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SUB-PROJECT COMPLETION REPORT

COMPONENT – II

RECONSTRUCTION OF ROADS & BRIDGES

VOLUME – II (ROADS)

Prepared By: LEA Associates South Asia Pvt. Ltd.

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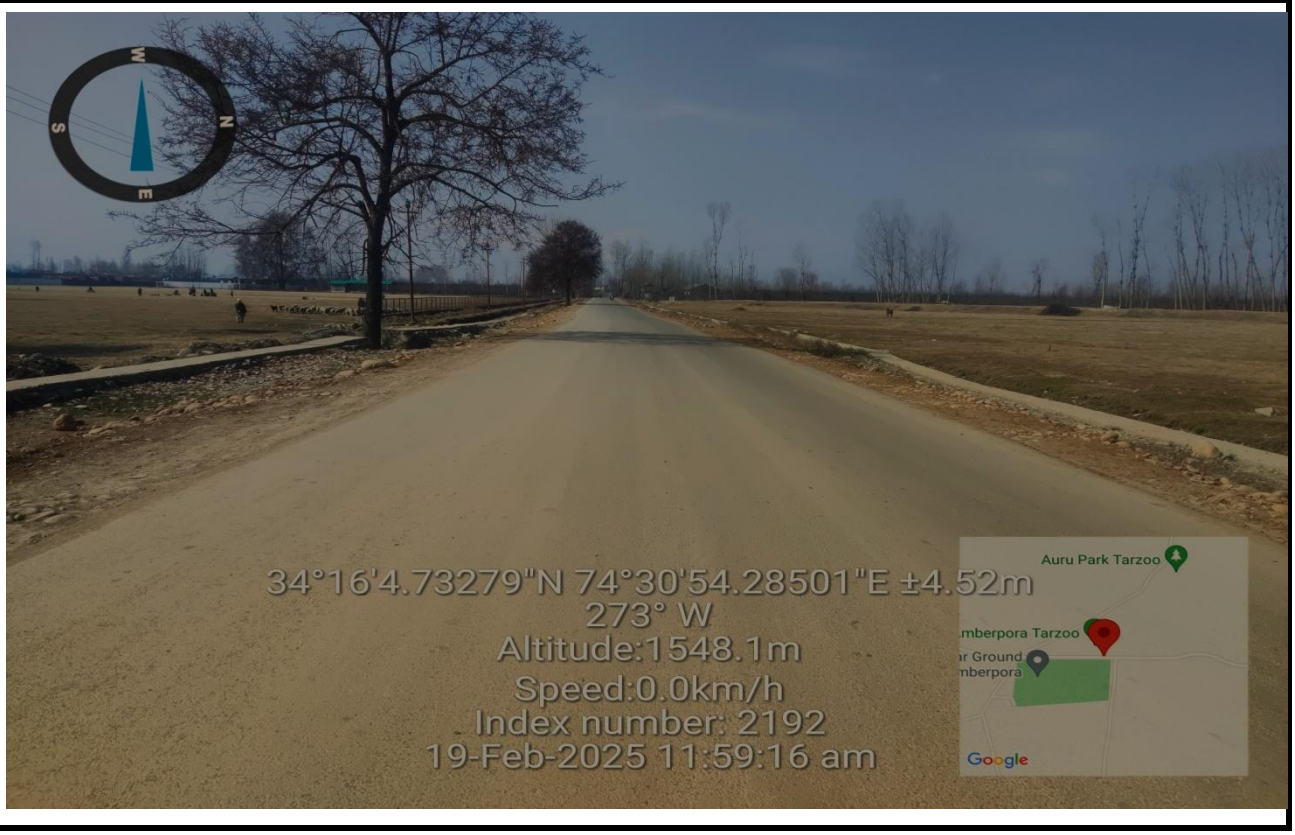
VOLUME-II

ROADS UNDER EXECUTION BY JKPCC



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1. INTRODUCTION

1.1 Project Background

In September 2014, Jammu & Kashmir experienced torrential monsoon rains in the region causing major flooding & landslides. The continuous spell of rains from September 2-6, 2014 caused Jhelum and Chenab Rivers as well as many other streams/tributaries to flow above the danger mark. The Jhelum River also breached its banks flooding many low-lying areas in Kashmir, including the capital. In many districts, the rainfall exceeded the normal by over 600%. The Indian Meteorological Department (IMD) records precipitation above 244.4 mm as extremely heavy rainfall and J&K received 558mm of rain in the June – September period as against the normal 477.4 mm. For example, the district of Qazigund recorded over 550 mm of rainfall in 6 days as against a historic normal of 6.2 mm over the same period.

Due to unprecedented heavy rainfall the catchment areas particularly the low lying areas were flooded for more than two weeks. Some areas in urban Srinagar stayed flooded for 28 days. Water levels were as high as 27 feet in many parts of Srinagar. The areas from the main tributaries of river Jhelum vis-à-vis Brengi nallah, Vishow nallah, Lider nallah and Sandran nallah started overflowing due to the heavy rainfall causing water levels in Jhelum to raise. Subsequently, the discharge of the river Suran was 200 thousand cusecs as against an average of 50 thousand cusecs. With the excessive discharge of water, the river Suran affected the basin areas and also took a different course at various locations causing damages to the surrounding villages in the catchment area. Water levels also increased in the rivers of Chenab and Tawi, both of which were flowing above normal levels. Due to the rivers overflowing nearly 20 districts of the State were impacted.

A Joint team led by the Department of Economic Affairs (DEA), GoI, with representation from the World Bank visited J&K on October 21, 2014. Subsequently, GoI has sent a request to the World Bank on January 5, 2015 to field a joint Rapid Damage and needs Assessment (RDNA) Mission within the State. In response, a mission of the World Bank visited the State during February 1-6, 2015 in order to produce a rapid multi-sectored assessment report of the damages and needs. The RDNA estimates the total damages and loss caused by floods at about INR 211.975 Million, most of it to housing, livelihoods; roads and bridges which combined represented more than 70% of the damages in terms of value. Public service infrastructure and equipment of hospitals and education centers were also severely damaged and were still not fully operational.

The primary focus of the project “Jhelum & Tawi Flood Recovery Project” is on restoring critical infrastructure using international best practice of resilient infrastructure. Given the region’s vulnerability to both flood and earthquakes, the infrastructure will be designed with upgraded resilient feature, and will include contingency planning for future disaster events. Therefore, a study followed by

detailed reports on flood management aims at both restoring essential services disrupted by the floods and improving the design standards and practices resilience.

The Government of India has received a loan from the World Bank towards the cost of Jhelum & Tawi Flood Recovery Project (JTFRP) for Government of Jammu and Kashmir. The Disaster Management, Relief & Rehabilitation Department, Government of J&K has been appointed as the implementing agency. One Project Management Unit (PMU) has been set up under this implementing agency which is responsible for overall project management, coordination and reporting.

Based on the Rapid Damage Needs Assessment (RDNA): Results, restoration works underway and discussion with the GOJ&K, the project will focus on resorting critical infrastructure using international best practice on resilient infrastructure. Given the state's vulnerability to both floods and earthquakes, the infrastructure will be designed with upgraded resilient features and will include contingency planning for further disaster events. Therefore, the project aims at both restoring essential services disrupted by the floods and improving the design standard and practices in the state to increase resilience.

1.2 Project Development Objective:

The Project Development Objective (PDO) is to support the recovery and increase disaster resilience in targeted areas of the state and increase the capacity of the state entities to respond promptly and effectively to an eligible crisis or emergency.

1.3 Project Components:

The project is comprised of the following seven components:

1. Reconstruction and strengthening of critical infrastructure (US$50 million)
2. Reconstruction of roads and bridges (US$55 million)
3. Restoration of urban flood management infrastructure (US$40 million)
4. Restoration and strengthening of livelihoods (US$15 million)
5. Strengthening disaster risk management capacity (US$25 million)
6. Contingent Emergency Response (US$45 million)
7. Implementation Support (US$20 million).

Total Amount is US$ 250 Million.

Component 2 – Reconstruction of Roads and Bridges, US$80million

The objective of this component is to restore and improve the connectivity disrupted due to the disaster through the reconstruction of damaged roads and bridges. The infrastructure has been designed to withstand earthquake and flood forces as per the latest official design guidelines. The affected areas will benefit by the restored access to markets, inter district connectivity thereby increasing the economic growth in these

areas and timely access to health and education services. Restoration of roads will also serve as supply/rescue lines in the event of a disaster.

The component will finance the reconstruction of damaged roads, bridges and associated drainage and slope stabilization works, retaining walls, breast walls and other structures to increase resilience.

2. ROADS UNDER EXECUTION BY JKPCC/R&B (K)

The road subprojects undertaken by JKPCC and R&B (Kashmir) under the **Jhelum Tawi Flood Recovery Project (JTFRP)** are a strategic response to restore and modernize key road infrastructure in flood-affected regions of the Kashmir Valley. These road projects aim to improve connectivity, enhance disaster resilience, and uplift socio-economic conditions in vulnerable and underserved areas, particularly those that suffered significant infrastructure loss during the **2014 floods**.

The interventions focus on the **strengthening, widening, and flood-proofing** of critical rural roads, improving both riding quality and road safety. These roads are essential for connecting remote villages to essential services such as healthcare, education, and markets, and serve as vital routes for disaster relief and evacuation. The selected road stretches traverse flood-prone zones, and their rehabilitation involves comprehensive structural improvements—such as pavement strengthening, cross-drainage enhancements, protective works (retaining walls, toe walls), and realignment in waterlogged segments.

The roads under this initiative include those that link important rural clusters across **Baramulla, Anantnag, and Pulwama** districts, directly benefiting over **40 villages** and a cumulative population of **over 75,000**. Through systematic design and quality assurance, these projects are setting a new benchmark in climate-resilient rural road development in Jammu & Kashmir.

2.1 Executive Summary

2.1.1 Objective

The primary goal of these subprojects is to **restore, strengthen, and modernize rural road infrastructure** across key corridors in Kashmir Valley that were critically damaged by the 2014 floods. The up gradation works aim to:

- Establish **flood-resilient and all-weather road access**.
- Address chronic issues such as **poor pavement quality**, inadequate drainage, and unsafe geometry

- Improve **regional mobility**, boost **agricultural and trade logistics**, and ensure **uninterrupted access to emergency services**
- Implement **modern road engineering techniques**, including multi-layered flexible pavement, reinforced protection structures, and enhanced road safety features

2.1.2 Summary of Achievements

Three major road corridors, totaling nearly **9 km**, have been upgraded under JTFRP:

1. **Amberpora to Haritar Road** (2.45 km, Baramulla)
2. **Halmulla–Punchpora to Kralkut Road** (3.35 km, Anantnag)
3. **Malangpora–Chakoora–Litter–Tahab Road** (3.216 km, Pulwama)

- Roads widened and reconstructed to meet **IRC rural road specifications**
- **Flood mitigation measures** implemented through embankment raising, construction of **culverts, retaining walls, and cross-drainage systems**
- **Pavement structures upgraded** with layers such as Wet Mix Macadam (WMM), Bituminous Macadam (BM), and Bituminous Concrete (BC) to support projected traffic and ensure longer design life
- **Road safety features**—including road signs, reflective markings, and retro boards—integrated throughout
- Projects completed on schedule and within allocated budgets, ensuring **sustainable, low-maintenance infrastructure**

2.2 Introduction & Background

The **2014 Kashmir floods** exposed the fragility of rural transportation infrastructure across the valley, with widespread road collapse, submergence, and loss of connectivity in hilly and low-lying areas. In response, the **World Bank-funded JTFRP**, through JKERA, initiated critical subprojects targeting roads that function as both **economic arteries and emergency corridors** in disaster-prone zones.

These projects, executed through JKPCC and R&B (Kashmir), were selected based on:

- **Historical importance** and current strategic value of the road
- **Extent of flood damage and structural vulnerability**
- Need for **safe evacuation routes and robust cross-village connections**

Unlike earlier patchwork repairs, this initiative adopted a **comprehensive engineering approach**—covering pavement design, safety audits, hydrological

studies, and climate-resilient materials—ensuring long-term durability and performance.

2.3 Sub-Project Details

Each road subproject was developed following **IRC guidelines and MORT&H specifications**, with terrain classification, projected traffic load, and community feedback integrated into the final designs.

Key components included:

- **Widening** of existing carriageways
- **Reconstruction, strengthening** of existing pavements.
- **Installation or upgrading of drainage systems**, culverts, and embankments
- **Road safety enhancements**, including curve widening, reflective signage, and protective parapets

The road designs also addressed unique challenges:

- **Amberpora–Haritar Road**: Raised in low-lying flood-prone segments, embankments fortified with more than 1000m of retaining walls.
- **Halmulla–Kralkut Road**: Connects several villages, widened to **3.75m** with **0.5m shoulders on either side**, designed to handle future flood escape needs
- **Malangpora–Litter–Tahab Road**: Phased reconstruction (strengthening + overlay) based on **Benkelman Beam Deflection** studies, with upgraded **6 culverts** and durable surface treatment for agricultural drainage

The table below outlines the essential details of each finished subproject, such as pavement type, road length, contractor name, financials (allocated, revised, and final completion costs), and timelines from the start to actual completion.

S.No	Name of Road Subproject	Type of Pavement	Name of Contractor	Length of Road Package *(in Km)*	Allotted cost *(in Crores)*	Revised cost *(in Crores)*	Completion cost *(in Crores)*	Date of Start *(as per Allotment)*	Date of Completion *(Actual)*
1	Up gradation of Amberpora to Haritar Road (Length 2.45 Km)	Flexible Pavement	JKPCC Ltd.	2.45	7.85			10-10-2018	03-07-2025
2	Widening/ Upgrading of Halmulla Punchpora to Kralkut Road	Flexible Pavement	JKPCC Ltd.	3.35	4.98	4.76	5.02	03-10-2018	30-09-2020
3	Widening of Litter Chowdarybagh Chakoora Road in Distt. Pulwama.	Flexible Pavement	JKPCC Ltd.	3.216	3.36	2.14	2.25	03-10-2018	31-10-2020

DETAILS OF THE STAKEHOLDERS		
1	Project Management Unit	JHELUM TAWI FLOOD RECOVERY PROJECT (JTFRP)
2	Project Implementation Agency	JAMMU & KASHMIR PROJECT CONSTRUCTION CORPORATION (JKPCC)
3	Design Consultant	XPLORER CONSULTANCY SERVICES PVT. LTD.
4	Quality Audit Consultants	LEA ASSOCIATES SOUTH ASIA PVT LTD. (TAQAC)
5	Funding Agency	The World Bank
6	Total Contract Price of Road Subprojects under execution by JKPCC	

3. CONTRACT DETAILS

3.1 Upgradation of Amberpora to Haritar Road (Length 2.45 Km)

3.1.1 Project Overview & Necessity

The **Amberpora to Haritar Road**, extending over 2.45 kilometers, plays a crucial role in connecting **Sonawari** with **Sopore**, while also serving as an essential corridor for several villages, including **Amberpora**, **Wandakpora**, **Haritar**, and **Akhanpora**. This road forms a vital part of the **Major District Road (MDR)** network, which links the districts of **Baramulla**, **Bandipora and Ganderbal.**

Historically, the road has been a lifeline for local communities, facilitating socio-economic activities. However, due to its deteriorated condition, it faced significant challenges. Initially constructed about **40 years ago**, the road was partially repaired in **2010**. After the devastating **2014 floods**, the road suffered major damage, leaving it nearly impassable and disrupting connectivity for local residents. The flooding caused substantial structural damage to the road, including **potholes**, **cracks**, **erosion**, and other serious safety hazards, significantly hindering the region's development.

The **up gradation** of this road was essential for several reasons:

- **Heavy Traffic Flow**: Despite the poor condition, the road was subjected to high traffic volumes daily, underscoring the need for modernization.
- **Flood Vulnerability**: The road lies in a low-lying area, making it prone to flooding. The 2014 floods inflicted considerable damage, highlighting the urgent need for flood-resistant infrastructure.
- **Socio-Economic Growth**: The road was critical for the socio-economic development of the surrounding villages, which rely on it for daily commuting, services, and trade.

Impact of the 2014 Floods: In **September 2014**, the region experienced unprecedented floods that caused massive destruction to infrastructure, resulting in widespread loss of life and property. The **Amberpora to Haritar Road** was severely affected, with large sections submerged for extended periods. In response to the damage, the government initiated the **Jhelum-Tawi Flood Recovery Project (JTFRP)**, aimed at rebuilding and strengthening infrastructure across the region, including this crucial road.

During the floods, the road served as a **critical escape route**, enabling locals to reach safer, unaffected areas. As part of the **JTFRP initiative**, the road underwent significant upgrades to restore its functionality and ensure long-term resilience against future floods.

3.1.2 Road Upgrades & Improvement

The up gradation of the **Amberpora to Haritar Road** involved extensive work to improve road safety, enhance flood resilience, and accommodate increased traffic. The completed upgrades include:

➢ **WIDENING & STRENGTHENING:**

- The road was widened from **3.65 meters** to **5.5 meters** to support higher traffic volumes, particularly for commercial vehicles.
- **Embankments** were extended, and **retaining walls** and **toe walls** were built to prevent erosion and safeguard the road's structure.

➢ **RAISING LOW-LYING AREAS:**

- Sections prone to flooding were **raised** ensuring they remain accessible during future flood events. The low lying section of the existing pavement was also raised in order to meet the FRL of new constructed triple cell box culvert between **RD 1+400 & RD 2+450.**

➢ **DRAINAGE WORKS:**

➢ **Cross Drainage Structures:**

- New culverts and cross-drainage structures were constructed to efficiently manage surface water flow, directing excess runoff towards Wular Lake to minimize the risk of flooding.
- Specifically, a **single-cell box culvert** was constructed at **RD 1+350**, and a **triple-cell box culvert** at **RD 2+300**, to enhance drainage capacity and prevent future water logging or flood-related issues.

➢ **Longitudinal Drains:**

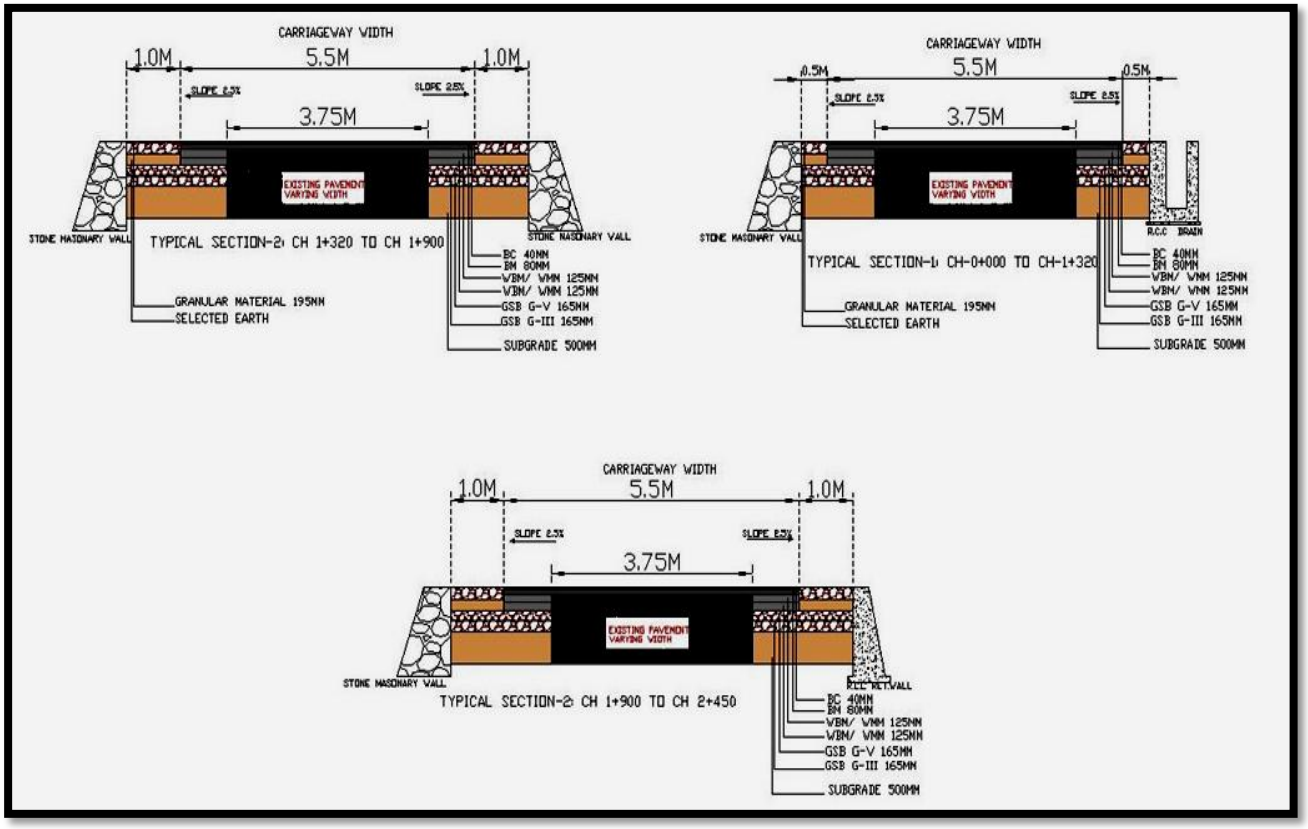
- A **longitudinal surface drain cum irrigation canal**, measuring **1,100 meters in length**, was constructed from **RD 0+000 to RD 1+150**.
- This system was designed to effectively channel surface runoff while simultaneously providing irrigation to adjacent **paddy fields and apple orchards**, supporting both flood mitigation and agricultural needs

➢ PROTECTION WORKS:

- Protection and retaining walls were constructed to prevent soil erosion, safeguard the road from further degradation, and support the embankments along raised sections of the roadway.
- **Stonemasonry toe wall**, totaling 925 meters in length, was built from **RD 1+150 to RD 1+725 and RD 1+900 to RD 2+250**, on both sides of the road.
- R**einforced cement concrete** (R.C.C.) retaining wall, with a total length of 550 meters, was constructed from **RD 1+725 to RD 1+900 and from RD 2+250 to RD 2+45**

➢ PAVEMENT COMPOSITION:

- **Sub-base and base layers:** The road foundation comprises GSB (Granular Sub-base) and WMM (Wet Mix Macadam) layers to enhance structural integrity. A 165 mm layer each of GSB Grade-III and GSB Grade-V was laid, followed by 250 mm of Wet Mix Macadam applied in two layers to strengthen and improve the structural stability of the pavement.
- **Surface Layers:** BM (80mm) **and** BC (40mm) **were applied to ensure a resilient and smooth driving surface.**



3.1.3 Conclusion

The up gradation of the Amberpora to Haritar Road has substantially enhanced regional infrastructure, improved flood resilience, and ensured safer, more efficient connectivity for local communities. Through strategic widening, pavement strengthening, elevation of flood-prone stretches, and the integration of robust drainage and protection systems, the project has addressed long-standing vulnerabilities that hindered socio-economic growth.

Now capable of supporting increased traffic volumes—including commercial vehicles the road facilitates smoother transit, reliable access to markets and services, and sustained development of surrounding villages. This intervention not only restores a critical transport link but also serves as a model of resilient infrastructure under the Jhelum-Tawi Flood Recovery Project (JTFRP).

➢ **KEY FEATURES OF THE COMPLETED UP GRADATION:**

- **Flood Resilience:** Raised carriageway and advanced drainage solutions minimize future flood risks and ensure year-round accessibility.
- **Wider Carriageway:** Upgraded to a 5.5-meter intermediate lane, enhancing capacity and traffic movement.
- **Durable Pavement Structure:** Incorporation of multi-layered pavement—comprising GSB, WMM, BM (80 mm), and BC (40 mm)—ensures long-term structural performance and surface quality.
- **Safety Enhancements:** Installation of R.C.C. retaining walls and stonemasonry toe walls to prevent erosion and support embankments.

3.2 Widening/Up gradation of Halmulla-Punchpora to Kralkut Road in District Anantnag

3.2.1 Project Overview & Necessity

The **Halmulla-Punchpora to Kralkut Road**, stretching over approximately 3.35 kilometers, starts at **Halmulla** (RD 0) and terminates at **Kralkut** (RD 3.35). This road serves as a **major connecting link** between several villages, including **Halmulla**, **Punchpora**, and **Kralkut**, while also benefiting neighboring areas such as **Marhama**, **Sirhama**, **Wopzan**, and **Khiram**.

This road, categorized as a **Rural Road (VR)**, is vital for the movement of people and goods, with a significant population depending on it. During the **2014 floods**, the elevated section of the road, which connects villages at higher altitude served as an **escape route** for many local residents seeking higher ground while as the lower stretches were submerged.

Prior to its upgrade, the road was in a severely deteriorated condition, characterized by potholes, ruts, cracking, raveling, and washouts, all consequences of the devastating 2014 floods. The pavement was insufficient, drainage was poor, and frequent inundation during rains made travel difficult. This vital corridor served the local agrarian population, who relied on it for access to markets, healthcare, and educational institutions in Anantnag and Bijbehara.

The **DPR (Detailed Project Report)** proposed the up gradation of the road by:

- **Widening** it from approximately **3.35 meters** to **3.75 meters**
- **Black topping** with **0.5 meter hard shoulders** on both sides
- Construction of necessary **cross-drainage** works and **retaining structures** at various points

Key reasons for up gradation under JTFRP include:

- **Post-Disaster Restoration:** The 2014 floods caused extensive damage, necessitating reconstruction for continuity of services.
- **Connectivity Enhancement:** This road connects multiple villages to NH-44, ensuring better access to public infrastructure.
- **Public Health & Education:** Acts as the primary route to hospitals, schools, and government offices.
- **Economic Lifeline:** Facilitates the movement of horticultural produce and daily goods to Anantnag and Srinagar.

3.2.2 Road Upgrades & Improvements

The up gradation and widening of the Halmulla–Punchpora to Kralkut Road was executed with a focus on structural durability, safety, and climate resilience. The following key interventions were carried out:

➢ **WIDENING & STRENGTHENING:**

- The carriageway was widened from approximately 3.35 meters to 3.75 meters.
- 0.5-meter hard shoulders were added on both sides, resulting in a total roadway width of 4.75 meters.

➢ **CROSS DRAINAGE WORKS:**

- Several new cross-drainage structures were constructed.
- Specifically, four **single-cell box culverts** were constructed at **RD 0+757, RD 1+210**, **RD 1+300** and at **RD 1+820**, to enhance drainage capacity and prevent future water logging or flood-related issues.

➢ **PROTECTION & RETAINING STRUCTURES:**

- Retaining walls and toe walls were built along vulnerable sections to prevent erosion and landslides.
- R**einforced cement concrete** (R.C.C.) retaining wall, with a length of 100 meters, was constructed from **RD 0+200 to RD 0+300** and around 400 meters **from RD 2+000 to RD 2+400**

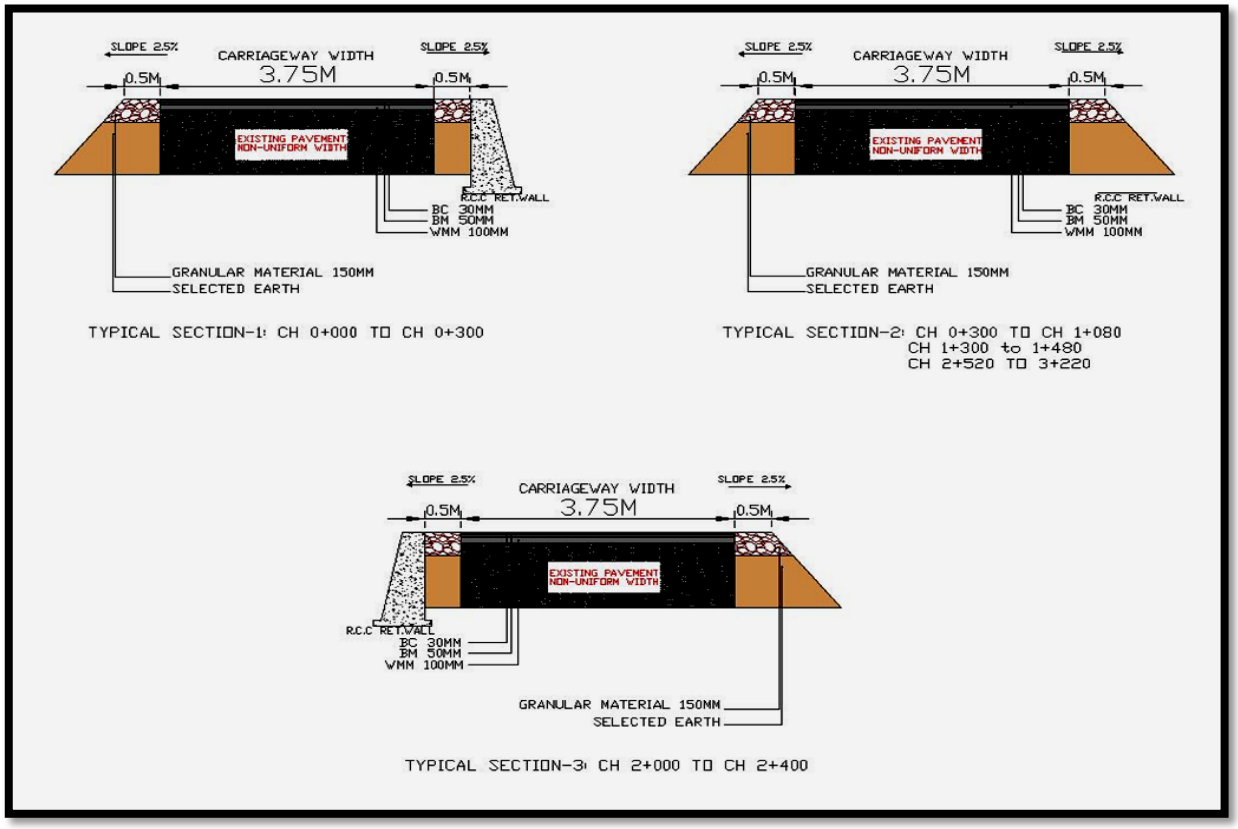
➢ **PAVEMENT COMPOSITION:**

The pavement was designed as per IRC 72 (2015) standards for a projected load of 1.5–2 MSA, upgraded with the following composition:

- **Bituminous Concrete (BC) – 30 mm**
- **Bituminous Macadam (BM) – 50 mm**
- **Wet Mix Macadam (WMM) – 100 mm**

➢ **ROAD SAFETY FEATURES:**

- Installation of total **18 road signage boards** in compliance with IRC:67-2001
- Thermoplastic lane markings as per IRC:35-1997
- Retro-reflective boards and delineators at critical curves
- Hard shoulders were stabilized and appropriately dressed.



3.2.3 Conclusion

The widening and up gradation of the Halmulla–Punchpora to Kralkut Road have markedly improved regional connectivity, road safety, and climate resilience. With enhanced cross-drainage systems, structurally reinforced pavement, and protective retaining works, the project has established a durable and reliable transportation corridor in this flood-prone region.

This infrastructure upgrade has directly benefited thousands of residents by reducing travel time, improving year-round access to essential services, and facilitating stronger economic linkages—particularly for the region's agrarian communities. The intervention exemplifies effective post-disaster recovery under the JTFRP, contributing to long-term socio-economic revitalization in rural Kashmir.

➢ **KEY FEATURES OF THE COMPLETED UP GRADATION:**

1. **Carriageway Widening:** From ~3.35 m to 3.75 m with 0.5 m shoulders on each side.
2. **Durable Pavement:** Multi-layered pavement structure ensures longevity.
3. **Drainage & Protection:** Four new single cell box culverts and retaining structures safeguard against erosion and water logging.
4. **Safety Features:** Signage, markings, and parapet walls enhance user safety.
5. **On-Time Delivery:** Completed in ₹4.98 Cr within two working seasons without delays.

3.3 Construction/Upgradation of Malangpora, Chakora, Chowdhary Bagh, Litter Road Including Naina Chakora Tahab Road in District Pulwama (3.216 Kms)

3.3.1 Project Overview & Necessity

The Litter–Chowdarybagh–Chakoora Road in Pulwama District spans a length of approximately 3.216 kilometers and forms a key rural arterial road that connects the settlements **Litter, Aglar, Niloora, Tahab, Chakoora, Chowdhary Bagh, Naina, Panzgam, Koil, and Malangpora**, benefiting around **25,000 residents directly**, with thousands more in surrounding areas. This corridor plays a crucial role in ensuring accessibility to Pulwama town and major institutions like the District Hospital, educational centers, and agricultural markets. The surrounding area, primarily agrarian, depends heavily on this road for the movement of goods, services, and commuting workers.

Prior to its up gradation, the road suffered from narrow width, surface deterioration, inadequate drainage, and absence of protection works. The 2014 floods further compromised its usability, submerging large stretches and washing away critical road segments.

➢ **PRE-EXISTING ROAD CONDITIONS:**

- **Pavement:** 3.3 **meters** - **3.75 meters** width, with sections in very poor condition due to **potholes**, **depressions**, and **undulations**.
- **Cross Drainage:** The road features two minor bridges and five culverts, most of which are in a dilapidated state.

➢ **Key reasons for taking up this road under JTFRP include**:

- **Post-Flood Recovery:** The 2014 floods rendered the road almost unusable, cutting off access to essential services.
- **Economic Relevance:** Local farmers use this route to transport fresh produce to Pulwama mandi and Srinagar markets.
- **Public Demand:** Local communities had long sought proper widening, drainage, and surface treatment.
- **Emergency Access:** The road is a primary link for medical emergencies and disaster response in southern Kashmir.

3.3.2 Road Upgrades & Improvement

The up gradation under JTFRP was aimed at enhancing road geometry, structural performance, and resilience to weather-related risks. Major works included:

➢ WIDENING AND STRENGTHENING:

- Existing road width enhanced to standard single lane specifications (3.75 meters).
- Shoulders of width 0.5m provided on either side to ensure safe edge movement.

➢ PAVEMENT DESIGN:

- **From Section 0+00 to 1+660 (Strengthening and Reconstruction)**:

- Sub grade thickness: **300mm**
- Granular Sub Base (GSB) layers: **130mm (Grade V)** and **135mm (Grade III)**
- Wet Mix Macadam: **125mm** (Layer I), **100mm** (Layer II)
- Bituminous Macadam (BM): **50mm**
- Bituminous Concrete (BC): **30mm**

- **From Section 1+660 to 3+216 (Overlay with Top Layer):**

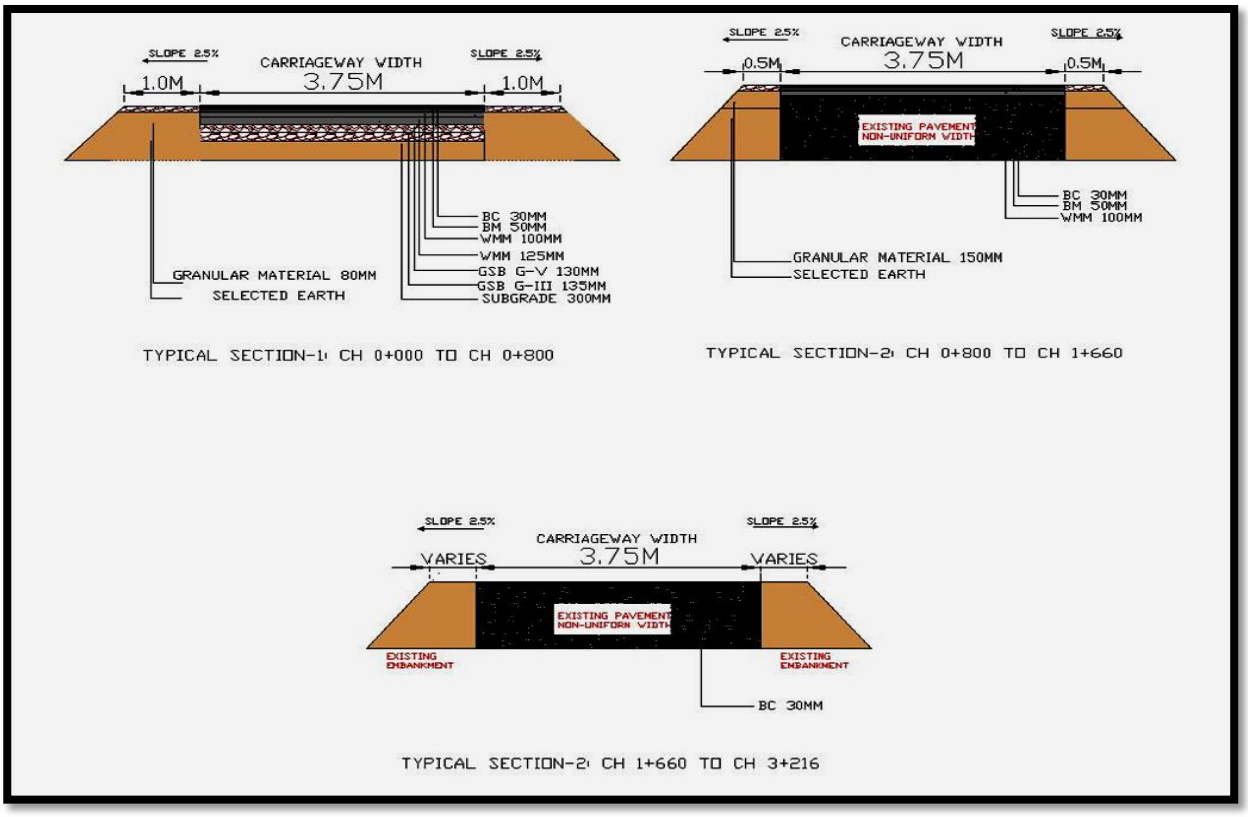
- Only **30mm Bituminous Concrete (BC)** overlaid on existing pavement, based on the **Benkelman Beam Deflection (BBD)** results.

➢ CROSS DRAINAGE WORKS:

- **02 Box Culverts:** Replacement and upgrading of existing culverts to handle seasonal agricultural drainage needs. The damaged structures were replaced with 02 No single cell Box Culverts at RD 0+800 and RD 0+950.

➢ ROAD SAFETY MEASURES:

- **Road Signs:** Compliance with **IRC: 67-2001** for road signs (e.g., direction, hazard, speed limit). In total **08 signage** boards were installed on the road.
- **Road Markings: Thermoplastic markings** in line with **IRC: 35-1997**.
- **Retro-reflective Information Boards:** To ensure visibility and safe navigation, especially at night.



3.3.3 Conclusion:

The Widening of Litter–Chowdarybagh–Chakoora Road has transformed mobility for rural Pulwama, especially for the farming community benefiting more than **25,000 residents** and thousands more indirectly, improving their daily lives. The project has drastically improved connectivity to markets and health facilities and ensured flood resilience through upgraded drainage. The completed works have established an all-weather corridor for surrounding villages, boosting social and economic integration.

This project under JTFRP illustrates effective post-flood infrastructure rebuilding in a vulnerable and economically active region.

➢ KEY FEATURES OF THE COMPLETED UP GRADATION:

1. **Widened Road Geometry:** Carriageway enhanced to standard single lane 3.75 meters with 0.5 meter wide shoulders on either side.
2. **Strengthening of Pavement:** Pavement strengthening by way of reconstruction of entire road pavement from RD 0+00 To RD 1+660.
3. **Improved Cross Drainage:** Construction of 02 no box culverts improved the carrying capacity of water to mitigate the floods.
4. **Safety Compliance:** Standard road furniture and markings ensure safer travel.
5. **Timely Completion:** Delivered within budget and schedule by JKPCC.

4. IMPACTS

1. Under the Jhelum Tawi Flood Recovery Project (JTFRP), the up gradation of three vital rural corridors — Amberpora–Haritar, Halmulla–Punchpora to Kralkut, and Litter–Chowdarybagh–Chakoora — has significantly improved regional connectivity, economic mobility, and disaster resilience in Kashmir Valley. These roads, serving over 75,000 rural inhabitants, were earlier vulnerable to seasonal floods and chronic deterioration. Their reconstruction has re-established safe, all-weather access to markets, schools, healthcare, and emergency services.
2. Improved connectivity has eased access between rural settlements and economic centre for example, connecting Sopore with Amberpora, and Pulwama town with its surrounding fruit-growing areas.
3. Remote villages now have uninterrupted year-round access to key services including schools, hospitals, and local markets.
4. Faster and safer commutes have enabled better social inclusion, particularly benefiting women, children, and the elderly.
5. Access to orchards and agricultural belts has been enhanced, reducing post-harvest losses and enabling direct field-edge loading of produce such as apples, pears, and walnuts.
6. Local economies have seen a boost through improved movement of goods and services, reduced transport costs, and better support for rural logistics.
7. Standardized carriageway widths, hard shoulders, and reinforced retaining walls have enhanced road safety and traffic flow across all corridors.
8. Drainage improvements including longitudinal and cross-drains, elevated road profiles, and culverts have made these roads resilient to flooding and water logging.
9. All works were completed within the approved cost and timeframe, with minimal disruption to local communities.
10. Strong field coordination, particularly by JKPCC and PMU, contributed to high levels of community satisfaction and smooth execution.

5. LESSONS LEARNT

1. Execution was aided by ground-verified data in DPRs, which reduced redesign and rework. However, the incomplete DPRs led to delays, emphasizing the need for fully finalized and validated DPRs before implementation.
2. Effective road drainage required integration with natural streams and existing municipal systems and proper disposal, underscoring the need for hydrologic analysis beyond standard designs.

3. Utility conflicts during construction, such as in Litter, highlighted the need for accurate mapping and demarcation of irrigation and water supply lines during the planning phase.
4. Pre-construction coordination with relevant departments helped resolve clearance, access, and service alignment issues before they escalated on site.
5. Involving some line departments early helped align road plans with regional development goals. However, not all departments were engaged during the planning stage, highlighting the need for broader coordination from the outset
6. Continuous capacity building and staff continuity within PIUs and PMU played a critical role in maintaining quality control and project momentum across multiple seasons.
7. Retention of skilled engineering and planning personnel allowed consistent supervision, quicker decision-making, and fewer delays.
8. Regular site visits, technical assistance to JKPCC engineers, and independent quality audits by the TAQAC team significantly strengthened the institutional capacity of executing agencies. These efforts ensured adherence to quality standards, promoted good engineering practices, and contributed to long-term sustainability of infrastructure delivery.

END OF REPORT

ANNEXURE

COMPLETION CERTIFICATES