Alternative Analysis and Justification for Locating the Sohna Realignment

1.1 Project Backgound

The project road starts from km 0+200 of NH-919 (Km 78.940 of old NH-71B) in Palwal and ends at km 52+450 (km 26.650 of old NH-71B) at Rajasthan Haryana border near Bhiwadi. Km 0+000 of NH-919 is at Agra Chowk, Palwal where the project road meets with NH-2. Project also includes the Realignment of existing road from km 47.100 to km 49.350 of old NH-71B near Sohna.

1.2 Need for Sohna Realignment

NH-71 B passes through hilly terrain near Sohna from km 47.100 to km 49.350. The width of existing road in this section is varying from 5.5m to 7m. Gradient on existing road goes up to 7% at few places. Traffic is more than 17000 PCU on this section of road. As there is mining area and crusher zone in the vicinity of the project road, mostly multi-axle trucks are running on the project road. Traffic Jams on this section of road is very common. Hence there is an urgent need of realignment of this section of road.

1.3 Option Study for Sohna Realignment

Consultant has done the option study for Sohna Realignment. 3 options were studied. Start point of Realignment is on Alwar Gurgoan Road (New NH 248A, 500 m away from Sohna 4 legged Intersection)) & end point is on km 47of NH71B. Length of the option-1 is 2.18 km, length of option-2 is 1.39 km and length of the option -3 is 1.12 kms. Detailed comparison is given in table 2. For details please the refer fig:1 on next page.

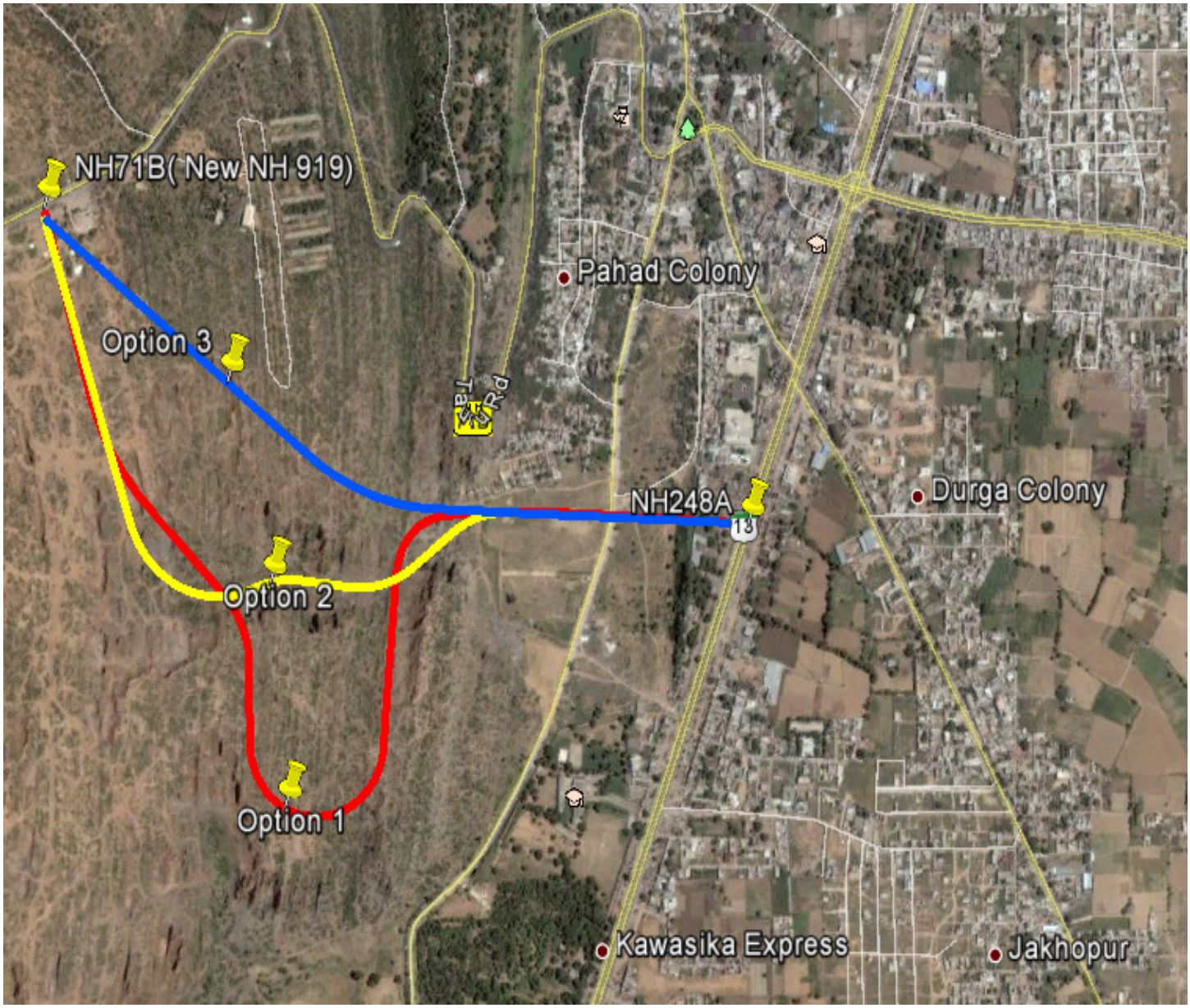

Fig 1. Option Study for Sohna Realignment

1.4 Mathematical Model Evaluation of Options

The comparative evaluation to select the final alignment is based on technical suitability, traffic needs, operating benefits and logical analysis. The study and analysis takes care of traffic and engineering aspects as well. Traffic benefits evaluation has been made on the basis of vehicle kilometre usage and logical analysis is on the basis of Consultant's experience on similar type of works. As discussed in last paragraph, preliminary selection was made for a total of 3 nos of alignments.

After site investigation an attempt has been made to identify the various important factors, which influence the judgement and selection of alignment for a new route. These factors are then examined for their relative level of influence, and marks assigned to each factor to indicate their relative weightage in the selection of alignment. The sum of all these marks is 100. Thereafter a marking system has been devised. Full marks are allotted to the best condition under each factor. Thereafter each deficiency is weighted and corresponding reduced mark assigned to it. The summation of marks so obtained for various factors determines the final score of the alignment. The marks obtained by the alignments serve as indicators of their relative level of suitability.

The ROW width required for widening of existing road is about 30 m. For construction of new bypass alignment, the required ROW is varying from 45 m to 60 m depending on the embankment height.

The factors influencing selection of alignment on each corridor have been identified for allocation of marks.

1. *Length of Proposed Road*
2. *Design Standards*
3. *Structures*
4. *Traffic Dispersal*
5. *Environmental Constraint*
6. *Land Acquisition & Social Impact*
7. *Cost*

1.5 Allotment of Marks for Evaluation

Following table shows the allotment of marks for evaluation purposes.

Table: 1 Allotment of Marks

Sl No	Factors	Value Marks	Principle of Application
1	Length of the Proposed Option	10	Maximum marks for shortest route and weighted reduction with increase in length
2	Design Standards	25	Maximum marks will be given where good geometry can be provided and least marks will be given where this not possible due to site constraints
3	Structures	5	Maximum marks for minimum numbers/length and weighted reduction with increase in numbers / length. Zero for maximum number / length
4	Traffic Dispersal	5	Maximum marks for good traffic dispersal and least marks for very poor traffic dispersal
5	Environmental Constraints	25	Maximum marks where impact is least and weighted reduction as the impact increases
6	LA and Social Impact	15	
7	Cost	15	Maximum marks for least cost and weighted reduction with increase in cost

Table: 2 Qualitative Parameters of Alignment Options

Parameters		Option-1	Option-2	Option-3
ENGINEERING	**Length**	Length=2.18 Km	Length = 1.63 km	Length = 1.3 km
	Design Standards	Longitudinal Gradient 6%	Longitudinal Gradient 7.5%	Longitudinal Gradient 10.5%
	Major Structures	NIL	NIL	NIL
	Traffic Benefit/Access Control	Good	Good	Good
ENVIRONMENTAL		Less environmental impact as less cutting involved (average cutting 7.8m)	More environmental impact as more cutting involved (average cutting more than 11m)	More environmental impact as more cutting involved (average cutting more than 14m)
SOCIO-ECONOMIC	**Land Acquisition/ Social Impact**	9.81 Hectares	6.25 Hectares	5.04
	Civil Cost (Approx.)	30 Crores	20 Crores	16 Crores

Table: 3 Mathematics Evaluation Matrix

Sl. No.	Factors	Maximum Points Alloted	Option 1	Option 2	Option 3
			Points	Points	Points
1	**Length**	10	2	7.6	10
2	**Design Standards**	25	25	10	0
3	**Major Structures**	5	5	5	5
4	**Traffic Benefit**	5	5	5	5
5	**Environmental**	25	25	11.5	2
6	**Land Acquisition / Social Impact**	15	2	11.0	15
7	**Cost**	15	3	11	15

	Total Marks	**100**	**67**	**61.1**	**52**

Out of 3 alignments options, option 1 is found to be more suitable as it scores maximum points from mathematical evaluation matrix.