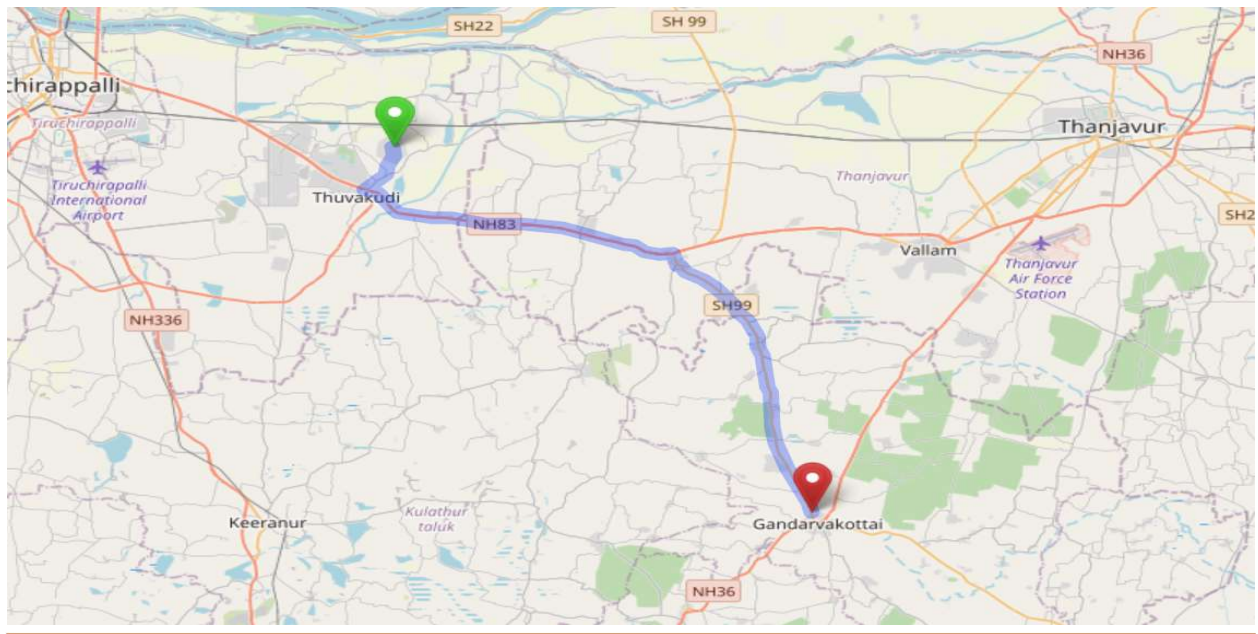
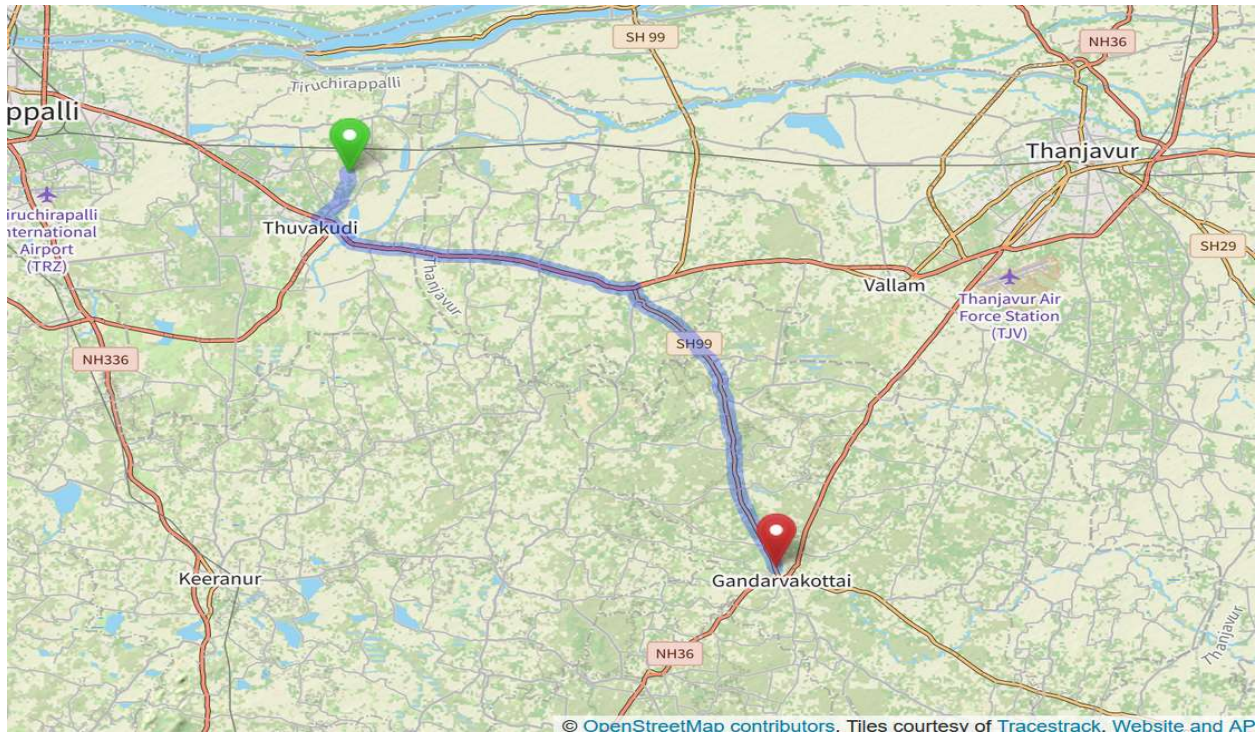




**IndianOil**

**WELCOME TO JOURNEY**  
**RISK MANAGEMENT**  
**(JRM) STUDY USING**  
**ARTIFICIAL**  
**INTELLIGENCE (AI)**  
**FOR IOCL TRICHY**  
**TERMINAL**

**IOCL TIRCHY TERMINAL (10.7753, 78.8368) TO KPM AGENCY ,(10.37136, 78.81651), TOTAL DISTANCE -36 KM**





# Welcome to the Journey Risk Management Study for KPM Agencies

**Total distance: 36 km; Start with: (10.7753, 78.8368), End with: (10.578749 , 79.011727)**

## ❖ Route Safety Analysis Report

### 1. Overview of the Route Map

The route from Trichy Terminal (T.N) To KPM Agency . The route passes through several key points including Thuakundi, Thircy – Tanjore Road, Thanjavur Road, Thircy -Thanjavur Road, Coimbatore – Nagapattan Highway, Pudukkottal – Tanjore Road, Alangudi- Pudhupati- Karambakundi Road and Total distance from Trichy Terminal To KPM Agency is 36 km for heavy vehicles carrying hazardous materials.

### Typical Weather Conditions and Potential Weather-Related Hazards

**Weather Conditions:** Trichy Terminal (T.N) To KPM Agency experiences a tropical climate with heavy monsoon rains from June to September, high humidity, and moderate temperatures throughout the year ,The summers are short and sweltering; the winters are short, cool, and dry; and it is mostly clear year-round. Over the course of the year, the temperature typically varies from 60.8°F to 110°F and is rarely below 60.8°F to 110°F.

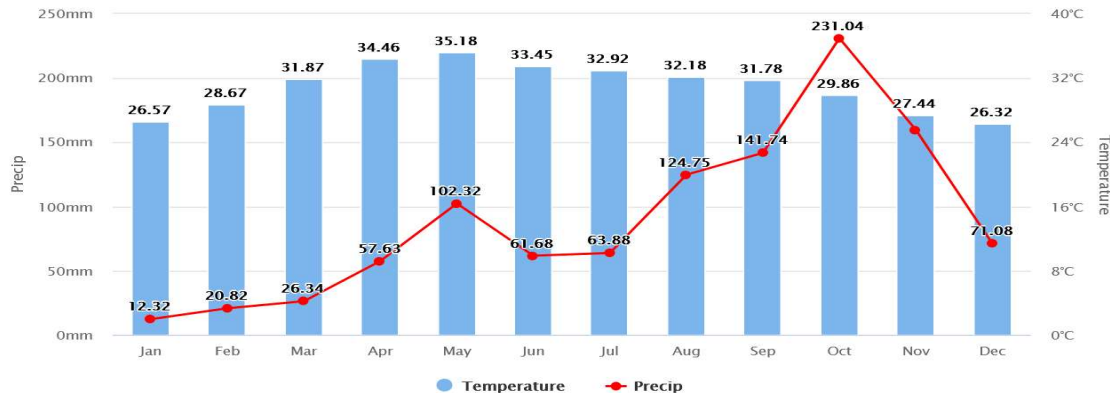
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Nov	Oct	Dec	Year
Record high °C (°F)	33.0 (91.4)	38.0 (100.4)	41.0 (105.8)	43.0 (109.4)	43.0 (109.4)	42.0 (107.6)	40.0 (104.0)	39.0 (102.2)	38.0 (100.4)	37.0 (98.6)	34.0 (93.2)	33.0 (91.4)	43.0 (109.4)
Average high °C (°F)	30.27 (86.49)	32.88 (91.18)	36.0 (96.8)	38.27 (100.89)	38.79 (101.82)	36.78 (98.2)	36.17 (97.11)	35.4 (95.72)	35.03 (95.05)	32.9 (91.22)	30.38 (86.68)	29.34 (84.81)	34.35 (93.83)
Daily mean °C (°F)	26.57 (79.83)	28.67 (83.61)	31.87 (89.37)	34.46 (94.03)	35.18 (95.32)	33.45 (92.21)	32.92 (91.26)	32.18 (89.92)	31.78 (89.2)	29.86 (85.75)	27.44 (81.39)	26.32 (79.38)	30.89 (87.6)
Average low °C (°F)	19.88 (67.78)	20.93 (69.67)	24.04 (75.27)	27.62 (81.72)	28.89 (84.0)	27.59 (81.66)	27.04 (80.67)	26.45 (79.61)	25.95 (78.71)	24.64 (76.35)	22.43 (72.37)	20.93 (69.67)	24.7 (76.46)
Record low °C (°F)	16.0 (60.8)	17.0 (62.6)	19.0 (66.2)	22.0 (71.6)	25.0 (77.0)	25.0 (77.0)	24.0 (75.2)	23.0 (73.4)	22.0 (71.6)	21.0 (69.8)	18.0 (64.4)	17.0 (62.6)	16.0 (60.8)
Average precipitation mm (inches)	12.32 (0.49)	20.82 (0.82)	26.34 (1.04)	57.63 (2.27)	102.32 (4.03)	61.68 (2.43)	63.88 (2.51)	124.75 (4.91)	141.74 (5.58)	231.04 (9.1)	159.62 (6.28)	71.08 (2.8)	89.44 (3.52)
Average precipitation days (≥ 1.0 mm)	3.09	3.27	5.36	7.36	16.73	12.36	13.55	18.91	19.64	22.73	17.55	9.73	12.52
Average relative humidity (%)	72.01	65.19	58.27	53.97	51.56	50.59	51.14	56.11	60.33	70.18	77.39	76.61	61.95
Mean monthly sunshine hours	11.19	11.34	11.34	11.63	12.65	12.68	11.83	11.24	11.05	9.11	7.68	8.29	10.84

**Weather-Related Hazards:** Trichy Terminal (T.N) To KPM Agency  
Providing a local hourly weather forecast of rain, sun, wind, humidity and temperature.

The Long-range 12 day forecast also includes detail for weather today. Live weather reports from Trichy Terminal (T.N) To KPM Agency weather stations and weather warnings that include risk of thunder, high UV index and forecast gales.

### Climate Graph

The chart below shows the mean monthly temperature and precipitation of Tiruchirappalli in recent years.



## **Analysis of Traffic Patterns**

### **Peak Hours:**

Typically, Trichy Terminal (T.N) To KPM Agency peak traffic hours are from 8:00 AM to 11:00 AM and 5:00 PM to 8:00 PM on weekdays.

### **Congestion-Prone Areas:**

- Ganesh Wine
- Bridgestone Select - Shakthi Tyres
- Diamond Diesel Pump Service
- Government hospital kottucherry
- Servite Higher secondary School
- Kottucherry Police Station,
- Navakiraha Orphanage Care Home - Nocomer Trust,
- Mary Help Of Christians Church,
- Mary St,
- Kumarpillai station

## ❖ **Assessment of Road Quality and Infrastructure**

**Road Quality:** Generally, the roads are well-maintained but can suffer from potholes and waterlogging on State Highway during the monsoon season.

**Infrastructure:** Adequate signage, street lighting, and traffic signals are present, but some areas may lack proper drainage systems, leading to waterlogging.

## ❖ **Suggestions for Alternative Routes for Emergencies**

**Alternative Route 1:** SIDCO Industrial Estate Valavanthankottai, NH 83, Muthandipatti Rd, SH 99, NH36, Thiruvalluvar Salai, Kummangulam - Alangudi Rd/Thiruvalluvar Salai, udukkottai - Alangudi - Avanam - Pattukkottai Rd/Vadakkadu - Alangudi Rd

**Alternative Route 2:** NH 83, Muthandipatti Rd, SH 99, NH36, Thiruvalluvar Salai, Kummangulam - Alangudi Rd/Thiruvalluvar Salai,

## ❖ **Summary of Local Regulations Affecting Hazardous Material Transport**

**Regulations:** Transport of hazardous materials is regulated by the Petroleum and Explosives Safety Organization (PESO) and the Motor Vehicles Act. Specific routes and timings may be restricted for hazardous material transport.

**Permits:** Ensure all necessary permits and documentation are in place.

## ❖ **Overview of Historical Incidents**

**Historical Incidents:** There have been occasional incidents involving heavy vehicles, particularly during the monsoon season due to waterlogging and poor visibility. No major incidents involving hazardous materials have been reported recently.

## ❖ **Environmental Considerations and Sensitive Areas**

- Bridgestone Select - Shakthi Tyres, Ganesh Wines, Government hospital kottucherry, Servite Higher secondary School, Kottucherry Police Station, Navakiraha Orphanage Care Home - Nocom Trust, Mary Help Of Christians Church, Marry St, Kumarpillai st
- **Educational institutions:** - Irrigation Management Training Institute, State Institute of Hotel Management and Catering Technology, V.O.C Govt Higher Secondary School, ENPEE International School, Don Bosco Higher Secondary
- **Hospital:** - ESI Dispensary, Trustee Medical Center Velangudi,

- **Gas Station:** - In there are several of fuel/Gas station some of them are G Parthasarathi Fuel Agencies , S N Ravi Kumar Agencies, Siva Fuels , Bhavani Agencies , SRI BHAGAVAN AGENCY PETROL BUNK, BPCL segipatti petrol pump,.
- **Environmental Impact:** Minimize noise and air pollution, especially in residential and sensitive areas.

**Air pollution:** Volatile chemicals evaporate during the filling and discharge process, or from leaks.

- **Loss of habitats:** Oil and gas operations can degrade animal habitats and disrupt migratory pathways.
- **Oil spills:** Oil spills can be devastating for animals and humans.
- **Greenhouse gas emissions:** Oil and gas operations can emit greenhouse gases like methane.

#### ❖ **Analysis of Communication Coverage**

Communication Coverage: Generally good throughout the route, but potential dead zones may exist densely built-up areas or underpasses.

Dead Zones: Monitor for any communication blackouts, especially in underpasses or near large buildings.

#### ❖ **Estimated Emergency Response Times**

- ❖ Bridgestone Select - Shakthi Tyres, Ganesh Wines, Government hospital kottucherry, Servite Higher secondary School, Kottucherry Police Station, areas like have quicker response times (15- 20 minutes)
- Congested areas may experience delays (up to 30-40 minutes).

#### ❖ **Overall Summary of Risk Assessment**














- **Risk Level:** Moderate to High, especially during monsoon season.
- **Key Risks:** Waterlogging, traffic congestion, and potential communication dead zones.
- **Mitigation Measures:** Plan travel during non-peak hours, ensure proper vehicle maintenance, and have alternative routes and emergency contacts ready and control on the speed limit of the vehicle.

#### ❖ **Road Signage for TT/PT Driver**

## Road Traffic Signs in India

















### Mandatory/Regulatory Signs

 Stop	 Give way	 No entry	 Straight prohibited
 One way	 One way	 Vehicles prohibited in both directions	 Horn prohibited
 Pedestrians prohibited	 Cycles prohibited	 Right turn prohibited	 Left turn prohibited
 U-turn prohibited	 Overtaking prohibited	 Trucks prohibited	 Tonga prohibited

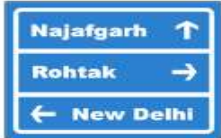

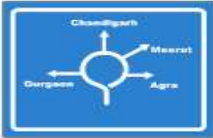
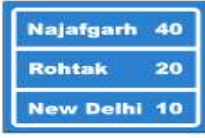
















 <p>All motor vehicles prohibited</p>	 <p>Hand cart prohibited</p>	 <p>Bullock cart prohibited</p>	 <p>Bullock and hand carts prohibited</p>
 <p>No parking</p>	 <p>No parking or stopping</p>	 <p>Speed limit</p>	 <p>Axle load limit</p>
 <p>Width limit</p>	 <p>Weight limit</p>	 <p>Length limit</p>	 <p>Load limit</p>
 <p>Restriction and</p>			



## Cautionary signs

			
Right hand curve	Left hand curve	Right hand pin bend	Left hand pin bend
			
Right reverse bend	Narrow bridge	Gap in median	Cycle crossing
			
Pedestrian crossing	School	Men at work	Roundabout
			
Narrow road	Road widens	Side road left	Side road right

## Information signs

			
Advance direction	Map type advance direction	Rotary intersection	Reassurance
			
Direction	Direction	Place identification	Truck lay bay
			
Toll booth ahead	Parking this side	Parking both sides	Cycle stand
			
Scooter and motor cycle stand	Taxi stand	Auto-rickshaw stand	Cycle-rickshaw stand
			
Public telephone	Filling station	Hospital	First aid post

## Conclusion

The route for Trichy Terminal (T.N) To KPM Agency is generally manageable but poses several risks, particularly during the monsoon season. Proper planning, adherence to regulations, and awareness of potential hazards can significantly mitigate these risks.

### ❖ Risk Assessment - Sharp Turns

<b>Risk Type</b>	<b>Risk Level</b>	<b>Coordination</b>	<b>Distance From Start</b>	<b>Recommendation Speed</b>
Sharp turn	Medium	10.769008535749057, 78.83723765484662	300 M	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.765497799294907, 78.83604620042777	700 M	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.764009578128617, 78.83419636244746	950 M	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.758028485487644, 78.8334001457567	1.6 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.756122556562806, 78.83055889901199	2.0 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.751420920596344, 78.82521649200099	2.8 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.739011461069182, 78.83858885050212	4.9 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.732693078871645, 78.8744004316786	9.1 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.717181602413664, 78.95464873306916	17.9 KM	20km/hr TO 30 Km/Hr
Sharp turn	High	10.720753025938777, 78.96377618938521	19.0 KM	10km/hr TO 20 Km/Hr
Sharp turn	Medium	10.71097912745339, 78.9558694661921	20.2 KM	20km/hr TO 30 Km/Hr
Sharp turn	High	10.71089603398133, 78.95587353077819	20.8 KM	10km/hr TO 20 Km/Hr
Sharp turn	Medium	10.710510777725322, 78.95815078770025	21.1 KM	10 km/hr TO 20 Km/Hr
Sharp turn	Medium	10.707892309680394, 78.9581432313126	21.4 KM	10km/hr TO 20 Km/Hr
Sharp turn	Medium	10.71089603398133, 78.95587353077819	25.4 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.573492136690625, 79.01365840917202	32.8 KM	20km/hr TO 30 Km/Hr

### ❖ Risk Assessment - Elevation Changes

Risk Type	Specific Risk	Risk Level	Coordinati on	Elevation Change	Gradient	Recommen dation Speed
Elevation Change	Descent	Low	10.7753, 78.8368	-5.02 m	2.6 %	30 km/hr to 40 km/hr
Elevation Change	Descent	Low	10.578749, 79.011727	10.02 m	6.6 %	30 km/hr to 40 km/hr

❖ **Risk Assessment – Key Location:**

Sr No	Location	Lat, lon.
1	Hall/Hotel	10.757627679523425, 78.83287045929539
2	OLD Burma Colony	10.75810448259808, 78.83342945889828
3	School/College	10.751940259658717, 78.824855152166
4	School/College	10.751244043943656, 78.82964545444308
5	Bank	10.749935829138195, 78.8268757083185
6	Toll Plaza	10.739223590189045, 78.82491390378034
7	Jagdish Filling station IOCL RO	10.730096699158965, 78.86385149738328
8	Bus Stand	10.737619717156392, 78.84469108474981
9	School/College	10.743654738281231, 78.85235497712233
10	Shri Rakku Sakti IOCL retail outlet	10.736854782210685, 78.85825905782572
11	School/College	10.736328228804307, 78.86222089649122
12	Moogambigai Agencies IOC RO	10.720992946251965, 78.94066066619781
13	G Parthasarathi Fuel Agencies IOCL RO	10.731949135570895, 79.01839981851398
14	Auto Parts Mall	10.73479825344728, 78.86383650381019
15	Trichy-Thanjavur Border check post	10.734414736299165, 78.8687554646539



16	Hotel	10.73449559472593, 78.87053727134324
17	Pkd railway station starting point	10.733035467327722, 78.87760665657318
18	Nayara Petrol Pump	10.733201787527669, 78.88075610377959
19	IOCL RO	10.7370281264634, 79.13691139189406
20	Smv Puncture Shop	10.733071879186443, 78.88788151537216
21	Hotel	10.732766784125532, 78.89204005296241
22	IOCL retail outlet	10.732484981220054, 78.89788773851032
23	Bank	10.730614988892885, 78.90808861916952

❖ **SHARP TURN PICTURE FOR TRICHY TERMINAL TO KPM AGENCY**



**SHARP TURN IMAGE START FROM TRICY TERMINAL**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.765497799294907,  
78.83604620042777**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.756122556562806,  
78.83055889901199**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.739011461069182,  
78.83858885050212**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.720753025938777,  
78.96377618938521**





**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.573492136690625,  
79.01365840917202**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.489673396392101,  
78.97667721669097**





**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.461719875337447,  
78.98089783911972**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.366911225762008,  
78.9863942537038**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.494374169846944,  
78.97771872041729**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.361143177391408,  
78.98166916302662**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.357266261057422,  
78.98084609847567**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI.23.423073831779945,  
70.68656297849758**





**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.494374169846944,  
78.97771872041729**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.366911225762008,  
78.9863942537038**





**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.521018452488628,  
78.9577791085502**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI.10.75826994715787,  
78.83326651420096**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.75826994715787,  
78.83326651420096**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.750231129775111,  
78.82811473719116**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.74903839684931,  
78.83067443431507**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.742539235146788,  
78.82757393279459**





**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.73973556832621,  
78.82562793774534**





IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.72027477903802,  
78.81393634911623



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.7141676534269, 78.80978487855221



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.706304240757193, 78.8074092846165**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.69925365221937, 78.80013538152075**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.695592180759466,  
78.7972570109372**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.69213724602102,  
78.79365805599211**



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.691122538049239,  
78.79072635315475



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.642372204088872,  
78.78787700005735