Criteria for Fixing Alignment for Expressways

1. The Expressway 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.
2. 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 in combination to reach from point A to point B.
3. It should be safe at all stages i.e. during design, construction and operation stages. Safety audits at each stage should confirm the same.
4. The project initial cost, maintenance cost, and operating cost should be optimum so as to be considered economical with respect to its options.
5. The alignment should be finalised 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.
6. Tunnel / Box cutting of Hills should be considered as the last option and should be provided only when it is absolutely necessary.
7. The location of spurs for connecting the important towns to be decided while fixing the alignment Options.
8. The alignment should follow the unused / barren land to the extent possible to reduce the cost of land acquisition.
9. The proposed options in the present case connects the under developed regions of Madhya Pradesh which would lead to the development of new growth centres along the proposed highway i.e. paving the way for economic development of the region.

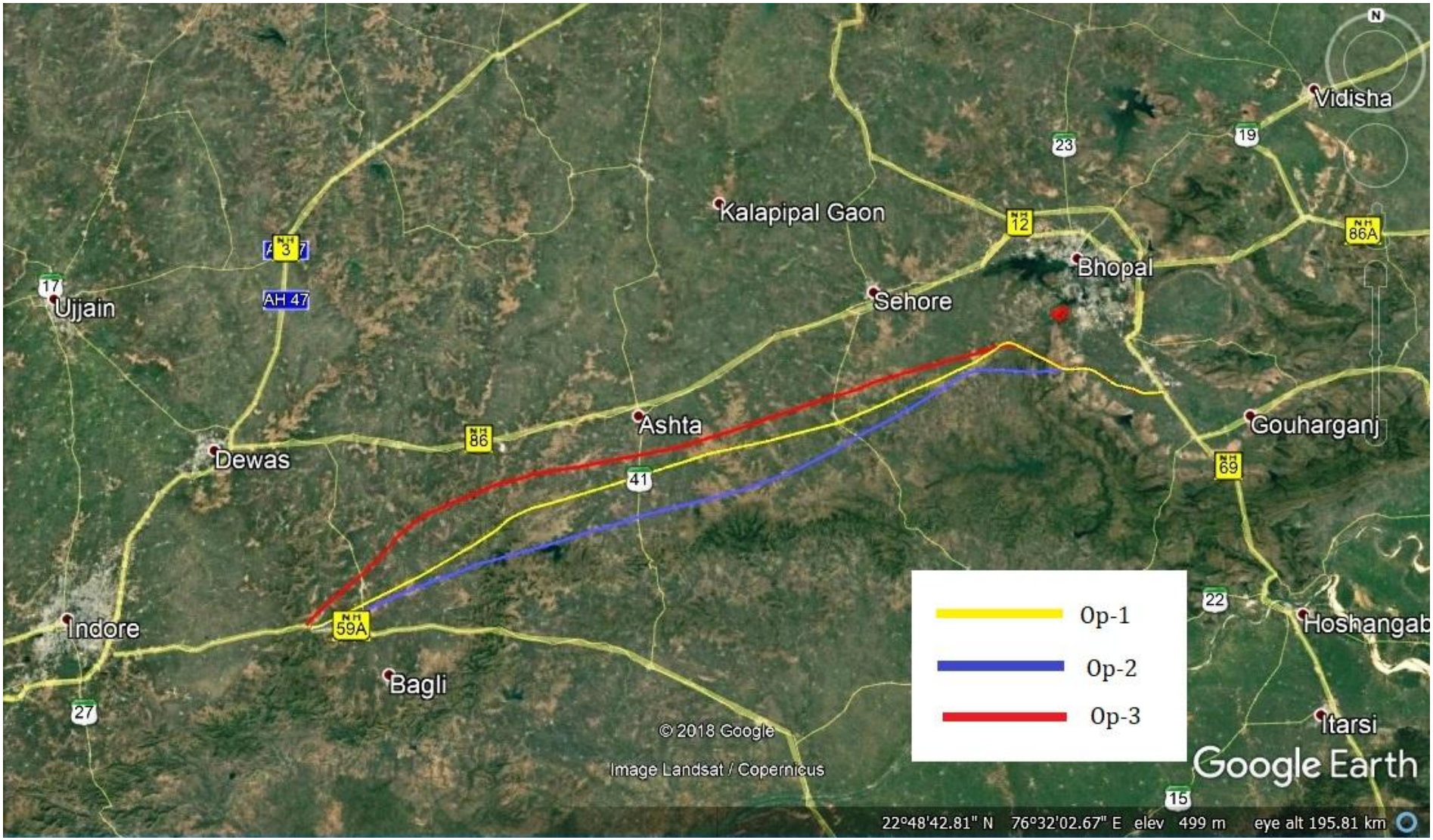
Obligatory points through which alignment options should not pass are detailed below:

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 Revenue/Protected and reserve forests. 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 finalising the alignment.



Option 1: Recommended

Figure- Map showing all the alternatives

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The comparative statement for proposed alignment is given in below table:

S. No.	Description	Option-1	Option-2	Option-3
1	Length in Kms.	**146.880**	**144.5**	**154.0**
2	Starting Point	Near Itaya Kalan Village on Bhopal Bypass	Near Itaya Kalan Village on Bhopal Bypass	Near Itaya Kalan Village on Bhopal Bypass
3	Ending Point	Ends on NH-59A Near Karnawad	Ends on NH-59A Near Karnawad	Ends on NH-59A Near Karnawad
4	Important Towns / Cities connected through spurs	• Ichhawar • Bhopal • Sehore • Ashta • Dewas	• Ichhawar • Bhopa • Sehore • Ashta • Dewas	• Ichhawar • Bhopa • Sehore • Ashta • Dewas
5	Districts	• Raisen, Bhopal, Sehore and Dewas	• Raisen, Bhopal, Sehore and Dewas	• Raisen, Bhopal, Sehore and Dewas
6	Lane Configuration	• 6 lane	• 6 lane	• 6 lane
7	Proposed ROW	70 Metres	70 Metres	70 Metres
8	Existing RoW	0, as it is a Greenfield alignment	0, as it is a Greenfield alignment	134.484, Greenfield alignment is only 28km
9	Approx Time Travel(Hrs, Min)	2 Hrs 25 Min.	2 Hrs 20 Min.	2 Hrs 40 Min.
10	**No of NH crossings**	Start-NH12, SH41, Sehore road End-NH 47	Start-NH12, SH41, Sehore road End-NH 47	Near Badjhiri following existing Sehore-Bhopal Road and After Sehore following the existing Bhopal-Indore Highways NH-86
11	**No of SH crossings**	SH-49, and 2 other SH	SH-49, and 2 other SH	
12	# of Interchanges	6	8	6
	# of Flyovers	1	3	2
	# of Major Bridges	4	6	4
	# of Minor Bridges	51	67	32
	# of VUP's	20	32	22
	# of Light VUP's	22	14	38

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S. No.	Description	Option-1	Option-2	Option-3
	# of Small VUP's	35	36	32
	# of ROB's	1	1	1
	# of River/Canal	21	24	14
	# of pond	4	4	3
13	No. of Settlements Shall be affected	14	15	**24**
	Length of proposed road along the settlements (Km.)	539 m(0.53km) only (Only 1 or 2 structures of the settlements affected)	2919m(2.91km)	2500m(2.5km)
	No. of Structures approx.	**140**	**450**	**380**
	Affected Forest Area (Ha) Approx.	**158.25**	**229.38**	**178.48**
	Land Acquisition (Ha) (70 Metres PROW) tentative	**1005.01**	**1022.9**	**1121**
	Land Acquisition Cost (Cr.) Tentative	**512.4**	**504.6**	**585.4**
	Eco-sensitive/Protected Area	Nil (ESZ of Ratapani is approx 1.3km from the proposed alignment Nr. Ch 13.7-15.7)	Nil	**Nil**
	Tentative Civil Cost (Cr)	**3158.83**	**3579.11, R&R**	**3234.00**
	Merit	• Less forest area with compare to other options • Will attract Major Industrial traffic from Mandideep and Mhow Industrial area. • Will reduce congestion in Bhopal City & travel time. • Development of the under-developed regions by having theme-based Nodes / Hubs will act as Growth Centres • Shortest Length of Expressway	• Will attract Major Industrial traffic from Mandideep and Mhow Industrial area. • Will reduce congestion in Bhopal City & travel time. • Development of the under-developed regions by having theme-based Nodes / Hubs will act as Growth Centers	• Near to the Cities.

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S. No.	Description	Option-1	Option-2	Option-3
		• LA cost is the lowest as it traverses through agricultural and barren land. • It doesn't affect the drainage pattern of Bhopal lakes.		
	Demerits	• Lacks direct connectivity to Agra Mumbai Highway.	• Lacks direct connectivity to Agra Mumbai Highway. • End section of 20Kms runs parallel (within 5Kms) to NH-59A hence this section of expressway not justifiable.	• Above three are under CA with Concessionaires and hence may lead to legal issues having cost implications. • It passes through densely built-up area requiring significant R & R cost. • Length and LA cost is higher than other options as alignment very near to Bhopal, Sehore, Ashta and Indore Town. • Does not serve the larger interest of the government of developing an Industrial Hub & International Airport near Ashta. • Dewas - Indore section is six lane.
	Recommendation	**RECOMMENDED**	Not recommended	Not recommended

Option I is best suitable due to following reasons:-

- Major part of the alignment Passing through the agricultural and barren land with patches of Forest
- No ESZ areas in the RoW
- Shortest Distance. Hence least time required for commuting
- Least land to be acquired
- Least number of settlements to be affected
- Least number of Sensitive Features

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