Mumbai-Ahmedabad High Speed Railway Corridor

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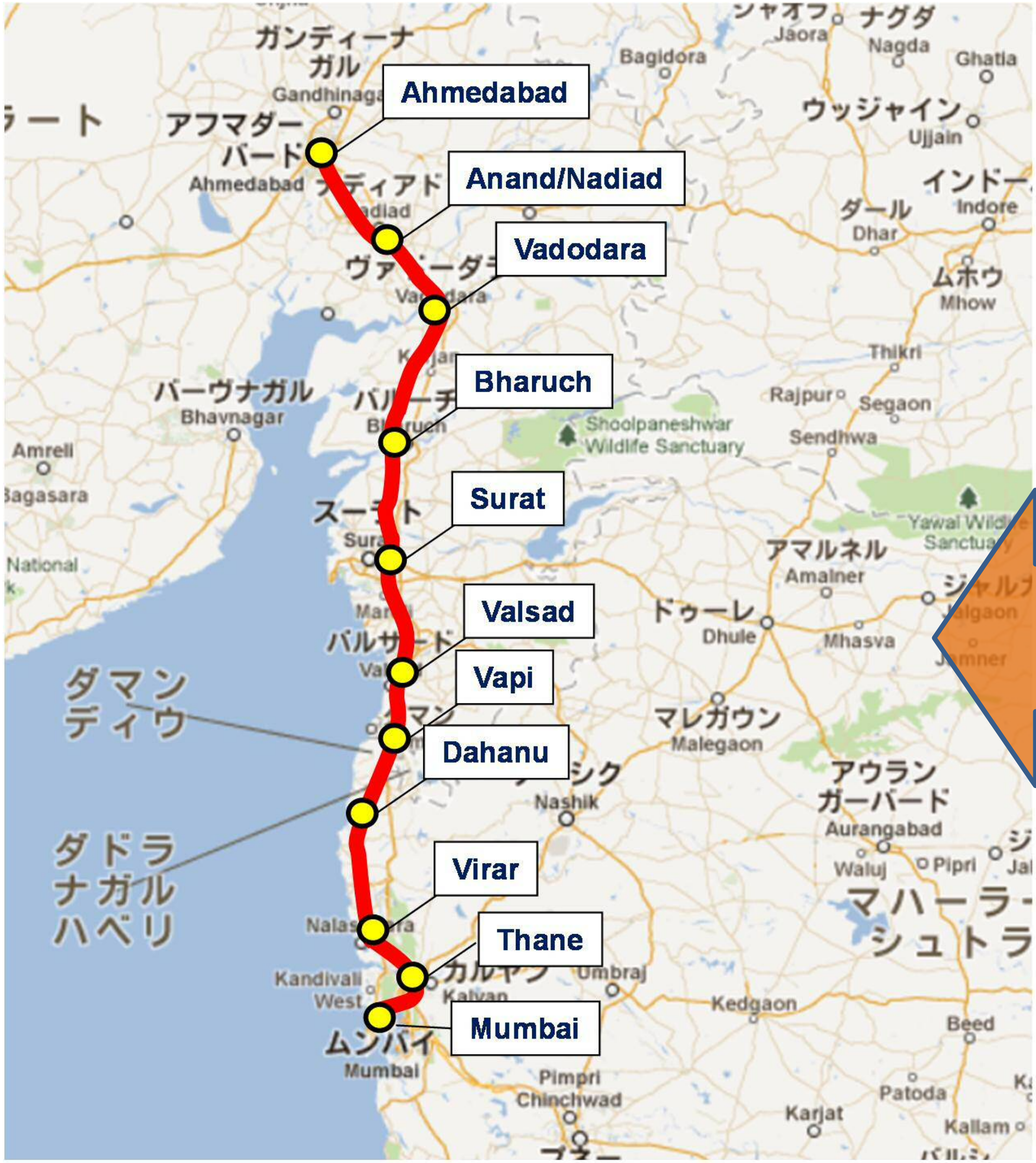
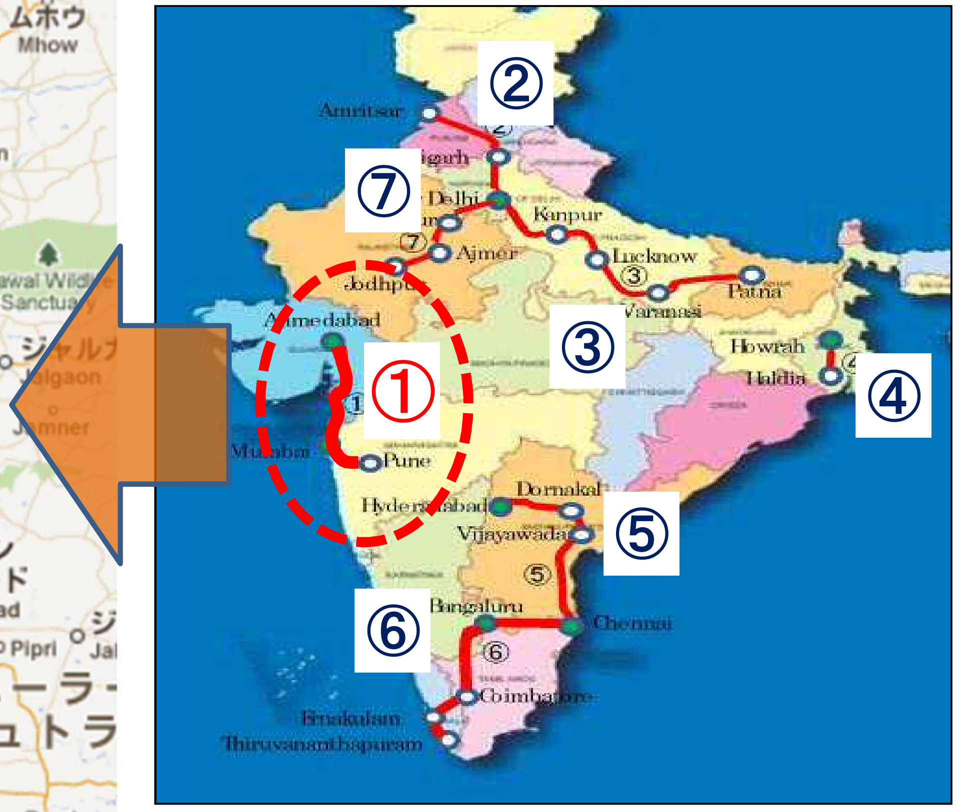
Basis of this Presentation

"Preliminary Study on the Formation of High-Speed Railway Project in Western India"

Ministry of Land, Infrastructure, Transport and Tourism of Japan

Route Alignment Design and Stations (DRAFT)





(Source; Google)

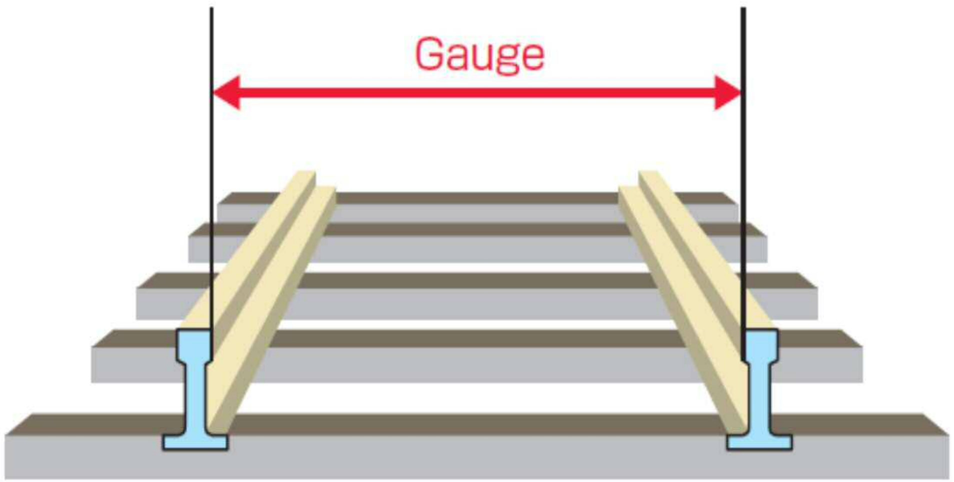
Basic Information on Gujarat State & Maharashtra State

	Gujarat	Maharashtra
Area	196,024 Km^2	307,713 km^2
Population	60.4 million	112 million
Population Density (per km^2)	308	365
Population Rank	10	2
Population Density Rank	15	12
Urban Population	37.4%	42.4%
GDP (in millions)	$90,650	$190,310
GDP (per Capita)	$1,510	$1,700

Principle of Technical Specification for HSR

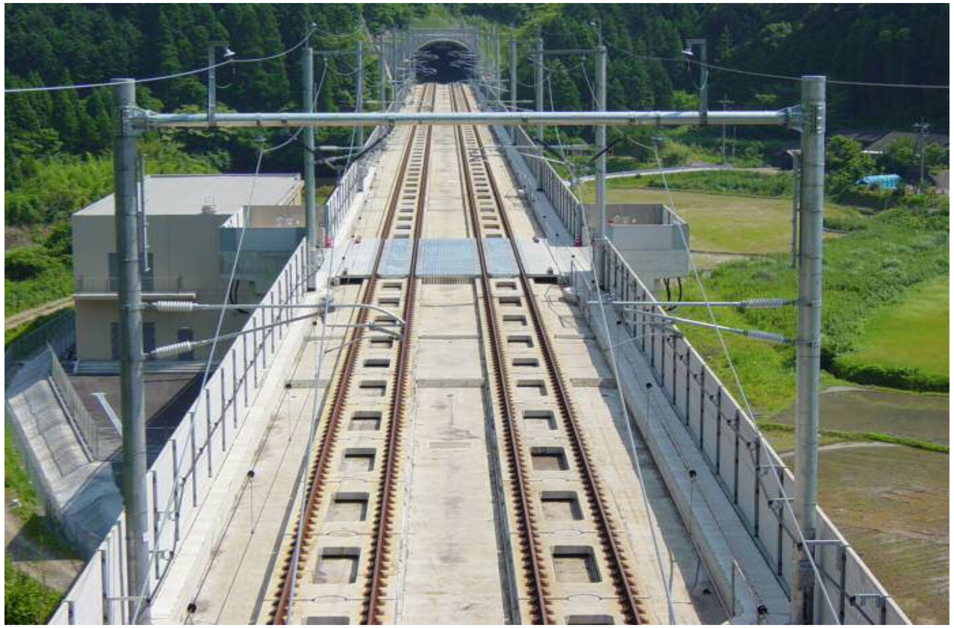
To build a standard-gauge HSR line completely separating from the existing network would be recommended.

- In Japan, conventional line: narrow gauge, HSR: standard gauge.
- We propose standard gauge for HSR in India (even though conventional line has broad gauge), as following reasons:
  - Main stream of world HSR is standard gauge
  - Capacity of the conventional line would be limited for HSR
  - Securing safety in different speeds of railway operations



Design Specifications of HSR (DRAFT)

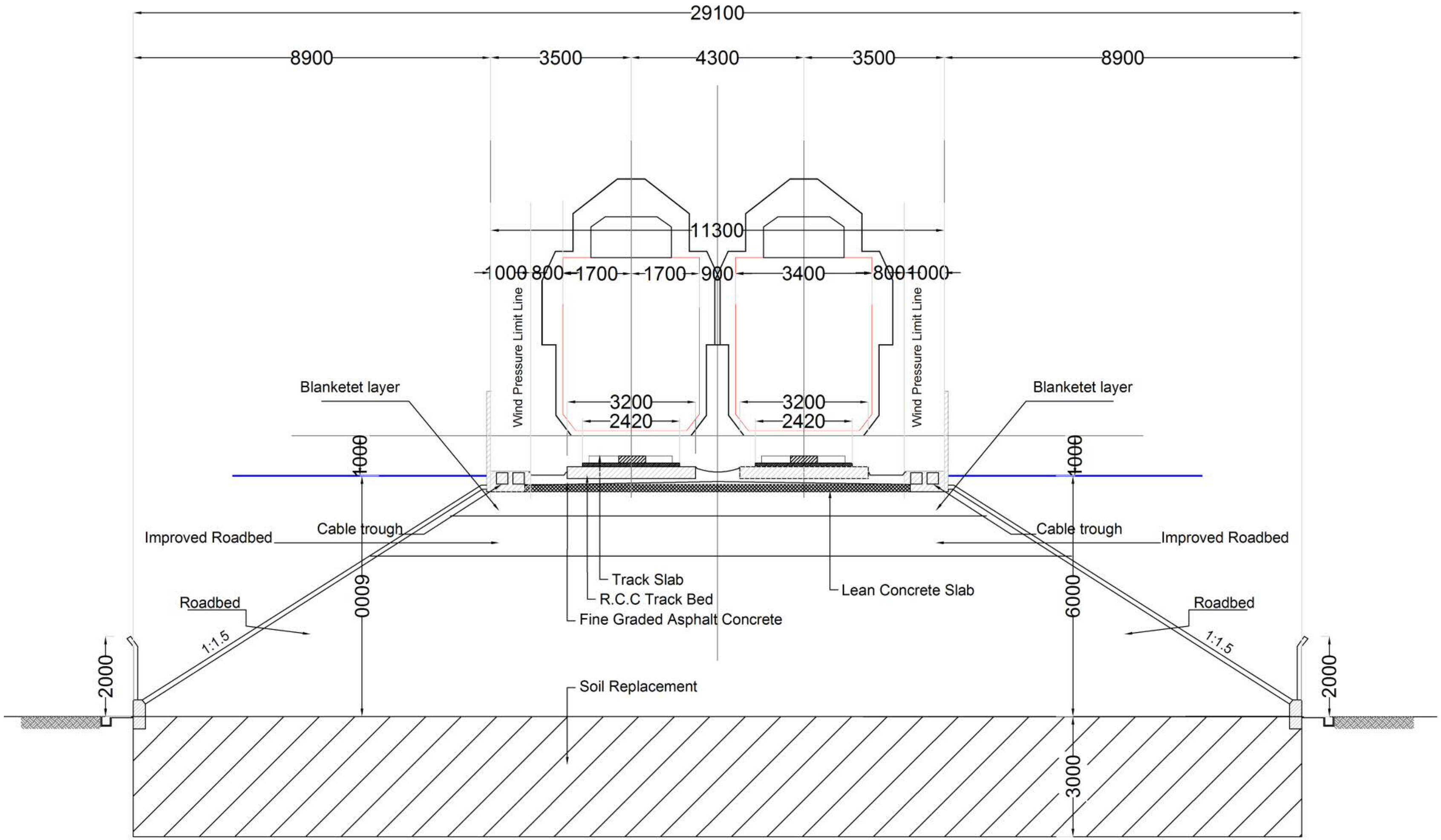
Item	Design Specification
Gauge	1435mm
Number of line	Double track (One way)
Maximum design speed	350km/h
Maximum operation speed	320km/h
Distance between track centerline	4.3m
Width of formation level	11.3m



Design Specifications of HSR (DRAFT)

Item	Design Specification
Cross-section of tunnel	$63.4m^2$ (double track)
Maximum axle load	16t
Feeder voltage	AC 2x25kV
Signaling system	Digital-ATC
Train radio	LCX (Leaky CoaXial Cable)
Rolling stock	Maximum 16 cars (Number of passenger capacity：High-speed type 1300/ Double-decker type 1600) Car body width : 3.4m

Cross section double track in embankment (Slab track)



The Basic Policy of Alignment for HSR No.1 in India

Station

Stations layout in consideration of the convenience for users and city planning, etc.

- **The locations of Mumbai and Ahmedabad stations and big station were examined in the center of the city area.**
- **The intermediate stations were also examined for the convenience of passengers along the railroad line, and future development along the line.**
- **Small stations were examined in the location to the center of the town as close as possible.**

The Basic Policy of Alignment for HSR No.1 in India

Between stations

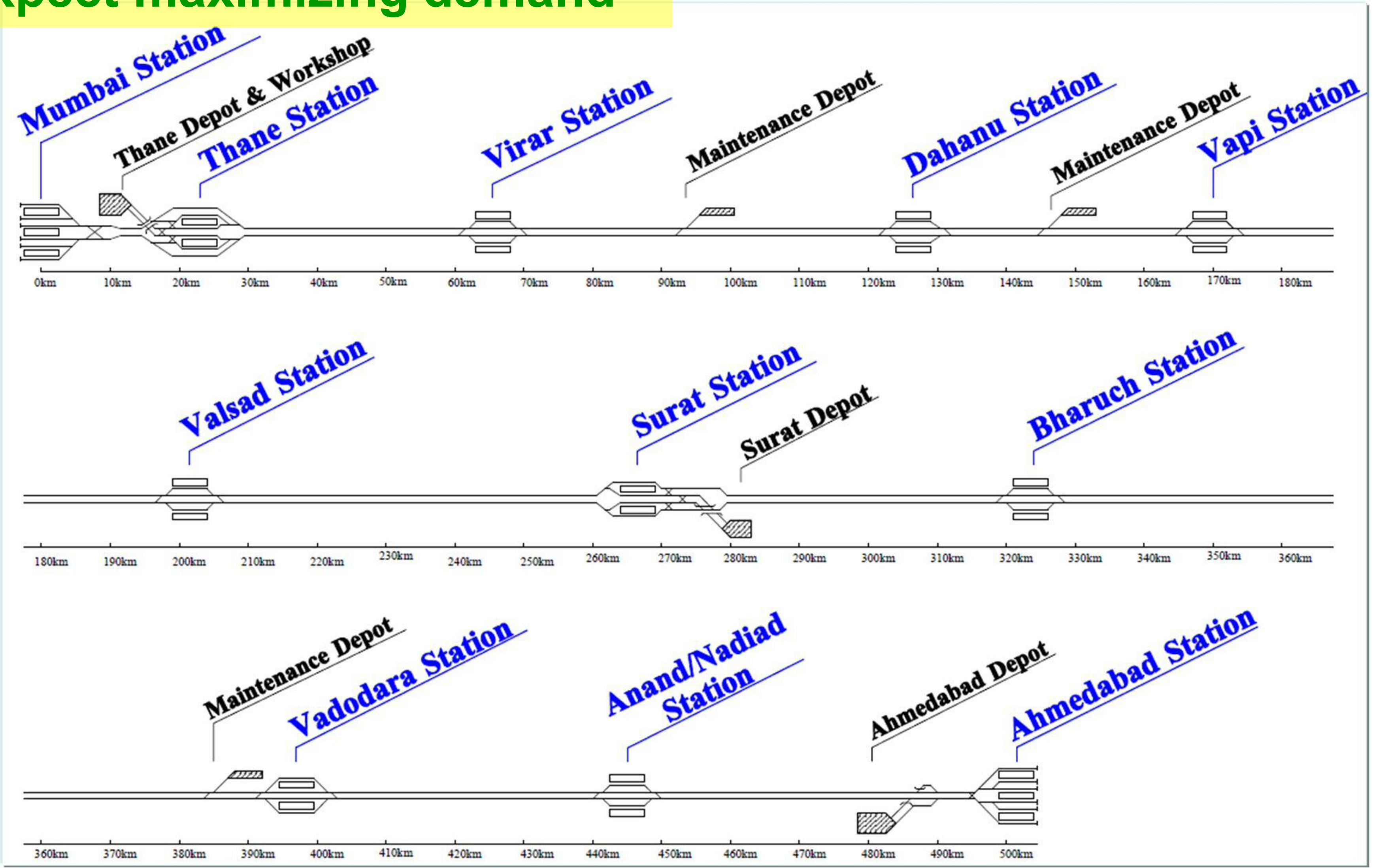
Alignment to secure the high-speed operation in consideration of the natural and social environment

- **A plane and profile were determined in consideration of high speed operation for HSR.**
- **A national park and a sanctuary were avoided for an effect of the natural environment.**
- **Existing buildings were also avoided for an effect of the human community and the social environment.**
- **Location of the large bridge were considered where is the best way pass through the big river.**

Station Layout (tentative)

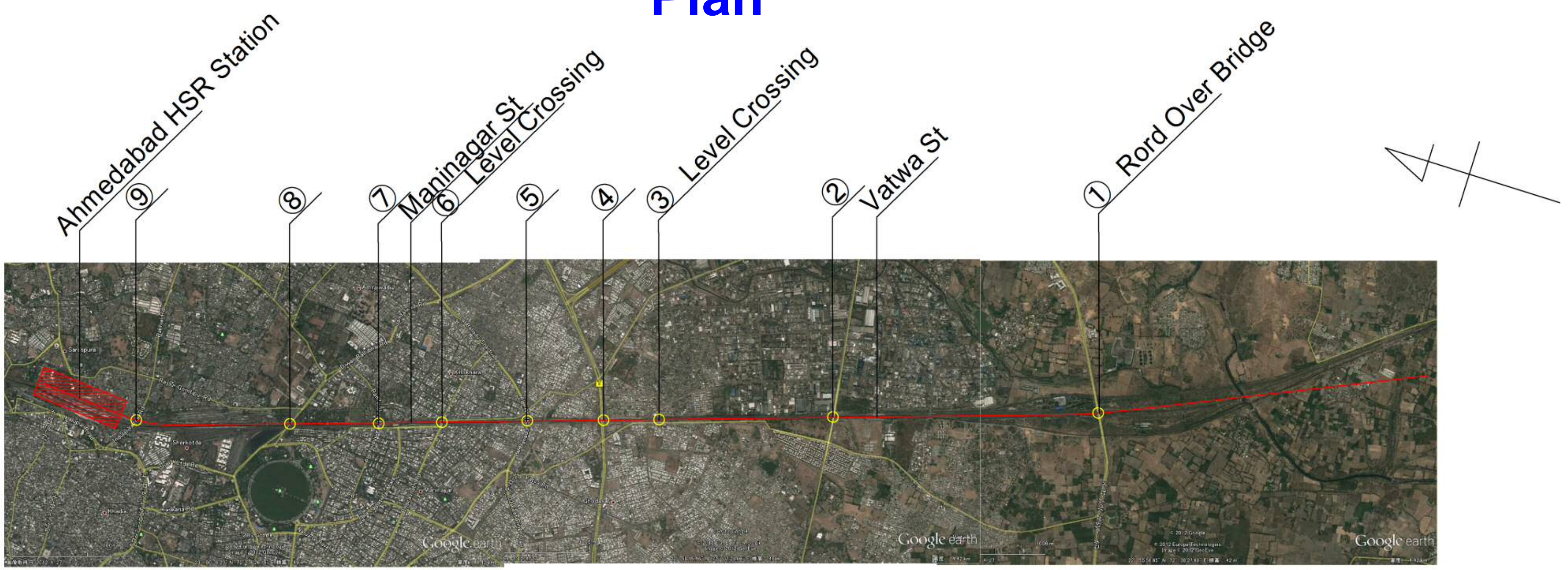
Stations layout to secure the high-speed operation and to expect maximizing demand

No. of station: 11
Total length: 498.5km
Average length between stations: 49.8km

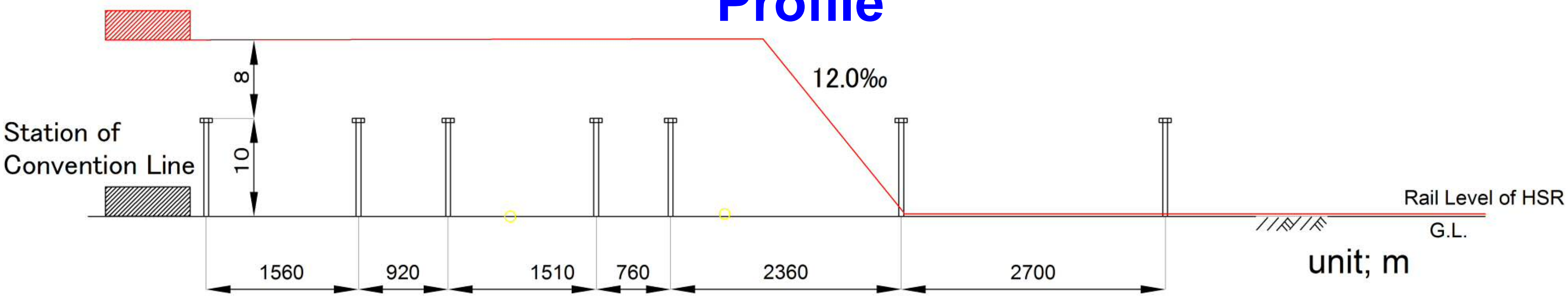


Conceptual Drawing for HSR in Ahmedabad (draft)

Plan



Profile



Demand Forecasting

- The future demand of current transport modes (railway, airplane, private car and bus) is estimated by using the **four-step model**.

Four- Step Method of Demand Forecast

1) Trip Generation / Attraction Model

⇩

2) Trip Distribution Model

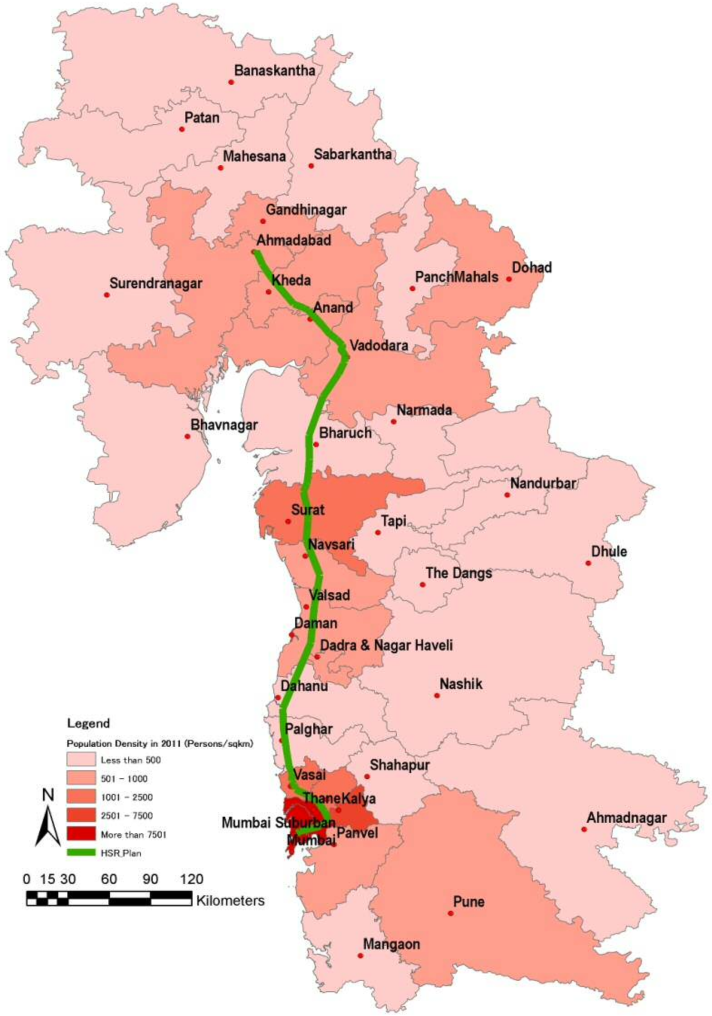
⇩

3) Modal Split Model

⇩

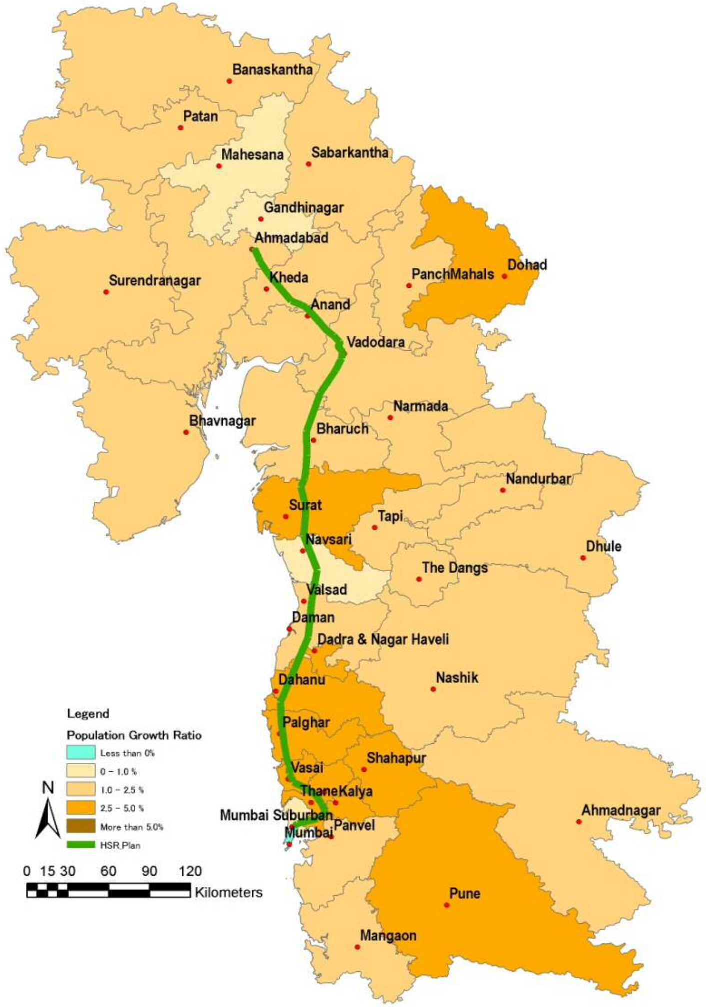
4) Traffic Assignment

Demographic Conditions along the proposed Line of HSR



Population Density (2011)

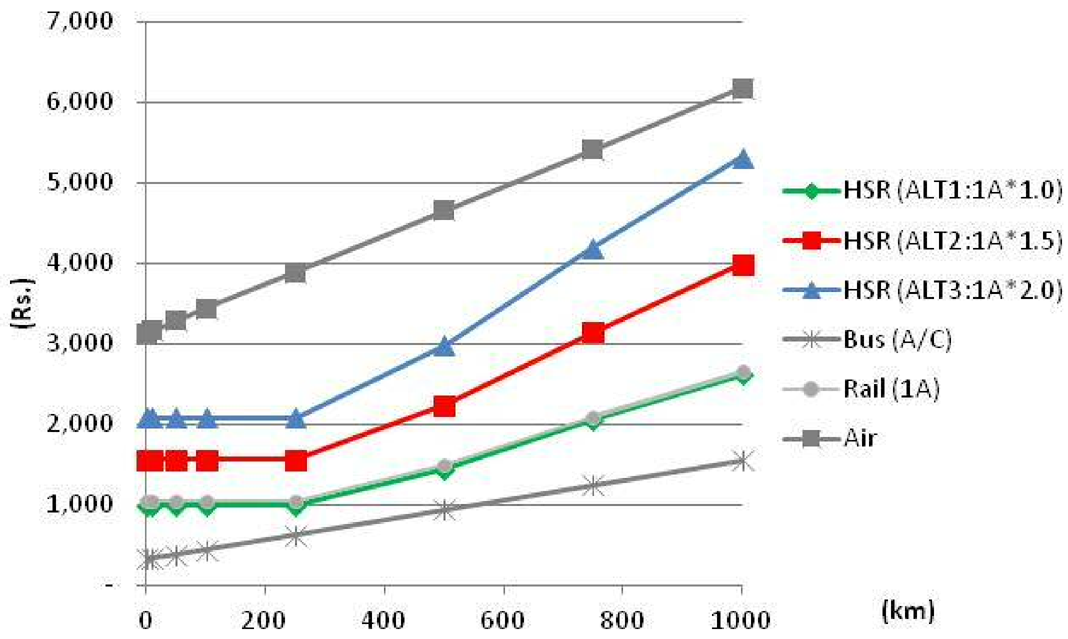
(Source; Population Census 2001, 2011)



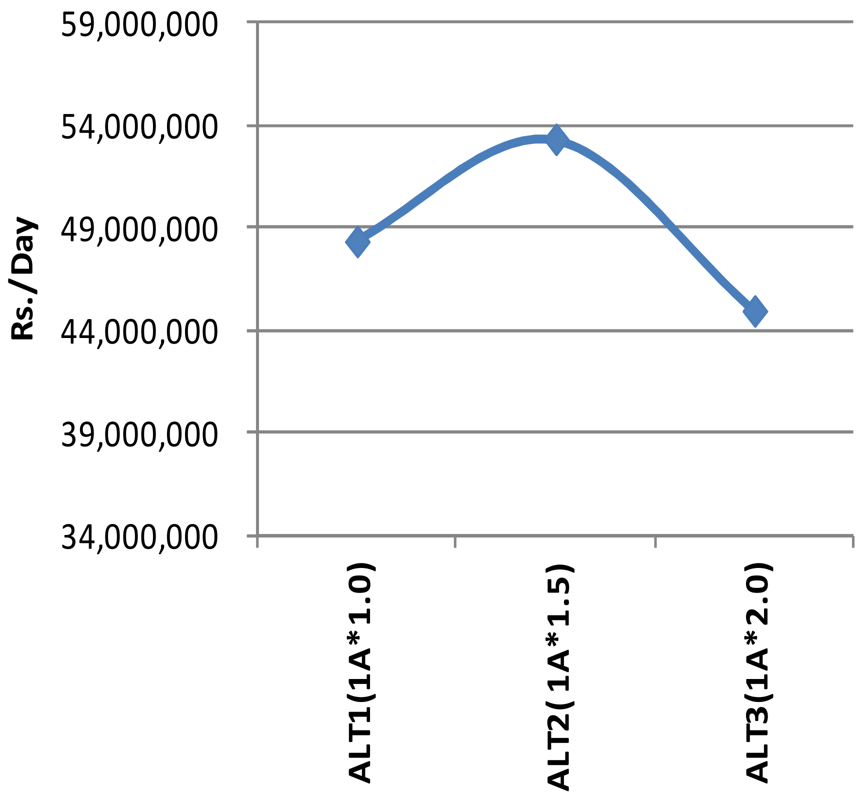
Annual Average Population Growth Ratio 2001 - 2011

Fare Level Setting and Fare Revenue

- HSR fare is set more than 1A class of existing railway and less than air fare.
- Fare revenue is the highest in case of ALT2.
  ALT2: HSR fare is 1.5 times fare of 1A class of existing railway.

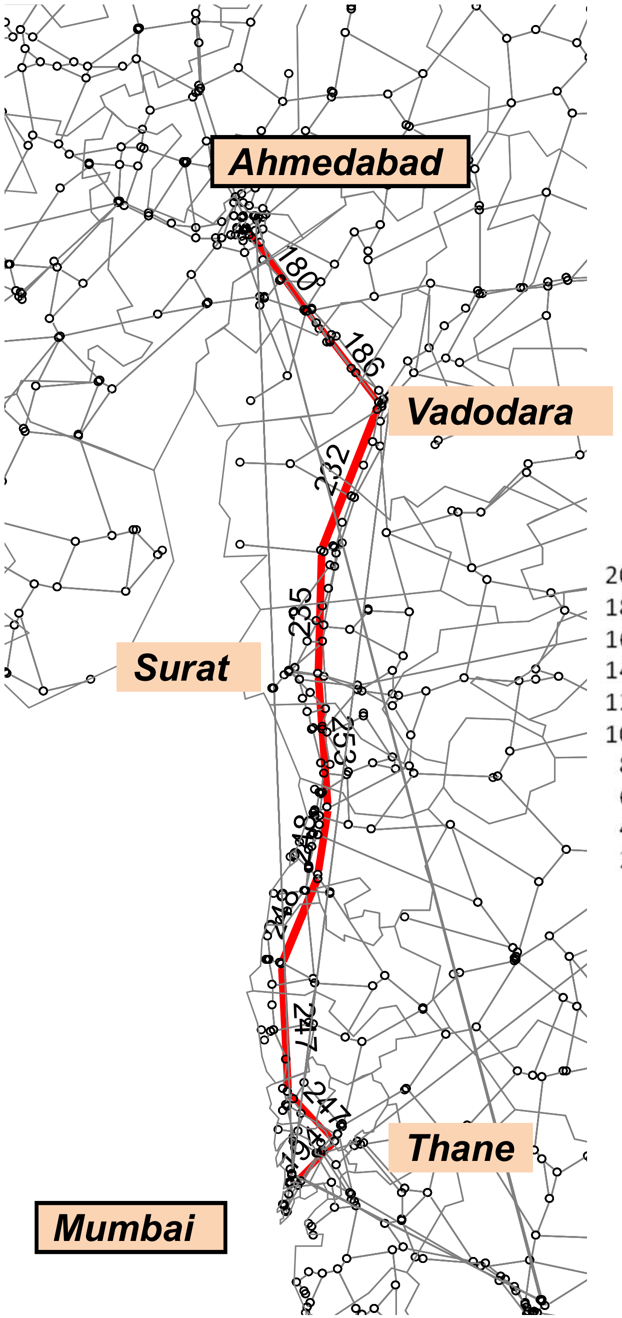


Fare Level Setting

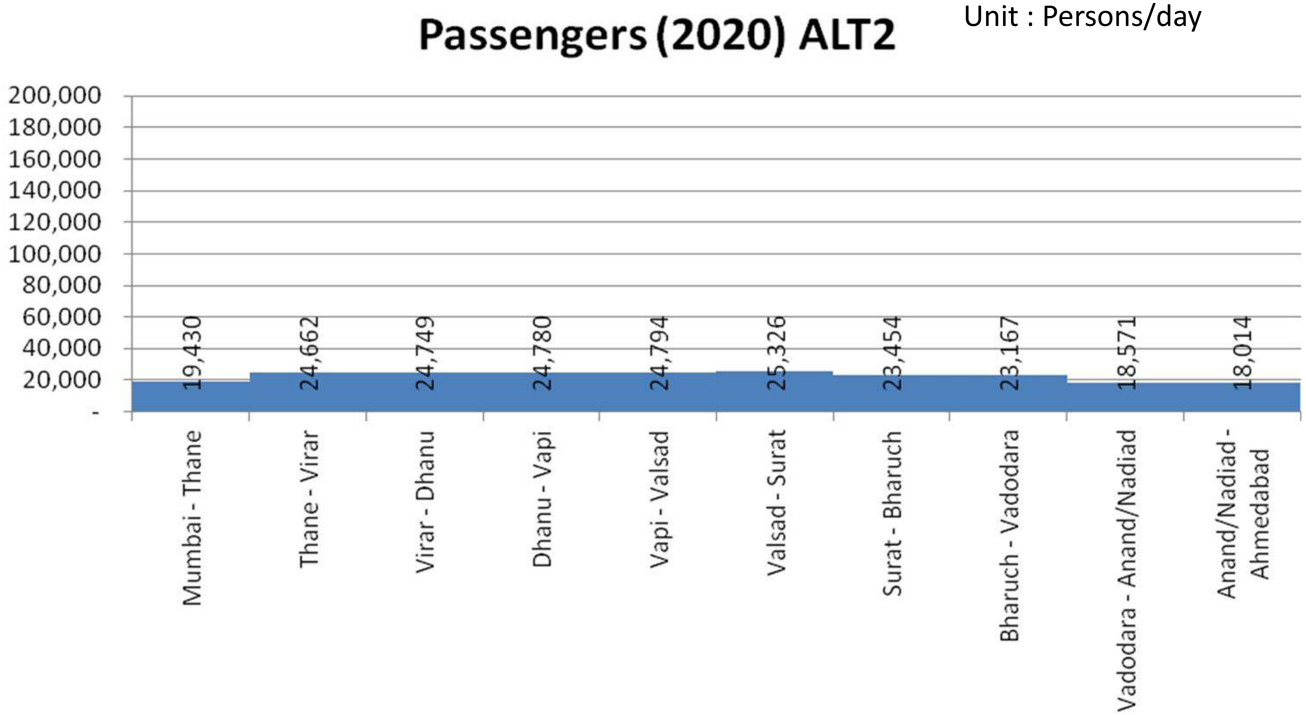


HSR Fare Revenue by Fare Level

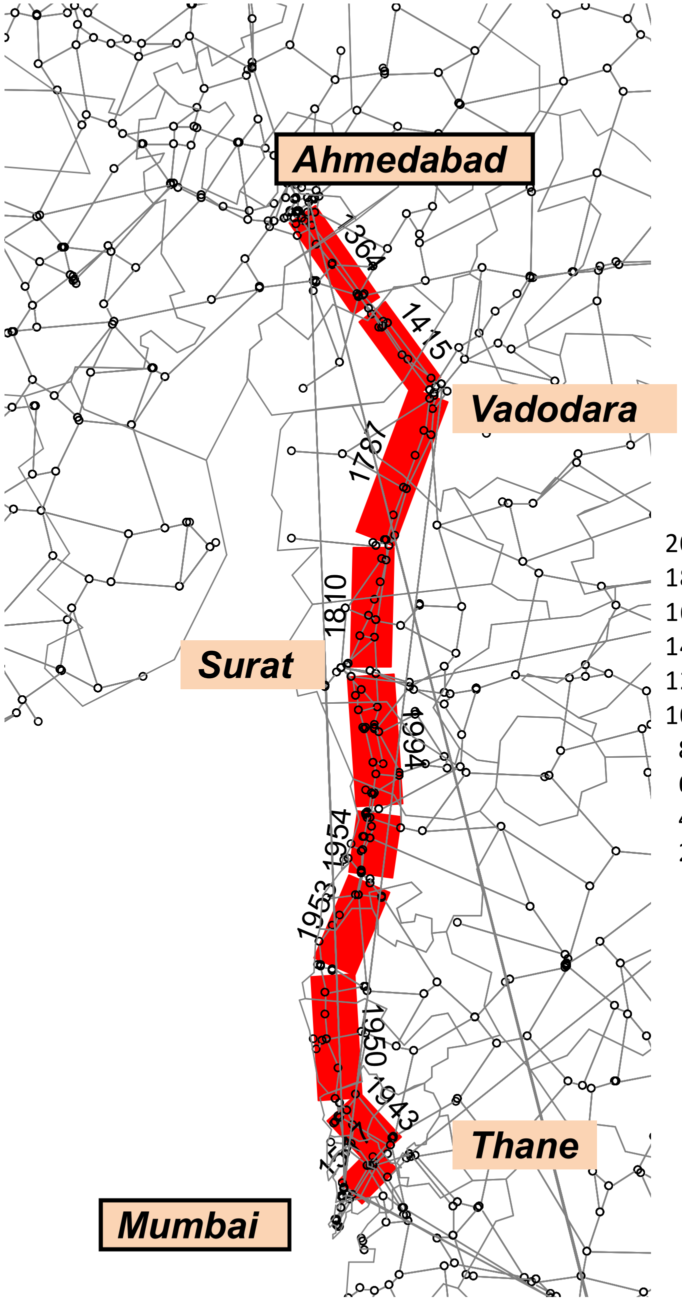
Sectional Passengers of Route No.1 HSR in 2020 (ALT2 Case)



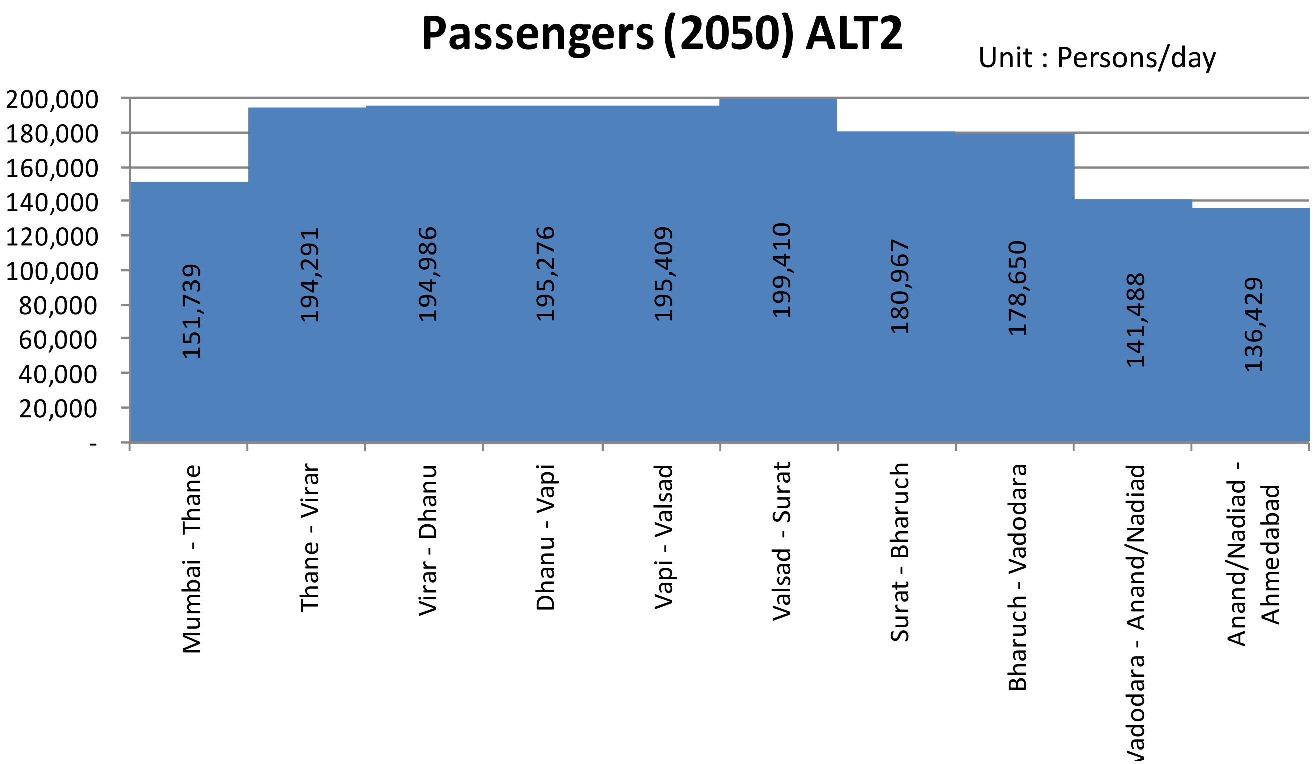
Daily Boarding Passengers: 29,529 Persons/day
Maximum Sectional Passengers: 25,326 Persons/day



Sectional Passengers of Route No.1 HSR in 2050 (ALT2 Case)



Daily Boarding Passengers: 231,522 Persons/day
Maximum Sectional Passengers: 199,410 Persons/day



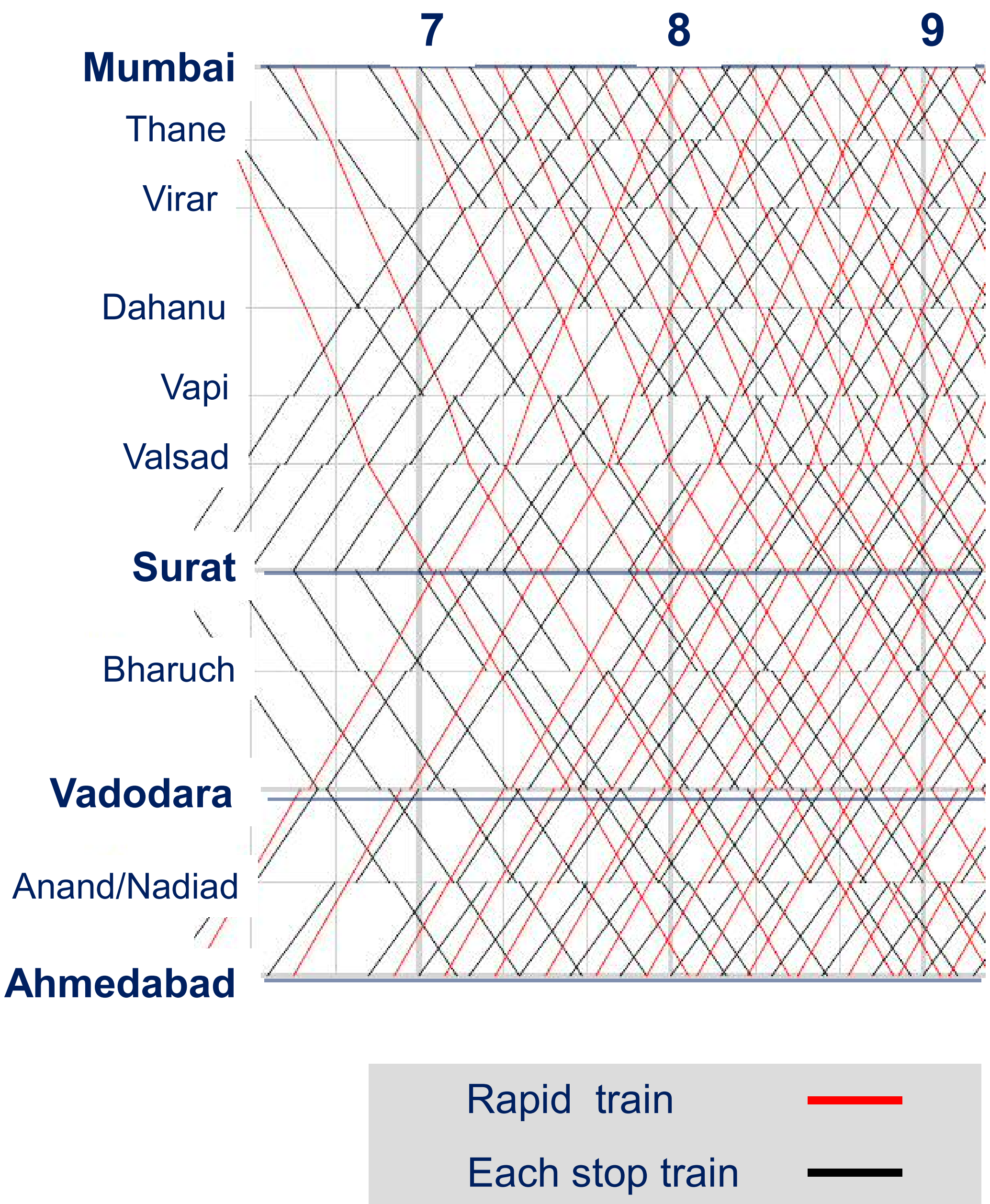
Traffic Volume and Number of Trains (tentative)

year	2020	2030	2040	2050
Number of cars per train	10	10	16	16
Capacity (seat)	750	750	1270	1270
Traffic Volume (day/direction)	13000	27000	55000	100000
Number of Trains (day/direction)	25 - 30	50 - 60	60 - 70	120 - 130
Number of Trains at peak hour (train/hour/direction)	2	4	6	10

Traffic volume is tentativeness.

Traffic volume may change in the future. With it, Number of trains change, too.

Image of Train Diagram (in 2050)



Mumbai – Ahmedabad

<u>Rapid train: 1 h 57 min.</u>

Each stop train: 2 h 40 min.

Number of Trains at peak hour (train/hour/direction)

2 trains (2020) ▶ 10 trains (2050)

Conclusion

- **Mumbai-Ahmedabad corridor has huge potential as an industrial and economic growth zone in India.**
- **To build a standard-gauge line completely separating from the existing network would be recommended.**
- **High volume of railway demand would be expected in the HSR.**
- **Collaboration of railway development and town development would be quite important in station planning.**