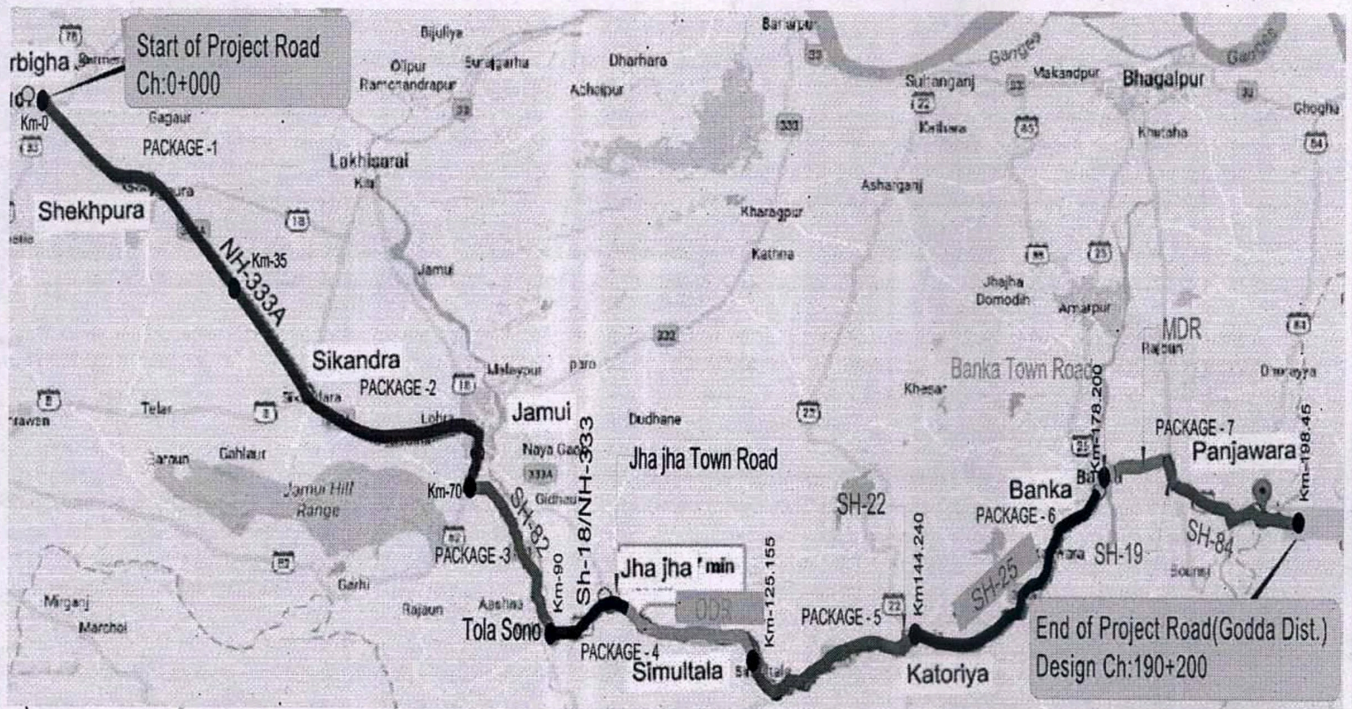


5/20/2021

COST BENEFIT ANALYSIS



PWD, NH Division, BIHAR
MINISTRY OF ROAD TRANSPORT AND HIGHWAYS

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COST BENEFIT ANALYSIS

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Name of the Project: Upgradation of National Highway (NH-333A) starting from its junction with NH-33 near Barbigha connecting Sheikhpura - Sikandra – Jamui, Jhajha - Banka - Panjawara - Bihar/Jharkhand border in the state of Bihar to two/four lane with paved shoulder configuration.

Nature of Proposal: Diversion of 162.010 Ha of forest land under FCA, 1980 for road construction.

Purpose: The Cost of Benefit Analysis is being undertaken for proposed Diversion of Forest land being affected due to Development of NH-333A.

Total length of the road along the PF/RF

Under protected Forest start near NH 33 at Barbigha and ends at Bihar Jharkhand Borde passing through Sheikhpur, Lakhisarai, Jamui & Banka forest division. Total length= 190.200 km approx.

Total Forest area proposed for diversion

Under protected Forest NH 33 at Barbigha and ends at Bihar Jharkhand Borde passing through Sheikhpur, Lakhisarai, Jamui & Banka forest division. Total forest area= 162.010 Ha.

Table A

[As per MoEF&CC guidelines for conducting Cost Benefit Analysis vide file no. &-69/2011-FC(Pt.) dated 1st August, 2017]

Sl. No.	Parameters	Applicable/not applicable	Remarks
1	All categories of proposals involving forest land up to 20 Hectares in plains and up to 5 Hectares in hills.	Applicable	The proposed project involves 162.010 Ha of forest land. Hence, the CBA is applicable.
2	Proposals for defence installation purposes and oil prospecting (Prospecting only)	Not applicable	No such area is involved in the project.
3	Habitation, establishment of industrial units tourist lodges/complex and other building construction.	Not applicable	No such activities are involved in the project.
4	All other proposals involving forest land more than 20 ha in plains and more than 5 ha in hills including roads, transmission lines, minor, medium and major irrigation projects, hydel projects,	Applicable	The proposed project involves 162.010 Ha of forest land. Hence, the CBA is applicable.

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Sl. No.	Parameters	Applicable/not applicable	Remarks
	mining activities, railway lines, location specific installation like micro-wave stations, auto repeater controls, towers etc.		

Table B: Estimation of cost of forest diversion

[As per MoEF&CC guidelines for conducting Cost Benefit Analysis vide file no. &-69/2011-FC(Pt.) dated 1st August, 2017]

S. No.	Parameters	Remarks
1	Ecosystem services losses due to the proposed forest diversion	The proposed forest area to be diverted is mostly characterized by dry deciduous forest. According to MoEF&CC Guidelines for diversion of forest land for non-forestry purposes under Forest (Conservation) Act, 1980- and Guidelines for collection of Net Present Value (NPV) dated 05.02.2009, the area comes under Class III type of Open forest. Considering open forest, an average value of Rs. 6,26,000/- can be considered per hectare. Hence, the total NPV for the diverted project shall be Rs. 101418260/- i.e Rs. 10.14 Crores (approx.)
2	Loss of animal husbandry productivity, including loss of fodder	10% of NPV i.e. Rs. 10141826/- (Rs. 1.014 Crores.)
3	Cost of human resettlement	No resettlement in the forest land that are diverted for the project
4	Loss of public facilities and Administrative (road, buildings, schools, dispensaries, electric lines, railways etc.) on forest land or which would require forest land if these facilities were diverted due to the project.	No R&R Involve in forest land
5	Possession value of forest land diverted	30% of the NPV i.e. Rs. 30425478/- (Rs. 3.042 Crores)
6	Cost of suffering to outstees	There are no outstees involved in the forest area. However, the final recommendation shall be made after the R&R

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S. No.	Parameters	Remarks
		survey is completed.
7	Habitat Fragmentation cost	50% of the NPV i.e. Rs. 50709130 /- (Rs. 5.070 Crores)
8	Compensatory afforestation and soil & moisture conservation cost	The compensatory afforestation will be taken up in about 324.02 ha of Degraded Forest land which is about two times of the area proposed to be diverted. The compensatory afforestation cost will be Rs. 129608000 (12.960 Crores) @ INR 400000 per ha.

The total estimated cost of forest diversion = Ecosystem services losses+ Loss of animal husbandry productivity+ Cost of human resettlement+ Loss of public and Administrative facilities+ Possession value of forest land diverted+ Cost of suffering to outstees+ Habitat Fragmentation cost+ Compensatory afforestation and soil & moisture conservation cost.

Hence, the total cost of forest diversion comes out to be Rs. 101418260/- + 10141826/- + 30425478/- + 50709130 /- + 129608000= Rs. 322302694/-

Table C: Existing guidelines for estimating benefits of forest-diversion in CBA

[As per MoEF&CC guidelines for conducting Cost Benefit Analysis vide file no. &-69/2011-FC(Pt.) dated 1st August, 2017]

S. No.	Parameters	Remarks
1	Increase in productivity attributable to the specific project.	The proposed project doesn't involve any manufacturing or production. Hence, this section is not applicable.
2	Benefits to the economy due to the project	<p>Currently an average daily traffic on the existing route is 4168 PCU.</p> <p>The current route between Barbigha and Banka measures about 198.450 Kms following the existing route without bypasses.</p> <p>Current Scenario- Distance= 198.450 Kms Fuel used per PCU=19.845 litres (@10 Km/litre) Cost per PCU= Rs. 1587.6 per PCU per day Total Cost= Rs. 6617116.8 per day= Rs. 4830495264 for 2 years.</p> <p>Modified Scenario- Distance= 190.200 Kms Fuel used per PCU=12.68 litres (@15 Km/litre) Cost per PCU= Rs. 1014 per PCU per day Total Cost= Rs. 4228019/-per day= Rs. 3086454016/- for 2 years.</p>

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S. No.	Parameters	Remarks
		Thus total amount to be saved in 2 years= Rs. 1744041248/-
3	Number of population benefitted due to the project	<p>Population of surrounding districts Sheikhpura (6,36,342), Lakhisarai (10,00,912), Jamui (17,60,405) & Banka(2,034,763) will get benefitted due to proposed development.</p> <p>In addition to the above, the man hours required for the commuters to travel the existing route shall be reduced by 8.3 km.</p> <p>Current scenario Distance= 198.450 Kms Time required= 4.4 hours(@45 Kms/hr) Total man hours= 4.4x4168x4= 73524 man hours per day= 44114112 man hours for 2 years (300 working days/year).</p> <p>Modify scenario Distance= 190.200 Kms Time required= 2.4 hours(@80 Kms/hr) Total man hours= 2.4x4168x4= 39638 man hours per day=23782608/- man hours for 2 years (300 working days). Hence, a total of 20331504 man hours shall be saved by the construction of the project.</p> <p>As per Business world, the average per capita income in the year 2019-20 was estimated to be Rs. 34413/- per year i.e. Rs. 14.3 per hour.</p> <p>Hence, monetarily a total amount of Rs. 291528353/- shall be saved in terms of man hours by the project in two years.</p>
4	Economic benefits due to direct and indirect employment of the project	<p>Assuming 1294 number of manpower for the project length for 2.5 Years of construction period. The man days of 1294 persons x 25 working days/month x 30 month = 970500 Man days. Employment will be given by the Contractor during Construction..</p> <p>Hence, monetarily the project shall generate employment worth of Rs. 294919216.</p>
5	Economic benefits due to Compensatory afforestation	<p>In lieu of total trees to be affected in forest land it is proposed to be undertake at least twice of the affected trees as compensatory afforestation as per Forest (Conservation) Act. So the net productivity will increase. Apart from compensatory plantation.</p>

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S. No.	Parameters	Remarks
		<p>The compensatory afforestation will be done in 324.02 ha of degraded forest land, which is down the line would be having a density of minimum 0.4. The ecological value for a 50 years period for the density of 1.0 is INR 126.74 lacs per hectare. By considering minimum density as 0.4 gains in density, the ecological gain for this project would be INR Rs. 1642651792 Lakh down the line.</p> <p>The compensatory afforestation will be added later after receiving from DFO.</p>

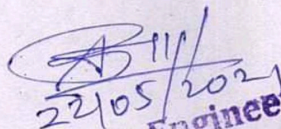
The total estimated benefits of forest diversion = Increase in productivity+ Benefits to the economy due to the project + Number of population benefitted due to the project + Economic benefits due to direct and indirect employment of the project + Economic benefits due to Compensatory afforestation

Hence, the total Environmental Benefit of forest diversion comes out to be Rs. 1744041248/- + Rs. 291528353/- + Rs. 294919216/- + Rs. 1642651792 = Rs. 3973140609/-

Therefore, Cost benefit Ratio = Total Environmental Benefits/Total cost of the environment
 $= 322302694/3973140609 = 12.3 > 1$

Hence, Project is found viable.

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 22/05/2021
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