# COST BENEFIT ANALYSIS IN ACCORDANCE WITH GOI FC GUIDELINES NO-7-69 / 2011-FC DATED 01-08-2017

**Name of Project: Development of Economic Corridors, Inter Corridors, Feeder Routes and National Corridors to improve the efficiency of freight movement in India under Bharatmala Pariyojana, [Lot-3/Chhattisgarh/Package-1(Bilaspur - Urga Section)]**

**Nature of Proposal: Diversion of 47.552 ha of Forest land under FCA, 1980 for road construction**

**Purpose:** The cost Benefit Analysis is being undertaken for proposed Diversion of Forest Land being affected due to Development of Economic Corridors Inter Corridors, Feeder Routes and National Corridors to improve the efficiency of freight movement in India under Bharatmala Pariyojana, [Lot-3/Chhattisgarh/Package-1(Bilaspur - Urga Section)]

**Total Length of the road along PF / RF**

| | | |
|---|---|---|
| Under Janjgir Champa Forest Division | = | 10.348 km approx. |
| Bilaspur Forest Division | = | 00.289 km approx. |
| **Total Length** | = | **10.637 km approx.** |

Number of districts involve- 02

Number of forest division involve: 02

| S. No. | Forest Division | Proposed Area (ha) |
|---|---|---|
| 1. | Janjgir Champa | 46.781 |
| 2. | Bilaspur | 0.771 |
| | Total Length | 47.552 |

**Guidelines for conducting cost-benefit analysis for projects involving forest diversion**

i. While considering proposal for diversion of forest land for non forestry use, it is essential that ecological and environmental losses and eco economic distress caused to the people who are displaced are weighted against economic and social gains.

ii. Whenever the forest land is involved in the development projects, the cost of ecosystem services and fragmentation of habitat of wildlife and economic distress caused to the people dependent on forests and the cost of settlement of people dependent on forest should also be added as the cost of forest diversion in addition to the standard project cost which would have been incurred by the user agencies without involvement of forest land while conducting the cost benefit analysis of the project. Similarly, the benefits from the project accruing due to diversion of forest land and used in the project should also be accounted for in the benefits component in addition to the standard benefits of the project which would have been accrued without involvement of forest land while conducting the cost benefit analysis and determining the benefit and cost ratio (BC ratio).

iii. The cost of Compensatory afforestation and its maintenance in future and soil & moisture conservation at present discounted value and future benefits from such compensatory afforestation accruing over next 50 years monetized and discounted to the present value should be included as cost and benefits respectively of compensatory affrestation while conducting the cost benefit analysis and determining the benefit and cost ratio (BC ratio).

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iv. **Table A** list the details the types of projects involving forest land for which cost benefit analysis will be required, **Table-B** Lists the parameters according to which the cost aspect of forest land diverted for the development projects will be determined, while **Table C** lists the parameters for assessing the benefits accruing to the project using forest land.

v. A cost benefits analysis as above should be accompanied the proposals sent to central Government for forest clearance under the Forest Conservation Act.

**Table A: Cases under which a Cost -benefit analysis for forest diversion are required**

| Sl. No. | Nature of Proposal | Applicable/Not Applicable | Remarks |
|---|---|---|---|
| 1 | All Categories of proposal involving forest land up to 20 hectares in plains and up to 5 hectares in hills | Not Applicable | These proposals may be considered a case to case basis and value judgments. |
| 2 | Proposed for defense installation purpose and oil prospecting only | Not Applicable | In view of national priority accorded to these sectors, the proposal would be critically assessed to help ascertain that the utmost minimum forest land is diverted for non forest use |
| 3 | Habitation, establishment of industrial units, tourist lodge complex and other building construction | Not Applicable | These activities being detrimental in protection and conservation of proposals would be rarely entertained. |
| **4** | **All other proposal involving forest land more than 20 hectares in plain and more than 5 hectares in hills including roads, transmission line, minor, medium and major irrigation projects, hydro projects, mining activity, railway line, location specific installations like microwave stations, auto repeater centers, TV tower etc.** | **Applicable** | **These are cases where a cost benefit analysis is necessary to determine when diverting the forest land to non forest use in the overall public interest.** |

**Since, the proposal is for diversion of forest land measuring more than 20 hectare in plain area for the road project, cost benefit analysis report is applicable**

**Table B: Estimation of Cost of forest diversion**

| S. No | Parameters | Given Guideline | Evaluation |
|---|---|---|---|
| 1 | Ecosystem services looses due to proposed forest diversion | Economic value of loss of ecosystem services due to diversion of forest shall be the net present Value ( NPV) of the forest land being diverted as prescribed by central Government ( MOEF & CC )<br>Note: In case of National parks the NPV shall be ten (10) times the normal NPV and in case wildlife Sanctuary the NPV shall be five (5) times the normal | NPV value has been taken as Rs 6.26 lakhs per hectare<br><br>Therefore losses = **6.26X47.552= 297.67552 Lakhs** |

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| | | | |
|---|---|---|---|
| | | NPV or otherwise prescribed by the ministry or any other competent authority | |
| 2 | Loss of animal husbandry productivity, including loss of fodder | To be quantified and expressed in monetary terms or 10% of NPV applicable whichever is maximum | Loss of Animal husbandry due to proposed diversion is very moderate and calculated below:<br><br>Gross loss @ 5ton/Ha/Year @ Rs. 100/- per tonne. Therefore, loss of fodder as estimated for about 47.552 hectare will be 47.552 x 5 x 100 x 100 years = Rs. 23,77,600.00 (Rs.23.7766 lakhs)<br><br>10% of NPV<br>=10 % of NPV (297.67552)<br>=29.76755 lakhs.<br><br>So considered amount is **Rs 29.76755 Lakhs.** |
| 3 | Cost of human resettlement | To be quantified and expressed in monetary terms as per approved R & R plan. | **NIL**<br>No resettlement in the forest land that are diverted for the project. |
| 4 | Loss of public facilities and administrative infrastructure (Roads, buildings School, dispensaries, electric lines, railways etc) on forest land, or which would require forest land if these facilities were diverted due to the project. | To be quantified and expressed in monetary terms on actual basis at the time of diversion. | No loss of public facilities and administrative infrastructure on forest land.<br>The public facilities and administrative infrastructures falling on the diverted forest land will be shifted by project proponent. |
| 5 | Possession value of forest land diverted | 30% of environment costs ( NPV) due to loss of forests or circle rate of adjoining area in the district should be added as a cost component as possession value of forest land whichever is maximum | The circle rate of adjoining area in the district is about 70 Lakhs per hectare. The amount of 47.552 ha will be 47.552 x 70 = 3328.64 lakhs.<br>Whereas, 30 % of NPV is **89.3026**(=0.3X297.67552) lakhs. Which is less than 70 lakh per hectare.<br><br>Therefore, Procession Value of forest land will be **3328.64 lakhs** |
| 6 | Cost of Suffering to oustees | The social cost of rehabilitation of Oustees ( in addition to the cost likely to be incurred in providing residence, occupation and | **Nil** as no Resettlement and Rehabilitation is required in forest land proposed to be diverted. |

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| | | | |
|---|---|---|---|
| | | social services as per R & R plan) be worked out as 1.5 times of what oustees should have earned in two years had he not been shifted | |
| 7 | Habitat fragmentation Cost | While the relationship between fragmentation and forest goods and services is complex, for the sake of simplicity the cost due to fragmentation has been pegged at 50% of NPV applicable as a thumb rule. | Habitat fragmentation Cost is 50 % of NPV i.e 0.5 X 297.67552 = **Rs 148.83776 Lakhs.** |
| 8 | Compensatory afforestation and soil & moisture conservation cost | The actual cost of compensatory afforestation and soil & moisture conservation and its maintenance in future at present discounted value | Total 95.104 Hectare of degraded forest land which is about two times of the forest area proposed for diversion has been proposed for CA in lieu of 47.552 ha forest land. Cost of CA is **Rs. 695.08 Lakhs** |

**Table C: Existing Guidelines for estimating benefits of forest land diversion in CBA**

| S. No | Parameters | Given Guideline | Evaluation |
|---|---|---|---|
| 1 | Increase in productivity attributable to the specific project | To be quantified and expressed in monetary terms avoiding double counting | The proposal for which diversion of forest land is sought is for Development of Economic Corridors Inter Corridors, Feeder Routes and National Corridors to improve the efficiency of freight movement in India under Bharatmala Pariyojana, [Lot-3/Chhattisgarh/Package-1(Bilaspur - Urga Section)].<br>The project road will improve accessibility to the region. This will help in both economic & social development in the region.<br>The project will enable smooth accessibility in the region by which people of the region will be directly benefitted. This will accelerate industrialization /commercialization in region and the same will directly generate employment opportunities in these areas and boosting up the economy of the region and the state. Again, directly the project will have the potential for employment generation for local people 225649 man days during the construction period. The proposed project does not involve any manufacturing or production. Hence, This section is not applicable. Monetary benefits due to increase in productivity is **NIL.** |
| 2 | Benefits of economy due to the specific project | The incremental economic benefit in monetary terms due | Economic benefit in terms of increase in trade, saving in vehicular operation and maintenance cost, better connectivity, |

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<table>
<tr><td></td><td></td><td>to the activities attributed to the specific project.</td><td>safer journey to commuter and saving of travel time. Improved road connectivity helps in better implementation and management of government schemes. It will provide last and economical transport of goods, after completion of project, the local people and industries situated in the area will be greatly benefited. The widening of project road will provide safe and fast, economical and environment friendly transportation to the State, which in term will accelerate the rate of growth in this area.<br><br>Average Annual Daily Traffic = 18126 Passenger Car Unit (PCU).
<table>
<tr><th>Current Scenario</th><th>Modified Scenario</th></tr>
<tr><td>Present Distance = 87.5 Km<br>Average Fuel Economy = 20 km/litre<br>Total fuel consumption = 87.5/20 = 4.375 litre/km</td><td>Distance after development = 70.200 Km<br>Average Fuel Economy = 20km/litre<br>Total fuel consumption = 70.200/20 = 3.51 litre/km</td></tr>
<tr><td colspan="2">Fuel saving = 4.375-3.51 = 0.865 litre/km<br>Average fuel cost = 75 rupee per litre<br>Fuel saving on 18126 PCU = 0.865 x 18126 = 15678.99 Litre per day<br>Savings (in monetary terms) = 15678.99 x 75 = 1175924 Rupees per day (Rs. 11.76 lakhs)<br>Total benefits in 5 years (5*365.4=1827 days)<br>= 1827 x 1175924= 2148413604<br>= 21484.14 Lakhs</td></tr>
</table></td></tr>
<tr><td>3</td><td>No. of population benefited due to specific project</td><td>As per the detailed project report</td><td>Population of surrounding districts Korba (1,206,563), Janjgir Champa (1, 317, 431) and Bilaspur (2,663,629) will be benefitted due to proposed development.</td></tr>
<tr><td>4</td><td>Economic benefits due to of direct and indirect employment due to the project.</td><td>As per the detailed project report</td><td>A total of 225649-man days employment will be generated during construction phase for skilled/unskilled labour.<br>Average wages inclusive of all cost of living is Rs. 500 per day.<br>Total financial implication will come out to be = 225649 X 500= Rs 1128.25 Lakhs</td></tr>
<tr><td>5</td><td>Economic benefits due to Compensatory Afforestation</td><td>Benefits from such compensatory forestation accruing over next 50 years monetized and discounted to the present value should be included as benefits of</td><td>In lieu of total trees to be removed from the proposed Row in forest land along the project road, it is proposed to undertake at least twice of affected area as Compensatory afforestation as per Forest Conservation Act, 1980 to increase the net productivity.<br>The Compensatory Afforestation will be done in 47.552 X 2= 95.104 hectare of</td></tr>
</table>

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| | | | |
|---|---|---|---|
| | | compensatory afforestation. *For benefits of CA the guideline of the ministry for NPV estimation may be considered. | degraded forest land which is down the line would be having a density of minimum 0.7. The ecological value for a 50 years period for the density of 1.0 is Rs. 126.74 Lakhs per hectare. By considering minimum 0.4 density the ecological gain for the project would be INR **126.74 X 0.4 X 95.104= Rs. 4821.3923 lakhs (48.21 crores)** |

**Summary of Cost -Benefit Analysis for the Project**

| S. No | Loss ( in Lakh) | Benefit ( Lakh) |
|---|---|---|
| 1 | Ecosystem services losses = **Rs 297.67552 Lakhs** | Ecology gain for Compensatory = **Rs. 4821.3923 lakhs** |
| 2 | Loss of Animal Husbandry Productivity including loss of Fodder = **Rs 29.76755 Lakhs.** | 225649 Man days will be generated assuming 500 Rs per Day as wages total benefit = **Rs. 1128.25 Lakhs** |
| 3 | Possession Value of Forest Land diverted = **Rs 3328.64 lakhs** | Benefits of economy due to the specific project = **Rs. 21484.14 Lakhs** |
| 4 | Shifting of Public Utilities = **Rs. 0 Lakhs** | |
| 5 | Habitat Fragmentation Cost = **Rs. 148.83776 Lakhs.** | |
| 6 | Compensatory Afforestation and Soil and Moisture Conservation = **Rs. 695.08 Lakhs,** | |
| | **Total Loss = Rs. 4500.001 Lakhs** | Total Benefit = **Rs 27433.78 Lakhs** |

Benefit Cost Ratio =Total Benefit /Total Loss

**=Rs 27433.78 Lakhs / Rs 4500.00 Lakhs =6.09 which is more than 1 hence project is viable.**

**Note 1: Net Present Value (NPV) of environment and ecosystem services loss:**
The concept of Net Present Value of the forest land diverted is a scientific method of calculating the environment cost and other losses caused due to diversion of forest land for non-forestry purposes. The NPV represents the net value of various ecosystem services and other environment services in monetary terms which the forest would have provided if the forest would not have been diverted.

**Note 2: Possession Value of forest land diverted:**
The forest land diverted for the project such as irrigation, hydropower, railways, roads, wind, and transmission lines and mining etc are unlikely to be returned and remains in possession of the user agencies. Therefore 30% of the net present value (NPV) of the forest land diverted or market rate of adjoining area in the district should be added as a cost of component as "possession value of forest land" in addition to the environment costs due to loss of forests.

**Date: 06-01-2020**
**Place: Bilaspur**

Project Director
PIU, NHAI, Bilaspur

PROJECT DIRECTOR
NHAI, PIU, Bilaspur (C.G.)

भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
(सड़क परिवहन और राजमार्ग मंत्रालय, भारत सरकार)
National Highways Authority Of India
(Ministry of Road Transport and Highways, Govt. of India)
कार्यालय परियोजना निदेशक, परियोजना कार्यान्वयन ईकाई, बिलासपुर
Office of Project Director, Project Implementation Unit, Bilaspur
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भारतमाला
प्रगति के पथ पर अग्रसर

## Certificate of Undertaking details of Employment Generation

It is hereby certified that for the work of **Construction and Upgradation to 4 - Lane with paved shoulders configuration of Bilaspur - Urga Section of NH-130A in the State of Chhattisgarh. (Km 0.000 to Km. 70+200) From Bilaspur to Urga is in Public interest**, it will generate employment as per below produced details:-

### Details of employment generation

| Sno. | Type of Employment | Skilled | | Semi / | Unskilled | Total Employment | Annexure |
|---|---|---|---|---|---|---|---|
| | | Direct Employment | In-Direct Employment | Direct Employment | In-Direct Employment | | |
| 1. | Temporary (man days) | 42560 | 63840 | 47700 | 71550 | 225649 | A |
| 2. | Permanent | 17 | 35 | 33 | 63 | 148 | B |

**Theoretical Basis:-**

1. The very basis of calculation of Employment generation potential is taken from Effective unit contribution/weightage of different kind of labor from Standard Data Book issued by Ministry of Roads Transport Et Highways.

2. Quantities of Bituminous Concrete, Dense Bituminous Concrete, Cement Treated wmm, Wet Mix Macadam , Cement Treated GSB, Granular Sub Base , GSB , Subgrade is taken from Cost Estimate of Detailed Project Report as per below produced details:-

Bituminous Concrete = 75179 Cum, Dense Bituminous Concrete= 78065.7 Cum, Cement Treated wmm= 292006 Cum, Wet Mix Macadam= 159471 Cum , Cement Treated GSB=414540 Cum, Granular Sub Base = 66466.8 Cum.

Date: March 2020.

Place: Bilaspur

PROJECT DIRECTOR
NHAI, PIU, Bilaspur (C.G.)

(Signature & Seal of Authorized Signatory)

Annexure A

| | Construction and Widening of 4 lane with paved shouders configuration of Bilaspur to Urga section from Km 0.000 to Km 70.200 section of NH 130 A in state of Chhattisgarh | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | CALCULATION OF MAN DAYS | | | | | | | |
| S. no. | BoW Item | BoQ Qty | | | Man days Calculation | | | |
| | | | | 30% additional for other anciallary activity subgrade etc | Skilled | | | Semi / Unskill |
| 1 | **Bituminous concrete** | **75179** | **Cum** | | | | | |
| | **Unit = 1 cum** | | | | | | | |
| | Taking output = 191 cum (450 tonnes) | 191 | cum | | | | | |
| | a) Labour | | | Factor | | | | |
| | Mate | day | 0.84 | 511.69 | 430 | | | |
| | Mazdoor | day | 16 | 511.69 | | 8187 | | |
| | Mazdoor skilled | day | 5 | 511.69 | | | | 2558 |
| | b) Machinery | | | | | | | |
| | Batch mix HMP @ 75 tonne per hour | hour | 6 | | 1825 | | | 1825 |
| | Paver finisher hydrostatic with sensor control @ 75 cum per hour | hour | 6 | | 730 | | | 1460 |
| | Generator 250 KVA | hour | 6 | | 730 | | | 730 |
| | Front end loader 1 cum bucket capacity | hour | 6 | | 730 | | | 1460 |
| | Tipper 10 tonne capacity | tonne.km | 450 x 18 | | 730 | | | 730 |
| | Smooth wheeled roller 8-10 tonnes for initial break down rolling. | hour | 6.00x0.65* | | 730 | | | 1460 |
| | Vibratory roller 8 tonnes for intermediate rolling | | 6.00x0.65* | | 730 | | | 730 |
| | Finish rolling with 6-8 tonnes smooth wheeled tandem roller. | | 6.00x0.65* | | 730 | | | 1460 |
| | | | | | | | | |
| 2 | **Dense bituminous concrete** | **78065.7** | **Cum** | | | | | |
| | **Unit = 1 cum** | | | | | | | |
| | Taking output = 195 cum (450 tonnes) | 195 | cum | | | | | |
| | a) Labour | | | Factor | | | | |
| | Mate | day | 0.84 | 520.44 | 437 | | | |
| | Mazdoor | day | 16 | 520.44 | | 8327 | | |
| | Skilled mazdoor for checking line & levels | day | 5 | 520.44 | | | | 2602 |
| | b) Machinery | | | | | | | |
| | Batch mix HMP @ 75 tonne per hour | hour | 6 | | 1825 | | | 1825 |
| | Paver finisher hydrostatic with sensor control @ 7 | hour | 6 | | 2190 | | | 1460 |
| | Generator 250 KVA | hour | 6 | | 2190 | | | 2190 |
| | Front end loader 1 cum bucket capacity | hour | 6 | | 2190 | | | 1460 |
| | Tipper 10 tonne capacity | tonne.km | 450 x 18 | | 2190 | | | 2190 |
| | Add 10 per cent of cost of carriage to cover cost of loading and unloading | | | | 2190 | | | 1460 |
| | smooth wheeled roller 8-10 tonnes for initial brea | hour | 6.00x0.65* | | 2190 | | | 2190 |
| | Vibratory roller 8 tonnes for intermediate rolling. | hour | 6.00x0.65* | | 2190 | | | 1460 |
| | Finish rolling with 6-8 tonnes smooth wheeled tar | hour | 6.00x0.65* | | 2190 | | | 2190 |
| 3 | **cement treated WMM** | **292006** | **Cum** | | | | | |
| | **Unit = 1 cum** | | | | | | | |
| | Taking output = 225 cum (495 tonnes) | 225 | cum | | | | | |
| | a) Labour | | | Factor | | | | |
| | Mate | day | 0.48 | 1687.15 | 810 | | | |
| | Mazdoor skilled | day | 2 | 1687.15 | | 3374 | | |
| | Mazdoor | day | 10 | 1687.15 | | | | 16871 |
| | b) Machinery | | | | | | | |
| | Wet mix plant of 75 tonne hourly capacity | hour | 6.6 | | 2190 | | | 1460 |
| | Electric generator 125 KVA | hour | 6 | | 2190 | | | 2190 |
| | Front end loader 1 cum capacity | hour | 6 | | 2190 | | | 1460 |
| | Paver finisher | hour | 6 | | 2190 | | | 2190 |
| | Vibratory roller 8 - 10 tonne | hour | 6x0.65 | | 2190 | | | 1460 |
| | or | | | | | | | |
| | Smooth 3 wheeled steel roller @ 8-10 tonnes. | hour | 12 | | 2190 | | | 1460 |
| | Water tanker 6 KL capacity | hour | 3 | | 730 | | | 730 |
| | Tipper | tonne.km | 495 x 18 | | 2190 | | | 1460 |
| 4 | **WMM** | **159471** | **Cum** | | | | | |
| | **Unit = 1 cum** | | | | | | | |
| | Taking output = 225 cum (495 tonnes) | 225 | cum | | | | | |
| | a) Labour | | | Factor | | | | |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Mate | day | 0.48 | 921.39 | 442 | | | |
| | Mazdoor skilled | day | 2 | 921.39 | | 1843 | | |
| | Mazdoor | day | 10 | 921.39 | | | | 9214 |
| | b) Machinery | | | | | | | |
| | Wet mix plant of 75 tonne hourly capacity | hour | 6.6 | | 2190 | | | 1460 |
| | Electric generator 125 KVA | hour | 6 | | 2190 | | | 2190 |
| | Front end loader 1 cum capacity | hour | 6 | | 2190 | | | 1460 |
| | Paver finisher | hour | 6 | | 2190 | | | 2190 |
| | Vibratory roller 8 - 10 tonne | hour | 6x0.65 | | 2190 | | | 1460 |
| | or | | | | | | | |
| | Smooth 3 wheeled steel roller @ 8-10 tonnes. | hour | 12 | | 2190 | | | 1460 |
| | Water tanker 6 KL capacity | hour | 3 | | 2190 | | | 2190 |
| | Tipper | tonne.km | 495 x 18 | | 2190 | | | 1460 |
| 5 | **Cement treated GSB** | **414540** | **Cum** | | | | | |
| | **Unit = 1 cum** | | | | | | | |
| | Taking output = 300 cum (600 tonnes) | 300 | cum | | | | | |
| | a) Labour | | | Factor | | | | |
| | Mate | day | 0.48 | 1796.34 | 862 | | | |
| | Mazdoor skilled | day | 2 | 1796.34 | | 3593 | | |
| | Mazdoor unskilled | day | 10 | 1796.34 | | | | 17963 |
| | b) Machinery | | | | | | | |
| | Motor Grader 110 HP @ 50 cum | hour | 6 | | 2190 | | | 1460 |
| | Vibratory roller 8 -10 tonne | hour | 6 | | 2190 | | | 2190 |
| | Tractor - Rotavator | hour | 12 | | 2190 | | | 1460 |
| | Water tanker 6 KL capacity | hour | 3 | | 2190 | | | 2190 |
| 6 | **GSB** | **66466.8** | **Cum** | | | | | |
| | **Unit = 1 cum** | | | | | | | |
| | Taking output = 300 cum (600 tonnes) | 300 | cum | | | | | |
| | a) Labour | | | Factor | | | | |
| | Mate | day | 0.48 | 288.02 | 138 | | | |
| | Mazdoor skilled | day | 2 | 288.02 | | 576 | | |
| | Mazdoor unskilled | day | 10 | 288.02 | | | | 2880 |
| | b) Machinery | | | | | | | |
| | Motor Grader 110 HP @ 50 cum | hour | 6 | | 2190 | | | 1460 |
| | Vibratory roller 8 -10 tonne | hour | 6 | | 2190 | | | 2190 |
| | Tractor - Rotavator | hour | 12 | | 2190 | | | 1460 |
| | Water tanker 6 KL capacity | hour | 3 | | 2190 | | | 2190 |
| | **Total number of mandays** | | | | **80500** | **25900** | | **119250** |
| | | | | **Skilled** | **106399** | | **Unskilled** | **119250** |
| | | | | **Direct** | **42560** | | **Direct** | **47700** |
| | | | | **Indirect** | **63840** | | **Indirect** | **71550** |
| | | | | **Total** | | | **225649** | |

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Annexure-B

| Construction and Widening of 4 lane with paved shouders configuration of Bilaspur to Urga section from Km 0.000 to Km 70.200 section of NH 130 A in state of Chhattisgarh | | | | | | |
|---|---|---|---|---|---|---|
| CALCULATION OF MAN DAYS (PERMANENT) | | | | | | |
| | Total | | Skilled | | Semi Skilled/Unskilled | |
| | | | Direct | Indirect | Direct | Indirect |
| Permanent employement due to Toll Plaza @ 4 person per lare for 28 lane | 112 | | 8 | 24 | 24 | 56 |
| Permanent employement due to Route patrol vehicle @2 for 1 vehicle | 2 | | 1 | 0 | 1 | 0 |
| Permanent employement due to Ambulance @3 for 1 vehicle | 3 | | 1 | 1 | 1 | 0 |
| Permanent employement due to Engineers/Consultancy firm @ 10 per contract | 10 | | 2 | 2 | 3 | 3 |
| Permanent employement due to Contractor firm @ 20 per contract | 20 | | 4 | 8 | 4 | 4 |
| Permanent employement due to Highway operation unit | 1 | | 1 | 0 | 0 | 0 |
| **Total Permanent Employement** | **148** | | **17** | **35** | **33** | **63** |

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