation period from three to two years. Annex 1 provides a narrative of the key Value for Money initiatives contained in our proposal, for which monetary values are assigned in Proforma 6 of the Commercial Response.

## 4 Methodology

### 4.1 CONSTRUCTION

Due to the lack of locally available labour along the route, a combined equipment and labour based approach was developed during the design phase. This relies on the use of excavators for all earthworks and quarrying works, use of tractor trailers for transporting bulky or heavy items over longer distances, and the use of labour for structures and bio-engineering works. Where possible, labour will be locally sourced from households living along the route, however, to accelerate the works we will need to recruit additional labour. We will attempt to source this from other Karnali districts. Where possible, we will transfer RBG and SBG members from the RAP3 roads when their work is completed, to gain the benefits of their previous training and experience.

The Equipment Based Road Works (EBRW) Pilot will build a pool of trained and experienced operators. As the pilot closes, we will carry out a local competitive procurement process through the two Municipalities to select small contractors to complete the equipment based works. The excavators will start by opening a 2m track along the full length of the road to enable the excavators to reach and work simultaneously at different work sections.

Once in place, the excavators will complete the earthworks across the full road width of 4.5m, plus the additional width as needed for structures and passing bays. This will be managed under very strong control of the central and site teams to ensure health and safety, environmental, social and other safeguards

management. At the same time, RBGs/ SBGs will follow the excavators to build the structures. We will employ as many RBG /SBGs as necessary to keep up with the excavation works, protecting the opened slopes with structures as soon as possible to protect them against slope failure during the works. Ideally the excavation will include the additional width needed for structures and additional features such as passing bays, but in some places where excavation may leave the side slopes vulnerable, wider excavation may be held until the labour gangs are available to work on the structures in that location. As the road nears full completion, we will conduct technical, road safety and resilience audits to identify any adjustments or additional features required, which will be completed as part of the finishing works. Also extra care will be ensured to improve the quality of the challenging 0km-4km section already built.

## 4.2 SAFEGUARDS

The safeguards management plan builds on the environmental management plan approved by GON in the Environmental Impact Assessment undertaken by RAP3. Additional mitigation measures include those relating to the use of heavy equipment for earthworks, enhanced measures for worker safety and duty of care responsibilities, building on lessons learned from RAP3 and the Safety Knot scoping study, and additional measures for worker welfare in the difficult conditions along the road, especially in the Chankheli section.

Most mitigation / enhancement actions can be addressed within the regular works implementation, though some will need additional effort or special initiatives that will be addressed through peripheral activities.

## 4.3 SUSTAINABILITY

Sustainability has been incorporated in the MHLR Project from its inception, through the planning and design phases. This will continue through the implementation (construction), operation and decommissioning phase and into the decommissioning.

Our approach to sustainability builds on four Key Principles<sup>2</sup>:

Key Principle	Operational Principle	MHLR measures
Environmental Sustainability	Environmental measurements, targets, limits	Carbon footprint Forest management Environmental management Bio-engineering
Socio-economic sustainability	Socio-economic measurements, targets, limits Respect people and human rights	Development impact of road access Capacity Building Worker welfare, health and safety Social safeguards management
Intergenerational stewardship	Long term sustainability plans All stages of life cycle	Maintenance planning Capacity Building
Complex systems	Deal with uncertainty Integrate working roles and disciplines	Risk Management Integrated teams and plans.

<sup>2</sup> Reference: Sustainable Infrastructure: Principles into Practice, Ainger and Fenner, ICE Publishing, 2014.

### **4.3.1 ENVIRONMENTAL SUSTAINABILITY**

Whilst heavy equipment is considered to have a more negative impact on the environment than labour based methods, this may not be the case on MHLR where the impact of labour camps and the associated problems of transporting all supplies to site, use of wood for cooking fires, and waste disposal will be significant. A carbon footprint study is being conducted under the RAP3 EBRW Pilot to assess these impacts. The study will compare the use of heavy equipment in place of labour and assess the proposed MHLR forest management and bio-engineering programme.

As the MHLR alignment passes through dense forest, approximately 14,000 trees will be felled for construction. These will be replaced at a ratio of 1:25 meaning that approximately 350,000 new tree saplings will be planted. This will be done directly through the existing Community Forest User Groups and the District Forest Office (or its replacement).

The works also use bio-engineering to stabilise slopes and small structures, which is a more sustainable long term solution than other higher tech solutions.

### **4.3.2 SOCIO-ECONOMIC SUSTAINABILITY**

It is anticipated that the MHLR will have significant positive socio-economic benefits both during and after construction for the roadside communities and for the wider population served by the road. The impacts during construction will be monitored and reported by the safeguards team. The RAP3 Baseline and Mid-Term Evaluation reports produced by the RAP3 MEL consultants will be used to provide a baseline for MHLR.

The MHLR construction works includes a number of training / capacity building initiatives essential to completing the works on time, within budget and to the quality standards required. These activities will also build longer term socio-economic sustainability by building the capacity of local government and the private sector / communities to implement future maintenance works on MHLR and to better manage and implement improvement or new construction works on their wider road network.

It is clear from site visits and socio-economic studies in the area the MHLR passes through that the population from which we will draw our labour from suffers from lack of services and facilities which affects their food security and health status. In order to ensure our workforce is able to work with the effort required to complete the works, we will need to manage both food supply and access to health services to minimise the loss of worker days by RBGs / SBGs and to maximise the wage incomes to locally recruited workers. As mentioned above, we will also need strong management of social safeguards linked to imported labour and labour camps.

### **4.3.3 INTERGENERATIONAL STEWARDSHIP**

In this time of Federal restructuring, the long term stewardship of the local road network is still uncertain. We will work with the local authorities and local communities to instil a sense of local ownership of the MHLR, strengthened by using local workers as RBG members and engaging local authorities in the management of the road works and public audits.

We will support the Municipalities, and if appropriate the District and Provincial level authorities, to develop appropriate maintenance plans. The maintenance plan and training will include for a Winterisation programme that protects the road from damage due to ice and snow during the winter months and water damage during thawing. The Winterisation programme will also seek to minimise the duration of winter road closures due to snow and ice, through snow shovelling and salting / gritting.

Road Maintenance Groups (RMGs) for routine maintenance and Special Maintenance Groups (SMGs) for future periodic maintenance or for routine maintenance in the more remote locations can be formed from the trained and experienced RBG members. These winter maintenance techniques will be developed and tested in the winter of 2019 during the construction works.



#### 4.3.4 COMPLEX SYSTEMS

We have proposed an interdisciplinary team to manage MHLR implementation with a number of sub-teams integrating engineering and safeguards aspects of the project. The Project Field Manager will be responsible for managing the engineering and safeguards aspects of the project through the district team leaders<sup>3</sup> and safeguards officer. Each road section will be managed by a Section Engineer who will be responsible for managing the social mobilisers and inspectors of works to deliver the works in accordance with all aspects of the project requirements – work plan, quality standards, safety, safeguards, budgets.

The MHLR project will apply the same risk management approaches as on RAP3. The operational risks on MHLR are significantly greater than on RAP3, especially now that the construction period has been reduced to two years and we are using small scale contractors with limited practical and management experience rather than a larger single contractor with a pool of operators and mechanics at their disposal. These can be managed, within reason, through better advance planning and adaptive management; logistics, inventory and supply chain management; and a stronger focus on building integrated teams with a strong sense of ownership and responsibility for delivering the MHLR. The proposed MHLR team will already be well established by the start of this implementation phase contract as they will be delivering the RAP3 EBRW Pilot before being transferred to MHLR on contract start. Their experience on EBRW Pilot should have built a strong team bond and have ironed out many of the concerns we have relating to the capacity and reliability of the excavator owners and operators. In preparing this technical and commercial response, we have stripped out all cushions normally used to help manage operational risks to provide the lowest price and best value tender to DFID. It would be prudent, therefore, for DFID to put in place their own mitigation measures, such as provision for contract time and cost extensions, that could be deployed if needed to manage any delays or cost overruns associated with external events outside of the control of the MHLR team which cannot be absorbed within the contract. Examples of major external risk events that affected RAP3 implementation included GON imposed work stoppages due to outbreak of communicable diseases and political unrest, extended highway closures due to heavy snow, extended border and highway closures due to political unrest (6 month blockade).

## 5 Work Plan

A simplified overview of the work plan shown below, with the detailed work plan in Annex 2.

The assumed start date of the MHLR Implementation Phase is 1<sup>st</sup> September 2018. The construction phase is two years, with road completion by the end of August 2020. It is likely that the construction works will continue right up to this end date. The work plan therefore shows a 3 month period from September to November 2020 in which a skeleton team will be responsible for any remaining works measurement and payments, disposal or handover of project assets and closure of site and project offices.

The bio-engineering works can only take place during the monsoon season and so the bio-engineering for the road sections where structures are completed after July 2020 can only be started from June 2021. These sections should be reasonably short and rather than retain a team to implement these works, we will train local workers and the Municipality officers so that these Bio-engineering works can be carried out by Special Maintenance Groups (SMGs) under a Municipality contract. The works can be funded by DFID through a similar arrangement as was used for the Defects Liability Payments (DLP) of the RAP2 Bridges in Eastern Nepal, where the funds were used to fund a Bank Guarantee which then paid the contractor's retention payment on completion of the DLP after one year.

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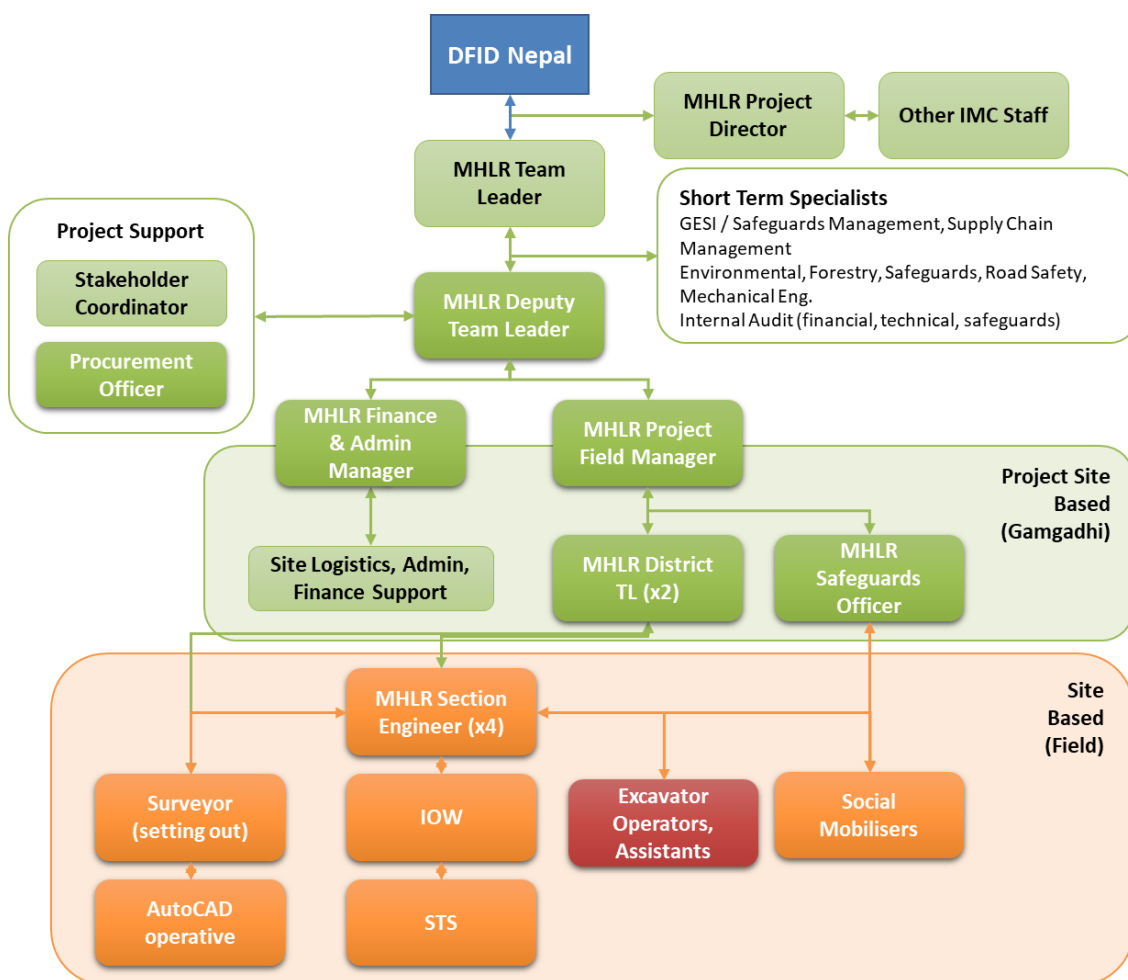
<sup>3</sup> We are aware this is no longer an appropriate title, but it follows the RAP3 convention and a suitable replacement term has not yet been agreed.

Work Plan Overview	2018		2019				2020				2021	
	IY1		IY2				IY3					
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	SON	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON	DJF	MAM	JJA
<b>Planning, Design, Procurement</b>												
Procure, mobilise Contractors												
<b>Works</b>												
Improvement Works 0-4km												
Forest Clearance Works												
New Works 2m Track Opening												
New Works 4.5m Track Opening												
New Works Structures												
Finishing Works												
Bio- Engineering												
<b>Completion, Handover</b>												
Maintenance planning, training, handover												
<b>Safeguards</b>												
Road safety, resilience audits												
Safeguards Plans, Systems												
<b>Sector Development</b>												
Post RAP3 local GON support												

## 6 Personnel

### 6.1 TEAM STRUCTURE

The proposed team structure is shown in the diagram below.





The Key Personnel for contractual purposes are:

- ❖ MHLR Team Leader, Kirsteen Merrilees
- ❖ MHLR Deputy Team Leader, Ram Prasad Thapaliya
- ❖ MHLR Project Field Manager, Bishnu Ram Bista
- ❖ MHLR Finance & Admin Manager, Suman Khatri

# Annex 1: VfM Narrative

## Works Cost Estimates

Since the last proposal submission, a number of factors resulted in significant increases in the works cost estimates for the Humla side. These included

- a 24% increase in wage rates in Humla District (rather than the 9% we had provided for),
- the need to slightly increase the distance between hairpin bends to achieve design standards for longitudinal gradients – whilst these are very small increases at each bend, the cumulative effects are to increase the road length by 2km (7.4% increase) and to increase the height and cost of the retaining structures (an approximate 27% increase in costs)
- the combined effect of these changes led to an almost 50% increase in the cost estimate for the Humla side construction works (in the order of £3 million).

We managed to offset a large portion of this increase by

- reducing the contingencies built into the cost estimate - these had been included due to the uncertainty inherent in the cost estimate prepared before the engineering survey and detailed designs were complete
- reducing the inflation rate for Humla side in FY 2018-19 to reflect the huge increase given this year. As on RAP3 we should be able to negotiate a cap on local level inflation rates for FY2018-19 with the Municipalities
- reducing some cost items in the engineer's estimate where these are not essential to meet standards
- these combined savings enabled us to reduce the increase in the works cost estimate to £1.6 million or about 27% of the Humla side construction costs (an equivalent Saving of £1.4 million or 30% of the increased cost estimate)

## Change in funding modality

The proposal submitted under the joint GON funding modality had included provision to pay VAT on the GON share of the works costs, approximately £0.44 million had been set aside for this. On top of this a Risk Factor of £0.57m had been included in the proposal to cover potential risks relating to GON payments – late payments, reduced payments, etc. Now that the project is funded solely by DFID, these items are no longer needed and provides a direct saving of £1.01 million.

## Accelerating Construction Works

After making the above savings, the total project budget estimate was greater than the previously defined £16 million budget. We knew that this would be unacceptable to DFID and sought an 'out of the box' solution. It was clear that the effects of inflation over three years added a significant margin to the base year cost estimates, so logically, if we couldn't find another way to reduce costs, the only remaining solution was to reduce the time for works implementation to minimise the amount of works carried over into the third year. Further analysis showed that the only way to reduce the costs sufficiently for DFID to continue funding was to deliver the construction works in two years rather than three. This provided a further VfM saving of £1.1 million. To achieve this we will need to mobilise higher numbers of excavators and labourers than our previous plans. There are negative impacts associated with this change in approach, in terms of a reduction of the labour payments going into the hands of the people living along the road, but the population along the road is small and the benefits of opening the road quicker will probably outweigh the loss in local wage income. The total wage income to the region will remain the same. The ability to absorb external risk events within such a short project duration will also decrease.

### **Piggy backing on RAP3**

Whilst the above VfM issues provide the biggest savings, a number of smaller VfM savings can be provided by IMC Worldwide that other consultants could not. This is because of their ability to share facilities and costs with RAP3 to avoid or minimise the standard project start-up costs, and because they have selected a team already familiar with each other and the RAP3 management systems and technical approaches. Examples include:

- a. Sharing the Kathmandu office and support services avoids the need to
  - a. rent a new office,
  - b. purchase or hire new office equipment and furniture, or
  - c. hire additional staff to deal with office support, logistics and travel.
- b. Sharing the IT network in the IMC office in Kathmandu avoids the need to
  - a. Purchase a new network and email server and install a network for printers
  - b. Establish new ISP, email and IT support services
- c. Transferring a team that is already familiar with and experienced in using existing management systems and project procedures avoids the need to
  - a. Use staff inputs to develop and learn new systems rather than get on with the real job in hand
- d. Transferring existing RAP3 software and licenses minimises the cost of additional and renewal of software licenses.

## Annex 2: Detailed Work Plan

