

CHAPTER 3: ANALYSIS OF ALTERNATIVES

3.1 INTRODUCTION

This chapter has been comparing the feasible alternatives to the proposed project with respect to site, technology, design etc. The alternatives examined taking into account all the possible and feasible options and include with and without project scenarios in terms of the potential environmental impacts of the project.

3.2 CRITERIA FOR SELECTION OF SITE

- The project road between two terminal stations should be short and straight as far as possible, but due to engineering, social and environmental considerations, some deviations may be required.
- The project should be constructible and easy to maintain; the Greenfield project should reduce the vehicle operation cost with respect to the existing option already available i.e. using the NH/SHs to reach from point A to point B.
- It should be safe at all stages i.e. during design, construction and operation stages.
- Safety audits at each stage should confirm the same.
- The project initial cost, maintenance cost, and operating cost should be optimum to be considered economical with respect to its options.
- The alignment should be finalized giving due consideration to sitting/location of major structures including Major/Minor Bridges, Interchanges and ROBs. The space requirement of interchanges to be kept into consideration to avoid major resettlement.
- Tunnel / Box cutting of Hills should be considered as the last option and should be provided only when it is absolutely necessary.
- The location of spurs for connecting the important towns to be decided while fixing the alignment Options.
- The alignment should follow the unused / barren land to the extent possible to reduce the cost of land acquisition.
- The proposed options in the present case connects the under developed regions of Bihar which would lead to the development of new growth centers along the proposed highway i.e. paving the way for economic development of the region.

Obligatory points through which alignment options should not pass are detailed below:

Habitations: Proposed alignment is fixed in such a way that traverses at a minimum distance of 150 m from built up areas and avoiding important buildings and structures. However, few isolated buildings falling along the alignment cannot be avoided due to Geometric requirements.

Wildlife Sanctuaries, National Parks, Reserve Forest and other Eco Sensitive Zones: The proposed alignment doesn't pass through any Wildlife Sanctuary, National Park and other Eco Sensitive Zones. However it passes through protected forest. Utmost care is taken while fixing the alignment near forest areas. The MOEF&CC guidelines have been adhered to and the alignment has been fixed keeping it away from any eco-sensitive zone. It was not possible to completely avoid the reserve forest areas. However, every effort has been made to reduce the acquisition of forest area.

Water Bodies: The proposed alignment has been fixed taking due consideration & importance of retaining the existing water bodies as far as feasible.

Railway Crossings and Important Structures: The components, which increases the project cost, are the presence of the Major bridges, ROBs and other structures. In order to reduce the project cost number of structures and its length were given due consideration while finalizing the alignment.

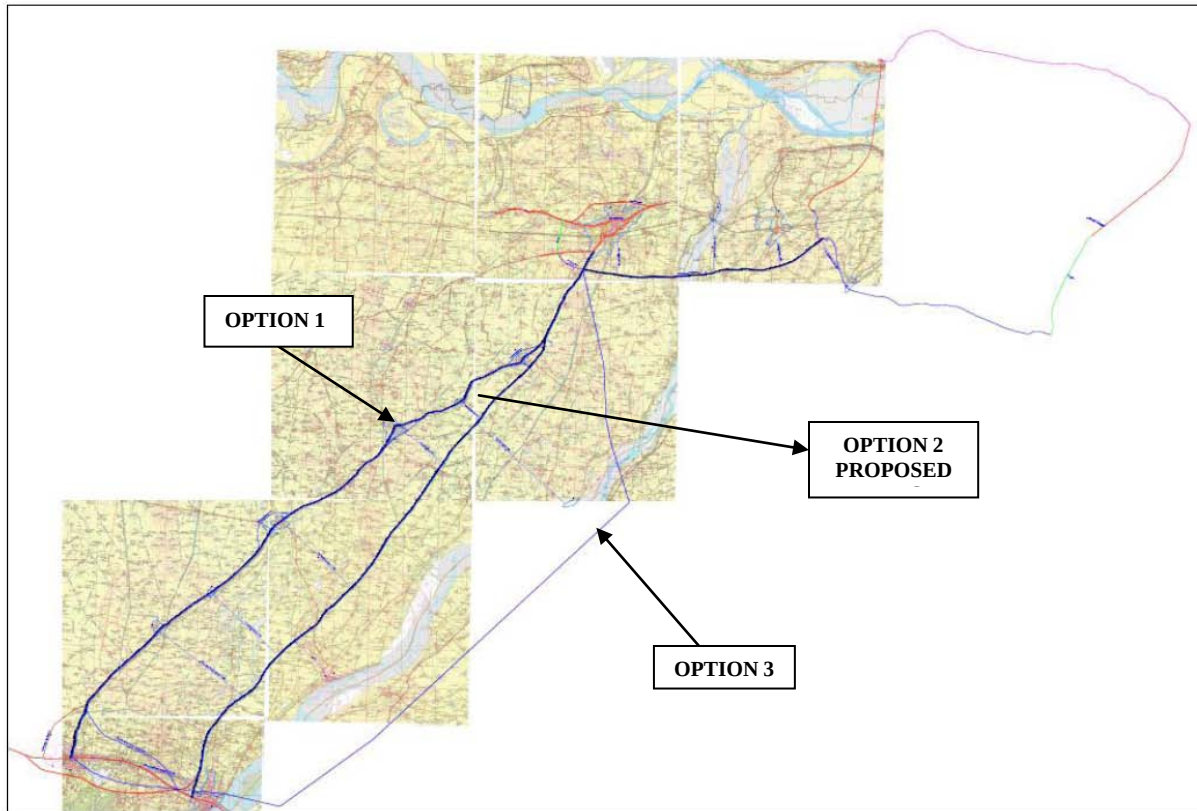


Figure 3-1: Map showing all alignment options

Table 3-1: Comparative statement for all options

S.N	Parameters/Issues	Option 1 (Red) -Existing	Option 2 (Purple)-Proposed	Option 3 (Cyan)
1	Length (km)	94.7	(Sasaram- Arrah) 84 km (Ara-Patna by road) 35km (Patna-Kayamnagar Spur)11.8km	105
2.	Total land acquired (ha)	650.175	559.089	700.475
	Govt. land (ha)	190.70	10	180
	Pvt. Land (ha)	437.235	520.259	450.45
	Forest land (ha)*	21	28.83	70
3.	Area under protected/ important or sensitive species of flora or fauna/Wildlife Sanctuary	The alignment does not pass through any wildlife sanctuary, protected area and its eco sensitive zone.	The alignment does not pass through any wild life sanctuary, protected area and its eco sensitive zone.	The alignment does not pass through any wild life sanctuary, protected area and its eco sensitive zone.
4.	No. of trees	11780	8448	11152
5.	Area under water bodies (ha)*	5.5	5.0	6.2
6.	No. of structure to be impacted due to proposed alignment	110	347	140
7.	No. of families	245	152	275

S.N	Parameters/Issues	Option 1 (Red) -Existing	Option 2 (Purple)-Proposed	Option 3 (Cyan)
8.	No. of structure to be constructed	i. Major Bridges (07) ii. Minor Bridges (24) iii. Vehicular underpass(03) iv. LVUP (12) v. SVUP (43) vi. Interchanges/Flyover (5) vii. Box Culverts (92) Total: 186	03 Major Bridge, 02 no. Major Bridge Cum Underpass SVUP, 25 Minor Bridge, 24 Minor Bridge cum Under Passes/SVUP, 03 Minor Bridge cum Under Passes/LVUP, 13 No. of VUP, 27 LVUP, 41 no. of SVUP, 11 nos. of Flyover, 2no. of ROB 133 Box culverts Total - 284	i. Major Bridges (04) ii. Minor Bridges (40) iii. Vehicular underpass(10) iv. LVUP (11) v. SVUP (48) vi. Interchanges/Flyover (3) vii. Box Culverts (210) Total: 326
9.	Connectivity	The proposed alignment is connected with Sasaram- Arrah-Patna- Patar- Kayamnagar	The proposed alignment is connected with Sasaram- Arrah- Patna- Patar-Kayamnagar.	The proposed alignment is connected with Sasaram- Arrah-Patna- Patar Kayamnagar.
10.	Project cost (cr.)	3429.86	2973.43	3222.38

Based on the above study the following observations are there:-

Option 1 and 3 leads to more impact on structure and families as number affected families are high as compared to option 2.

If alignment option 1 or 3 is followed then it will leads to more impacts on Environment & Social components, hence Option 2 is followed.

Table 3-2: Analysis of Alternatives

Sr. No.	Factors	Without Project Impacts		With Project Impacts	
		Positive	Negative	Positive	Negative
1.	All weather Accessibility	-	Due to improper drainage system, road may get flooded during heavy rains.	Drainage in some sections will be improved Road will be accessible all along the year since drainage will be improved along all sections.	Only some sections may get good drainage. Due to improper drainage system, road may get flooded during heavy rains.
2.	Road Safety/Accident rate	-	Due to congestion accidents may increase.	With realignment in critical sections, road safety would increase in these sections. Heavily congested areas will be bypassed so less chances of traffic jam/accidents at these section.	In densely populated/congested areas, accidents may increase. Due to congestion accidents may increase at heavily populated areas and at critical road sections.

3.	Transportation/vehicle maintenance /operating cost	-	Increased cost due to heavy traffic at populated/congested areas. And also more wear & tear because of frequent application of sudden brakes.	More comfortable driving at critical sections due to section improvement/realignment Less wear & tear cost, more riding comfort	Increased costs due to more wear & tear at heavily populated/congested areas. Increase in air pollution due to vehicular traffic. And short term increase in dust due to earth work during construction at micro level. Increased cost due to heavy traffic at populated/congested areas. And also more wear & tear because of frequent application of sudden brakes.
4.	Travel time / increased speed	-	Travel time is more due to less speed & congestion.	Reduction in travel time and increased speed.	More chances of accidents due to increased speed

					Travel time is more due to less speed & congestion. No significant change in travel time or speed.
5	Change in Land use pattern	-	-	-	Minor change in land use pattern. Small change in land use pattern. Change in Land use pattern with land diversion from forest to road.
6.	Loss of Property and livelihood	-	-	-	More loss of property & livelihood. Very little loss of property and minor loss of livelihood. Minor Loss of property

					& significant loss of livelihood due to traffic diversion on bypass.
7.	Change in Environmental quality during construction	-	-	-	Temporary degradation of environmental quality because of vehicular traffic during construction.
8.	Change in Environmental quality after construction Loss of vegetative cover	-	Project road will further deteriorate and more dust and noise pollution.	Less Noise pollution because of ease in congestion and diversion of traffic through by passes.	Increase in Air pollution due to increased vehicular traffic. No significant change
9	Loss of vegetative cover	-	-	Greater loss of vegetative cover than other options.	Loss vegetative cover along the road side will be less. But significant loss of Agricultural land due to bypass. Small amount of

					vegetative cover loss.
10.	Access to basic facilities such as Markets, schools, Hospitals etc.	-	Difficulty in accessing the basic facilities due to heavy traffic.	Difficulty in accessing the basic facilities due to heavy traffic.	Difficulty in accessing the facilities Easily Accessible as the traffic will be less.
11.	Employment opportunities & local economy growth.	-	Limited business opportunities. Overall development of area will be affected.	Limited business opportunities. Minor increase in business opportunities Faster transportation of Agricultural/commercial/ Perishable goods to prospectus markets. And local employment generation.	

12.	Others	-	Increase in fuel consumption, dust pollution & vehicular emission. And overall economy of the state will be affected.	Minor savings on fuel Consumption. Tourism will flourish (Access to Wadi improved), Improved riding quality & smooth Traffic flow. Will reduce accidents in congested Areas.	Loss of business opportunity in the congested populated area.
-----	--------	---	---	---	---