**Location-1 current scenario at Thurakapally Junction:**

**Latitude: 17.672381°**

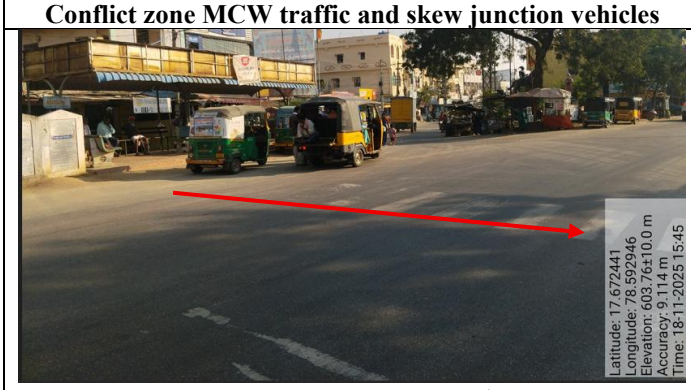
**Longitude: 78.593087°**

At present, the Thurakapally Junction is located between a left-hand horizontal curve on the approach side and a right-hand horizontal curve on the departure side of the main carriageway, with a skewed intersecting road, an existing median opening, and a bus shelter situated within a short junction influence area. This substandard geometric configuration results in inadequate sight distance and multiple vehicular conflict points between main carriageway and intersecting road traffic, further taking U-turn movements at the median opening. The bus shelter induces bus stoppages and pedestrian congregation close to the carriageway, leading to congestion, visibility obstruction, and driver confusion issues. The horizontal curves on both approaches restrict advance visibility, especially during night-time, causing sudden braking and unsafe movements, which increase the likelihood of rear-end and side-swipe collisions. Because of all these issues together, the Thurakapally Junction has become an accident-prone area and needs immediate safety improvements.

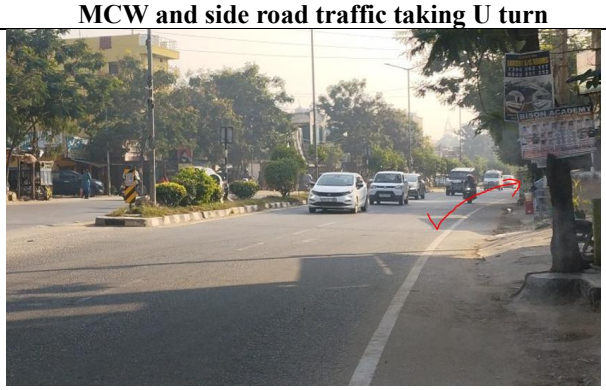
**Existing photographs at this location**

**Conflict zone MCW traffic and skew junction vehicles**

**MCW and side road traffic taking U turn**




**Faded out pavement marking**



**Curve on RHS**


**Bus shelter**


**Intersecting road in skew merging main carriageway**

**<u>Major Observations</u>**

1. Pavement markings at this location are faded and not clearly visible.
2. Several road studs are damaged and not functioning properly.
3. Adequate highway lighting is available at this location.
4. The existing transverse bar markings are faded and not clearly effective.

**Safety recommendations:**

**Short term measures:**

1. Provide three sets of **Transverse Bar Markings** (TBM) of 5 mm thickness on both approaches to the median opening at distances of 50 m, 80 m, and 120 m, along with road studs, to achieve effective speed reduction.
2. Install "**Accident-Prone Area**" warning signboards on both sides of the main carriageway and the intersecting road to alert drivers and improve safety awareness.
3. Provide **solar blinkers** on both approaches to enhance night-time visibility of the junction and conflict areas.
4. Provide **pavement markings** such as pedestrian crossing markings, edge lines, and centre lines as per IRC:35-2015, supplemented with road studs for improved delineation.
5. Provide hazard pavement markings at the Junction location as per IRC:35-2015 to warn drivers about the accident-prone zone.
6. Provide three sets of **Transverse Bar Markings (TBM)** of 5 mm thickness on the intersecting road at distances of 50 m, 80 m, and 120 m in advance of the merging point with the main carriageway, along with road studs, to control approach speeds.

**Long term measures:**

1. The junction shall be improved by converting it into a properly designed signalised intersection to regulate traffic movements and enhance overall safety.

**Location-2 current scenario at Genome Vally Junction:**

**Latitude: 17.659854°**

**Longitude: 78.586644°**

At present, an intersecting road known as **Genome Valley Road** connects to the **right-hand side (RHS) of the main carriageway (MCW)** through an existing median opening. A horizontal curve is located on the RHS approach of the MCW upstream of the Genome Valley junction, which significantly restricts advance visibility and creates a **blind spot** for through traffic. As a result, approaching MCW vehicles are unable to clearly perceive the intersecting road and merging traffic in time. A high volume of mixed traffic, ranging from heavy vehicles to small vehicles, enters the MCW from Genome Valley Road and frequently executes **U-turn movements at the median opening** to travel towards Karimnagar, while through traffic continues towards Hyderabad. These conflicting traffic movements, combined with inadequate road safety measures and restricted sight distance due to the horizontal curve, lead to frequent vehicle conflicts between MCW and intersecting road traffic, predominantly resulting in **side-swipe collisions**. Due to poor visibility, uncontrolled U-turn movements, and heavy interaction between vehicles, the Genome Valley junction has become an **accident-prone area** and needs immediate safety improvements.

**Existing photographs at this location**

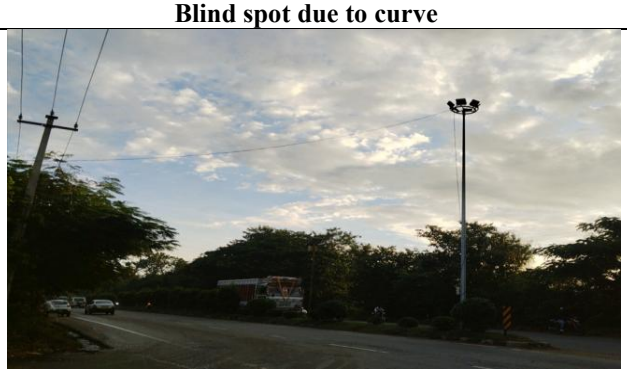

**Genome Vally Road**

**Median Opening on MCW**

**Horizontal curve on RHS**

**Blind spot due to curve**

**Restricted Visibility of Genome Valley Road from Main Carriageway**



**Existing High mast light**

**<u>Major Observations</u>**

1. Pavement markings at the junction are worn out and lack adequate visibility.
2. Several road studs are damaged and are not effectively delineating the carriageway.
3. Existing transverse bar markings are faded and have lost their functional effectiveness.
4. Only one high-mast light is available at the junction, which is inadequate to ensure proper illumination of the conflict area.
5. Solar blinkers installed on the BHS on MCW are provided and are presently functional.
6. Junction improvement signboards such as **STOP**, **speed limit**, and **junction ahead** warning signs are not provided on the Genome Valley Road.

**Safety recommendations:**

1. Provide three sets of **Transverse Bar Markings** (TBM) of 5 mm thickness on both approaches to the median opening at distances of 50 m, 80 m, and 120 m, along with road studs, to achieve effective speed reduction.
2. Install "**Accident-Prone Area**" warning signboards on both sides of the main carriageway and the intersecting road to alert drivers and improve safety awareness.
3. Provide **pavement markings** such as pedestrian crossing markings, edge lines, and centre lines as per IRC:35-2015, supplemented with road studs for improved delineation.
4. Provide hazard pavement markings at the Junction location as per IRC:35-2015 to warn drivers about the accident-prone zone.
5. Provide three sets of **Transverse Bar Markings (TBM)** of 5 mm thickness on the intersecting road at distances of 50 m, 80 m, and 120 m in advance of the merging point with the main carriageway, along with road studs, to control approach speeds.
6. Provide appropriate junction control and warning signboards on Genome Valley Road, such as **STOP**, **speed limit**, and **junction ahead** signs, as per IRC:67-2022, to regulate vehicle movements, improve driver awareness, and enhance overall junction safety.
7. Provide green-coloured road studs at the crossable lane markings at the Genome Valley Road and main carriageway merging location to improve delineation and driver guidance.
8. Provide highway lighting for a length of 250 m on both sides of the median opening, i.e., towards Hyderabad and towards Karimnagar, to improve visibility and safety.

**Safety measures at Blind spot**

1. Remove or trim roadside vegetation, trees, posters, and any obstructions within the **intersection sight distance (ISD)** envelope to restore visibility of the intersecting road.
2. **Advance Warning Signage on MCW**
   Install "Junction Ahead" and "speed limit sign board" warning signboards on MCW as per IRC:67-2022, to alert drivers of the upcoming conflict point.

**Permanent Improvements (Long-Term Development Measures)**

1. **Geometric Junction Improvement**: Reconfigure the intersection geometry by improving the approach alignment or channelizing movements to reduce direct conflicts between MCW and intersecting road traffic.

2. **Access Control at Median Opening**: Restrict or relocate the existing median opening away from the blind curve and junction influence area to minimize unsafe U-turn and crossing movements.

**Location-3 current scenario at Majidpur Junction:**

**Latitude: 17.569489°**

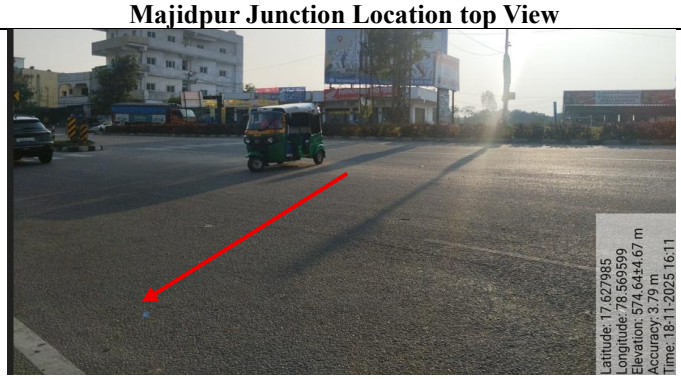
**Longitude: 78.627881°**

At present, **Majidpur Junction** is located on a **horizontal curve of the main carriageway (MCW)**, where **Medchal Road intersects the highway**. Due to the provision of **superelevation on the curved MCW**, the carriageway level is relatively higher than the intersecting Medchal Road, resulting in a noticeable **level difference at the junction**. A high volume of mixed traffic, including heavy and light vehicles during peak PCU conditions, enters the MCW from Medchal Road, with vehicles either merging towards **Karimnagar** or taking **U-turns at the median opening** to proceed towards **Hyderabad**. Simultaneously, vehicles from the MCW (Karimnagar direction) frequently cross the carriageway to access Medchal Road. Because of the level difference between the main carriageway and the intersecting road, heavy vehicles face difficulty while crossing the junction, resulting in slow movement and, at times, unexpected stopping or **rolling back** during crossing. These unsafe operating conditions, combined with curved alignment and high traffic interaction, have resulted in frequent **rear-end and side-swipe collisions** at the junction. Due to these geometric deficiencies and conflicting traffic movements, the Majidpur Junction has emerged as an **accident-prone location** requiring immediate safety and geometric improvement measures.

**Existing photographs at this location**


**Majidpur Junction Location top View**

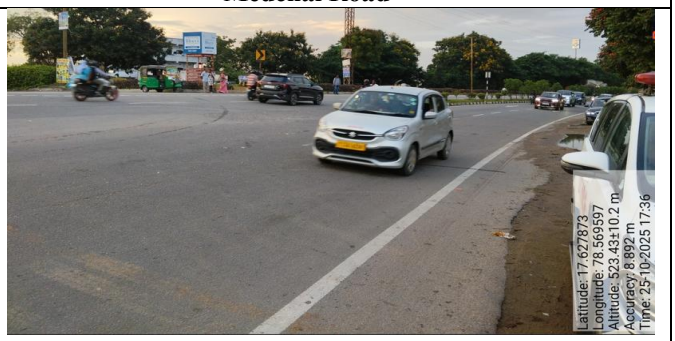
**Median Opening on MCW and level difference**



**Slope MCW**

**Medchal Road**

**Unsafe Heavy Vehicle Crossing**



**Junction on curve**

**Major Observations**

1. Pavement markings at the junction are severely worn out, resulting in poor visibility and reduced guidance to road users, especially during night-time and adverse weather conditions.

2. A number of road studs are damaged or missing and are therefore not effectively delineating the carriageway or traffic paths.
3. The existing transverse bar markings (TBMs) are faded and have lost their intended speed-calming and warning effectiveness.
4. Only one small high-mast light is provided at the junction, which is inadequate to ensure proper illumination of the intersection area during night hours.
5. Solar blinkers installed on the BHS along the main carriageway are provided and are presently functional.
6. Essential junction improvement signboards such as **STOP**, **speed limit**, and **junction ahead warning signs** are not provided on the Medchal Road, leading to inadequate advance warning for approaching traffic.
7. Pedestrian crossing facilities are provided on only one side of the junction, which is insufficient to ensure safe pedestrian movement across all approaches.

**Safety recommendations:**

**Short term measures:**

1. Provide three sets of **Transverse Bar Markings** (TBM) of 5 mm thickness on both approaches to the median opening at distances of 50 m, 80 m, and 120 m, along with road studs, to achieve effective speed reduction.
2. Install "**Accident-Prone Area**" warning signboards on both sides of the main carriageway and the intersecting road to alert drivers and improve safety awareness.
3. Provide **pavement markings** such as pedestrian crossing markings, edge lines, and centre lines as per IRC:35-2015, supplemented with road studs for improved delineation.
4. Provide hazard pavement markings at the Junction location as per IRC:35-2015 to warn drivers about the accident-prone zone.
5. Provide one sets of **Transverse Bar Markings (TBM)** of 5 mm thickness on the intersecting road at distances of 80m in advance of the merging point with the main carriageway, along with road studs, to control approach speeds.
6. Provide appropriate junction control and warning signboards on Medchal Intersection Road, such as **STOP**, **speed limit**, and **junction ahead** signs, as per IRC:67-2022, to regulate vehicle movements, improve driver awareness, and enhance overall junction safety.
7. Provide green-coloured road studs at the crossable lane markings at the Medchal Road and main carriageway merging location to improve delineation and driver guidance.
8. Provide highway lighting for a length of 250 m on both sides of the median opening, i.e., towards Hyderabad and towards Karimnagar, to improve visibility and safety.
9. Provide high Intensity High mast light junction location to enhance the highway lighting and clear visibility.

**Long term measures:**

1. Reconstruct and level the junction area by reducing the level difference between MCW and Medchal Road to facilitate safe heavy vehicle crossing.
2. **Option-1:** Convert this junction into a **signalised intersection** to regulate traffic movements and improve safety.
3. **Option-2:** Reconstruct and upgrade this junction into a **grade-separated intersection** to eliminate traffic conflicts and improve overall safety and traffic flow.

**Location-4 current scenario at Aliabad Junction:**

**Latitude: 17.61935°**

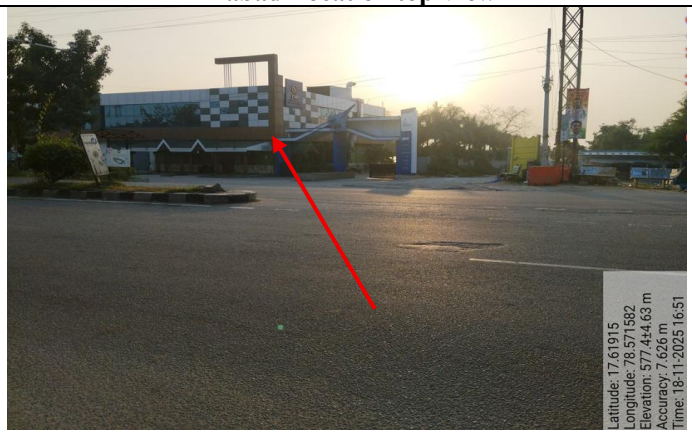
**Longitude: 78.571614°**

At present, the Aliabad Junction comprises the **Aliabad Village Road** intersecting the right-hand side of the main carriageway (MCW) along with an existing median opening. On the left-hand side, a minor Majidpur Village Road intersects the MCW very close to the Aliabad Village Road, and a function hall is located immediately adjacent to this junction area. The close spacing of two intersecting roads, presence of the median opening, and roadside activity generated by the function hall result in high vehicular and pedestrian interaction within a short influence length. These conditions create multiple conflict points, frequent turning and crossing movements, and driver confusion, thereby increasing the risk of **rear-end and side-swipe collisions.** Due to these combined factors, the Aliabad Junction has emerged as an accident-prone location requiring immediate safety improvements.

**Existing photographs at this location**


**Aliabad Location top View**

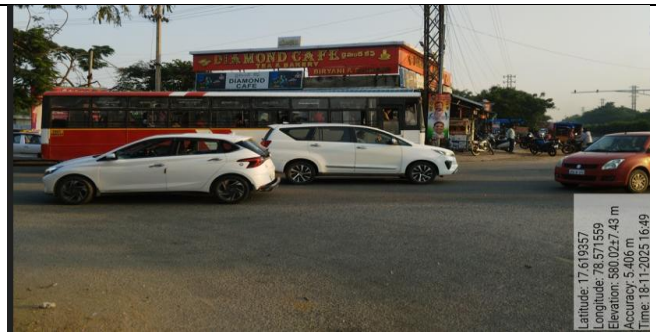

**Median Opening on MCW and Unsafe crossing**




**Median opening and function hall on LHS**


**Aliabad Road**

**Majidpur village road on LHS**




**Traffic flow between Aliabad road and MCW**

**Major Observations**

1. Pavement markings at the junction are severely worn out, resulting in poor visibility and reduced guidance to road users, especially during night-time and adverse weather conditions.
2. A number of road studs are damaged or missing and are therefore not effectively delineating the carriageway or traffic paths.

3. The existing transverse bar markings (TBMs) are faded and have lost their intended speed-calming and warning effectiveness.
4. Solar blinkers installed on the BHS along the main carriageway are provided and are presently functional.
5. Essential junction improvement signboards such as STOP, speed limit, and junction ahead warning signs are not provided on Aliabad Road, leading to inadequate advance warning for approaching traffic.
6. Pedestrian crossing facilities are not observed on MCW as well as Aliabad intersection road.
7. Adequate highway lighting is not provided along the main carriageway within the junction influence area, adversely affecting night-time visibility and safety.

**Safety recommendations:**

**Short term measures:**

1. Provide three sets of **Transverse Bar Markings** (TBM) of 5 mm thickness on both approaches to the median opening at distances of 50 m, 80 m, and 120 m, along with road studs, to achieve effective speed reduction.
2. Install "**Accident-Prone Area**" warning signboards on both sides of the main carriageway and the intersecting road to alert drivers and improve safety awareness.
3. Provide **pavement markings** such as pedestrian crossing markings, edge lines, and centre lines as per IRC:35-2015, supplemented with road studs for improved delineation.
4. Provide hazard pavement markings at the Junction location as per IRC:35-2015 to warn drivers about the accident-prone zone.
5. Provide one sets of **Transverse Bar Markings (TBM)** of 5 mm thickness on the intersecting road (Aliabad) at distances of 80m in advance of the merging point with the main carriageway, along with road studs, to control approach speeds.
6. Provide appropriate junction control and warning signboards on Aliabad Intersection Road, such as **STOP**, **speed limit**, and **junction ahead** signs, as per IRC:67-2022, to regulate vehicle movements, improve driver awareness, and enhance overall junction safety.
7. Provide crossable lane marking along with green colour road studs at the Aliabad Road and main carriageway merging location to improve delineation and driver guidance.
8. Provide highway lighting for a length of 250 m on both sides of the median opening, i.e., towards Hyderabad and towards Karimnagar, to improve visibility and safety.
9. Provide high Intensity High mast light junction location to enhance the highway lighting and clear visibility.

**Long term measures:**

1. **Option-1:** Convert this junction into a **signalised intersection** to regulate traffic movements and improve safety.
2. **Option-2:** Reconstruct and upgrade this junction into a **grade-separated intersection** to eliminate traffic conflicts and improve overall safety and traffic flow.

**Location-5 current scenario at Nalsar X Road (Orange Bowl Junction):**

**Latitude: 17.59589°**

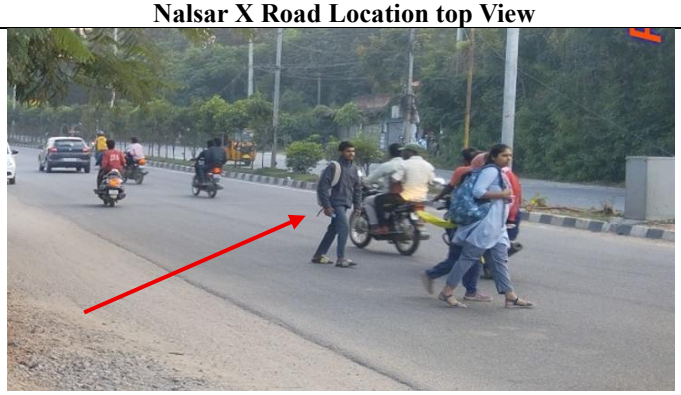
**Longitude: 78.569218°**

At present, one intersecting road is located on the left-hand side (LHS) of the main carriageway along with an existing median opening. Another intersecting road is situated approximately 170 m from the median opening on the right-hand side (RHS) in the Hyderabad direction. Due to the close spacing of these access points, vehicles frequently attempt to access the LHS intersecting road from the RHS intersecting road by adopting **wrong-side driving** towards the median opening and making U-turn movements. In addition, pedestrians are observed crossing the main carriageway at this location without **designated crossing facilities**, further increasing traffic conflicts. These unsafe and uncontrolled vehicle and pedestrian movements create severe conflicts with through traffic on the main carriageway, resulting in frequent **rear-end and side-swipe collisions**. Because several access points are located very close to each other and vehicles frequently move in the wrong direction, this location has become an accident-prone area and needs immediate safety and access control measures.

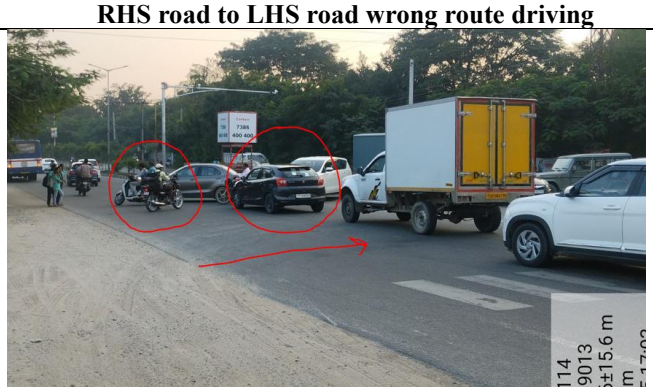
**Existing photographs at this location**


**Nalsar X Road Location top View**

**RHS road to LHS road wrong route driving**



**Unsafe pedestrian Crossing**



**Conflict of vehicles at median opening**


**Majidpur village road on LHS**

**LHS intersection road**

**Major Observations**

1. Pavement markings at the junction are severely worn out, resulting in poor visibility and reduced guidance to road users, especially during night-time and adverse weather conditions.
2. At present there is No studs are observed.

3. The existing transverse bar markings (TBMs) are faded and have lost their intended speed-calming and warning effectiveness.
4. Solar blinkers installed on the BHS along the main carriageway are provided and are presently functional.
5. Essential junction improvement signboards such as STOP, speed limit, and junction ahead warning signs are not provided on RHS and LHS intersection roads, leading to inadequate advance warning for approaching traffic.
6. Pedestrian crossing facilities are not observed on MCW as well as intersection roads.
7. Highway lighting has been provided along the main carriageway.

**Short term measures:**

1. Provide three sets of **Transverse Bar Markings** (TBM) of 5 mm thickness on both approaches to the median opening at distances of 50 m, 80 m, and 120 m, along with road studs, to achieve effective speed reduction.
2. Install "**Accident-Prone Area**" warning signboards on both sides of the main carriageway and the intersecting road to alert drivers and improve safety awareness.
3. Provide **pavement markings** such as pedestrian crossing markings, edge lines, and centre lines as per IRC:35-2015, supplemented with road studs for improved delineation.
4. Provide hazard pavement markings at the Junction location as per IRC:35-2015 to warn drivers about the accident-prone zone.
5. Provide one sets of **Transverse Bar Markings (TBM)** of 5 mm thickness on the intersecting roads at distances of 80m in advance of the merging point with the main carriageway, along with road studs, to control approach speeds.
6. Provide appropriate junction control and warning signboards on Intersection Roads, such as **STOP**, **speed limit**, and **junction ahead** signs, as per IRC:67-2022, to regulate vehicle movements, improve driver awareness, and enhance overall junction safety.
7. Provide crossable lane marking along with green colour road studs at intersection roads and main carriageway merging location to improve delineation and driver guidance.
8. Provide high Intensity High mast light junction location to enhance the highway lighting and clear visibility.
9. Regulate wrong-side traffic through strict enforcement measures, including routine Traffic fines and monitoring.
10. Provide pedestrian signal facilities at the junction to regulate pedestrian movements, improve crossing safety, and minimize conflicts with vehicular traffic.
11. Provide highway lighting on the LHS intersecting road to improve night-time visibility and enhance overall safety.

**Long term measures:**

1. **Option-1:** Convert this junction into a **signalised intersection** to regulate traffic movements and improve safety.
2. **Option-2:** Reconstruct and upgrade this junction into a **grade-separated intersection** to eliminate traffic conflicts and improve overall safety and traffic flow.

**Location-5 current scenario at Thumakunta Junction:**

**Latitude: 17.564469°**

**Longitude: 78.551578°**

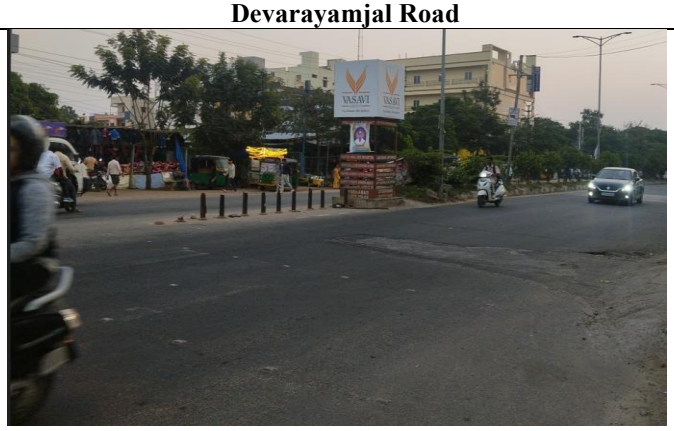
At present, Devarayamjal Road intersects the main carriageway (MCW) at the **Tumakunta** Junction, where an existing median opening is also provided within the junction influence area. The presence of this median opening, combined with frequent turning, crossing, and U-turn movements from **Devarayamjal** Road, results in multiple vehicular conflict points with through traffic on the MCW. These uncontrolled movements lead to speed differentials, sudden braking, and lane changes on the main carriageway, increasing the risk of **rear-end and side-swipe collisions**. Due to the intersection layout and the median opening within a short influence length, the Tumakunta Junction has emerged as an accident-prone location, needs immediate safety and access control measures.

**Existing photographs at this location**

**Thumkunta Junction Location top View**

**Devarayamjal Road**

**Shamirpet distress in the form of ravelling, rutting, and potholes**



**Median opening**

**Unsafe Pedestrian Crossing**

**RTC buses stopping on Devarayamjal Road pose a safety hazard to through traffic**

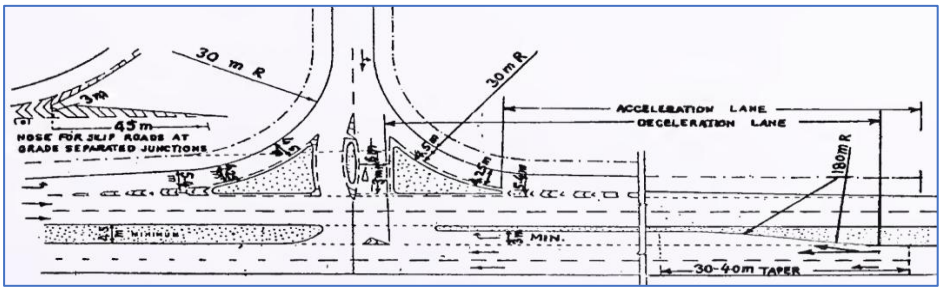
**Major Observations**

1. Pavement markings at the junction are severely worn out, resulting in poor visibility and reduced guidance to road users, especially during night-time and adverse weather conditions.
2. At present there is No studs are observed.

3. The existing transverse bar markings (TBMs) are faded and have lost their intended speed-calming and warning effectiveness.
4. Essential junction improvement signboards such as STOP, speed limit, and junction ahead warning signs are not provided on intersection roads, leading to inadequate advance warning for approaching traffic.
5. Pedestrian crossing facilities are not observed on MCW as well as intersection roads.
6. Highway lighting has been provided along the main carriageway.
7. Shamirpet Road (MCW) and Devarayamjal Road are exhibiting significant pavement surface distress in the form of ravelling, rutting, and potholes, with waterlogging observed at several locations, adversely affecting riding quality and road safety.

**Short term measures:**

1. Provide three sets of **Transverse Bar Markings** (TBM) of 5 mm thickness on both approaches to the median opening at distances of 50 m, 80 m, and 120 m, along with road studs, to achieve effective speed reduction.
2. Install "**Accident-Prone Area**" warning signboards on both sides of the main carriageway and the intersecting road to alert drivers and improve safety awareness.
3. Carry out immediate pavement repairs on Shamirpet Road (MCW) and Devarayamjal Road to rectify ravelling, rutting, potholes, and waterlogging, and improve overall road safety.
4. Provide **pavement markings** such as pedestrian crossing markings, edge lines, and centre lines as per IRC:35-2015, supplemented with road studs for improved delineation.
5. Provide hazard pavement markings at the Junction location as per IRC:35-2015 to warn drivers about the accident-prone zone.
6. Provide one sets of **Transverse Bar Markings (TBM)** of 5 mm thickness on the intersecting roads at distances of 80m in advance of the merging point with the main carriageway, along with road studs, to control approach speeds.
7. Provide appropriate junction control and warning signboards on Intersection Roads, such as **STOP**, **speed limit**, and **junction ahead** signs, as per IRC:67-2022, to regulate vehicle movements, improve driver awareness, and enhance overall junction safety.
8. Provide crossable lane marking along with green colour road studs at intersection roads and main carriageway merging location to improve delineation and driver guidance.
9. Provide high Intensity High mast light junction location to enhance the highway lighting and clear visibility.
10. Since an existing median opening is located at approximately 60 m, a **storage lane shall be provided on the main carriageway as per IRC: SP:41-1994** to facilitate safe U-turn movements of BHS vehicles.




**Long term measures:**

1. **Option-1:** Convert this junction into a **signalised intersection** to regulate traffic movements and improve safety.
2. **Option-2:** Reconstruct and upgrade this junction into a **grade-separated intersection** to eliminate traffic conflicts and improve overall safety and traffic flow.

## GK Consulting Engineers – Company Profile

GK Consulting Engineers (GKC) is a multidisciplinary engineering consultancy firm specializing in infrastructure, transportation, and development projects across India and abroad. The organization is committed

to delivering high-quality, cost-effective, and technically sound solutions, backed by a strong team of experienced professionals.

**Core Areas of Expertise:**

- Roads and Highways
- Traffic & Transportation Planning
- Road Safety Audits
- Infrastructure Development
- BOT/PPP Projects
- Pavement Design & Management
- Highway Traffic Management Systems (HTMS)

**Services Offered:**

- Feasibility studies, surveys, and investigations
- Traffic studies and analysis
- Detailed project reports, engineering designs, and cost estimation
- Pre-bidding and advisory services
- Contract documentation, drawings, and specifications
- Project management, supervision, and proof-checking
- Road safety audits and consultancy

**Team Strength:**

The firm is led by **Dr. G.N. Mallikarjuna Rao** (Team Leader & Road Safety Expert, Ph.D., 30+ years of experience) and supported by a team of structural engineers, highway engineers, HTMS specialists, and road safety professionals with a blend of extensive academic background and practical expertise.

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GKC has successfully executed and contributed to over 100 projects, ranging from national and state highway development, expressways, and BOT/PPP projects to urban infrastructure initiatives and smart city projects. Their clientele includes major private companies, government agencies, and international organizations.

**Reputation & Approach:**

The company is recognized for its technical competence, adherence to quality standards, and timely project delivery. Its work ethos emphasizes innovation, precision, and long-term client relationships, ensuring client satisfaction through professional service and reliable support.

**For G.K. Consulting Engineers**

**Dr. G. N. Mallikarjuna Rao**

**Road Safety Expert**