



# Road Maintenance Project Dhan Khola-Lamahi Road Section, 40Km

“Pavement FDR design and Superpave Implementation”

Date: 27 March 2024



## Project Definition/Scope

- The “Road Maintenance Project” (RMP) is part of the Millennium Challenge Corporation’s (MCC) Compact with the Government of Nepal (GoN), signed on the 14th of September 2017.
- RMP Objective: Maintain road quality of SRN by using new technology for pavement strengthening such as FDR and Superpave in Nepal including improved traffic safety
- Dhan Khola Lamahi Road Section (DLRS) constructed in 1985, resurfacing (Double Bituminous Surface Treatment (DBST)/Bituminous carpeting) has been conducted thereafter.
- International Road Assessment Programme (iRAP) recommendation: Countermeasures to improve safety “Star” rating to at least a 3-Star or higher
- Recommended road width: International Road Assessment Programme (iRAP) assessment and DOR geometric standard for Highway- 7m carriageway with 2.5m shoulders.
- **Improves roughness (Key performance indicator):** The target International Roughness Index (IRI) is 1.2 to 1.7 m/km. Below 1.2 m/km is subjected to bonus and above 1.7 m/km is subjected for penalty/rework as required.





## Project Implementation Arrangement

- MCA-Nepal: as the implementation agency, tasked with implementing and monitoring both civil works and environmental and social mitigation measures
- MCC: will provide oversight and support to MCA-Nepal throughout the project's implementation.
- Department of Roads (DoR): will oversee the design and implementation of the works and will ultimately take charge of the road upon its completion.
- Supervising Consultant Engineer: will supervise the works and the environmental and social mitigation measures; they report to DOR/MCA-N;
- Contractor: performs all construction activities, including environmental and social safeguards.

Once the Defect Notification Period (DLP) is concluded, the road section will be transferred to the Department of Roads.



## Specific Construction Measures or Technologies

- First time in Nepal: Full Depth Reclamation (FDR), an innovative and cost-effective road construction technology.
  - involves recycling existing pavement materials;
  - process involves applying and uniformly mixing Portland or mix of cement and water, followed by compaction using padfoot, smooth drum, and/or pneumatic-tired rollers
  - followed by shaping with motor graders, and ensuring proper curing until full strength
  - Depth of pulverization is 250mm and 300mm.
  - followed by the application of two layers of Superpave.
- First time in Nepal: Superpave
  - Longer lasting asphalt pavements compare to normal asphalt concrete
  - Better consideration of climate,  $-22^{\circ}$  to  $+76^{\circ}$  C (Bitumen grade: PG76H-22)
  - Customizable as per site





## Specific Construction Measures or Technologies

### FDR and Superpave - Why these technologies

#### ➤ FDR

- ✓ Recycles and reuse
- ✓ Makes use of local binder – cement
  - Avoids import and use of Nepal product
- ✓ Produces a stronger base
- ✓ Base not sensitive to moisture fluctuations
- ✓ Can stabilize soils as well as granular materials



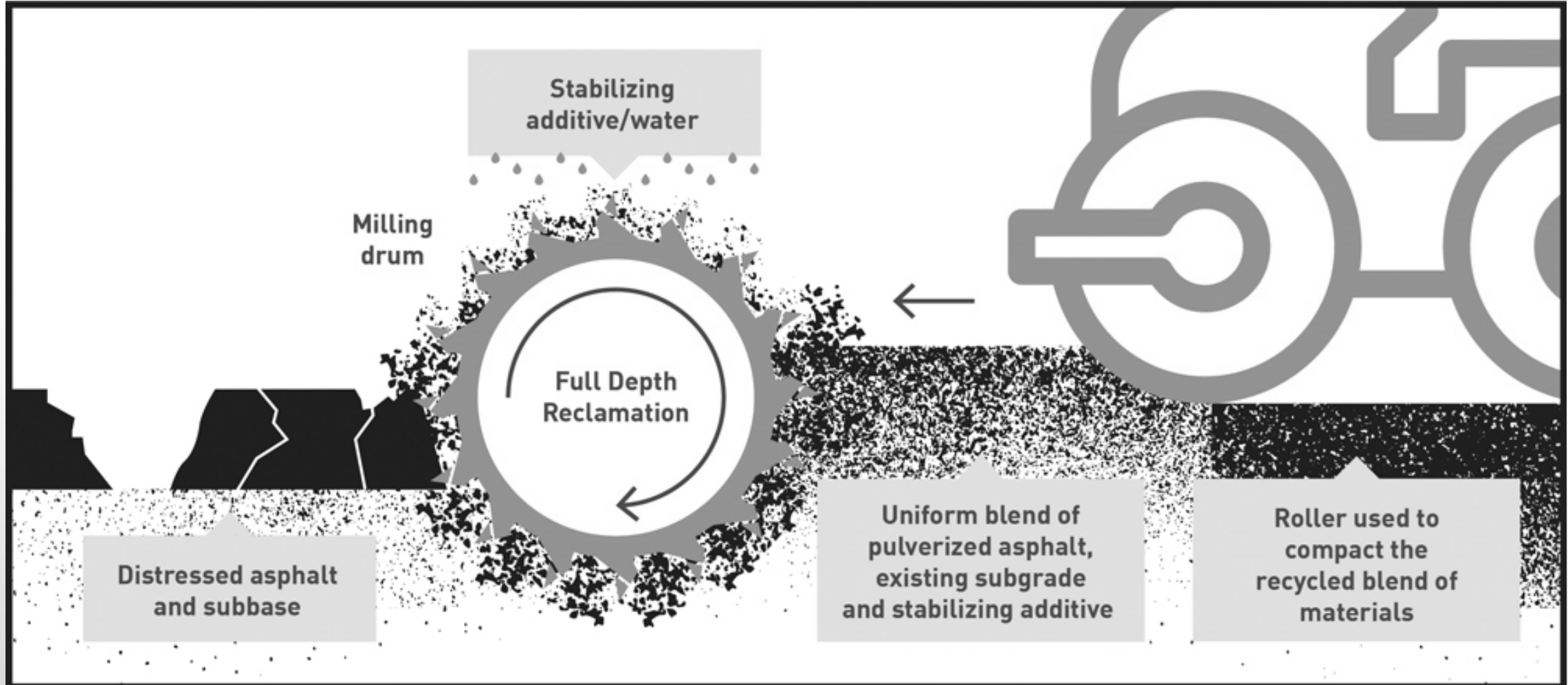
#### ➤ Superpave

- ✓ Longer lasting asphalt pavements
- ✓ Further develops viscosity based specifications
- ✓ Better consideration of climate
- ✓ Balanced mix design concepts and on site performance testing





## Specific Construction Measures or Technologies



Full Depth Reclamation Process



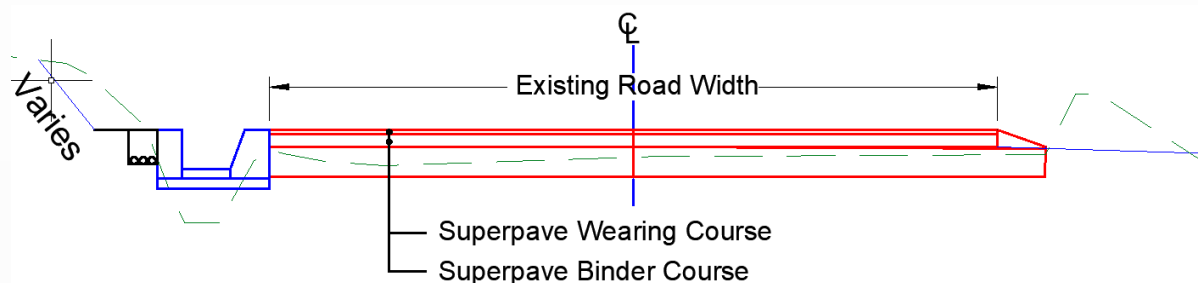
## Road Design Details

- Carriageway of 7m and shoulder width of 2.5m. In case of Wide Centre Line Treatment (WCLT) section, Shoulder width will be 2.25m
- Lane separation by providing WCLT of 0.5m to reduce head-on collision **at hilly terrain and 5 semi-urban** areas namely Pakhapani, Pipari, Sishaniya, Narti and Bankatti.
- Avoidance of extensive cutting of fragile slopes as recommended by geotechnical expert/geologist.
- 2-urban areas (Bhalubang and Lamahi) proposed for service lane with medians.
- Improvement of 2 major junctions at Bhaluwang and Arjun Khola. In Arjun Khola, roundabout is proposed.
- Access Road Improvement: length of 15m with DBST
- Drainage improvement by means of extension, replacement and new culverts and side drains
- Improvement of road safety, road markings, barriers, rumble strips and signage
- 650mm wide space at hill side for Utility Duct for Optical Fiber Cables

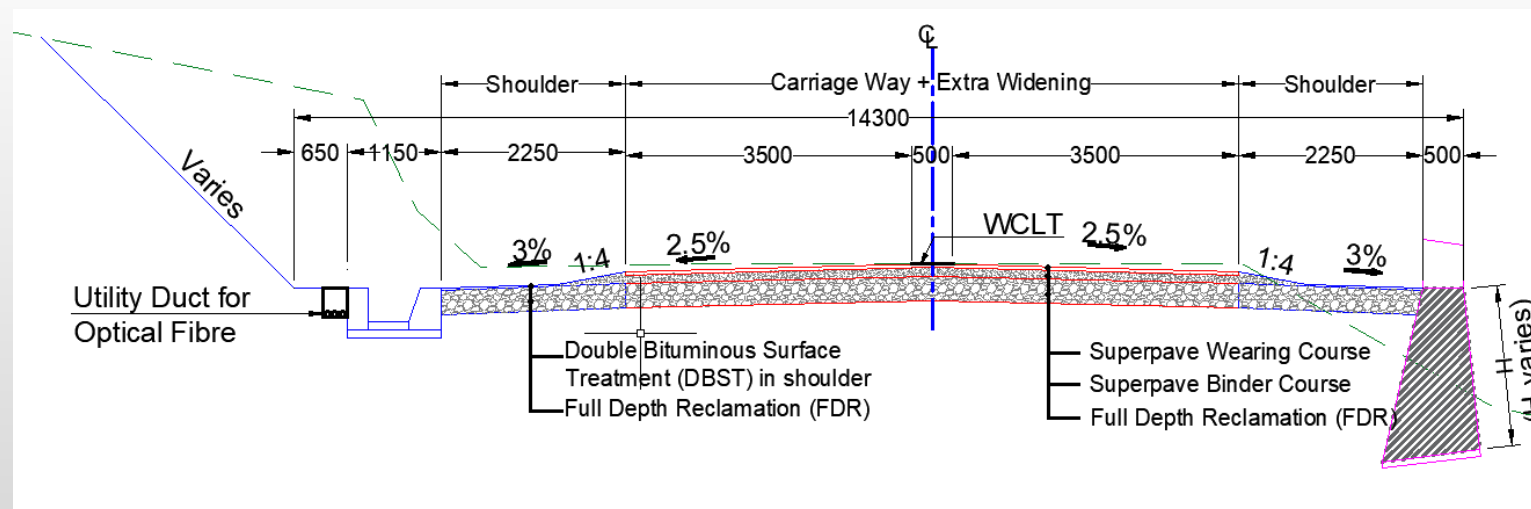




# Road Design Details



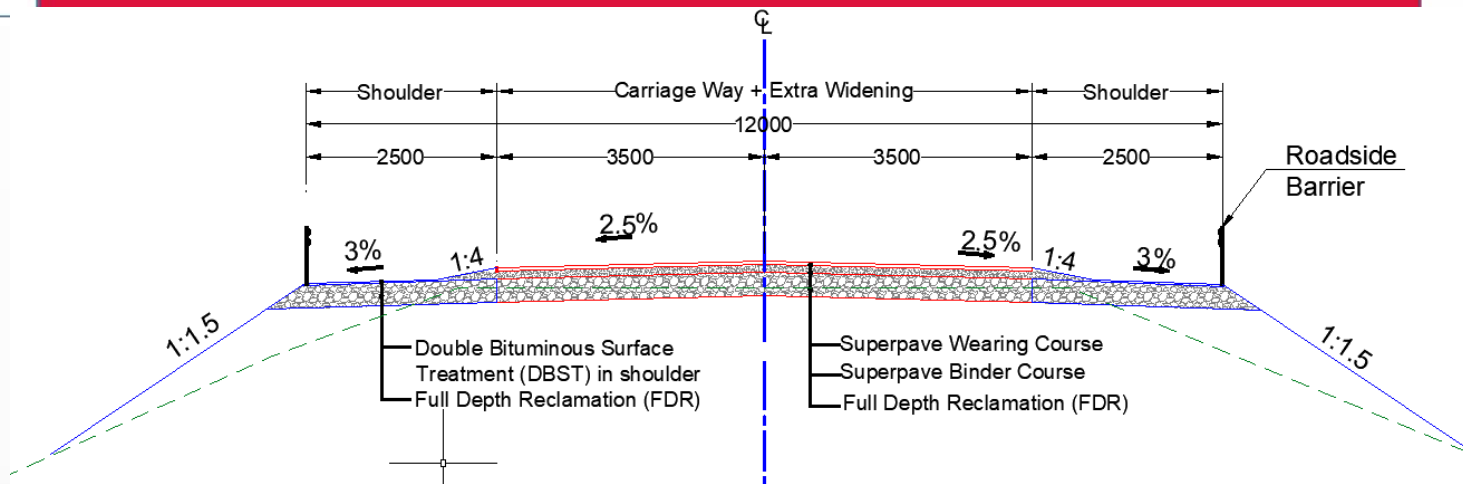
Typical X-section at Dhan Khola Bazaar Area (720m)  
(From Km 676+000 to Km 676+720)



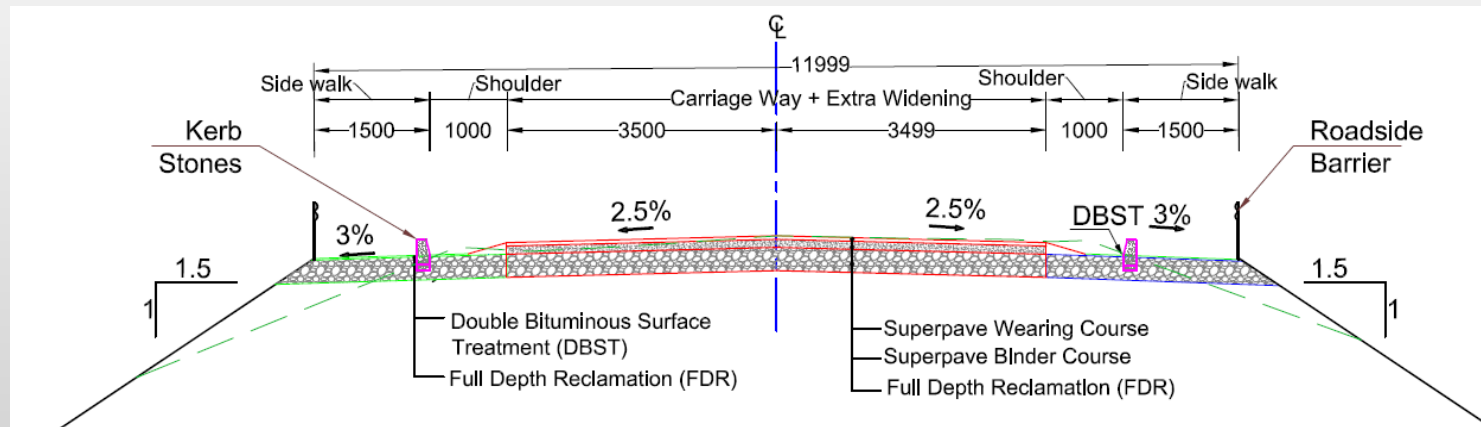
Typical X-section for hilly section with WCLT  
(From Km 676+720 to Km 688+067)



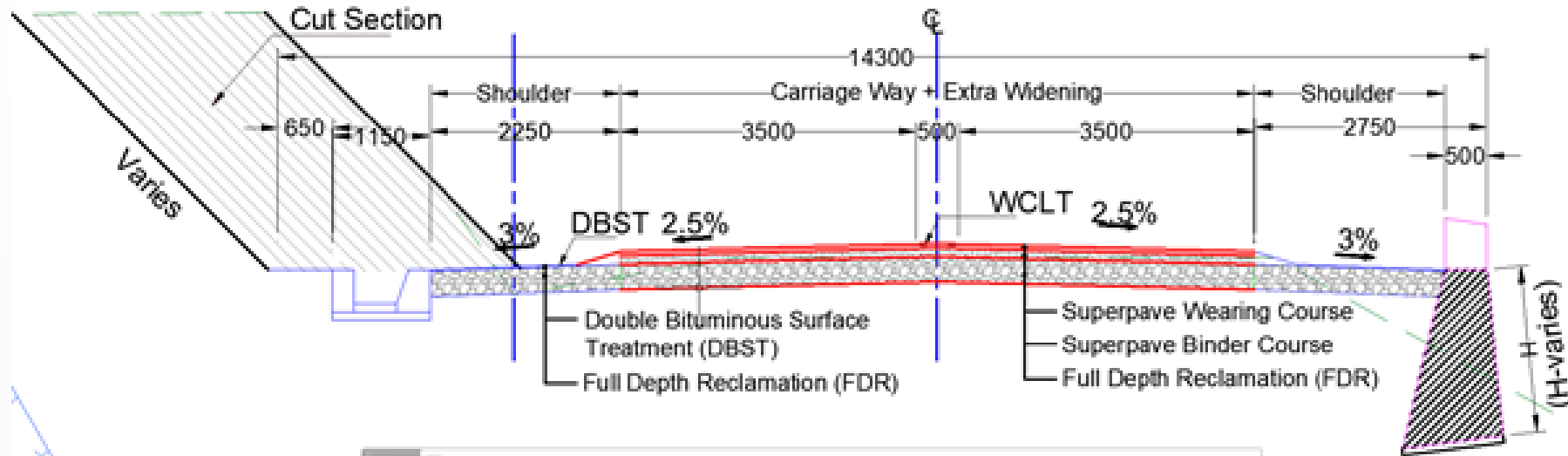
# Road Design Details



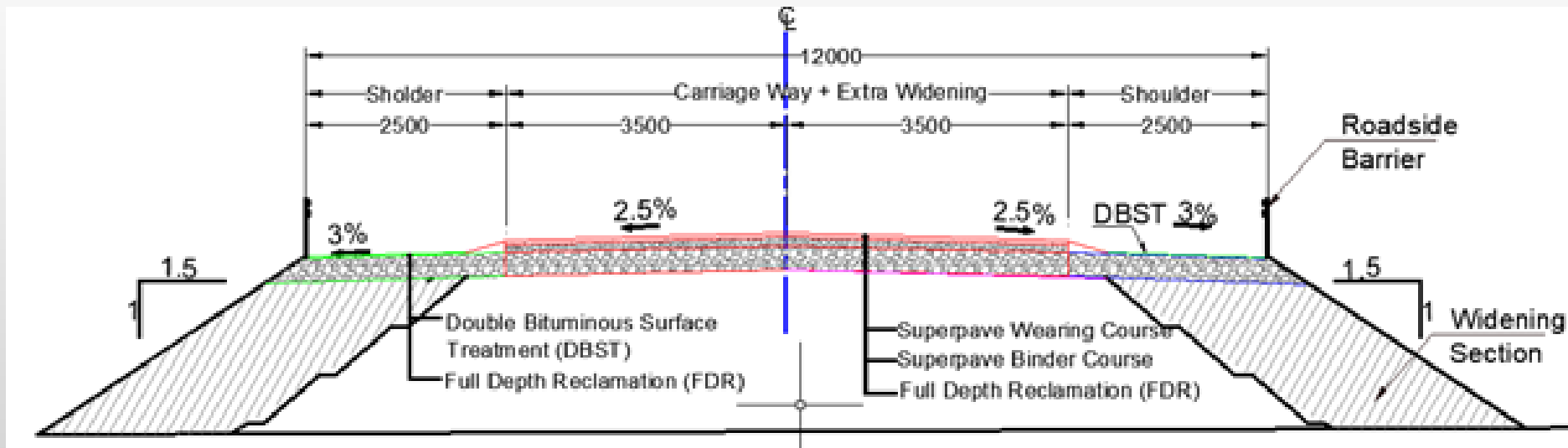
Typical X-section of plain/flat rural section- Bhalubang to Lamahi  
(From Km 688+067 to Km 714+985)



Typical Section showing Provision of Sidewalk



Typical Section: Hilly Section with widening



Typical Section: Plain Rural Section with widening



Proposed 12m road width, **Dhankhola-Bhalubang Section**, Existing avg. road width-6m



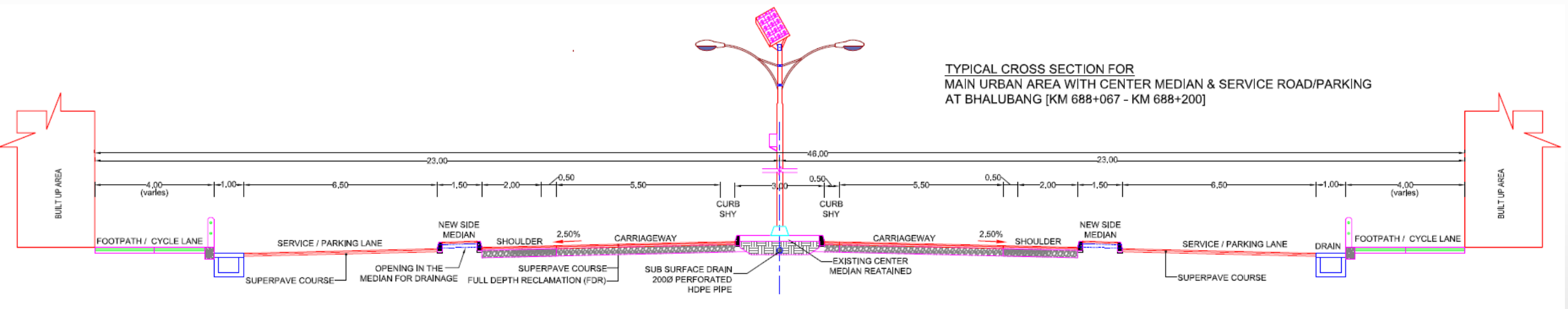


Proposed 12m road width, **Bhalubang-Lamahi Section**, Existing avg. road width-6m





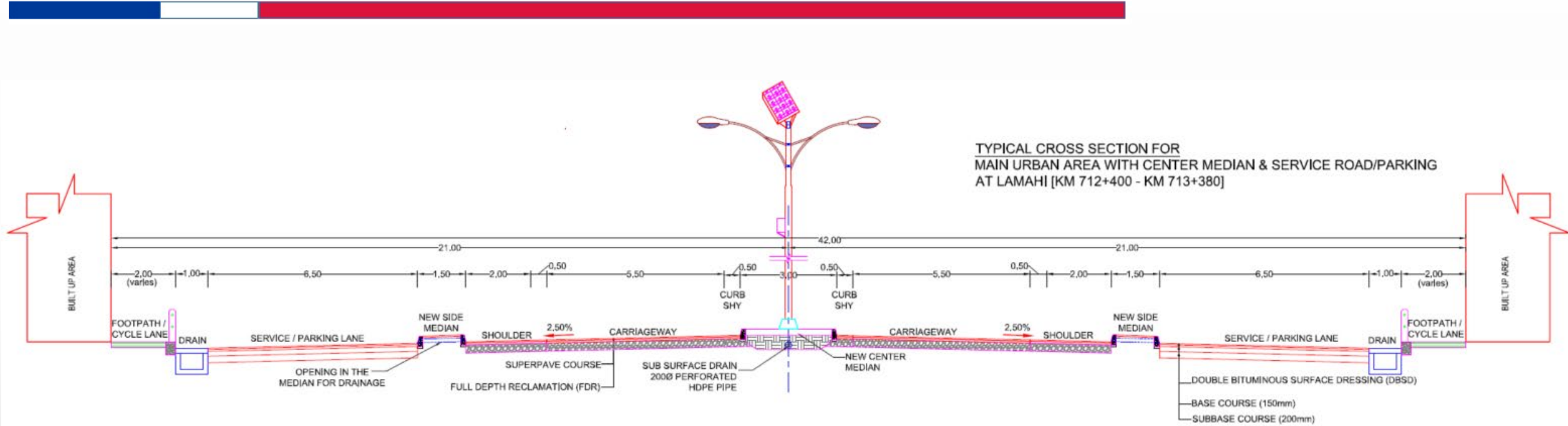
# Road Design Details



Typical Section: Plain Major Urban Area at Bhalubang



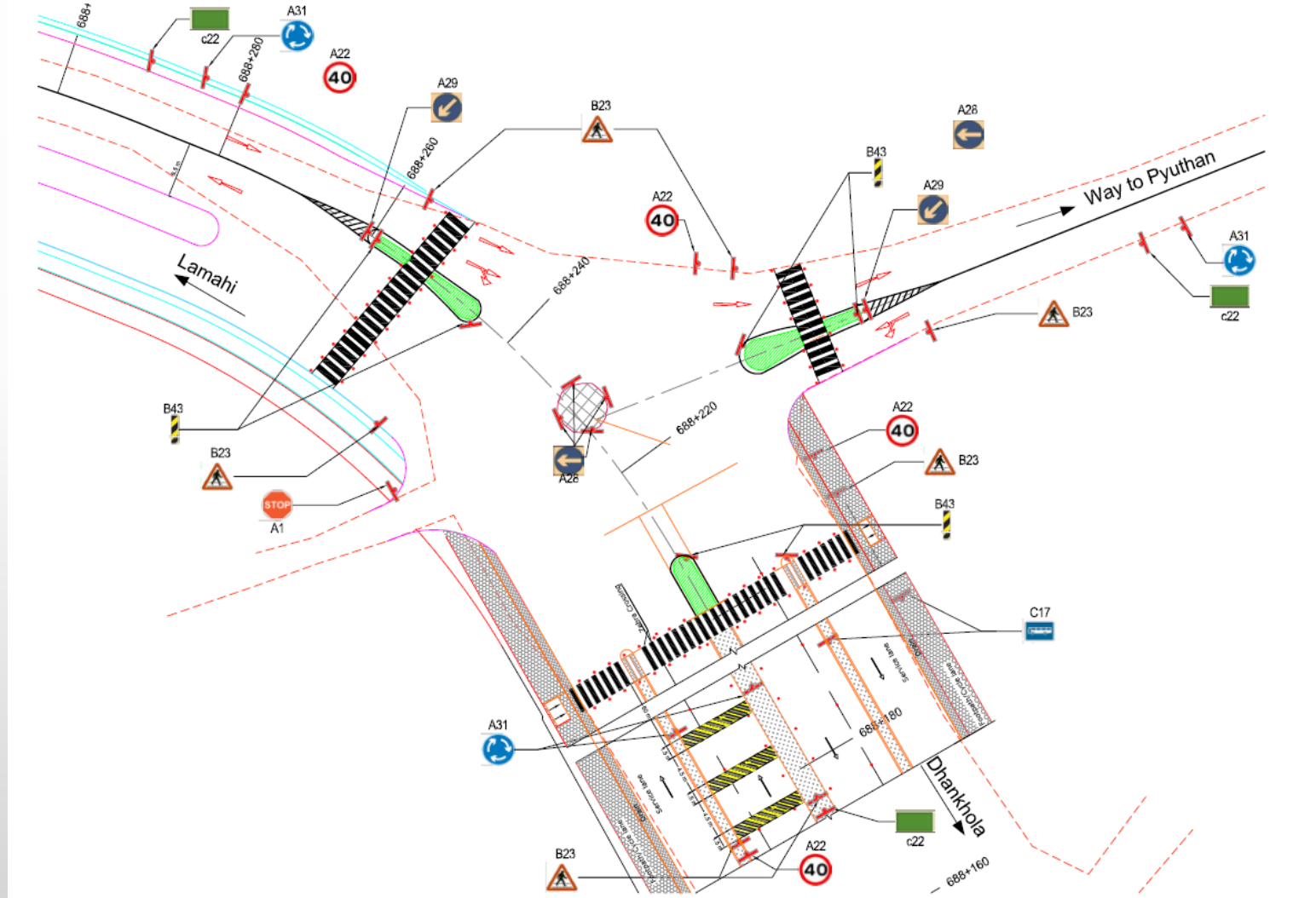
# Road Design Details



Typical Section: Plain Major Urban Area at Lamahi



# Road Design Details

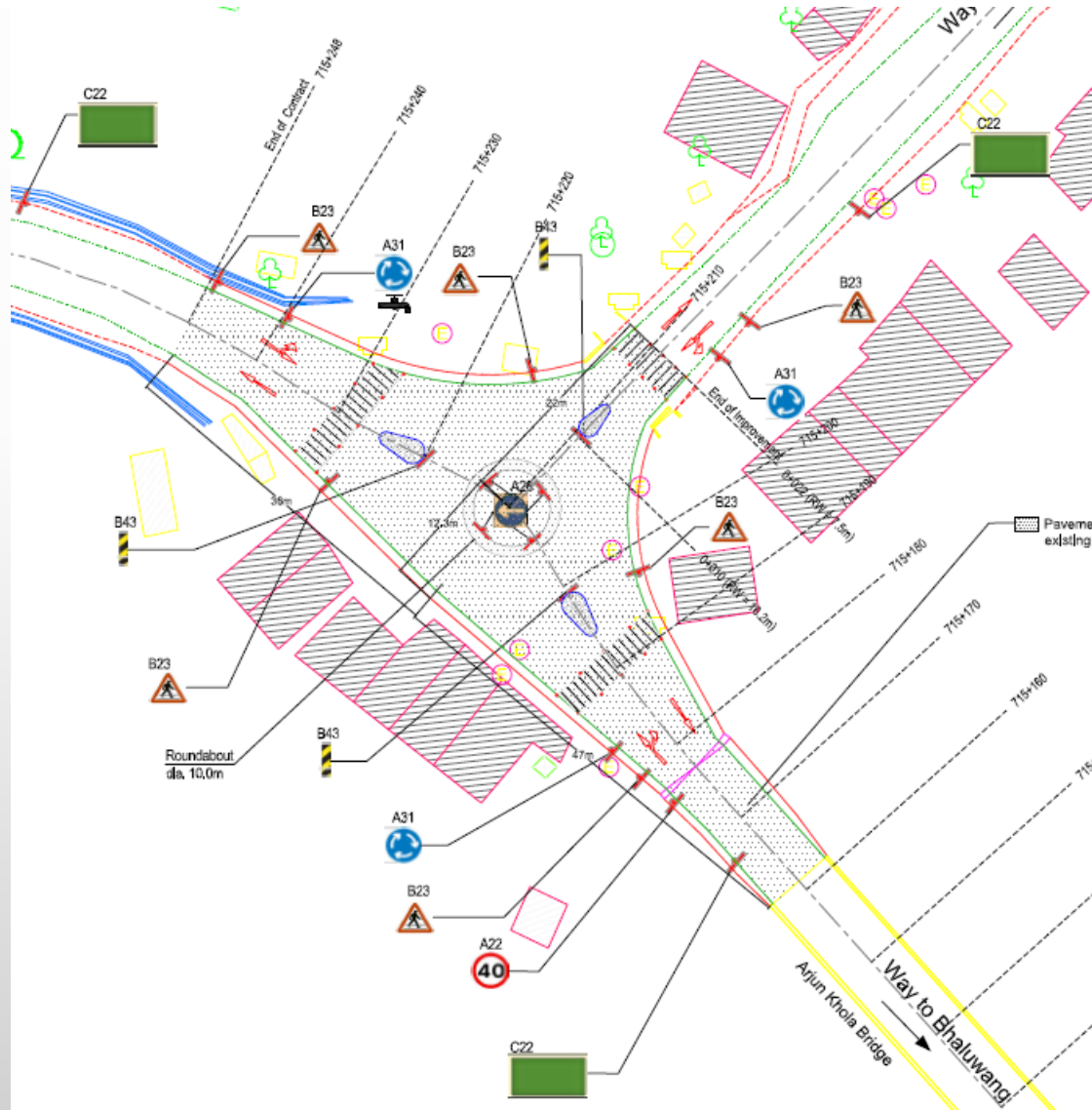


Junction Improvement at Bhalubang





# Road Design Details



Junction Improvement at Arjun Khola



## Road Design Details

<b>Retained</b>	<b>Retained and Extended. Extension usually 2 m at each side of the existing structure</b>	<b>To be Replaced with RCBC due to hydraulic or structural reasons</b>	<b>Total</b>
6	76	6	88

### Details of Slab Culvert Improvement

<b>Retained</b>	<b>Retained and Extended. Extension usually 2.50 m at each side of the existing structure</b>	<b>To be Replaced due to hydraulic or structural reasons.</b>		<b>Other: Add new, rebuild, remove</b>	<b>Total</b>
		PC	BC		
6	28	74	10	4	122

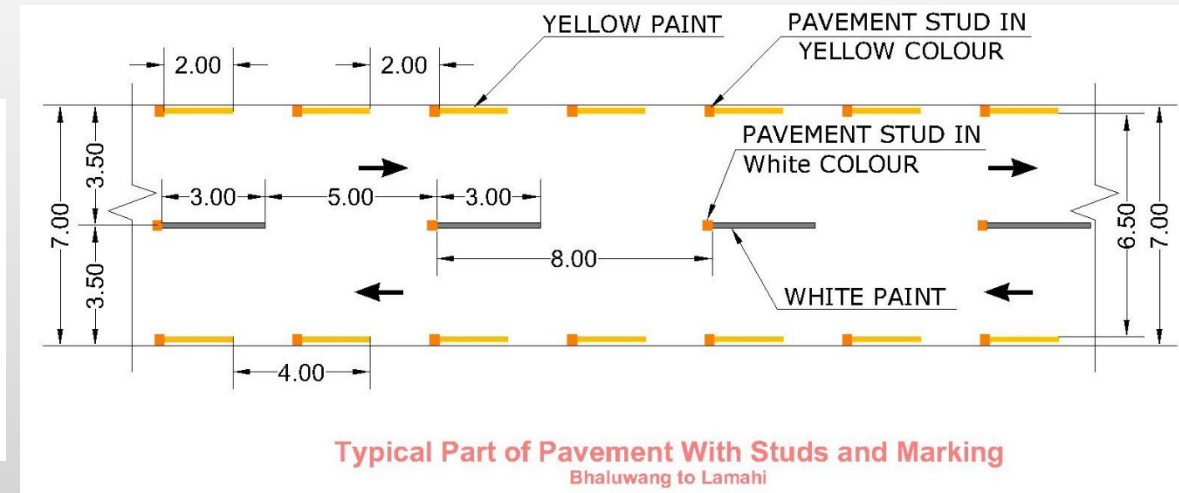
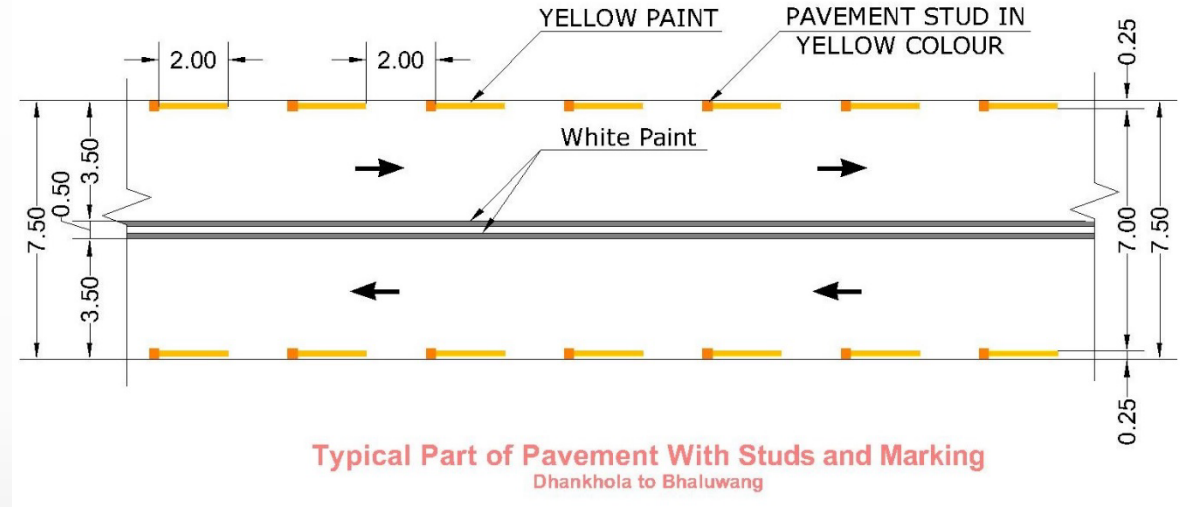
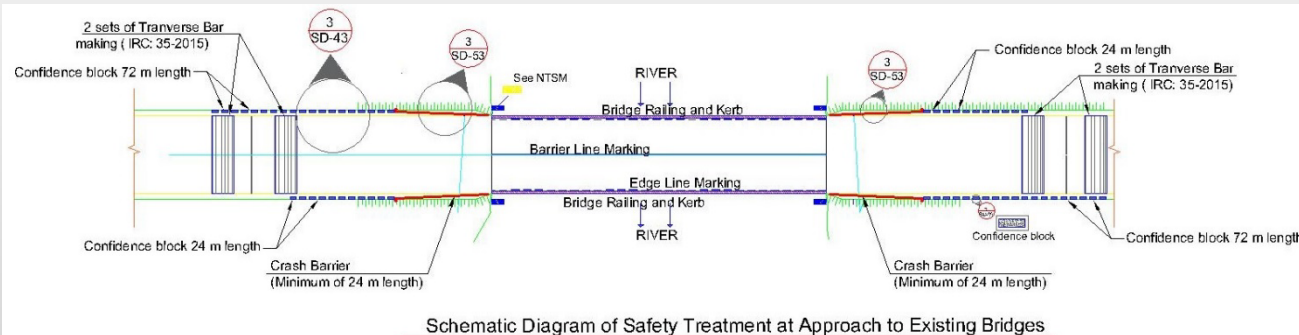
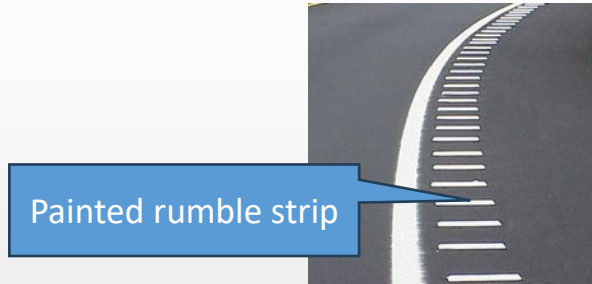
### Details of Pipe Culvert Improvement



# Road Design Details

## Traffic Safety

- Provision of road marking and traffic signs as per DoR Traffic Signs Manual Vol. 1 & 2
- Provision of painted rumble strip at pedestrian crossings at settlement areas.
- Provision of crash barriers at sharp curves along with Chevron.
- Road studs
- Safety element at bridges





## Road Design Details

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- **Repair and Maintenance of Bridges and Slab Culverts**
  - No widening to 24 nos. of bridges (Avg. width is 7.0m)
  - Repair and Maintenance of bridge's bearings and other elements such as railings, deck slabs, curb stones, painting, drainage spouts, expansion joints, crack sealing and provision of minor river training works.
  - Safety features at approach to the bridges



## Construction & Implementation Schedule

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- Tendering and Procurement: 6 months
- Construction Period: 24 months
- Project Monitoring and Evaluation: Defects Notification Period 12 months
- Project Operation stages – road will run for 15 years before need for refurbishment.



## WorkPlan Timeline (Road Maintenance Project)

S.N	Task Name	Duration	Start	Finish
1	Procurement of works contractor	187 days	1-Jun-24	4-Dec-24
1.1	<b>IFB Issue (CB red book)</b>	1 day	6-Jul-24	6-Jul-24
1.5	Contractor Site visit	3 days	22-Jul-24	24-Jul-24
1.6	Prebid Conference	1 day	27-Jul-24	27-Jul-24
1.7	Clarification receive	10 days	28-Jul-24	6-Aug-24
1.8	Response to Clarification	15 days	7-Aug-24	21-Aug-24
1.9	<b>Offer submission deadline</b>	1 day	7-Sep-24	7-Sep-24
1.10	Offer evaluation	21 days	8-Sep-24	28-Sep-24
	Offer Evaluation Report (OER) finalized & transmitted to AE/MCC			
1.11		7 days	29-Sep-24	5-Oct-24
1.12	OER approved by AE/MCC	7 days	6-Oct-24	12-Oct-24
1.13	Notification of Evaluation Result (NOTER) issued	1 day	13-Oct-24	13-Oct-24
1.14	Bid Challenge period	7 days	14-Oct-24	20-Oct-24
1.15	Preparation and printing of contract document	7 days	21-Oct-24	27-Oct-24
1.16	Letter of Acceptance	1 day	28-Oct-24	28-Oct-24
1.17	<b>Contract Signing</b>	1 day	13-Nov-24	13-Nov-24
1.18	Contract Commencement	21 days	14-Nov-24	4-Dec-24
2	Construction	1169 days	5-Dec-24	16-Feb-28
2.1	NTP and Contractor Kick Off	14 days	5-Dec-24	18-Dec-24
2.2	Contractor Mobilization	60 days	19-Dec-24	16-Feb-25
2.3	<b>Construction Duration</b>	730 days	17-Feb-25	16-Feb-27
2.4	Defects Notification Period	365 days	17-Feb-27	16-Feb-28



***Fostering economic growth with better access to electricity and roads.***

***Thank you***